TIRZ No. 1 & No. 2 Board of Directors Special Meeting

Dripping Springs City Hall

511 Mercer Street – Dripping Springs, Texas

Tuesday, September 02, 2025, at 4:00 PM

AGENDA

CALL TO ORDER AND ROLL CALL

Board Members

Place 1 Ryan Thomas, Chair
Place 3 Taline Manassian, Vice Chair
Place 2 Jessy Milner
Place 4 Miles Mathews
Place 5 Missy Atwood
Place 6 Susan Kimball
Place 7 Walt Smith
Advisory Member Bob Richardson

Staff, Consultants & Appointed/Elected Officials

City Administrator Michelle Fischer
Deputy City Administrator Shawn Cox
City Attorney Laura Mueller
City Secretary Diana Boone
Maintenance Director Riley Sublett
City Inspector Garrett Osborne
TIRZ Project Manager Keenan Smith, AIA

PRESENTATION OF CITIZENS

A member of the public that wishes to address the Board on any issue, regardless of whether it is posted on this agenda, may do so during Presentation of Citizens. It is the request of the Board that individuals wishing to speak on agenda items with a public hearing hold their comments until the item is being considered. Individuals are allowed two (2) minutes each to speak regarding issues not on the agenda and two (2) minutes per item on the agenda and may not cede or pool time. Those requiring the assistance of a translator will be allowed additional time to speak. Individuals are not required to sign in; however, it is encouraged. Individuals that wish to share documents with the Board must present the documents to the City Secretary or City Attorney providing at least eight (8) copies; if eight (8) copies are not provided, the Board will receive the documents the following day. Audio Video presentations will not be accepted during Presentation of Citizens. By law no action shall be taken during Presentation of Citizens; however, the Chair may provide a statement of specific factual information, recitation of existing policy, or direction or referral to staff.

MINUTES

1. **Consider approval of the August 11, 2025 TIRZ No.1 & No.2 Board meeting minutes.**

BUSINESS AGENDA

2. **Discuss and consider approval of a recommendation to City Council regarding the selection of a bidder for the Stephenson Building and Parking Lot Project and the authorization of staff and the Mayor to finalize agreement with selected bidder.** *Sponsor: Mayor Bill Foulds, Jr.*

3. **Update on the Dripping Springs Community Library Project.** *Missy Atwood, District Board of Trustees President*

CLOSED SESSION

The Board has the right to adjourn into closed session on any item on this agenda and at any time during the course of this meeting to discuss any matter as authorized by law or by the Open Meetings Act, Texas Government Code Sections 551.071 (Consultation With Attorney), 551.072 (Deliberation Regarding Real Property), 551.073 (Deliberation Regarding Prospective Gifts), 551.074 (Personnel Matters), 551.076 (Deliberation Regarding Security Devices or Security Audits), and 551.087 (Deliberation Regarding Economic Development Negotiations), and 551.089 (Deliberation Regarding Security Devices or Security Audits). Any final action or vote on any Closed Session item will be taken in Open Session.

4. **Consultation with attorney and deliberation regarding real property for parcels involved in TIRZ Priority Projects including Old Fitzhugh Road, Town Center, Stephenson Building, and other strategic real property acquisitions related to TIRZ Priority Projects.** (*551.071, Consultation with Attorney; 551.073, Deliberation Regarding Real Property*).

UPCOMING MEETINGS

TIRZ No. 1 & No. 2 Board Meetings
October 6, 2025, at 6:00 p.m.
November 10, 2025, at 6:00 p.m.
December 8, 2025, at 6:00 p.m.

City Council Meetings
September 16, 2025, at 5:30 p.m. (Special Meeting)
October 7, 2025, at 6:00 p.m.
October 21, 2025, at 6:00 p.m.
November 4, 2025, at 6:00 p.m.
November 18, 2025, at 6:00 p.m.
December 2, 2025, at 6:00 p.m.
December 16, 2025, at 6:00 p.m.

ADJOURN

TEXAS OPEN MEETINGS ACT PUBLIC NOTIFICATION OF MEETING

I certify that this public meeting is posted in accordance with Texas Government Code Chapter 551, Open Meetings. This meeting agenda is posted on the bulletin board at the City of Dripping Springs City Hall, located at 511 Mercer Street, and on the City website at, www.cityofdrippingsprings.com, on August 26, 2025 at 5:00 PM.

_____

Diana Boone, City Secretary

This facility is wheelchair accessible. Accessible parking spaces are available. Requests for auxiliary aids and services must be made 48 hours prior to this meeting by calling (512) 858-4725.

TIRZ No. 1 & No. 2 Board of Directors Regular Meeting

Dripping Springs City Hall

511 Mercer Street – Dripping Springs, Texas

Monday, August 11, 2025, at 4:00 PM

DRAFT MINUTES

CALL TO ORDER AND ROLL CALL

With a quorum of the board members present, Chair Thomas called the meeting to order at 4:08 p.m.

Board Members Present:
Place 1 Ryan Thomas, Chair
Place 2 Jessy Milner
Place 4 Miles Mathews
Place 6 Susan Kimball
Place 7 Walt Smith
Advisory Member Bob Richardson

Board Members Absent:
Place 3 Taline Manassian, Vice Chair
Place 5 Missy Atwood

Staff, Consultants & Appointed/Elected Officials
City Administrator Michelle Fischer
Deputy City Administrator Shawn Cox
City Attorney Laura Mueller
City Secretary Diana Boone
City Inspector/Grant Administrator Garrett Osborne
Senior Planner Sara Varvarigos
Maintenance Director Riley Sublett
TIRZ Project Manager Keenan Smith

PRESENTATION OF CITIZENS

A member of the public that wishes to address the Board on any issue, regardless of whether it is posted on this agenda, may do so during Presentation of Citizens. It is the request of the Board that individuals wishing to speak on agenda items with a public hearing hold their comments until the item is being considered. Individuals are allowed two (2) minutes each to speak regarding issues not on the agenda and two (2) minutes per item on the agenda and may not cede or pool time. Those requiring the assistance of a translator will be allowed additional time to speak. Individuals are not required to sign in; however, it is encouraged. Individuals that wish to share documents with the Board must present the documents to the City Secretary or City Attorney providing at least eight (8) copies; if eight (8) copies are not provided,

the Board will receive the documents the following day. Audio Video presentations will not be accepted during Presentation of Citizens. By law no action shall be taken during Presentation of Citizens; however, the Chair may provide a statement of specific factual information, recitation of existing policy, or direction or referral to staff.

No one spoke during Presentation of Citizens.

MINUTES

1. Consider approval of the July 14, 2025 TIRZ No.1 & No.2 meeting minutes.

A motion was made by Board Member Mathews and seconded by Board Member Smith, to approve the July 14, 2025, TIRZ No. 1 & No. 2 meeting minutes. The motion to approve carried unanimously 5 to 0.

BUSINESS AGENDA

2. **Introduction and welcome to new TIRZ No.1 & No.2 Board Member Jessy Milner.**

No action was taken.

3. Discuss and consider approval of a recommendation to City Council regarding the selection of a proposal for the Stephenson School Building and Parking Improvements Project.

No action was taken.

3. Discuss and consider approval of a possible Special meeting date for the TIRZ No.1 & No.2 Board to consider approval of a recommendation to City Council regarding the selection of a proposal for the Stephenson School Building and Parking Improvements Project.

No action was taken.

5. Update regarding TIRZ Priority Projects. *Keenan Smith, TIRZ Project Manager*

a. Old Fitzhugh Road

Project Manager Keenan Smith presented the update. No action was taken.

6. Report on HB 1522 concerning the new rules regarding the posting of meeting agendas and discuss the TIRZ No.1 & No.2 Board Agenda Submission Policy.

No action was taken.

CLOSED SESSION

A motion was made by Board Member Smith and seconded by Board Member Kimball, to go into Closed Session for agenda item 7, under sections 551.071 and 551.072. The motion carried unanimously 5 to 0.

Closed Session began at 4:27 p.m.

The Board has the right to adjourn into closed session on any item on this agenda and at any time during the course of this meeting to discuss any matter as authorized by law or by the Open Meetings Act, Texas Government Code Sections 551.071 (Consultation With Attorney), 551.072 (Deliberation Regarding Real Property), 551.073 (Deliberation Regarding Prospective Gifts), 551.074 (Personnel Matters), 551.076 (Deliberation Regarding Security Devices or Security Audits), and 551.087 (Deliberation Regarding Economic Development Negotiations), and 551.089 (Deliberation Regarding Security Devices or Security Audits). Any final action or vote on any Closed Session item will be taken in Open Session.

7. **Consultation with attorney and deliberation regarding real property for parcels involved in TIRZ Priority Projects including Old Fitzhugh Road, Town Center, Stephenson Building, and other strategic real property acquisitions related to TIRZ Priority Projects.** (*551.071, Consultation with Attorney; 551.073, Deliberation Regarding Real Property*).

Closed Session ended at 4:53 p.m.

No action was taken during Closed Session.

ADJOURN

A motion was made by Board Member Smith and seconded by Board Member Mathews, to adjourn the meeting. The motion to adjourn carried unanimously 5 to 0.

The meeting was adjourned at 4:54 p.m.

STAFF REPORT

City of Dripping Springs

PO Box 384

511 Mercer Street

Dripping Springs, TX 78620

Submitted By: Shawn Cox, Deputy City Administrator

Council Meeting Date: Tuesday, September 2, 2025

Agenda Item Wording: **Discuss and consider selection of bidder for Stephenson Building and Parking Lot Project and authorize staff and the Mayor to finalize agreement with selected bidder.**

Agenda Item Sponsor: Mayor Bill Foulds, Jr.

Summary/Background:

In June, The City issued a Request for Proposal (RFP) for the Stephenson School Building & Parking Improvements. Prior to the proposal due date of July 24, 2025, a pre-proposal conference was held for those interested in submitting a proposal. Thirteen (13) contractors attended the conference.

On July 11th, the City received proposals from the following contractors:

1. ASD Consultants
2. Braun & Butler
3. Premier
4. QA Construction

The proposals were reviewed by an evaluation team consisting of:

- Chad Gilpin, CODS
- Michelle Fischer, CODS
- Riley Sublett, CODS
- Garrett Osborne, CODS
- Ryan Thomas, TIRZ Board Chair
- Keenan Smith, TIRZ Project Manager
- Alexis McKinney, Architexas

Based on the review of the proposals received, the evaluation team is recommending Council authorize City Administration to negotiate a contract with QA Construction, who received the highest evaluation score, and the team considered to have provided the best valued proposal.

QA Construction's base bid totals $4,281,000.00, and is fully funded though a combination of the 2025 Debt Series, Landscaping and Hotel Occupancy Tax Funds. City Staff and Architexas will be working with QA Construction, if selected by Council, to value engineer the project, to reduce their based bid, and to include Bid Alternates A, B, 1 & 2 as recommended by the team, plus a reasonable and prudent Owner's Contingency to cover unfound conditions.

The negotiated contract will cover a fully funded project and will be considered by Council at the September 16, 2025 meeting. A complete breakdown of funding sources and totals will also be provided.

Commission Recommendations:	The TIRZ Board will make a recommendation on this at its Sept. 2nd Special Meeting just before the City Council meeting.
Recommended Council Actions:	The evaluation team recommends awarding the contract to QA Construction and authorizing City Administration to negotiate a contract for Council consideration at the September 16, 2025 meeting.
Attachments:	- Proposal Evaluation Score Summary - Tabular Summary of Proposals - Proposals
Next Steps/Schedule:	Approval of negotiated Contract

DRIPPING SPRINGS
Texas

REQUEST FOR PROPOSAL

Stephenson School Building & Parking Improvements

City of Dripping Springs, TX

The City of Dripping Springs will receive sealed proposals for the following project:

PROJECT:	Stephenson School Building & Parking Lot Improvements
DUE DATE AND TIME:	**Thursday, July 17, 2025, 2:00 p.m.**
SUBMISSION LOCATION:	City of Dripping Springs 511 Mercer Street Dripping Springs, Texas 78620 Personal Delivery or U.S. Mail accepted. No submissions by fax or email.
DEADLINE FOR INQUIRIES:	**Friday, July 11, 2025, 5:00 p.m.**
OPTIONAL PRE-PROPOSAL CONFERENCE:	**Wednesday, July 2, 2025, 1 p.m.** at the building, 311 Old Fitzhugh Rd, Dripping Springs, Texas - R23573
TYPE OF WORK:	Rehabilitation of an historic building (4,020 square feet), an addition of 1,881 square feet, 8,490 square feet of site improvements, and 41,160 of parking improvements.

NOTICE TO RESPONDENTS

Competitive sealed proposals will be received by the **City of Dripping Springs,** at its office at **511 Mercer St, City Hall Building, Dripping Springs, Texas,** until **2:00 p.m.** on **Thursday, July 17, 2025**. Proposals will be evaluated and scored based on selection criteria by the City's evaluation committee. Proposals will be for the furnishing of all necessary materials, machinery, equipment, labor, superintendence, and all other services and appurtenances required for the construction of the "Project" titled **Stephenson School Building & Parking Improvements** and shall include acknowledgement of any addenda submitted, and all other documents included in said call for proposals. No proposals may be withdrawn after receipt by the City. Any proposals received after the scheduled deadline will be returned unopened. Said proposal shall be marked;

"STEPHENSON SCHOOL BUILDING & PARKING IMPROVEMENTS"

Proposals must be submitted on City of Dripping Springs forms and must be accompanied by an acceptable proposal security in the form of a cashier's check or bond, payable to the City of Dripping Springs, Texas, equal to five percent (5%) of the total bid amount. Proposals must be submitted in a sealed envelope plainly marked with the name of the project as shown above, and the name and address of the Respondent. When submitted in person or by courier, this envelope shall be placed in another envelope addressed to:

City of Dripping Springs
511 Mercer St.
Dripping Springs, Texas 78620

Stephenson School Building & Parking Improvements Project generally includes: rehabilitation of an historic building (4,020 square feet), an addition of 1,881 square feet, 8,490 square feet of site improvements, and 41,160 of parking improvements.

Plans, Specifications, and Instructions to Respondents may be obtained via email at cgilpin@cityofdrippingsprings.com and via download at the City of Dripping Springs website https://www.cityofdrippingsprings.com/requestforbids beginning **June 25, 2025**.

The City reserves the right to reject any and all proposals and any nonconforming proposal and to award the Contract in a period of time not exceeding **60 days** from the proposal due date. Proposals shall remain firm for that period.

The successful Respondent must furnish a performance bond and payment bond on the forms provided, each in the amount of one hundred percent (100%) of the contract amount, from a surety company holding a permit from the State of Texas to act as surety.

Respondents are expected to inspect the site of the work and inform themselves regarding all local conditions.

An **Optional Pre-Proposal conference** with prospective proposers will be held on **Wednesday, July 2, 2025, at 1:00 p.m.** at the building, 311 Old Fitzhugh Rd., Dripping Springs, Texas.

INSTRUCTIONS TO RESPONDENTS

1. NONRESPONSIVE PROPOSALS: PROPOSALS, AT A MINIMUM, WILL BE CONSIDERED NONRESPONSIVE IF FAILURE TO:
    - *Sign Proposal*
    - Include *Proposal Bond*: All cost proposals shall be accompanied by a certified cashier's check upon a National or State bank in an amount not less than five percent (5%) of the total maximum proposal price, payable without recourse to City, or a bond in the same amount from a reliable surety company, as a guarantee that the respondent will enter into a contract and execute performance and payment bonds within ten (10) days after notice of award of contract to him. Proposal guarantees must be submitted in the same sealed envelope with the cost proposal. Proposals submitted without check or bonds will not be considered.
    - List *Unit Price* for each item
    - List *Total Amount of Cost Proposal*
    - Include *Non-Collusion Statement*: Each respondent shall file a statement executed by, or on behalf of, the person, firm, association, or corporation submitting the cost proposal certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action, in restraint of free competitive proposals in connection with the submitted proposal. Failure to submit the executed statement as part of the proposal documents will make the proposal nonresponsive and not eligible for award consideration.
    - Include *References*: The City REQUIRES respondent to supply with this Proposal, a list of at least three (3) references where like services have been supplied by their firm. Include name of firm, address, telephone number and name of representative. This information is provided on the Information from Respondents forms within this proposal package.

2. ALL INFORMATION REQUIRED BY THE COST PROPOSAL FORM MUST BE FURNISHED OR THE PROPOSAL WILL BE DEEMED NON-RESPONSIVE. WHERE THERE IS AN ERROR IN THE EXTENSION OF PRICE, THE UNIT PRICE SHALL GOVERN.

3. ONE (1) ORIGINAL OF ALL PROPOSALS MUST BE SUBMITTED (THIS INCLUDES ALL DOCUMENTATION SUBMITTED WITH THE PROPOSAL). PROPOSALS MUST BE MARKED ORIGINAL. ONE (1) DIGITAL COPY OF ALL PROPOSALS MUST BE SUBMITTED.

4. Should this solicitation fail to contain sufficient information in order for interested firms to obtain a clear understanding of the services required by the City, or should it appear that the instructions outlined in the solicitation are not clear or are contradictory, any interested firm may in writing request clarification from Chad Gilpin, P.E., no later than **5 p.m. on Friday, July 11, 2025**. The interested firm shall email a copy of the written clarification request to Chad Gilpin, at cgilpin@cityofdrippingsprings.com and Written requests from interested firms and written responses by the City will be provided to all Applicants.

5. Prior to submitting any proposal, respondents are required to read the plans, specifications, contract and bond forms carefully; to inform themselves by their independent research, test and investigation of the difficulties to be encountered and judge for themselves of the accessibility of the work and all attending circumstances affecting the cost of doing the work and the time required for its completion and obtain all information required to make an intelligent proposal.

6. Each proposal and the proposal guaranty must be originals and must be sealed in an envelope plainly marked with the name of the Project, and the name and the address of the respondent. When submitted, this envelope shall be placed in another envelope addressed as indicated in this Notice to Respondents.

7. Only proposals and proposal guaranties actually in the hands of the designated official at the time set in this Notice to Respondents shall be considered. Proposals submitted by telephone, e-mail, or fax will not be considered.

8. In case of ambiguity or lack of clarity in the statement of prices in the proposals, the City reserves the right to consider the most favorable analysis thereof, or to reject the proposal. Unreasonable (or unbalanced) prices submitted in a proposal may result in rejection of such proposal or other proposals.

9. Any quantities given in any portion of the contract documents, including the plans, are estimates only, and the actual amount of work required may differ somewhat from the estimates. The basis for the payment shall be the actual amount of work done and/or material furnished.

10. All proposal securities will be returned to the respective respondents within twenty-five (25) days after proposals are opened, except those which the City elects to hold until the successful respondent has executed the contract. Thereafter, all remaining securities, including security of the successful respondent, will be returned within sixty (60) days.

11. Performance and Payment Bonds: Section 262.032 and of the Texas Local Government Code and Section 2253.021 of the Texas Government Code governs the requirements for performance bonds and payment bonds for government entities making public work contracts. A performance bond is required if the contract is in excess of $50,000 and is to be made for the full amount of the contract. A payment bond is required if the contract is in excess of $25,000 and is to be made for the full amount of the contract. The bonds are to be executed within ten (10) days after receipt of written notification of award of contract prior to beginning work on the project and must be executed by a corporate surety or sureties in accordance with the Texas Insurance Code. In the event the bond exceeds $100,000.00, the surety must also: (1) hold a certificate of authority from the United States secretary of the treasury to qualify as a surety on obligations permitted or required under federal law; or (2) have obtained reinsurance for any liability in excess of $100,000.00 from a reinsurer that is authorized and admitted as an insurer in this state and is the holder of a certificate of authority from the United States secretary of the treasury to qualify as a surety or reinsurer on obligations permitted or required under federal law. In determining whether the surety or reinsurer holds a valid certificate of authority the City may rely on the list of companies

holding certificates of authority as published in the Federal Register covering the date on which the bond is to be executed. If the public works contract is less than $50,000 the performance bond will not be required as long as the contract provides that payment is not due until the work is completed and accepted by the City. The purpose of a performance bond is for the protection of the government entity and is conditioned on the faithful performance of the work being done by the contractor in accordance with the plans, specifications and contract documents. The payment bond is for the protection of persons supplying labor and materials to the contractor to ensure payment.

12. Contract Times and Liquidated Damages – Respondents must agree to commence work on or before a date to be specified in a written "Notice to Proceed" of the City, and to fully complete the project within the specified time stated in the proposal. Respondents must agree to pay liquidated damages of as listed in *Section C-7* to the City for every day past the specified completion date stated in the proposal.

13. All of the items listed are to be on a "per unit" basis, stating a firm price per unit or unit quantity of each item. This price must be good from the date of proposal opening through the completion of the project. Proposals which do not state a fixed price will not be considered. The City Council may award a contract for the period implied or expressly stated in the lowest and/or best proposal.

14. The City reserves the right to award the contract on the basis of the respondent's qualifications, cost proposal, and any combination of alternative cost proposal items which appears most advantageous to the City, to reject any or all proposals, to waive objections based on failure to comply with formalities and to allow the correction of obvious or patent errors. Unless all proposals are rejected, City agrees to give Notice of Award of contract to the successful respondent within **sixty (60) days** from the date of the proposal opening or for such longer period of time that the Respondent may agree to in writing upon request of Owner.

15. Respondents for the construction work must submit a satisfactory cashier's or certified check, or proposal bond from a surety duly authorized and licensed in the State of Texas, payable without recourse to the order of the City, in an amount not less than five percent (5%) of the total cost proposal which check or bond shall be submitted as a guarantee that the respondent will enter into a contract and executed performance and payment bonds within ten (10) days after Notice of Award of contract is given to him for contracts in excess of $25,000.00. Proposals without the required check or bond will NOT be considered.

16. The successful respondent for the construction of the improvements must furnish a satisfactory Certificate of Insurance, and a satisfactory Performance Bond in the amount of 100% of the total contract price, and a satisfactory Payment Bond in such amount, both duly executed by such respondent as principal and by a corporate surety duly authorized so to act under the laws of the State of Texas. The successful respondent will be required to provide Performance and Payment Bonds issued by an insurance company which meets the minimum State requirements and is licensed in the State of Texas, and has a Best's Key Rating as follows:

Construction Contract	Rating
25,001 - 250,000	None
250,000 - 1,000,000	B
Over - 1,000,000	A

All lump sum and unit prices must be stated in both script and figures.

17. Respondents are expected to inspect the site of the work and to inform themselves regarding all local conditions.

18. Sales Tax: The City is by statute, exempt from the State Sales Tax and Federal Excise Tax.

19. Basis of Award - The City shall not be obligated to accept the lowest priced proposal but shall make an award to the Respondent that provides the "Best Value" to the City. "Best Value" shall be determined using the evaluation criteria outlined below. The proposals will be evaluated and scored by the City's evaluation committee. The intent of the selection process is to review submitted proposals and make an award based upon qualifications and best value as described herein. Should the respondent deemed best value and fail to negotiate and execute an acceptable contract with the City, the City may move to the next highest scoring respondent. A 100-point scale will be used to create the final evaluation recommendations. The factors and weighting on which proposals will be evaluated are:

    I. Qualifications and Similar Project Experience, Including References (20 Points)
    II. Experience with installation of masonry restoration & cleaning, wood & door restoration, plaster restoration, & permeable pavers. (20 Points)
    III. Timeline and previously demonstrated ability to stay on schedule (15 Points)
    IV. Fees/ Pricing (40 Points)
    V. Value Engineering (5 Points)

20. Best Final Offer (BFO) - Clarification discussions, at the City's sole option, may be conducted with Respondents who submit Solicitation Responses determined to be acceptable and competitive. Respondents shall be accorded fair and equal treatment with respect to any opportunity for discussion and/or written revisions of the Solicitation Responses. Such revisions may be permitted after submissions and prior to award solely for the purpose of obtaining BFOs. In conducting discussions, the City shall not disclose any information derived from the Solicitation Responses submitted by competing Respondents. The City evaluation committee shall score BFO responses in a manner consistent with the scoring of original solicitation responses. The criteria to be re-evaluated following a BFO shall depend on the type of clarification requested by the Committee from Respondent. Scores for any of the applicable selection criteria included in the Committee's request for BFO shall be replaced by the BFO scores.

Project: **STEPHENSON SCHOOL BUILDING & PARKING IMPROVEMENTS**

THIS PROPOSAL IS SUBMITTED TO:

City of Dripping Springs
City Hall
511 Mercer St.
Dripping Springs, Texas 78620

FROM:_____
Contractor

1. The undersigned RESPONDENT proposes and agrees, if this Cost Proposal is accepted, to enter into an Agreement with OWNER in the form included in the Contract Documents to perform and furnish all Work as specified or indicated in the Contract Documents for the Contract Price and within the Contract Time indicated in this Cost Proposal and in accordance with the other terms and conditions of the Contract Documents.

2. RESPONDENT agrees to commence Work under this Contract on a date to be specified in written "Notice to Proceed" of the OWNER and to reach Substantial Completion of the Work within **sixty (60) calendar days** thereafter. RESPONDENT further agrees to pay, as liquidated damages, the sum for each consecutive working day thereafter as provided in Division C, Section 7 thereafter that Substantial Completion has not been reached as provided in the Agreement.

3. RESPONDENT accepts all of the terms and conditions of the Advertisement, Notice to Respondents and Instructions to Respondents, including without limitation those dealing with the deposition of Proposal Security. This Cost Proposal will remain subject to acceptance for **60 calendar days** after the day of Proposal opening. RESPONDENT will sign and submit the Agreement with the Bonds and other documents required by the Proposal Requirements within **10 calendar days** after the date of CITY's Notice of Award.

4. In submitting Cost Proposal, RESPONDENT represents, as more fully set forth in the Agreement, that:

   A. RESPONDENT has examined copies of all the Proposal Documents and of the following Addenda (receipt of all which is hereby acknowledged):

      Addendum No.:_____ Dated: _____
      Addendum No.:_____ Dated: _____
      Addendum No.:_____ Dated: _____
      Addendum No.:_____ Dated: _____
      Addendum No.:_____ Dated: _____

   B. RESPONDENT has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance, or furnishing of the Work.

D. RESPONDENT has obtained and carefully studied (or assumes responsibility for obtaining and carefully studying) all such examinations, investigations, explorations, tests, and studies that pertain to the subsurface or physical conditions at the site or otherwise may affect the cost, progress, performance, or furnishing of the Work as RESPONDENT considers necessary for the performance or furnishing of the Work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents; and no additional examinations, investigations, explorations, tests, reports, or similar information or data are or will be required by RESPONDENT for such purposes.

E. RESPONDENT has reviewed and checked all information and data shown or indicated on the Contract Documents with respect to existing Underground Facilities at or contiguous to the site and assumes responsibility for the accurate location of said Underground Facilities. No additional examinations, investigations, explorations, tests, reports, or similar information or data in respect of said Underground Facilities are or will be required by RESPONDENT, of the OWNER and/or the ENGINEER, in order to perform and furnish the Work at the Contract Price, within the Contract Time, and in accordance with the other terms and conditions of the Contract Documents.

F. RESPONDENT has correlated the results of all such observations, examinations, investigations, explorations, tests, reports, and studies with the terms and conditions of the Contract Documents.

G. RESPONDENT has given ENGINEER written notice of all conflicts, errors, or discrepancies that it has discovered in the Contract Documents, and the written resolution thereof by ENGINEER is acceptable to RESPONDENT.

H. This Proposal is genuine and not made in the interest of or on behalf of any undisclosed person, firm, or corporation, and is not submitted in conformity with any Agreement or rules of any group, association, organization, or corporation; RESPONDENT has not directly or indirectly induced or solicited any other RESPONDENT to submit a false or sham Proposal; RESPONDENT has not solicited or induced any person, firm, or corporation to refrain from proposing; and RESPONDENT has not sought by collusion to obtain for itself any advantage over any other RESPONDENT or over OWNER.

5. The following documents (signed and completed) are attached to and made a condition of this Proposal:

A. Required Proposal Security in the form of a Proposal Bond, Cashier's Check, or Certified Check.
B. Non-Collusion Affidavit
C. Conflict of Interest Statement
D. Information From Respondents

RESPECTFULLY SUBMITTED on _____, 2025.

By:_____
(Authorized Signature)

Respondent, if Respondent is an individual
Partner, if the Respondent is a Partnership
Officer, if the Respondent is a Corporation

_____
(Typed or Printed Name and Title)

Respondent:_____
(Name of Company)

Business Address: _____

_____

_____

Telephone No: _____

IF Respondent is a Corporation:

ATTEST

_____
(Signature of Witness) (Corporate Seal)

_____
(State of Incorporation)

IF Respondent is a Joint Venture:

Each joint venture must sign a separate copy of this page. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.

DRIPPING SPRINGS
Texas

City of Dripping Springs / Stephenson Building and Parking Improvements

Bid Tabulation Summary- References

Bidder's Firm Name:

Bid Item	Project Element	Reference	Scope of Work / Remarks	Bid Amount
1	Stephenson Building- Adaptive Re-Use & Addition	Architexas Plans, Specs & Bid Docs Pkg.	Adaptive Re-Use of existing Historic Building, with an attached Addition of New Construction- Building Permit Case #2025-1075	$
2	Stephenson Parking Improvements (excluding Alternate "A" Parking Lot Power)	HDR / Doucet (Kleinfelder) Plans, Specs & Bid Docs Pkg	Parking Lot with associated Site Improvements- Site Development Permit Case #SD 2024-022	$
-		Bid Items 1+2	Subtotal- Building and Parking Improvements:	$
3	Add Alternate "A" Parking Lot Power & Electrical Service	E103, E502, E602 HDR / Doucet set	Add: Convenience Outlets and associated enabling Electrical Service to facilitate use of Parking Lot during City authorized events	$
4	Add Alternate "B" Rambo Lodge (offsite) Supplemental Paving	Rambo Lodge Easement Exhibit B	Add: Paving Mill & Overlay all deteriorated paving in Rambo Lodge parking area, per Agreement	$
Bid Recap	Total Project (All Elements, including Add Alternates)	Bid Items 1+2+3+4	Total Bid Summary:	$

NON-COLUSION AFFIDAVIT
PRIME RESPONDENT

STATE OF TEXAS {}

COUNTY OF HAYS {}

being first duly sworn, deposes and says

That he is _____
(a Partner of Officer of the firm of, etc.)

the party making the foregoing proposal, that such proposal is genuine and not collusive or sham; that said Respondent has not colluded, conspired, connived or agreed, directly or indirectly, sought by agreement or collusion, or communication or conference, with any person, to fix the cost proposal or affiant or of any other Respondent, or to secure any advantage against the City of Dripping Springs or any person interested in the proposed Contract; and that all statements in said proposal are true.

_____
Signature of

Respondent, if the Respondent is an individual
Partner, if the Respondent is a Partnership
Officer, if the Respondent is a Corporation

Subscribed and sworn before me this _____ day of _____, **2025**.

_____
Notary Public

My Commission expires:

_____

INFORMATION FROM RESPONDENTS

THE FOLLOWING INFORMATION MUST BE COMPLETED AND SUBMITTED WITH THE PROPOSAL. Failure to provide the information will cause the Proposal to be non-responsive and may cause its rejection.

Qualifications and Similar Experience: Provide information for 3 similar projects completed by Respondent within last 5 years.

1. Name of Project:_____
   Project Owner: _____
   Reference Contact Person & Phone No.:_____
   Value of Contract:_____
   Date Completed:_____
   Respondent's Project Manager:_____
   Respondent's Project Superintendent:_____
   Original Project Completion Date: _____
   Actual Project Completion Date: _____

2. Name of Project:_____
   Project Owner: _____
   Reference Contact Person & Phone No.:_____
   Value of Contract:_____
   Date Completed:_____
   Respondent's Project Manager:_____
   Respondent's Project Superintendent:_____
   Original Project Completion Date: _____
   Actual Project Completion Date: _____

3. Name of Project:_____
   Project Owner: _____
   Reference Contact Person & Phone No.:_____
   Value of Contract:_____
   Date Completed:_____
   Respondent's Project Manager:_____

Respondent's Project Superintendent:_____

Original Project Completion Date: _____

Actual Project Completion Date: _____

Experience with rehabilitation and preservation of historic buildings: Provide a statement in an additional attachment discussing the Respondent's Project Manager and Project Superintendent experience with rehabilitation and preservation of historic buildings.

Project Timeline: Provide a proposed project schedule from Notice to Proceed to Project Closeout.

Subcontractors and Suppliers: Submit a list of proposed Subcontractors who will perform the following work as well as list the proposed subcontractors who will perform work having a value of more than ten (10) percent of the total contract amount. If self-performing any items below, indicate in the space provided.

1. Masonry Restoration & Cleaning_____
2. Wood Window Restoration_____
3. Wood Door Restoration _____
4. Plaster Restoration_____

Value Engineering: In a separate attachment provide a list of value engineering considerations including potential savings on items contained in the Cost Proposal. A summary narrative of the value engineering considerations and how they would benefit the City may also be included.

Financial Status: A confidential financial statement will be submitted by the selected Respondent only if the City deems it necessary.

CITY OF DRIPPING SPRINGS CONFLICT OF INTEREST STATEMENT

I hereby acknowledge that I am aware of the Local Government Code of the State of Texas, Section 176.006 regarding conflicts of interest and will abide by all provisions as required by Texas law.

Certificate of Interested Parties (TEC Form 1295). For contracts needing City Council approval, or any subsequent changes thereto requiring City Council approval, the City may not accept or enter into a contract until it has received from the Contractor a completed, signed, and notarized TEC Form 1295 complete with a certificate number assigned by the Texas Ethics Commission ("TEC"), pursuant to Texas Government Code § 2252.908 and the rules promulgated thereunder by the TEC. The Contractor understands that failure to provide said form complete with a certificate number assigned by the TEC may prohibit the City from entering into this Agreement. Pursuant to the rules prescribed by the TEC, the TEC Form 1295 must be completed online through the TEC's website, assigned a certificate number, printed, signed and notarized, and provided to the City. The TEC Form 1295 must be provided to the City prior to the award of the contract. The City does not have the ability to verify the information included in a TEC Form 1295, and does not have an obligation or undertake responsibility for advising Contractor with respect to the proper completion of the TEC Form 1295. **The agreement number for this agreement will be STE06252025.**

Printed name of person submitting form:
Name of Company:
Date:
Signature of person submitting form:

NOTARIZED:

Sworn and subscribed before me,
by_____
on_____. **(date)**

CONSTRUCTION CONTRACT TEMPLATE

THIS CONSTRUCTION CONTRACT (hereinafter the "Contract") made this the _____ day of _____, 2025 ("Effective Date"), by and between _____
(a Texas limited liability company), whose address is _____
(hereinafter called the "Contractor"), and the CITY OF DRIPPING SPRINGS (hereinafter called the "City") acting herein by its Mayor, Bill Foulds, Jr. hereunto duly authorized.

WITNESSETH, that the Contractor and the City for the considerations stated herein mutually agree as follows:

ARTICLE 1. STATEMENT OF WORK

The Contractor shall furnish all supervision, technical personnel, labor, materials, machinery, tools, equipment and services, including utility and transportation services that are such an inseparable part of the work described that exclusion would render performance by Contractor impractical, illogical, or unconscionable. Furthermore, Contractor shall perform and complete all work required for the construction of the Improvements embraced in the Project; namely, STEPHENSON SCHOOL BUILDING & PARKING IMPROVEMENTS PROJECT and required supplemental work, all in strict accordance with the contract documents including all addenda thereto (hereinafter referred to as the "Work"). All Work shall be performed in a good and workmanlike manner according to industry standards. The parties agree that the Statement of Work and the addenda to this Contract is a description of Contractor's obligations and responsibilities and is deemed to include preliminary considerations and prerequisites.

ARTICLE 2. CONTRACTOR'S DUTIES

2.1 Construction. Contractor shall construct all Improvements embraced in the **Project** as described in the proposal documents.

2.2 Labor and Materials. The Contractor shall furnish all labor, materials, mechanical workmanship, transportation, equipment, and services necessary for the completion of the work described in this Contract and in accordance with the plan (if any) and other contract documents to conduct the construction required under this Contract in an efficient manner.

2.3 Completion of Work. Work, in accordance with the Contract dated _____, 2025, **Project**, shall commence after the date the Notice to Proceed is received by the Contractor following the preconstruction meeting, and Contractor shall complete the Work within **thirty (30) consecutive calendar days** after receiving the Notice to Proceed. The City shall provide Contractor with written acceptance of the Work upon completion. Payment of monies due hereunder does not constitute acceptance of the Work.

2.4 Invoicing. Contractor shall prepare an invoice for work completed and submit the involved to the City for payment. The proposal for the work is set forth in the proposal documents. Incomplete or inaccurate invoices shall be returned other Contractor for correction and re-submittal.

2.5 Insurance. Contractor shall assume all risk and liability for accidents and damages that may occur to persons or property during the performance of the work under this Contract. Contractor shall not be covered by the City's liability carrier. Contractor shall, at its sole expense, acquire and maintain during the full term of this Contract insurance coverage with insurers licensed to do business in the State of Texas and acceptable to the City. The Contractor shall comply with all insurance requirements contained in *Article 5 of General Conditions and Division C*, including maintaining worker's compensation and liability coverage in stated amounts and providing proof of such coverage. Contractor shall give the City thirty (30) days written notice of any material change or cancellation of coverage.

2.6 Change Orders. Change orders from the City or requested by the Contractor shall be controlled by *Articles 10, 11 and 12 of the General Conditions*. The City shall have the continuing right to inspect and, upon reasonable cause, reject any Work provided by Contractor under this Contract. Contractor will at Contractor's cost promptly re-perform any Work to the extent necessary to correct any rejected Work, to correct any breach or to make the Work conform to the provisions of this Contract and any applicable Statement of Work (collectively, "Corrective Work"). The City's failure to inspect or to discover defective Work will not relieve Contractor from any liability or responsibility. Payment of any funds by the City to Contractor will not constitute a waiver or acceptance of any defective Work.

2.7 Warranty and Maintenance Bond. The Contractor agrees to remedy all defects appearing in the work or developing in the materials furnished and the workmanship performed under this Contract during the warranty period of **two (2) years** after the date of final acceptance of the work by the City for the full amount of the work. Contractor further agrees to indemnify and hold the City harmless from any costs encountered in remedying such defects. Contractor shall agree to supply a **two (2) year** maintenance bond to the City at the time of acceptance of the work for the full amount of the work. Furthermore, Contractor shall:

(a) Timely perform the Work with due diligence, in a good, workmanlike and safe manner consistent with that high degree of skill, competence and professional care of generally accepted industry standards and in compliance with City policies and the provisions of this Contract and any applicable Statement of Work. Contractor will perform the Work within the period of time set by the City in each Statement of Work.
(b) Ensure that all employees of Contractor and Contractor Group maintain a current license while performing any Work for which a license is required under any applicable regional, state or federal law or regulatory agency.
(c) Use only materials, goods, tools, machinery and equipment of sufficient quality for their purposes, free from defect and meeting all standards and specifications customary for the Work being performed as well as standards and specifications provided by City, if any.

2.8 Mandatory Disclosures. Texas law requires that vendors make certain disclosures. Prior to the effective date of this Contract, the Contractor has submitted to the City a copy of the Conflict-of-Interest Questionnaire form (CIQ Form) approved by the Texas Ethics Commission (Texas Local Government Code Chapter 176) and the Affidavit regarding Prohibition on Contracts with Companies Boycotting Israel (Texas Government Code Chapter 2270). Contractor agrees by

approving this Contract that it is in compliance with the Prohibition on Contracts with Companies Boycotting Israel (Texas Government Code Chapter 2270). (Additional Disclosures may be required based on state and federal law and this will be included in the Contract.)

ARTICLE 3. THE CONTRACT PRICE

The City will pay the Contractor for the performance of the Contract, in current funds, subject to additions and deductions as provided in this Contract and Addenda, the sum of **$_____**. Payments will be made pursuant to this Contract and its Addenda. Contractor shall document and submit to City all time, mileage, travel, equipment, rentals, supplies, materials and other charges incurred for which City has agreed to reimburse Contractor. Contractor shall maintain correct records in connection with the Work and all transactions related to this Contract (including without limitation, complete and accurate records of all of Contractor's charges and expenses and documentation of items that are chargeable to City under this Contract) and shall retain all records for two years following the calendar year in which the final invoice for the Work was sent to City. City shall have the right, at City's expense, upon reasonable advance notice at the offices of Contractor and during Contractor's normal business hours, to inspect, copy, and audit all records (except Contractor's trade secrets or proprietary information) of Contractor in connection with the Work performed by or on behalf of Contractor for City's account and all payments made to or by Contractor. If the audit reveals a discrepancy between the amount or value of materials or services billed to City and that which is evidenced by Contractor's books and records, City shall have the right to adjust its account with Contractor, which adjustment may necessitate a refund by Contractor of funds disbursed to Contractor.

ARTICLE 4. THE CONTRACT

The executed contract documents shall consist of the following components:

Exhibit A	General Conditions
Exhibit B	Plans
Exhibit C	Specifications
Exhibit D	Instructions and Notice to Respondents
Exhibit E	Performance and Payment Bond
Exhibit F	Certificate of Insurance
Exhibit G	Wage Rates
Exhibit H	Addenda
Exhibit I	Contractor's Signed Cost Proposal
Exhibit J	Conflict of Interest Questionnaire

This Contract, together with other documents enumerated in this ARTICLE 4, which said other documents are as fully a part of this Contract as if hereto attached or herein repeated, forms the Contract between the parties hereto. If there is any inconsistency between the terms of this Contract and other documents listed herein Article 4, the terms of this Contract shall control. The City objects to and rejects any terms contained within Contractor's statements of work, purchase orders, work orders, invoices, bids, proposals, delivery tickets, or other document issued by Contractor that modify, alter, amend, or supplement the terms of this Contract, purport to affect the risk

allocation scheme in this Contract, or add additional requirements to this Contract or any Statement of Work. The Parties agree that no changes to the risk allocation scheme set forth in this Contract may be made unless an amendment to this Contract is executed by authorized representatives of both Parties that specifically identifies this Contract and the specific terms or provisions that are amended

ARTICLE 5. TERMINATION AND DELAYS

Terminations and delays are governed by *Articles 10, 12 and 15 of General Conditions*.

ARTICLE 6. MISCELLANEOUS

6. Non-Assignability. Neither the City nor the Contractor shall assign any interest in this Contract without the prior written consent of the other party outside of what is allowed in this Contract, or its the proposal documents described above.

6.2 Amendment. This Contract and the proposal documents described above embody the entire Contract between the parties and may not be modified unless in writing, executed by all parties.

6.3 Independent Contractor. Contractor is an independent contractor under this Contract. Services provided by Contractor pursuant to this Contract shall be subject to the supervision of the Contractor. In providing such services, neither Contractor nor Contractor's agents shall act as officers, employees, or agents of the City. No partnership, joint venture, or other join relationship is created hereby. City does not extend to Contractor or Contractor's agents any authority of any kind to bind City in any respect whatsoever.

6.4 Notice. Any notice and/or statement required or permitted by this Contract, shall be deemed to be given and delivered when deposited in the United States mail, certified with return receipt requested, postage prepaid, addressed to the appropriate Party at the following addresses, or such other address as amended by providing notice to the other party at the addresses below:

If to the City:	**If to the Contractor:**
City of Dripping Springs	_____
Attn: City Administrator	_____
PO Box 384	_____
Dripping Springs, TX 78620	_____

6.5 Force Majeure. No party to this Contract shall be deemed in violation if it is prevented from timely performing any of its obligations by reason of labor disputes, acts of God, acts of the public enemy, acts of superior governmental authority, or other circumstances for which the party is not responsible, or which is not in its control.

6.6 Law & Venue. This Contract shall be governed by the laws of the State of Texas. The venue for any disputes arising under this Contract shall be the district court of Hays County, Texas.

6.7 Severability. If the final judgment of a court of competent jurisdiction invalidates any part of this Contract, then the remaining parts shall be enforced, to the extent possible, consistent with the intent of the Parties as evidenced by this Contract.

6.8 Entire Contract. This Contract and the proposal documents described above in Article 4 herein constitutes the entire Contract of the Parties and supersedes any and all prior understandings, or oral or written Contracts, between the Parties on this subject matter.

6.09 Termination and Delays. Terminations and delays are governed by *Articles 10, 12 and 15 of Section D-1 of the General Conditions*.

6.10 Indemnification. Contractor hereby releases, and shall cause its insurers, its subcontractors, to release the City and its agents and assigns from any and all claims or causes of action which Contractor, its insurers, and/or its subcontractors might otherwise possess resulting in or from or in any way connected with any loss covered or which should have been covered by insurance maintained and/or required to be maintained by Contractor and/or its subcontractors pursuant to this contract, even if such claims of causes of action arise from or are attributed to the sole or concurrent negligence of any City agent or from strict liability.

6.11 Liquidated Damages. Failure on the part of the Contractor to sustain the required maintenance or perform under this Contract may result in liquidated damages. The City may assess liquidated damages as listed in Section C-7 for incomplete work until all work is completed.

IN WITNESS WHEREOF, the parties hereto have caused this Contract to be executed in four (4) original copies on the day and year first above written.

CITY OF DRIPPING SPRINGS:

_____

Bill Foulds, Jr., Mayor

ATTEST:

_____

City Secretary

CONTRACTOR:

_____
Printed Name and Title

ATTEST:

_____
Signature

_____
Printed Name and Title

CORPORATE CERTIFICATIONS:

I, _____, certify that I am the Secretary / Treasurer of the corporation named as Contractor herein; that _____ who signed this Contract on behalf of the Contractor, was then _____ of said corporation; that said Contract was duly signed for and on behalf of said corporation by authority of its governing body, and is within the scope of its corporate powers.

[CORPORATE SEAL]

_____
Corporate Secretary

_____
Printed Name

_____
Date

PERFORMANCE BOND
EXAMPLE TEMPLATE

(As required by Chapter 2253, Texas Government Code)

THE STATE OF {}
COUNTY OF {}

KNOW ALL MEN BY THESE PRESENTS: That we

(1)_____, a

(2) _____of hereafter called Principal and

(3) _____

of _____, State of _____, hereinafter called the Surety, are held and firmly

bound unto (4) the City of Dripping Springs, Texas hereinafter called Owner, in the penal sum of

_____($_____) Dollars

in lawful money of the United States, to be paid in (5) HAYS COUNTY, TEXAS for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by the these presents.

THE CONDITIONS OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with (6) the City of Dripping Springs the Owner, dated the ____ day of _____**2025**, a copy of which is hereto attached and made a part hereof for the construction of :

_____

_____

(hereinafter called the "Work").

Date of Bond must not be prior to Date of Contract.

These notes refer to the numbers in body of Contract above:

(1) Correct name of Contractor
(2) A Corporation, or Partnership or an Individual, as case may be
(3) Correct name of Surety
(4) Correct name of Owner
(5) County and State
(6) Owner

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform the work in accordance with the Plans, Specifications and Contract Documents during the original term thereof, and any extensions thereof which may be granted by the Owner with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such Contract, and shall fully indemnify and save harmless the Owner from all costs and damages which it may suffer by reason of failure to do so, and shall reimburse and repay the Owner all outlay and expenses which the Owner may incur in making good any default, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED FURTHER, that if any legal action be filed upon this Bond, venue shall lie in Hays County, State of Texas, and that the said surety, for value received hereby stipulates and agrees that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed there under or the Specifications accompanying the same, shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or in the work or to the Specifications.

IN WITNESS WHEREOF, this Instrument is executed in six counterparts, each one of which shall be deemed an original, this the _____ day of _____, **2025**.

ATTEST:

_____
(Principal) Secretary

_____
PRINCIPAL

By: _____

(SEAL)

_____
Address (State & Zip Code)

_____
Witness as to Principal

_____
Telephone Number

_____
Address (State and Zip Code)

ATTEST:

_____
(Surety) Secretary

_____
SURETY

By:_____

(SEAL)

_____
Address (State and Zip Code)

_____
Witness as to Surety

_____
Telephone No. (Area Code)

_____

PAYMENT BOND
EXAMPLE TEMPLATE

(As required by Chapter 2253, Texas Government Code)

THE STATE OF {}
COUNTY OF {}

KNOW ALL MEN BY THESE PRESENTS: That we

(1) _____, a

(2) _____ of hereinafter called Principal and

(3) _____

of _____, State of _____, hereinafter called the Surety, are held and firmly bound unto (4) the City of Dripping Springs, Texas hereinafter called Owner, and unto all Persons, Firms, and Corporation who may furnish materials for, or perform labor upon the building or improvements hereinafter referred to in the penal sum of

_____($_____) Dollars in lawful money of the United States, to be paid in (5) HAYS COUNTY, TEXAS for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators and successors, jointly and severally, firmly by the these presents.

THE CONDITIONS OF THIS OBLIGATION is such that whereas, the Principal entered into a certain contract with (6) the City of Dripping Springs The Owner, dated the ___ day of _____, **2025**, a copy of which is hereto attached and made a part hereof for the construction of

_____

_____

(hereinafter called the "Work").

Date of Bond must not be prior to Date of Contract.

These notes refer to the numbers in body of Contract above:

(1) Correct name of Contractor
(2) A Corporation, or Partnership or an Individual, as case may be
(3) Correct name of Surety
(4) Correct name of Owner
(5) County and State
(6) Owner

NOW, THEREFORE, if the Principal shall well, truly and faithfully perform the work in accordance with the Plans, Specifications and Contract Documents during the original term thereof, and any extensions thereof which may be granted by the Owner with or without notice to the Surety, and if he shall satisfy all claims and demands incurred under such Contract, then this obligation shall be null and void, otherwise it shall remain in full force and effect.

This Bond is made and entered into solely for the prosecution of all claimants supplying labor and material in the prosecution of the work provided for in said Contract, and all such claimants shall have a direct right of action under the Bond as provided in Section 2253.073, Texas Government Code.

PROVIDED FURTHER, that if any legal action be filed upon this Bond, venue shall lie in Hays County, State of Texas, and that no change, extension of time, alteration or addition to the terms of the Contract or to the work to be performed thereunder or the Specifications accompanying the same, shall in any wise affect its obligation on this Bond, and it does hereby waive notice of any such change, extension of time, alteration or addition to the terms of the Contract or in the work or to the Specifications.

PROVIDED FURTHER, that no final settlement between the Owner and the Contractor shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

IN WITNESS WHEREOF, this instrument is executed in six counterparts, each one of which shall be deemed an original, this the _____ day of _____ **2025**.

ATTEST:

_____
(Principal) Secretary

_____
PRINCIPAL

By: _____

(SEAL)

_____
Address (State & Zip Code)

_____
Witness as to Principal

_____
Telephone Number

_____
Address (State and Zip Code)

ATTEST:

_____
(Surety) Secretary

_____
SURETY

By:_____

(SEAL)

_____
Address (State and Zip Code)

_____
Witness as to Surety

_____
Telephone No. (Area Code)

_____
Address (State and Zip Code)

NOTE: If Contractor is Partnership, all Partners should execute Bond.

PERFORMANCE – PAYMENT BOND FORM
M-24, 25, Attach. Sa

_____	_____ (SEAL)
	Individual Principal
_____	_____
Address (State and Zip Code)	Business – Address
_____	_____
Telephone Number (Area Code)	Telephone Number (Area Code)
ATTEST:	_____
	Corporate Principal
_____	_____
(State and Zip Code)	Business Address Name
	_____
	Telephone Number (Area Code)
_____	_____
Address (State and Zip Code)	(Affix Corporate Seal)
ATTEST:	By: _____
	_____
	Address (State and Zip Code)
	_____
	Corporate
_____	
Surety	
	_____
	Business Address
	_____
	(Affix Corporate Seal)
	_____
	Telephone

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the Secretary of the Corporation named as Principal in the within Bond; that _____, who signed the said Bond on behalf of the Principal was then _____, of said Corporation; that I know his signature thereof is genuine; and that said Bond was duly signed, sealed, and attested for and on behalf of said Corporation by authority of its governing body.

_____
Title

_____ _____

Date: _____ (Affix Corporate Seal)

Telephone No.: _____

The rate of premium on this Bond is _____ per thousand.

Total of premium charge $_____.

NOTE: The above must be filled in by Corporate Surety. Power of Attorney of person signing for Surety Company must be attached.

SECTION C-4
CONTRACTOR'S AND SUBCONTRACTOR'S INSURANCE
CITY OF DRIPPING SPRINGS
MINIMUM INSURANCE PROVISIONS AND LIMITS
FOR CONSTRUCTION, REPAIR, INSTALLATION AND MAINTENANCE CONTRACTORS

***Contractor shall provide and continuously maintain the minimum insurance coverages set forth below during the term of its agreement with* the City of Dripping Springs (City); and Contractor shall require its subcontractors to purchase the same types and amounts of insurance, at a minimum, as set forth below with respect to statutory workers' compensation and liability insurance.**

1. Standard ISO commercial general liability insurance at minimum combined single limits of $1,000,000 per-occurrence and $2,000,000 general aggregate for bodily injury and property damage, which coverage shall include: products/completed operations ($2,000,000 products/completed operations aggregate); XCU (explosion, collapse, underground) hazards; and contractual liability. Without limitation, the commercial general liability coverage must cover all operations required in the contract, as well as contractual liability for the indemnity obligations assumed by the Contractor in the contract. Coverage must be written on an occurrence form.

2. Workers' compensation insurance at statutory limits, including employer's liability coverage at minimum limits of $1,000,000 each-occurrence, each accident/$1,000,000 by disease each-occurrence/$1,000,000 by disease aggregate.

3. Commercial automobile liability insurance at a minimum combined single limit of $1,000,000 per-occurrence for bodily injury and property damage, including non-owned and hired car coverage and owned vehicles if any are owned.

4. Umbrella liability or following-form excess liability at minimum limits of $ 1,000,000 each-occurrence/$2,000,000 aggregate where applicable in any underlying coverage. Coverage must be at least as broad as the underlying commercial general liability, auto liability, and employer's liability.

5. Waiver of Rights - Owner and Contractor intend that all policies purchased will protect Owner, Contractor, Subcontractors, and E/A, and all other individuals or entities identified in the Insurance Rider to be listed as additional named insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Upon receipt of payment for any loss or damage covered by an insurance policy required by the Insurance Rider or this Agreement, the Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against all other individuals or entities identified in the Insurance Rider to be listed as insured or additional named insured (and the officers, directors, partners, employees, agents,

consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.

With reference to the foregoing insurance requirements, Contractor shall specifically endorse applicable insurance policies as follows:

1. City of Dripping Springs shall be named as an additional named insured on a primary and non-contributory basis, regardless of the application of other insurance, with respect to all liability coverages, except for the professional liability and workers' compensation.

2. All liability policies shall contain no cross-liability exclusions or insured versus insured restrictions.

3. A waiver of subrogation in favor of the City shall be contained in all policies.

4. All insurance policies shall be endorsed to require the insurer to immediately notify the City of any material change in the insurance coverage.

5. All insurance policies shall be endorsed to the effect that City will receive at least thirty (30) days' notice prior to cancellation or non-renewal of the insurance.

6. The additional insured coverage in the CGL policy in favor of the City must apply to the ongoing operations of Contractor for contract costs or up to $1,000,000 and expanded to include products/completed operation for contract costs in excess of $1,000,000.

7. Required limits may be satisfied by any combination of primary and umbrella/excess liability insurances.

8. Contractor may maintain reasonable and customary deductibles, subject to approval by the City.

9. Insurance must be purchased from insurers that are financially acceptable to the City with a minimum *A.M. Best* financial rating of A-:VII.

10. Coverage for commercial general liability must be maintained for at least (2) years after the project is completed.

11. For projects in excess of $10,000,000 in cost, a per-project aggregate limit must be included in the commercial general liability.

All insurance must be written on standard ISO or equivalent forms. Certificates of insurance shall be prepared and executed by the insurance company, or its authorized agent, shall be furnished to the City within ten (10) business days of being notified of the award of the contract, and shall contain provisions representing and warranting the following:

- Shall set forth all endorsements and insurance coverages according to requirements and instructions contained herein.

- Shall specifically set forth the notice-of-cancellation or termination provisions to the City.

- Copies of all required endorsements must be attached to the certificate of insurance. The certificates of insurance must be updated and resubmitted to the City to show renewal coverages, as applicable, at least thirty (30) days prior to expiration of any one or more policies.

Upon request, Contractor shall furnish the City with certified copies of all insurance policies.

NOTICE OF AWARD

To: _____
_____
_____

Project: STEPHENSON SCHOOL BUILDING & PARKING IMPROVEMENTS

The City of Dripping Springs has considered the bids submitted for the above described project in response to its advertisement for proposals dated **July 17, 2025** and related information to Proposers.

You are hereby notified that your proposal in the amount of $_____
_____, has been favorably considered for the project by the City. Pursuant to the Instructions to Proposers you are asked to sign the proposed Contract and to return the same, along with the required Certificate of Insurance and Payment Bond and Performance Bond within ten (10) days of your receipt of this Notice, for the approval and signature of the authorized representative of the City.

For the purpose of effective date of the Performance and Payment Bond, and the required Certificate of Insurance, the date of _____ may be considered the date of the Contract, if the Documents are approved by the City.

If you fail to submit the proposed Contract and the Performance and Payment Bonds and the Certificate of Insurance within ten (10) days from your receipt of this Notice, your bid will be considered as withdrawn and your bid bond will be forfeited.

You are asked to acknowledge receipt of this Notice by signing in the appropriate place below.

Dated this ____day of _____, 2025.

CITY OF DRIPPING SPRINGS

_____
City Engineer

ACKNOWLEDGEMENT:

Receipt of this Notice is hereby acknowledged.

Dated this _____day of _____, 2025.

_____
Authorized Signature

Title:_____

NOTICE TO PROCEED

Date: _____

To: _____

_____

_____

Project:_____

In accordance with the construction contract dated_____,

you are hereby notified to commence work no later than _____.

Contract time is: **365 calendar days**.

Substantial Completion Date is: _____

CITY OF DRIPPING SPRINGS

_____
City Engineer

The above NOTICE TO PROCEED is hereby acknowledged by

_____

on this the _____day of _____2025.

_____
Authorized Signature

_____
Name:

Title:_____

CONTRACT TIME & LIQUIDATED DAMAGES

The Contract Performance for this project shall be **365 Calendar Days**.

The time set forth in the proposal for the completion of the work is an essential element of the Contract. For each working day under the conditions described in the preceding Paragraph that any work shall remain uncompleted after the expiration of the calendar days specified in the Contract, together with any additional working days allowed, the amount per day given in the following schedule will be deducted from the money due or to become due the Contractor, not as a penalty but as liquidated damages.

	FOR AMOUNT OF CONTRACT	
From More Than	**To and Including**	**Amount of Liquidated Damages Per Working Days**
$0	$100,000	$200
$100,000	$500,000	$400
$500,000	$1,000,000	$550
$1,000,000	$2,000,000	$700
$2,000,000	$5,000,000	$850
$5,000,000	$10,000,000	$1,200
$10,000,000	$15,000,000	$1,500
$15,000,000	$20,000,000	$1,700
$20,000,000	Over $20,000,000	$2,500

EQUAL OPPORTUNITY CLAUSE

1. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex or natural origin. The Contractor will take Affirmative action to ensure that applicants are employed, and that employees are treated during their employment, without regard to their race, creed, color or national origin. Such action shall include, but not limited to, the following: employment, upgrading, demotion or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection of training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the contracting officer setting forth the provisions of the non-discrimination clause.

2. The Contractor will, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, religion, color, sex or natural origin.

Equal Employment Opportunity is

THE LAW

Employers Holding Federal Contracts or Subcontracts

Applicants to and employees of companies with a Federal government contract or subcontract are protected under the following Federal authorities:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Executive Order 11246, as amended, prohibits job discrimination on the basis of race, color, religion, sex or national origin, and requires affirmative action to ensure equality of opportunity in all aspects of employment.

INDIVIDUALS WITH DISABILITIES

Section 503 of the Rehabilitation Act of 1973, as amended, prohibits job discrimination because of disability and requires affirmative action to employ and advance in employment qualified individuals with disabilities who, with reasonable accommodation, can perform the essential functions of a job.

VIETNAM ERA, SPECIAL DISABLED, RECENTLY SEPARATED, AND OTHER PROTECTED VETERANS

38 U.S.C. 4212 of the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended, prohibits job discrimination and requires affirmative action to employ and advance in employment qualified Vietnam era veterans, qualified special disabled veterans, recently separarted veterans, and other protected veterans.

Any person who believes a contractor has violated its nondiscrimination or affirmative action obligations under the authorities above should contact immediately:

The Office of Federal Contract Compliance Programs (OFCCP), Employment Standards Administration, U.S. Department of Labor, 200 Constitution Avenue, N.W., Washington, D.C. 20210 or call (202) 693-0101, or an OFCCP regional or district office, listed in most telephone directories under U.S. Government, Department of Labor.

Private Employment, State and Local Governments, Educational Institutions

Applicants to and employees of most private employers, state and local governments, educational institutions, employment agencies and labor organizations are protected under the following Federal laws:

RACE, COLOR, RELIGION, SEX, NATIONAL ORIGIN

Title VII of the Civil Rights Act of 1964, as amended, prohibits discrimination in hiring, promotion, discharge, pay, fringe benefits, job training, classification, referral, and other aspects of employment, on the basis of race, color, religion, sex or national origin.

DISABILITY

The Americans with Disabilities Act of 1990, as amended, protects qualified applicants and employees with disabilities from discrimination in hiring, promotion, discharge, pay, job training, fringe benefits, classification, referral, and other aspects of employment on the basis of disability. The law also requires that covered entities provide qualified applicants and employees with disabilities with reasonable accommodations that do not impose undue hardship.

AGE

The Age Discrimination in Employment Act of 1967, as amended, protects applicants and employees 40 years of age or older from discrimination on the basis of age in hiring, promotion, discharge, compensation, terms, conditions or privileges of employment.

SEX (WAGES)

In addition to sex discrimination prohibited by Title VII of the Civil Rights Act of 1964, as amended (see above), the Equal Pay Act of 1963, as amended, prohibits sex discrimination in payment of wages to women and men performing substantially equal work in the same establishment.

Retaliation against a person who files a charge of discrimination, participates in an investigation, or opposes an unlawful employment practice is prohibited by all of these Federal laws.

If you believe that you have been discriminated against under any of the above laws, you should contact immediately:

The U.S. Equal Employment Opportunity Commission (EEOC), 1801 L Street, N.W., Washington, D.C. 20507 or an EEOC field office by calling toll free (800) 669-4000. For individuals with hearing impairments, EEOC's toll free TDD number is (800) 669-6820.

Programs or Activities Receiving Federal Financial Assistance

RACE, COLOR, RELIGION, NATIONAL ORIGIN, SEX

In addition to the protection of Title VII of the Civil Rights Act of 1964, as amended, Title VI of the Civil Rights Act prohibits discrimination on the basis of race, color or national origin in programs or activities receiving Federal financial assistance. Employment discrimination is covered by Title VI if the primary objective of the financial assistance is provision of employment, or where employment discrimination causes or may cause discrimination in providing services under such programs. Title IX of the Education Amendments of 1972 prohibits employment discrimination on the basis of sex in educational programs or activities which receive Federal assistance.

INDIVIDUALS WITH DISABILITIES

Sections 501, 504 and 505 of the Rehabilitation Act of 1973, as amended, prohibits employment discrimination on the basis of disability in any program or activity which receives Federal financial assistance in the federal government. Discrimination is prohibited in all aspects of employment against persons with disabilities who, with reasonable accommodation, can perform the essential functions of a job.

If you believe you have been discriminated against in a program of any institution which receives Federal assistance, you should contact immediately the Federal agency providing such assistance.

WAGE DETERMINATION

Wage Rates. Pursuant to Section 2258.023(a), Texas Government Code, as amended, wage rates paid by the Contractor and any subcontractor on this Project shall be not less than the general prevailing rate of per diem wages for work of a similar character in this locality as specified in the schedule of general prevailing rates of per diem wages set forth by the Davis Bacon General Decision Number: TX20240007 01/05/2024 below:

"General Decision Number: TX20240007 01/05/2024

Superseded General Decision Number: TX20230007

State: Texas

Construction Types: Heavy and Highway

Counties: Atascosa, Bandera, Bastrop, Bell, Bexar, Brazos, Burleson, Caldwell, Comal, Coryell, Guadalupe, Hays, Kendall, Lampasas, McLennan, Medina, Robertson, Travis, Williamson and Wilson Counties in Texas.

HEAVY (excluding tunnels and dams, not to be used for work on Sewage or Water Treatment Plants or Lift / Pump Stations in Bell, Coryell, McClennon and Williamson Counties) and HIGHWAY Construction Projects

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658. Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extended (e.g., an option is exercised) on or after January 30, 2022:	. Executive Order 14026 generally applies to the contract. . The contractor must pay all covered workers at least $17.20 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in 2024.
If the contract was awarded on or between January 1, 2015 and	. Executive Order 13658 generally applies to the

January 29, 2022, and the contract is not renewed or extended on or after January 30, 2022:	contract. . The contractor must pay all covered workers at least $12.90 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2024.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at http://www.dol.gov/whd/govcontracts.

Modification Number 0 — Publication Date 01/05/2024

SUTX2011-006 08/03/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving and Structures)	$ 12.56 **	
ELECTRICIAN	$ 26.35	
FORM BUILDER/FORM SETTER		
Paving & Curb	$ 12.94 **	
Structures	$ 12.87 **	
LABORER		
Asphalt Raker	$ 12.12 **	
Flagger	$ 9.45 **	
Laborer, Common	$ 10.50 **	
Laborer, Utility	$ 12.27 **	
Pipelayer	$ 12.79 **	
Work Zone Barricade Servicer	$ 11.85 **	
PAINTER (Structures)	$ 18.34	
POWER EQUIPMENT OPERATOR:		
Agricultural Tractor	$ 12.69 **	

```
     Asphalt Distributor.....$ 15.55 **
     Asphalt Paving Machine......$ 14.36 **
     Boom Truck..................$ 18.36
     Broom or Sweeper............$ 11.04 **
     Concrete Pavement
     Finishing Machine...........$ 15.48 **
     Crane, Hydraulic 80 tons
     or less.....................$ 18.36
     Crane, Lattice Boom 80
     tons or less................$ 15.87 **
     Crane, Lattice Boom over
     80 tons.....................$ 19.38
     Crawler Tractor.............$ 15.67 **
     Directional Drilling
     Locator.....................$ 11.67 **
     Directional Drilling
     Operator....................$ 17.24
     Excavator 50,000 lbs or
     Less........................$ 12.88 **
     Excavator over 50,000 lbs...$ 17.71
     Foundation Drill, Truck
     Mounted.....................$ 16.93 **
     Front End Loader, 3 CY or
     Less........................$ 13.04 **
     Front End Loader, Over 3 CY.$ 13.21 **
     Loader/Backhoe..............$ 14.12 **
     Mechanic....................$ 17.10 **
     Milling Machine.............$ 14.18 **
     Motor Grader, Fine Grade....$ 18.51
     Motor Grader, Rough.........$ 14.63 **
     Pavement Marking Machine....$ 19.17
     Reclaimer/Pulverizer........$ 12.88 **
     Roller, Asphalt.............$ 12.78 **
     Roller, Other...............$ 10.50 **
     Scraper.....................$ 12.27 **
     Spreader Box................$ 14.04 **
     Trenching Machine, Heavy....$ 18.48

Servicer.........................$ 14.51 **

Steel Worker
     Reinforcing.................$ 14.00 **
     Structural..................$ 19.29

TRAFFIC SIGNALIZATION:
Traffic Signal Installation
     Traffic Signal/Light Pole
     Worker......................$ 16.00 **

TRUCK DRIVER
     Lowboy-Float................$ 15.66 **
     Off Road Hauler.............$ 11.88 **
     Single Axle.................$ 11.79 **
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Single or Tandem Axle Dump Truck.....$ 11.68 **
Tandem Axle Tractor w/Semi Trailer.....$ 12.81 **

WELDER.....$ 15.97 **

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($17.20) or 13658 ($12.90). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at https://www.dol.gov/agencies/whd/government-contracts.

Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage

determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union

average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour National Office because National Office has responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the

interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION"

The OWNER's design professional as outlined in Article 9 of the General Conditions:

Building Engineer/Architect (E/A):
Building Scope
Name: Alexis McKinney, AIA
Company: Architexas
Address: 1023 Springdale Road, Building 11 Suite E, Austin, TX 78721
Phone: 512-444-4220
E-mail: amckinney@architexas.com

Parking Lot/Site Engineers

Name: Joe Grasso, PE
Company: Doucet, A Kleinfelder Company
Address: 7401 B Hwy 71 West, Suite 160
Phone: 512.924.8485
E-mail: jgrasso@kleinfelder.com

The designated representative of the OWNER as outlined in Article 8 of the General Conditions:

Owner's Representative:
Name: Chad Gilpin, City Engineer
Company: City of Dripping Springs
Address: 511 Mercer St., Dripping Springs TX 78620
Phone: 512-858-4725
E-mail: cgilpin@cityofdrippingsprings.com

GENERAL CONDITIONS OF THE CONTRACT

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ARTICLE 1 – DEFINITIONS

Whenever used in these General Conditions or in the other Contract Documents the following terms have the meanings indicated which are applicable to both the singular and plural thereof:

1.1 Addendum - Written instruments issued by the Contract Awarding Authority which clarify, correct or change the bidding requirements or the Contract Documents prior to the Due Date. "Addenda" is the plural form of Addendum.

1.2 Alternative Dispute Resolution - The process by which a disputed Claim may be settled if the OWNER and the CONTRACTOR cannot reach an agreement between themselves, as an alternative to litigation.

1.3 Bid - A complete, properly signed response to an Invitation for Bid that, if accepted, would bind the Bidder to perform the resultant Contract.

1.4 Bidder - A person, firm, or entity that submits a Bid in response to a Solicitation. Any Bidder may be represented by an agent after submitting evidence demonstrating the agent's authority. The agent cannot certify as to his own agency status.

1.5 Bid Documents - The advertisement or Invitation for Bids, instructions to Bidders, the Bid form, the Contract Documents and Addenda.

1.6 Calendar Day - Any day of the week; no days being excepted. Work on Saturdays, Sundays, and/or Legal Holidays shall be coordinated with OWNER.

1.7 Change Directive - A written directive to CONTRACTOR, signed by OWNER, ordering a change in the Work and stating a proposed basis for adjustment, if any, in the Contract Amount or Contract Time, or both. A Change Directive may be used in the absence of total agreement on the terms of a Change Order. A Change Directive does not change the Contract Amount or Contract Time, but is evidence that the parties expect that the change directed or documented by a Change Directive will be incorporated in a subsequently issued Change Order.

1.8 Change Orders - Written agreements entered into between CONTRACTOR and OWNER authorizing an addition, deletion, or revision to the Contract, issued on or after the Execution Date of the Agreement.

1.9 Claim - A written demand seeking, as a matter of right, adjustment or interpretation of Contract terms, payment of money, extension of time or other relief with respect to the terms of the Contract.

1.10 Contract - The binding legal agreement between the OWNER and the CONTRACTOR. The Contract represents the entire and integrated agreement between OWNER and CONTRACTOR for performance of the Work, as evidenced by the Contract Documents.

1.11 Contract Amount - The moneys payable by OWNER to CONTRACTOR for completion of the Work in accordance with the Contract Documents.

1.12 Contract Awarding Authority - A City department authorized to enter into Contracts on behalf of the City.

1.13 Contract Documents - Project Manual, Drawings, Addenda and Change Orders.

1.14 Contract Time - The number of days allowed for completion of the Work as defined by the Contract. When any period is referred to in days, it will be computed to exclude the first and include the last day of such period. A day of twenty-four hours measured from midnight to the next midnight will constitute a day.

1.15 CONTRACTOR - The individual, firm, corporation, or other business entity with whom OWNER has entered into the Contract for performance of the Work.

1.16 Critical Path - The longest series of tasks that runs consecutively from the beginning to the end of the project, as determined by duration and workflow sequence. This longest path sets the managerial standard for how quickly a project can be completed, given appropriate resources.

1.17 Drawings - Those portions of the Contract Documents which are graphic representations of the scope, extent and character of the Work to be furnished and performed by CONTRACTOR and which have been approved by OWNER. Drawings may include plans, elevations, sections, details, schedules and diagrams. Shop Drawings are not Drawings as so defined.

1.18 Due Date - The date and time specified for receipt of Bids.

1.19 Engineer/Architect (E/A) - The OWNER's design professional identified as such in the Contract. The titles of "Architect/Engineer," "Architect" and "Engineer" used in the Contract Documents shall read the same as Engineer/Architect (E/A). Nothing contained in the Contract Documents shall create any contractual or agency relationship between E/A and CONTRACTOR.

1.20 Equal - The terms "equal" or "approved equal" shall have the same meaning.

1.21 Execution Date - Date of last signature of the parties to the Agreement.

1.22 Field Order - A written order issued by Owner's Representative which orders minor changes in the Work and which does not involve a change in the Contract Amount or the Contract Time.

1.23 Final Completion - The point in time when OWNER determines that all Work has been completed and final payment to CONTRACTOR will be made in accordance with the Contract Documents.

1.24 Force Account - a basis of payment for the direct performance of Work with payment based on the actual cost of the labor, equipment and materials furnished and consideration for overhead and profit as set forth in Section 11.5.

1.25 Inspector - The authorized representative of any regulatory agency that has jurisdiction over any portion of the Work.

1.26 Invitation for Bid (IFB) - a Solicitation requesting pricing for a specified Good or Service which has been advertised for Bid in a newspaper and/or the Internet.

1.27 Legal Holidays

1.27.1 The following are recognized by the OWNER:

Holiday	Date Observed
New Year's Day	January 1
President's Day	Third Monday in February
Memorial Day	Last Monday in May
Independence Day	July 4
Labor Day	First Monday in September
Veteran's Day	November 11
Thanksgiving Day	Fourth Thursday in November
Friday after Thanksgiving	Friday after Thanksgiving
Christmas Eve	December 24
Christmas Day	December 25

1.27.2 If a Legal Holiday falls on Saturday, it will be observed on the preceding Friday. If a Legal Holiday falls on Sunday, it will be observed on the following Monday.

1.27.3 Christmas Eve is observed only if it falls on a Monday through Thursday. If Christmas Eve falls on a Friday, that day is observed as the Christmas Day holiday.

1.28 Milestones - A significant event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.

1.29 Notice to Proceed - A Written Notice given by OWNER to CONTRACTOR fixing the date on which the Contract Times will commence to run and on which CONTRACTOR shall start to perform CONTRACTOR's obligations under the Contract Documents.

1.30 OWNER - City of Dripping Springs, Texas, a municipal corporation, general law, Type A city and political subdivision organized and existing under the laws of the State of Texas, acting through the City Council's designee, officers, agents or employees to administer design and construction of the Project.

1.31 Owner's Representative - The designated representative of the OWNER.

1.32 Partial Occupancy or Use - Use by OWNER of a substantially completed part of the Work for the purpose for which it is intended (or a related purpose) prior to Substantial Completion of all the Work, provided OWNER and CONTRACTOR have accepted in writing the responsibilities assigned to each of them for payments, retainage if any, security, maintenance, utilities, corrective work, insurance and warranties.

1.33 Project - The subject of the Work and its intended result.

1.34 Project Manual - That portion of the Contract Documents which may include the following: introductory information; bidding requirements, Contract forms and General and Supplemental General Conditions; General Requirements; Specifications; Drawings; MBE/WBE or DBE Procurement Program Package; Project Safety Manual; and Addenda.

1.35 Resident Project Representative - The authorized representative of E/A who may be assigned to the site or any part thereof.

1.36 Shop Drawings - All drawings, diagrams, illustrations, schedules and other data or information which are specifically prepared or assembled by or for CONTRACTOR and submitted by CONTRACTOR as required by the Contract Documents.

1.37 Specifications - Those portions of the Contract Documents consisting of written technical descriptions as applied to the Work, which set forth to CONTRACTOR, in detail, the requirements which must be met by all materials, equipment, construction systems, standards, workmanship, equipment and services in order to render a completed and useful project.

1.38 Solicitation - Solicitation means, as applicable, an Invitation for Bid or a Request for Proposal.

1.39 Substantial Completion - The stage in the progress of the Work when the Work, or designated portion thereof, is sufficiently complete in accordance with the Contract Documents so OWNER can occupy or utilize the Work for its intended use, as evidenced by a Certificate of Substantial Completion approved by OWNER.

1.40 Subcontractor - An individual, firm, corporation, or other business entity having a direct contract with CONTRACTOR for the performance of a portion of the Work under the Contract.

1.41 Sub-Subcontractor - A person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the work.

1.42 Superintendent - The representative of CONTRACTOR authorized in writing to receive and fulfill instructions from the Owner's Representative, and who shall supervise and direct construction of the Work.

1.43 Supplemental General Conditions - The part of the Contract Documents which amends or supplements the General Conditions. All General Conditions which are not so amended or supplemented remain in full force and effect.

1.44 Supplier - An individual or entity having a direct contract with CONTRACTOR or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by CONTRACTOR or any Subcontractor.

1.45 Time Extension Request - An approved request for time extension on a form acceptable to OWNER.

1.46 Work - The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents.

1.47 Working Day - Any day of the week, not including Saturdays, Sundays, or Legal Holidays in which conditions under the CONTRACTOR's control will permit work for a continuous period of not less than seven (7) hours between 7:00 a.m. and 6:00 p.m. Upon agreement with Owner's Representative, work on Saturdays, Sundays and/or Legal Holidays may be allowed and will be considered a Working Day.

1.48 Working Hours

1.48.1 Working Day Contract: All Work shall be done between 7:00 a.m. and 5:00 p.m. unless authorized by Owner's Representative. However, emergency work may be done without prior permission as indicated in paragraph 6.11.5. If night Work is authorized and conditions under CONTRACTOR's control will permit Work for a continuous period of not less than seven (7) hours between 12:00 a.m. and 11:59 p.m. it will be considered a Working Day. Night Work may be revoked at any time by OWNER if CONTRACTOR fails to maintain adequate equipment and supervision for the prosecution and control of the night Work.

1.48.2 Calendar Day Contract: All Work shall be done between 7:00 a.m. and 6:00 p.m. unless authorized by Owner's Representative. However, emergency work may be done without prior permission as indicated in paragraph 6.11.5. Night Work may be revoked at any time by OWNER if CONTRACTOR fails to maintain adequate equipment and supervision for the prosecution and control of the night Work.

1.49 Written Notice - Written communication between OWNER and CONTRACTOR. Written Notice shall be deemed to have been duly served if delivered in person to Owner's Representative or CONTRACTOR's duly authorized representative, or if delivered at or sent by registered or certified mail to the attention of Owner's Representative or CONTRACTOR's duly authorized representative at the last business address known to the party giving notice.

ARTICLE 2 - PRELIMINARY MATTERS

2.1 Delivery of Agreement, Bonds, Insurance, etc.: Within ten (10) Calendar Days after written notification of award of Contract, CONTRACTOR shall deliver to OWNER signed Agreement, Bond(s), Insurance Certificate(s) and other documentation required for execution of Contract.

2.2 Copies of Documents: OWNER shall furnish to CONTRACTOR with digital copies of the Contract Documents unless otherwise specified. CONTRACTOR will be responsible for furnishing hardcopies for CONTRACTOR and subcontractor use.

2.3 Commencement of Contract Times; Notice to Proceed: The Contract Time(s) will begin to run on the day indicated in the Notice to Proceed. Notice to Proceed will be given at any

time within sixty (60) calendar days after the Execution Date of the Agreement, unless extended by written agreement of the parties.

2.4 Before Starting Construction:

2.4.1 No Work shall be done at the site prior to the preconstruction conference without OWNER's approval. Before undertaking each part of the Work, CONTRACTOR shall carefully study the Contract Documents to check and verify pertinent figures shown thereon compare accurately to all applicable field measurements. CONTRACTOR shall promptly report in writing to Owner's Representative any conflict, error, ambiguity or discrepancy which CONTRACTOR may discover and shall obtain a written interpretation or clarification from Owner's Representative before proceeding with any Work affected thereby. CONTRACTOR shall be liable to OWNER for failure to report any conflict, error, ambiguity or discrepancy in the Contract Documents of which CONTRACTOR knew or reasonably should have known.

2.4.2 It is mutually agreed between CONTRACTOR and OWNER that successful completion of the Work within the Contract completion date is of primary importance. Therefore, the CONTRACTOR hereby agrees to submit to the Owner's Representative for review and approval, or acceptance, as appropriate, all information requested within this section, including a Baseline Schedule, no later than three working days prior to the preconstruction conference. The Owner's Representative will schedule the preconstruction conference upon the timely submittal of the required documents, unless time is extended by written mutual agreement. CONTRACTOR will submit the following:

.1 A proposed Baseline Schedule developed using Microsoft Project software, unless otherwise approved by Owner's Representative ("Baseline Schedule") to confirm that all Work will be completed within the Contract time. The Baseline Schedule must (i) indicate the times (number of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents, (ii) identify the Critical Path for completing the Work, (iii) identify when all Subcontractors will be utilized, and (iv) take into consideration any limitations on Working Hours, including baseline Rain Days on Calendar Day Contracts. This Baseline Schedule, a copy of which shall be made available at the job site(s), must contain sufficient detail to indicate that the CONTRACTOR has properly identified required Work elements and tasks, has provided for a sufficient and proper workforce and integration of Subcontractors, has provided sufficient resources and has considered the proper sequencing of the Work required to result in a successful Project that can be completed within the Contract time;

.2 An organizational chart showing the principals, management personnel, Superintendent and project manager who will be involved with the Work, including each one's responsibilities for the Work;

.3 A preliminary schedule of Shop Drawing and sample submittals;

.4 A preliminary schedule of values for all of the Work, subdivided into component parts in sufficient detail to serve as the basis for progress payments during construction. Such prices will be deemed to include an appropriate amount of overhead and profit applicable to each item of Work;

.5 If applicable, an excavation safety system plan;

.6 If applicable, a plan illustrating proposed locations of temporary facilities;

.7 A letter designating the Texas Registered Professional Land Surveyor for layout of the Work, if the Work requires the services of a surveyor; and

.8 Appropriate safety training certificates for workers that will initially be on site.

2.4.3 Neither the acceptance nor the approval of any of the submittals required in paragraph 2.4.2, above, will constitute the adoption, affirmation, or direction of the CONTRACTOR'S means and methods.

2.5 Preconstruction Conference: Prior to commencement of Work at the site, CONTRACTOR must attend a preconstruction conference with Owner's Representative and others, as set forth in Contract documents.

2.6 Initially Acceptable Schedules: Unless otherwise provided in the Contract Documents, CONTRACTOR shall obtain approval of Owner's Representative on the Baseline Schedule submitted in accordance with paragraph 2.4.2.1 before the first progress payment will be made to CONTRACTOR. The Baseline Schedule must provide for an orderly progression of the designated portion of the Work to completion within any specified Milestones and Contract Times. Acceptance of the schedule by Owner's Representative will neither impose on Owner's Representative responsibility or liability for the sequencing, scheduling or progress of the Work nor interfere with or relieve CONTRACTOR from CONTRACTOR's full responsibility for such Work. CONTRACTOR's schedule of Shop Drawings and sample submissions must provide an acceptable basis for reviewing and processing the required submittals.

ARTICLE 3 - CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE

3.1 Intent:

3.1.1 The intent of the Contract Documents is to include all information necessary for the proper execution and timely completion of the Work by CONTRACTOR. The CONTRACTOR will execute the Work described in and reasonably inferable from the Contract Documents as necessary to produce the results indicated by the Contract Documents. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. In cases of disagreement, the following order of precedence shall generally govern (top item receiving priority of interpretation):

Signed Agreement
Addendum to the Contract Documents, including approved changes
Supplemental General Conditions
General Conditions
Other Bidding Requirements and Contract Forms
Special Provisions to the Standard Technical Specifications
Special Specifications
Standard Technical Specifications
Drawings (figured dimensions shall govern over scaled dimensions)
Project Safety Manual (if applicable),

with the understanding that a common sense approach will be utilized as necessary so that the Contract Documents produce the intended response.

3.1.2 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

3.2 Reporting and Resolving Discrepancies: If, during the performance of the Work, CONTRACTOR discovers any conflict, error, ambiguity or discrepancy within the Contract Documents or between the Contract Documents and any provisions of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual or code or instructions of any Supplier, CONTRACTOR shall report it to Owner's Representative in writing at once, and CONTRACTOR shall not proceed with the Work affected thereby until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in paragraph 3.3.1 or 3.3.2. CONTRACTOR shall be liable to OWNER for failure to report any such conflict, error, ambiguity or discrepancy of which CONTRACTOR knew or reasonably should have known.

3.3 Amending and Supplementing Contract Documents:

3.3.1 The Contract Documents may be amended to provide for additions, deletions and revisions in the Work or to modify the terms and conditions thereof in one or more of the following ways:

.1 Change Order.

.2 Change Directive.

.3 Time Extension Request.

3.3.2 In addition, the requirements of the Contract Documents may be supplemented, and minor variations and deviations in the Work may be authorized, in one or more of the following ways:

.1 Field Order.

.2 Review of a Shop Drawing or sample.

.3 Written interpretation or clarification.

3.4 Reuse of Documents Prohibited: CONTRACTOR and any Subcontractor or Supplier or other person or organization performing or furnishing any of the Work under a direct or indirect contract with OWNER: (i) shall not have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of E/A or E/A's consultant, and (ii) shall not reuse any of such Drawings, Specifications, other documents or copies on extensions of the Project or any other project without written consent of OWNER and E/A.

3.5 In the event of the breach by the OWNER or CONTRACTOR of any of its obligations under the Contract, so as to support a claim by the other party, the provisions of this Contract will be equitably construed to allow the resolution of such a claim and all of the other provisions of this Contract shall continue in full force and effect as to the rights, responsibilities, and remedies of the OWNER and CONTRACTOR.

ARTICLE 4 - AVAILABILITY OF LANDS; SUBSURFACE & PHYSICAL CONDITIONS

4.1 Availability of Lands: The OWNER will provide access to all land and interests in land required for the Work and will notify CONTRACTOR of any restrictions in such access. CONTRACTOR may make a claim if OWNER fails to provide timely access to the Work. CONTRACTOR must obtain any additional temporary construction facilities, stockpiling or storage sites not otherwise provided.

4.2 Subsurface and Physical Conditions:

4.2.1 CONTRACTOR specifically represents that it has carefully examined the plans, the geotechnical report, if any, and the site of the proposed Work and is thoroughly familiar with all of the conditions surrounding construction of the Project, having had the opportunity to conduct any and all additional inquiry, tests and investigation that he/she deems necessary and proper. CONTRACTOR acknowledges the receipt of the geotechnical report, if any, and agrees that the report, while it is an accurate record of the geotechnical conditions at the boring locations, is not a guarantee of specific site conditions which may vary between boring locations.

4.2.2 CONTRACTOR must notify OWNER in writing as soon as reasonably possible, but no later than three (3) calendar days, if unforeseen conditions are encountered at the site which are (i) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (ii) unknown physical conditions of an unusual nature, that differ materially from those normally encountered in the type of work being performed under this Contract. CONTRACTOR may not disturb the conditions until OWNER conducts an investigation. Owner's Representative and E/A will promptly investigate such conditions with E/A. If it is determined that such conditions differ materially and cause an increase or decrease in the CONTRACTOR's cost of or time required for performance of any part of the Work, Owner's Representative will recommend an equitable adjustment in the Contract Amount or Contract Time, or both. If it is determined that such conditions are not materially different from those indicated in the Contract Documents, Owner's Representative will notify CONTRACTOR in writing of such findings and the Contract will not be adjusted. CONTRACTOR may dispute such a determination in accordance with Article 16.

4.2.3 Notwithstanding any other provision of this Contract, CONTRACTOR is solely responsible for the location and protection of any and all public utility lines and utility customer service lines in the Work area. "Public utility lines" means the utility distribution and supply system, and "utility customer service lines" means the utility lines connecting customers to the utility distribution and collection system. Generally, existing utility customer service line connections are not shown on the Drawings. CONTRACTOR shall notify "One Call" and exercise due care to locate, mark, uncover and otherwise protect all such lines in the construction zone and any of CONTRACTOR's work or storage areas. CONTRACTOR's responsibility for the location and protection of utilities is primary and nondelegable. **CONTRACTOR shall indemnify or reimburse such expenses or costs (including fines that may be levied against OWNER) that may result from unauthorized or accidental damage to all public lines and utility customer service lines in the work area.** OWNER reserves the right to repair any damage CONTRACTOR causes to such utilities at CONTRACTOR's expense. If a public line and/or customer service line is damaged by CONTRACTOR, CONTRACTOR shall give verbal notice within one (1) hour and written notice within twenty-four (24) hours to the Owner's Representative.

4.2.4 CONTRACTOR shall take reasonable precaution to avoid disturbing primitive records and antiquities of archaeological, paleontological or historical significance. No objects of this nature shall be disturbed without written permission of OWNER and Texas Historical Commission. When such objects are uncovered unexpectedly, CONTRACTOR shall stop all Work in close proximity and notify Owner's Representative and Texas Historical Commission of their presence and shall not disturb them until written permission and permit to do so is granted. All primitive rights and antiquities uncovered on OWNER's property shall remain property of State

of Texas, Texas Historical Commission conforming to Texas Natural Resources Code. If it is determined by OWNER, in consultation with Texas Historical Commission, that exploration or excavation of primitive records or antiquities on Project site is necessary to avoid loss, CONTRACTOR shall cooperate in salvage work attendant to preservation. If the Work stoppage or salvage work causes an increase in CONTRACTOR's cost of, or time required for, performance of the Work, the Contract Amount and/or Contract Time will be equitably adjusted.

4.3 Reference Points: All control lines and benchmarks suitable for use in layout will be furnished by CONTRACTOR, unless otherwise specified. Controls, bench marks and property boundary markers shall be carefully preserved by CONTRACTOR by use of flags, staffs or other visible devices and in case of destruction or removal by CONTRACTOR or its employees, such controls and bench marks shall be replaced by a Registered Professional Land Surveyor at CONTRACTOR's expense. City survey monuments damaged by CONTRACTOR will be reestablished by OWNER at CONTRACTOR's expense.

4.4 Hazardous Materials:

4.4.1 CONTRACTOR shall immediately notify Owner's Representative of any suspected hazardous materials encountered before or during performance of the Work and shall take all necessary precautions to avoid further disturbance of the materials.

4.4.2 CONTRACTOR shall be responsible for any hazardous materials brought to the site by CONTRACTOR, Subcontractor, Suppliers or anyone else for whom CONTRACTOR is responsible.

4.4.3 The CONTRACTOR shall not knowingly use, specify, request or approve for use any asbestos containing materials or lead-based paint without the OWNER'S written approval. When a specific product is specified, the CONTRACTOR shall endeavor to verify that the product does not include asbestos containing material.

4.4.4 Hazardous material definitions and procedures.

.1 Unless otherwise expressly provided in the Contract Documents to be part of the Work, CONTRACTOR is not responsible for any unexpected Hazardous Materials encountered at the site. Upon encountering any Hazardous Conditions, CONTRACTOR must stop Work immediately in the affected area and duly notify OWNER and, if required by applicable law or regulations, all government or quasi-government entities with jurisdiction over the Project or site.

.2 Upon receiving notice of the presence of suspected Hazardous Materials, OWNER shall take the necessary measures required to ensure that the Hazardous Materials are remediated or rendered harmless. Such necessary measures shall include OWNER retaining qualified independent experts to (i) ascertain whether Hazardous Materials have actually been encountered, and, if they have been encountered, (ii) prescribe the remedial measures that OWNER must take either to remove the Hazardous Materials or render the Hazardous Materials harmless.

.3 CONTRACTOR shall be obligated to resume Work at the affected area of the Project only after OWNER's Representative provides written certification that (i) the Hazardous Materials have been removed or rendered harmless and (ii) all necessary approvals have been obtained from all government and quasi-government entities having jurisdiction over the Project or site. The CONTRACTOR shall be responsible for continuing the Work in the unaffected portion of the Project and site.

.4 CONTRACTOR will be entitled, in accordance with these General Conditions, to an adjustment in its Contract Amount and/or Contract Time(s) to the extent CONTRACTOR's cost and/or time of performance have been adversely impacted by the presence of Hazardous Materials.

.5 Notwithstanding the preceding provisions of this Section 4.1, OWNER is not responsible for Hazardous Materials introduced to the Site by CONTRACTOR, Subcontractors or anyone for whose acts they may be liable. **CONTRACTOR shall indemnify, defend and hold harmless OWNER and OWNER's officers, directors, employees and agents from and against all claims, losses, damages, liabilities and expenses, including attorneys' fees and expenses, arising out of or resulting from those hazardous materials introduced to the site by CONTRACTOR, Subcontractors or anyone for whose acts they may be liable.**

4.4.5 CONTRACTOR shall be responsible for use, storage and remediation of any hazardous materials brought to the Site by CONTRACTOR, Subcontractors, Suppliers or anyone else for whom CONTRACTOR is responsible.

ARTICLE 5 - BONDS AND INSURANCE

5.1 Surety and Insurance Companies: All bonds and insurance required by the Contract Documents shall be obtained from solvent surety or insurance companies that are duly licensed by the State of Texas and authorized to issue bonds or insurance policies for the limits and coverages required by the Contract Documents. The bonds shall be in a form acceptable to OWNER and shall be issued by a surety which complies with the requirements of Texas Insurance Code, Title 12, Chapter 3503. The surety must obtain reinsurance for any portion of the risk that exceeds 10% of the surety's capital and surplus. For bonds exceeding $100,000, the surety must also hold a certificate of authority from the U.S. Secretary of the Treasury or have obtained reinsurance from a reinsurer that is authorized as a reinsurer in Texas and holds a certificate of authority from the U.S. Secretary of the Treasury.

5.2 Workers' Compensation Insurance Coverage:

5.2.1 Definitions:

.1 Certificate of coverage ("certificate") - A copy of a certificate of insurance, a certificate of authority to self-insure issued by the commission, or a coverage agreement (TWCC-81, TWCC-82, TWCC-83, or TWCC-84), showing statutory workers' compensation insurance coverage for the person's or entity's employees providing services on the Project, for the duration of the Project.

.2 Duration of the Project - includes the time from the beginning of the Work on the Project until the CONTRACTOR's/ person's Work on the Project has been completed and accepted by OWNER.

.3 Persons providing services on the Project ("subcontractor" in Texas Labor Code, Section 406.096) - includes all persons or entities performing all or part of the services the CONTRACTOR has undertaken to perform on the Project, regardless of whether that person contracted directly with the CONTRACTOR and regardless of whether that person has employees. This includes, without limitation, independent contractors, Subcontractors, leasing companies, motor

carriers, owner-operators, employees of any such entity, or employees of any entity which furnishes persons to provide services on the Project. "Services" include, without limitation, providing, hauling, or delivering equipment or materials, or providing labor, transportation, or other service related to a project. "Services" does not include activities unrelated to the Project, such as food/beverage vendors, office supply deliveries, and delivery of portable toilets.

5.2.2 CONTRACTOR shall provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all employees of the CONTRACTOR providing services on the Project, for the duration of the Project.

5.2.3 CONTRACTOR must provide a certificate of coverage to OWNER prior to being awarded the Contract.

5.2.4 If the coverage period shown on the CONTRACTOR's current certificate of coverage ends during the duration of the Project, the CONTRACTOR must, prior to the end of the coverage period, file a new certificate of coverage with OWNER showing that coverage has been extended.

5.2.5 CONTRACTOR shall obtain from each person providing services on the Project, and provide to OWNER:

.1 A certificate of coverage, prior to that person beginning Work on the Project, so OWNER will have on file certificates of coverage showing coverage for all persons providing services on the Project; and

.2 No later than seven (7) days after receipt by CONTRACTOR, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project.

5.2.6 CONTRACTOR shall retain all required certificates of coverage for the duration of the Project and for one (1) year thereafter.

5.2.7 CONTRACTOR shall notify OWNER in writing by certified mail or personal delivery, within ten (10) days after CONTRACTOR knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project.

5.2.8 CONTRACTOR shall post on each Project site a notice, in the text, form and manner prescribed by the Texas Workers' Compensation Commission, informing all persons providing services on the Project that they are required to be covered, and stating how a person may verify coverage and report lack of coverage.

5.2.9 CONTRACTOR shall contractually require each person with whom it contracts to provide services on a Project, to:

.1 Provide coverage, based on proper reporting of classification codes and payroll amounts and filing of any coverage agreements, which meets the statutory requirements of Texas Labor Code, Section 401.011(44) for all of its employees providing services on the Project, for the duration of the Project;

.2 Provide to CONTRACTOR, prior to that person beginning Work on the Project, a certificate of coverage showing that coverage is being provided for all employees of the person providing services on the Project, for the duration of the Project;

.3 Provide CONTRACTOR, prior to the end of the coverage period, a new certificate of coverage showing extension of coverage, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

.4 Obtain from each other person with whom it contracts, and provide to CONTRACTOR: a) a certificate of coverage, prior to the other person beginning Work on the Project; and b) a new certificate of coverage showing extension of coverage, prior to the end of the coverage period, if the coverage period shown on the current certificate of coverage ends during the duration of the Project;

.5 Retain all required certificates of coverage on file for the duration of the Project and for one (1) year thereafter;

.6 Notify OWNER in writing by certified mail or personal delivery, within ten (10) days after the person knew or should have known, of any change that materially affects the provision of coverage of any person providing services on the Project; and

.7 Contractually require each person with whom it contracts, to perform as required by paragraphs 5.2.9.1 - 5.2.9.7, with the certificates of coverage to be provided to the person for whom they are providing services.

5.2.10 By signing this Contract or providing or causing to be provided a certificate of coverage, CONTRACTOR is representing to OWNER that all employees of the CONTRACTOR who will provide services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of a self-insured, with the Texas Worker's Compensation Commission's Division of Self- Insurance Regulation. Providing false or misleading information may subject CONTRACTOR to administrative penalties, criminal penalties, civil penalties, or other civil actions.

5.2.11 CONTRACTOR's failure to comply with any of these provisions is a breach of Contract by CONTRACTOR which entitles OWNER to declare the Contract void if CONTRACTOR does not remedy the breach within ten (10) days after receipt of notice of breach from OWNER.

5.3 Other Bond and Insurance Requirements: For additional insurance requirements, refer to Division C.

5.4 Bonds:

5.4.1 General.

.1 Bonds, when required, shall be executed on forms furnished by or acceptable to OWNER. All bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

.2 If the surety on any bond furnished by CONTRACTOR is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Texas or it ceases to meet the requirements of the preceding paragraph, CONTRACTOR shall within ten (10) days thereafter substitute another bond and surety, both of which must be acceptable to OWNER.

.3 When Performance Bonds and/or Payment Bonds are required, each shall be issued in an amount of one hundred percent (100%) of the Contract Amount as security for the faithful performance and/or payment of all CONTRACTOR's obligations under the Contract Documents. Performance Bonds and Payment Bonds shall be issued by a solvent surety company authorized to do business in the State of Texas, and shall meet any other requirements established by law or by OWNER pursuant to applicable law. Any surety duly authorized to do

business in Texas may write Performance and Payment Bonds on a project without reinsurance to the limit of ten percent (10%) of its capital and surplus. Such a surety must reinsure any obligations over ten percent (10%).

5.4.2 Performance Bond.

.1 If the Contract Amount exceeds $100,000, CONTRACTOR shall furnish OWNER with a Performance Bond.

.2 If the Contract Amount exceeds $25,000 but is less than or equal to $100,000, CONTRACTOR shall furnish OWNER with a Performance Bond, unless the original Contract Time is 60 Calendar Days/40 Working Days or less, in which case CONTRACTOR can agree to the following terms and conditions for payment in lieu of providing a Performance Bond: no moneys will be paid to CONTRACTOR until completion and acceptance of the Work by OWNER; CONTRACTOR shall be entitled to receive 95% of the Contract Amount following Final Completion, and the remaining 5% of the Contract Amount following the two (2) year warranty period.

.3 If the Contract Amount is less than or equal to $25,000, CONTRACTOR will not be required to furnish a Performance Bond; provided that no moneys will be paid to CONTRACTOR until completion and acceptance of the Work by OWNER under the following terms and conditions: CONTRACTOR shall be entitled to receive 95% of the Contract Amount following Final Completion, and the remaining 5% of the Contract Amount following the two (2) year warranty period.

.4 If a Performance Bond is required to be furnished, it shall extend for the two (2) year warranty period.

5.4.3 Payment Bond.

.1 If the Contract Amount exceeds $50,000, CONTRACTOR shall furnish OWNER with a Payment Bond.

.2 If the Contract Amount is less than or equal to $50,000, CONTRACTOR will not be required to furnish a Payment Bond; provided that no moneys will be paid to CONTRACTOR until completion and acceptance of the Work by OWNER under the terms and conditions specified in paragraph 5.4.2.3.

5.4.4 Maintenance Bond.

.1 Before final payment and acceptance, CONTRACTOR shall furnish the OWNER with a maintenance bond to assure the quality of the materials and workmanship, and maintenance of all required improvements including the OWNER'S costs for collecting the guarantee of funds and administering the correction and/or replacement of covered improvements.

.2 The maintenance bond shall be satisfactory to the OWNER as to form, sufficiency, and manner of execution.

.3 Said bond shall be in an amount equal to one hundred percent (100%) of the cost of improvements verified by the ENGINEER and shall run for a period of two (2) calendar years measured from the date of final acceptance.

.4 In an instance where a maintenance bond has been posted and a defect or failure of any required improvements occurs within the period of coverage, the OWNER shall require that the improvements be repaired or replaced by the CONTRACTOR who issued the bond. If the improvements or repairs are not

completed in what the OWNER deems to be a timely manner, the OWNER may declare said bond to be in default and require that improvements be repaired or replaced by the bonding company.

.5 Whenever a defect or failure of any required improvement occurs within the period of coverage, OWNER may require that a new maintenance bond be posted for a period of two (2) full calendar years sufficient to cover the corrected defect or failure.

ARTICLE 6 - CONTRACTOR'S RESPONSIBILITIES

6.1 Supervision and Superintendence:

6.1.1 CONTRACTOR shall supervise, inspect and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. CONTRACTOR shall be solely responsible for the means, methods, techniques, sequences and procedures of construction. CONTRACTOR shall be responsible to see that the completed Work complies accurately with the Contract Documents.

6.1.2 CONTRACTOR shall have an English-speaking, competent Superintendent on the Work at all times that work is in progress. The Superintendent will be CONTRACTOR's representative on the Work and shall have the authority to act on the behalf of CONTRACTOR. All communications given to the Superintendent shall be as binding as if given to CONTRACTOR. Either CONTRACTOR or the Superintendent shall provide a cellular telephone number and an emergency and home telephone number at which one or the other may be reached if necessary when work is not in progress. The Superintendent must be an employee of the CONTRACTOR, unless such requirement is waived in writing by the Owner's Representative. If the CONTRACTOR proposes a management structure with a Project Manager supervising, directing, and managing construction of the work in addition to or in substitution of a Superintendent, the requirements of these Construction Documents with respect to the Superintendent shall likewise apply to any such Project Manager.

.1 CONTRACTOR shall present the resume of the proposed Superintendent to the Owner's Representative showing evidence of experience and successful superintendence and direction of work of a similar scale and complexity. If, in the opinion of the Owner's Representative, the proposed Superintendent does not indicate sufficient experience in line with the Work, he/she will not be allowed to be the designated Superintendent for the Work.

.2 The Superintendent shall not be replaced without Written Notice to Owner's Representative. If CONTRACTOR deems it necessary to replace the Superintendent, CONTRACTOR shall provide the necessary information for approval, as stated above, on the proposed new Superintendent.

.3 A qualified substitute Superintendent may be designated in the event that the designated Superintendent is temporarily away from the Work, but not to exceed a time limit acceptable to the Owner's Representative. CONTRACTOR shall replace the Superintendent upon OWNER's request in the event the Superintendent is unable to perform to OWNER's satisfaction.

6.2 Labor, Materials and Equipment:

6.2.1 CONTRACTOR shall maintain a work force adequate to accomplish the Work within the Contract Time. CONTRACTOR agrees to employ only orderly and competent workers, skillful in performance of the type of Work required under this Contract. CONTRACTOR, Subcontractors, Sub-subcontractors, and their employees may not use or possess any alcoholic or other intoxicating beverages, illegal drugs or controlled substances while on the job or on OWNER's property, nor may such workers be intoxicated, or under the influence of alcohol or drugs, on the job. Subject to the applicable provisions of Texas law, CONTRACTOR, Subcontractors, Sub-subcontractors, and their employees may not use or possess any firearms or other weapons while on the job or on OWNER'S property. If OWNER or Owner's Representative notifies CONTRACTOR that any worker or representative of Contractor is incompetent, disorderly, abusive, or disobedient, has knowingly or repeatedly violated safety regulations, has possessed any firearms in contravention of the applicable provisions of Texas law, or has possessed or was under the influence of alcohol or drugs on the job, CONTRACTOR shall immediately remove such worker or representative, including an officer or owner of CONTRACTOR, from performing Contract Work, and may not employ such worker or representative again on Contract Work without OWNER's prior written consent. CONTRACTOR shall at all times maintain good discipline and order on or off the site in all matters pertaining to the Project.

6.2.2 Unless otherwise specified in the contract documents, CONTRACTOR shall provide and pay for all materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities and all other facilities and incidentals necessary for the furnishing, performance, testing, start-up and completion of the Work.

6.2.3 All materials and equipment shall be of good quality and new (including new products made of recycled materials, pursuant to Section 361.426 of the Texas Health & Safety Code), except as otherwise provided in the Contract Documents. If required by Owner's Representative, CONTRACTOR shall furnish satisfactory evidence (reports of required tests, manufacturer's certificates of compliance with material requirements, mill reports, etc.) as to the kind and quality of materials and equipment. All materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned in accordance with instructions of the applicable Supplier, except as otherwise provided in the Contract Documents.

6.2.4 Substitutes and "Approved Equal" Items:

.1 Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function and quality required. Unless the specification or description contains words reading that no like, equivalent or "approved equal" item or no substitution is permitted, other items of material or equipment of other Suppliers may be submitted by CONTRACTOR, at CONTRACTOR'S sole risk, including disruptions to the Critical Path of the Progress Schedule, to E/A through Owner's Representative under the following circumstances:

.1.1 "Approved Equal": If in E/A's sole discretion an item of material or equipment proposed by CONTRACTOR is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by E/A as an "approved equal" item, in which case review of the proposed item may, in E/A's sole discretion, be accomplished without compliance with some or all of the requirements for evaluation of

proposed substitute items. CONTRACTOR shall provide E/A with the documentation required for E/A to make its determination.

.1.2 Substitute Items: If in E/A's sole discretion an item of material or equipment proposed by CONTRACTOR does not qualify as an "approved equal" item under subparagraph 6.2.4.1.1, it will be considered a proposed substitute item. CONTRACTOR shall submit sufficient information to allow E/A to determine that the item of material or equipment proposed is essentially equivalent to that named and a substitute therefore.

.2 Substitute Construction Methods and Procedures: If a specific means, method, technique, sequence or procedure of construction is shown or indicated in and expressly required by the Contract Documents, CONTRACTOR may, at CONTRACTOR'S sole risk, including disruptions to the Critical Path of the Progress Schedule, with prior approval of E/A furnish or utilize a substitute means, method, technique, sequence, or procedure of construction. CONTRACTOR shall submit sufficient information to Owner's Representative to allow E/A, in E/A's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The procedure for review by E/A will be same as that provided for substitute items.

.3 E/A's Evaluation: E/A will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to subparagraphs 6.2.4.1.1 and 6.2.4.1.2. E/A will be the sole judge of acceptability. No "approved equal" or substitute shall be ordered, installed, or utilized until E/A's review is complete, which will be evidenced by either a Change Order or completion of the Shop Drawing review procedure. OWNER may require CONTRACTOR to furnish at CONTRACTOR's expense a special performance guarantee or other surety bond with respect to any "approved equal" or substitute or for any other delay or disruption to the Critical Path of the Project Schedule attributable to any such substitution. OWNER shall not be responsible for any delay due to review time for any "approved equal" or substitute.

.4 CONTRACTOR's Expense: All data and documentation to be provided by CONTRACTOR in support of any proposed "approved equal" or substitute item will be at CONTRACTOR's expense.

.5 The approval of the E/A will not relieve the CONTRACTOR from primary responsibility and liability for the suitability and performance of any proposed substitute item, method or procedure and will not relieve CONTRACTOR from its primary responsibility and liability for curing defective Work and performing warranty work, which the CONTRACTOR shall cure and perform, regardless of any claim the CONTRACTOR may choose to advance against the E/A or manufacturer.

6.2.5 CONTRACTOR agrees to assign to OWNER any rights it may have to bring antitrust suits against its Suppliers for overcharges on materials incorporated in the Project growing out of illegal price fixing agreements. CONTRACTOR further agrees to cooperate with OWNER should OWNER wish to prosecute suits against Suppliers for illegal price fixing.

6.3 Progress Schedule: Unless otherwise provided in the contract documents, CONTRACTOR shall adhere to the Baseline Schedule established in accordance with paragraph 2.6 as it may be adjusted from time to time as provided below:

6.3.1 CONTRACTOR shall submit to Owner's Representative for review and approval any proposed adjustments in the Progress Schedule that will not change the Contract

Times or Milestones on a monthly basis. Any such proposed adjustments must be substantiated with documentation of any changes to the underlying logic of the Progress Schedule. CONTRACTOR's Progress Schedule must show how the CONTRACTOR will consistently advance the progress of the Work in accordance with the Critical Path of the Work and the Contract Time or Milestones. Such adjustments will conform generally to the Progress Schedule then in effect and additionally will comply with any provisions of the contract documents applicable thereto.

6.3.2 Proposed adjustments in the Progress Schedule that will change the Contract Times or Milestones shall be submitted in accordance with the requirements of Article 12. Any such proposed adjustments must be substantiated with documentation of any changes to the underlying logic of the Progress Schedule. Such adjustments may only be made by a Change Order or Time Extension Request in accordance with Article 12.

6.4 Concerning Subcontractors, Suppliers and Others:

6.4.1 Assignment: CONTRACTOR agrees to retain direct control of and give direct attention to the fulfillment of this Contract. CONTRACTOR agrees not to, by Power of Attorney, or otherwise, assign said Contract without the prior written consent of OWNER. In addition, without OWNER'S written consent, the CONTRACTOR will not subcontract the performance of the entire Work or the supervision and direction of the Work.

6.4.2 Award of Subcontracts for Portions of the Work: CONTRACTOR shall not employ any Subcontractor, Supplier or other person or organization, whether initially or as a substitute, against whom OWNER may have reasonable objection. OWNER will communicate such objections by Written Notice. If OWNER requires a change without good cause of any Subcontractor, person or organization previously accepted by OWNER, the Contract Amount shall be increased or decreased by the difference in the cost occasioned by any such change, and appropriate Change Order shall be issued. CONTRACTOR shall not substitute any Subcontractor, person or organization that has been accepted by OWNER, unless the substitute has been accepted in writing by OWNER. No acceptance by OWNER of any Subcontractor, Supplier or other person or organization shall constitute a waiver of any right of OWNER to reject defective Work.

6.4.3 CONTRACTOR shall enter into written agreements with all Subcontractors and Suppliers which specifically binds the Subcontractors or Suppliers to the applicable terms and conditions of the Contract Documents for the benefit of OWNER and E/A. The OWNER reserves the right to specify that certain requirements shall be adhered to by all Subcontractors and Sub-subcontractors as indicated in other portions of the Contract Documents and these requirements shall be made a part of the agreement between CONTRACTOR and Subcontractor or Supplier. Subject to and in accordance with the above requirements, the CONTRACTOR must provide and will be deemed for all purposes to have provided in its contracts with major Subcontractors or Suppliers on the Project (those contracts of more than $10,000) the following specific provision: alternative dispute resolution (paragraphs 16.2 and 16.3), which shall be mandatory in the event of a subcontractor or supplier claim and a prerequisite for the submission of any derivative claim. The CONTRACTOR's standard subcontract form is subject to the OWNER's review and approval. The OWNER may request and the CONTRACTOR will provide within five (5) working days a copy of any subcontract requested by the OWNER.

6.4.4 CONTRACTOR shall be fully responsible to OWNER for all acts and omissions of the Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR just

as CONTRACTOR is responsible for CONTRACTOR's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier or other person or organization any contractual relationship between OWNER and any such Subcontractor, Supplier or other person or organization, nor shall it create any obligation on the part of OWNER or E/A to pay or to see to the payment of any moneys due any such Subcontractor, Supplier or other person or organization except as may otherwise be required by laws and regulations.

6.4.5 CONTRACTOR shall be solely responsible for efficiently scheduling and coordinating the Work of Subcontractors, Suppliers and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with CONTRACTOR in order to avoid any delays or inefficiencies in the prosecution of the Work. CONTRACTOR shall require all Subcontractors, Suppliers and such other persons and organizations performing or furnishing any of the Work to communicate with Owner's Representative through CONTRACTOR.

6.4.6 The divisions and sections of the Specifications and the identifications of any Drawings shall not control CONTRACTOR in dividing or delineating the Work to be performed by any specific trade.

6.4.7 CONTRACTOR shall pay each Subcontractor and Supplier their appropriate share of payments made to CONTRACTOR not later than ten (10) Calendar Days of CONTRACTOR’s receipt of payment from OWNER.

6.4.8 To the extent allowed by Texas law, the OWNER shall be deemed to be a third party beneficiary to each subcontract and may, if OWNER elects, following a termination of the CONTRACTOR, require that the Subcontractor(s) perform all or a portion of unperformed duties and obligations under its subcontract(s) for the benefit of the OWNER, rather than the CONTRACTOR; however, if the OWNER requires any such performance by a Subcontractor for the OWNER’s direct benefit, then the OWNER shall be bound and obligated to pay such Subcontractor the reasonable value for all Work performed by such Subcontractor to the date of the termination of the CONTRACTOR, less previous payments, and for all Work performed thereafter. In the event that the OWNER elects to invoke its right under this section, OWNER will provide notice of such election to the CONTRACTOR and the affected Subcontractor(s).

6.5 Patent Fees and Royalties:

6.5.1 CONTRACTOR shall be responsible at all times for compliance with applicable patents or copyrights encompassing, in whole or in part, any design, device, material, or process utilized, directly or indirectly, in the performance of the Work or the formulation or presentation of its Bid.

6.5.2 CONTRACTOR shall pay all royalties and license fees and shall provide, prior to commencement of Work hereunder and at all times during the performance of same, for lawful use of any design, device, material or process covered by letters, patent or copyright by suitable legal agreement with the patentee, copyright holder, or their duly authorized representative whether or not a particular design, device, material, or process is specified by OWNER.

6.5.3 CONTRACTOR shall defend all suits or claims for infringement of any patent or copyright and shall save OWNER harmless from any loss or liability, direct or indirect, arising with respect to CONTRACTOR's process in the formulation of its Bid or the performance of the Work or otherwise arising in connection

therewith. OWNER reserves the right to provide its own defense to any suit or claim of infringement of any patent or copyright in which event CONTRACTOR shall indemnify and save harmless OWNER from all costs and expenses of such defense as well as satisfaction of all judgments entered against OWNER.

6.5.4 OWNER shall have the right to stop the Work and/or terminate this Agreement at any time in the event CONTRACTOR fails to disclose to OWNER that CONTRACTOR's work methodology includes the use of any infringing design, device, material or process.

6.6 Permits, Fees: Unless otherwise provided in the Supplemental General Conditions, CONTRACTOR shall obtain and pay for all construction permits, licenses and fees required for prosecution of the Work.

6.7 Laws and Regulations:

6.7.1 CONTRACTOR shall give all notices and comply with all laws and regulations applicable to furnishing and performing the Work, including arranging for and obtaining any required inspections, tests, approvals or certifications from any public body having jurisdiction over the Work or any part thereof. Except where otherwise expressly required by applicable laws and regulations, neither OWNER nor E/A shall be responsible for monitoring CONTRACTOR's compliance with any laws and regulations.

6.7.2 Maintaining clean water, air and earth or improving thereon shall be regarded as of prime importance. CONTRACTOR shall plan and execute its operations in compliance with all applicable Federal, State and local laws and regulations concerning control and abatement of water pollution and prevention and control of air pollution.

6.7.3 If CONTRACTOR performs any Work knowing or having reason to know that it is contrary to laws or regulations, CONTRACTOR shall bear all claims, costs, losses and damages arising therefrom; however, it shall not be CONTRACTOR's primary responsibility to make certain that the Specifications and Drawings are in accordance with laws and regulations, but this does not relieve CONTRACTOR of CONTRACTOR's obligations under Article 3.

6.7.4 This Work is subject to the Texas Pollution Discharge Elimination System (TPDES) permitting requirements for the installation and maintenance of temporary and permanent erosion and sediment controls and storm water pollution prevention measures throughout the construction period.

As applicable based TCEQ requirements related to project size and area of disturbance CONTRACTOR shall be responsible for:

.1 Prepare Storm Water Pollution Prevention Plan (SWPPP).

.2 CONTRACTOR shall file the Notice of Intent to the Texas Commission on Environmental Quality (TCEQ). CONTRACTOR shall pay the TPDES storm water application fee.

.3 Posting of TCEQs "Construction Site Notice" near the main entrance of the work.

.4 Inspection and Maintenance of all erosion/sedimentation controls.

.5 Update the SWPPP as necessary to comply with TPDES permitting requirements, which includes noting changes in erosion / sedimentation controls and other

best management practices that are part of the SWPPP and which may be necessary due to the results of inspection reports.

.6 .Upon completion of the Work, provide TPDES records to OWNER."

6.8 Taxes:

6.8.1 CONTRACTOR shall pay only those sales, consumer, use and other similar taxes required to be paid by CONTRACTOR in accordance with the laws and regulations of the State of Texas in the performance of this public works contract.

6.8.2 OWNER is an exempt organization as defined by Chapter 11 of the Property Tax Code of Texas and is thereby exempt from payment of Sales Tax under Chapter 151, Limited Use Sales, Excise and Use Tax, Texas Tax Code, and Article 1066 (C), Local Sales and Use Tax Act, Revised Civil Statutes of Texas.

6.9 Use of Premises:

6.9.1 CONTRACTOR shall confine construction equipment, the storage of materials and equipment and the operations of workers to the site and land and areas identified in and permitted by the Contract Documents and other land and areas permitted by laws and regulations, right-of-way, permits and easements, and shall not unreasonably encumber the premises with construction equipment or other materials or equipment. CONTRACTOR shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof or of any adjacent land or areas, resulting from the performance of the Work. Should any claim be made by any such owner or occupant because of or in connection with the performance of the Work, CONTRACTOR shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law. **CONTRACTOR shall indemnify, defend and hold harmless OWNER, E/A, E/A'S Consultants and anyone directly or indirectly employed by any of them from and against all claims, costs, losses and damages (including court costs and reasonable attorney's fees) arising out of or resulting from any claim or action, legal or equitable, brought by any such owner or occupant against OWNER, E/A or any other party indemnified hereunder to the extent caused by or based upon performance of the work or failure to perform the Work.**

6.9.2 During the progress of the Work and on a daily basis, CONTRACTOR shall keep the premises free from accumulations of waste materials, rubbish and other debris resulting from the Work. At the completion of the Work, CONTRACTOR shall remove all waste materials, rubbish and debris from and about the premises as well as all tools, appliances, construction equipment and machinery and surplus materials. CONTRACTOR shall leave the site clean and ready for occupancy by OWNER at Substantial Completion of the Work. CONTRACTOR shall, at a minimum, restore to original condition all property not designated for alteration by the Contact Documents. If the CONTRACTOR fails to clean up at the completion of the Work, OWNER may do so and the cost thereof will be charged against the CONTRACTOR.

6.9.3 CONTRACTOR shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall CONTRACTOR subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

6.10 Record Documents: CONTRACTOR shall maintain in a safe place at the site, or other location acceptable to OWNER, one (1) record copy of all Drawings, Specifications, Addenda, Change Orders, Change Directives, Field Orders and written interpretations and clarifications (issued pursuant to paragraph 9.5) in good order and annotated to show all changes made during construction. These record documents together with all final samples and all final Shop Drawings will be available to OWNER and E/A for reference during performance of the Work. Upon Substantial Completion of the Work, these record documents, samples and Shop Drawings shall be promptly delivered to Owner's Representative.

6.11 Safety and Protection:

6.11.1 CONTRACTOR shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Upon request, and prior to installation of measures, CONTRACTOR shall submit a site security plan for approval by OWNER. By reviewing the plan or making recommendations or comments, OWNER will not assume liability nor will CONTRACTOR be relieved of liability for damage, injury or loss. CONTRACTOR shall take all necessary precautions for the safety of and shall provide the necessary protection to prevent damage, injury or loss to:

.1 all persons on the Work site or who may be affected by the Work;

.2 all the Work and materials and equipment to be incorporated therein, whether in storage on or off the site; and

.3 other property at the site or adjacent thereto, including, but not limited to, trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.

6.11.2 CONTRACTOR shall comply with all applicable laws and regulations of any public body having jurisdiction for safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. CONTRACTOR shall notify owners of adjacent property and of underground facilities, and utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation and replacement of their property. All damage, injury or loss to any property referred to in paragraph 6.11.1.2 and 6.11.1.3 caused, directly or indirectly, in whole or in part, by CONTRACTOR, Subcontractor, Supplier or any person or organization directly or indirectly employed by any of them to perform or furnish any of the Work or anyone for whose acts any of them may be liable, shall be remedied by CONTRACTOR (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of OWNER, or E/A, or E/A's consultant or anyone employed by any of them or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the faults or negligence of CONTRACTOR or any Subcontractor, Supplier or other person or organization directly or indirectly employed by any of them). CONTRACTOR's duties and responsibilities for safety and protection of the Work shall continue until such time as all the Work is completed and Owner's Representative has issued a notice to OWNER and CONTRACTOR in accordance with Article 14 that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion). Without limitation, CONTRACTOR shall comply with the following specific provisions:

It shall be the duty and responsibility of CONTRACTOR and all of its subcontractors to be familiar with and comply with 29 USC Section 651, et seq., the Occupational

Safety and Health Act of 1970, as amended ("OSHA") and to enforce and comply with all provisions of this Act.

The CONTRACTOR and all of its subcontractors shall comply with all applicable requirements of Subpart P of Part 1926 of 29 C.F.R, OSHA Safety and Health Standards, Texas Health and Safety Code Section 756.023, as amended, and shall submit a unit price for the particular excavation safety systems to be utilized by the Contractor for all excavations which exceed a depth of five feet (5').

Before commencing any excavation which will exceed a depth of five feet (5'), the CONTRACTOR shall provide the Owner with detailed plans and specifications regarding the safety systems to be utilized. Said plans and specifications shall include a certification from a Texas licensed professional engineer indicating full compliance with the OSHA provisions cited above.

6.11.3 Safety Representative: CONTRACTOR shall designate in writing a qualified and experienced safety representative (the "Safety Representative") at the site whose duties and responsibilities shall include safety training; identifying and mitigating hazardous conditions and unsafe work practices; and developing, maintaining and supervising the implementation of safe work practices and safety programs as deemed necessary and appropriate for the Project. The term "Safety Representative" includes any designated Safety Supervisor, Superintendent or Safety Manager. The Safety Representative shall exercise due diligence in the execution of all Project related safety duties. The Safety Representative shall report directly to a company executive, not an on site project manager. Upon request of OWNER, CONTRACTOR shall provide certifications or other acceptable documentation of the Safety Representative's qualifications.

6.11.4 Hazard Communication Programs: CONTRACTOR shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with laws and regulations.

6.11.5 Emergencies:

.1 In emergencies affecting the safety or protection of persons or the Work at the site or adjacent thereto, CONTRACTOR, without special instruction or authorization from OWNER or E/A, is obligated to act reasonably to prevent threatened damage, injury or loss and to mitigate damage or loss to the Work. CONTRACTOR shall give Owner's Representative telephone notification as soon as reasonably practical and a prompt written notice if CONTRACTOR believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby. If Owner's Representative determines that a change in the Contract Documents is required because of the action taken by CONTRACTOR in response to such an emergency, a Change Directive or Change Order will be issued to document the consequences of such action; otherwise OWNER will not be responsible for CONTRACTOR's emergency action.

.2 Authorized agents of CONTRACTOR shall respond immediately to call-out at any time of any day or night when circumstances warrant the presence on Project site of CONTRACTOR or his agent to protect the Work or adjacent property from damage, restriction or limitation or to take such action or measures pertaining to the Work as may be necessary to provide for the safety of the public. Should CONTRACTOR and/or their agent fail to respond and take action to alleviate such an emergency situation, OWNER may direct other forces to take action as

necessary to remedy the emergency condition, and OWNER will deduct any cost of such remedial action from the funds due CONTRACTOR under this Contract.

.3 In the event there is an accident involving injury to any individual or damage to any property on or near the Work, CONTRACTOR shall provide to Owner's Representative verbal notification within one (1) hour and written notification within twenty-four (24) hours of the event and shall be responsible for recording the location of the event and the circumstances surrounding the event through photographs, interviewing witnesses, obtaining medical reports, police accident reports and other documentation that describes the event. Copies of such documentation shall be provided to Owner's Representative, for OWNER's and E/A's records, within forty-eight (48) hours of the event. Contractor shall cooperate with OWNER on any OWNER investigation of any such incident.

6.12 Continuing the Work: CONTRACTOR shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with OWNER. No Work shall be delayed or postponed pending resolution of any disputes or disagreements, except as OWNER and CONTRACTOR may otherwise agree in writing.

6.13 CONTRACTOR's General Warranty and Guarantee:

6.13.1 CONTRACTOR warrants and guarantees to OWNER that all Work will conform to the plans and specifications, be performed in a good and workmanlike manner in accordance with the Contract Documents and will not be defective. This warranty will survive the termination or expiration of the Contract. CONTRACTOR's warranty and guarantee hereunder excludes defects or damage caused by:

.1 abuse, modification or improper maintenance or operation by persons other than CONTRACTOR, Subcontractors or Suppliers; or

.2 normal wear and tear under normal usage.

6.13.2 CONTRACTOR's obligation to perform and complete the Work in a good and workmanlike manner in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of CONTRACTOR's obligation to perform the Work in accordance with the Contract Documents:

.1 observations by Owner's Representative and/or E/A;

.2 recommendation of any progress or final payment by Owner's Representative;

.3 the issuance of a certificate of Substantial Completion or any payment by OWNER to CONTRACTOR under the Contract Documents;

.4 use or occupancy of the Work or any part thereof by OWNER;

.5 any acceptance by OWNER or any failure to do so;

.6 any review of a Shop Drawing or sample submittal;

.7 any inspection, test or approval by others; or

.8 any correction of defective Work by OWNER.

6.14 INDEMNIFICATION:

6.14.1 CONTRACTOR shall defend, indemnify and hold harmless OWNER, E/A, E/A'S Consultants and Subconsultants and their respective officers, directors, partners, employees, agents and

other Consultants and any of them (the "INDEMNIFIED PARTIES") from and against all claims, costs, losses and damages (including but not limited to all fees and charges of engineers, architects, attorneys and other professionals and all court or arbitration or other dispute resolution costs) arising out of or resulting from the performance of the Work, provided that any such claim, cost, loss or damage:

.1 Is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself), including the loss of use resulting therefrom, and

.2 Is caused in whole or in part by any negligent act or omission of CONTRACTOR, any Subcontractor, any Supplier, any person or organization directly or indirectly employed by any of them to perform or furnish any of the work or anyone for whose acts any of them may be liable, regardless of whether or not caused in part by any negligence or omission of the INDEMNIFIED PARTIES hereunder or whether liability is imposed upon such INDEMNIFIED PARTY by laws and regulations regardless of the negligence of any such person or entity.

In the event that indemnification of the INDEMNIFIED PARTIES is prohibited by law, CONTRACTOR shall nonetheless be solely responsible for any liability arising out of or resulting from the performance of the Work, subject to the limitations set forth above, and shall indemnify and hold harmless the remaining INDEMNIFIED PARTIES, who may be legally indemnified, from such liability of the CONTRACTOR and the associated costs described above.

6.14.2 The indemnification obligation under paragraph 6.14.1 shall not be limited in any way by any limitation on the amount or type of damages, or compensation or benefits payable by or for CONTRACTOR or any such Subcontractor, Supplier or other person or organization under workers' compensation acts, disability benefit acts or other employee benefit acts.

6.14.3 The obligations of CONTRACTOR under paragraph 6.14.1 shall not extend to the liability of OWNER, E/A, E/A's consultants, and their officers, directors, partners, employees or agents caused primarily by negligent preparation of maps, drawings, surveys, designs or specifications upon which is placed the applicable state-authorized design professional seal of OWNER's, E/A's or E/A's consultant's officers, directors, partners, employees or agents.

6.14.4 In the event CONTRACTOR fails to follow OWNER's directives concerning use of the site, scheduling or course of construction, or engages in other conduct which proximately causes damage to property based on inverse condemnation or

otherwise, then and in that event, CONTRACTOR shall indemnify OWNER against all costs resulting from such claims.

6.14.5 In the event CONTRACTOR unreasonably delays progress of the work being done by others on the site so as to cause loss for which OWNER becomes liable, then CONTRACTOR shall indemnify OWNER from and reimburse OWNER for such loss.

6.15 Survival of Obligations: All representations, indemnifications, warranties and guarantees made in, required by or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion and acceptance of the Work and termination or completion of the Agreement.

6.16 Losses from Natural Causes: Unless otherwise specified, all loss or damage to CONTRACTOR arising out of the nature of the Work to be done or from action of the elements, floods or from unforeseeable circumstances in prosecution of the Work or from unusual obstructions or difficulties which may be encountered in prosecution of the Work, shall be sustained and borne by CONTRACTOR at its own cost and expense.

6.17 Notice of Claim: Should CONTRACTOR suffer injury or damage to person or property because of any error, omission or act of OWNER or of any of OWNER's employees or agents or others for whose acts OWNER is liable, a Claim must be made to the other party within ninety (90) calendar days of the event giving rise to such injury or damage. The provisions of this paragraph 6.17 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or statute of repose.

6.18 Liquidated Damages: CONTRACTOR or its Surety shall be liable for liquidated damages for the failure of the CONTRACTOR to timely complete the Work or any portion thereof within the Contract Time.

ARTICLE 7 - OTHER WORK

7.1 OWNER may perform other work related to the Project at the site by OWNER's own forces, or let other contracts therefore, or have other work performed by utility owners. CONTRACTOR and OWNER agree to and shall use best efforts to cooperate and coordinate the Work with others performing work and other work related to the Project in order to avoid conflicts and delays in the Work. If CONTRACTOR believes that delay or additional cost is involved because of such action by OWNER, CONTRACTOR may make a Claim as provided in Article 11 or 12.

7.2 CONTRACTOR shall afford other contractors who are in a contract with OWNER and each utility owner (and OWNER, if OWNER is performing the additional work with OWNER's employees) proper and safe access to the site and a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work and shall properly connect and coordinate the Work with theirs. Unless otherwise provided in the Contract Documents, CONTRACTOR shall do all cutting, fitting and patching of the Work that may be required to make its several parts come together properly and integrate with such other work. CONTRACTOR shall not endanger any work of others by cutting, excavating or otherwise altering their work and will only cut or alter their work with the written consent of Owner's Representative and the other contractors whose work will be affected. CONTRACTOR shall promptly remedy damage wrongfully caused by CONTRACTOR to completed or partially completed construction or to property of the OWNER or separate contractors.

7.3 If the proper execution or results of any part of CONTRACTOR's Work depends upon work performed by others under this Article 7, CONTRACTOR shall inspect such other work and

promptly report to Owner's Representative in writing any delays, defects or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of CONTRACTOR's Work. CONTRACTOR's failure to report will constitute an acceptance of such other work as fit and proper for integration with CONTRACTOR's Work except for latent or non-apparent defects and deficiencies in such other work.

7.4 OWNER shall provide for coordination of the activities of the OWNER's own forces and of each separate contractor with the Work of CONTRACTOR, who shall cooperate with them. CONTRACTOR shall participate with other separate contractors and Owner's Representative in reviewing their construction Progress Schedules when directed to do so. On the basis of such review, CONTRACTOR shall make any revisions to the construction Progress Schedule deemed necessary after a joint review and mutual agreement. The agreed upon construction Progress Schedules shall then constitute the Progress Schedules to be used by CONTRACTOR, separate contractors and OWNER until subsequently revised.

7.5 Costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefore.

ARTICLE 8 - OWNER'S RESPONSIBILITIES

8.1 Prior to the start of construction, OWNER will designate a person or entity to act as Owner's Representative during construction. Except as otherwise provided in these General Conditions, OWNER shall issue all communications to CONTRACTOR through Owner's Representative.

8.2 OWNER will not supervise, direct, control or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction or the safety precautions and programs incident thereto. OWNER is not responsible for any failure of CONTRACTOR to comply with laws and regulations applicable to furnishing or performing the Work. OWNER is not responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents. Failure or omission of OWNER to discover, or object to or condemn any defective Work or material shall not release CONTRACTOR from the obligation to properly and fully perform the Contract.

8.3 OWNER is not responsible for the acts or omissions of CONTRACTOR, or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work. CONTRACTOR acknowledges and agrees that OWNER'S direction to perform Work in accordance with the approved Progress Schedule is not a demand for acceleration or a dictation of CONTRACTOR'S means or methods.

8.4 Information or services under the OWNER's control shall be furnished by the OWNER with reasonable promptness to avoid delay in orderly progress of the Work. The OWNER shall have a reasonable amount of time to investigate site conditions, review submittals, analyze requests for changes, and to make other decisions in the orderly administration of the Contract. CONTRACTOR must notify the OWNER in writing, if the time for the investigation, review, analysis of any submittals, required for changes or otherwise required for OWNER'S decision, impacts in any way the Critical Path of the approved Progress Schedule.

8.5 The foregoing are in addition to other duties and responsibilities of the OWNER enumerated herein and especially those in respect to Article 4 (Availability of Lands; Subsurface and Physical Conditions; Reference Points), Article 7 (Other Work) and Article 14 (Payments to CONTRACTOR and Completion).

8.6 **Notice of Claim:** Should OWNER suffer injury or damage to person or property because of any error, omission or act of CONTRACTOR or of any of CONTRACTOR's employees or agents

or others for whose acts CONTRACTOR is liable, a Claim will be made to the other party within thirty (30) calendar days of receipt of actual or constructive notice of the event giving rise to such injury or damage. The provisions of this paragraph 8.6 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitations or statute of repose.

ARTICLE 9 - ENGINEER/ARCHITECT'S STATUS DURING CONSTRUCTION

9.1 E/A's Authority and Responsibilities:

9.1.1 The duties and responsibilities and the limitations of authority of E/A during construction, as set forth in the Contract Documents, may be assigned or assumed by the OWNER, but shall not be extended without written consent of OWNER and/or E/A. The assignment of any authority, duties or responsibilities to E/A under the Contract Documents, or under any agreement between OWNER and E/A, or any undertaking, exercise or performance thereof by E/A, is intended to be for the sole and exclusive benefit of OWNER and not for the benefit of CONTRACTOR, Subcontractor, Supplier, or any other person or organization, or for any surety or employee or agent of any of them.

9.1.2 E/A will not supervise, direct, control or have authority over or be responsible for CONTRACTOR's means, methods, techniques, sequences or procedures of construction, or the safety precautions and programs incident thereto. E/A is not responsible for any failure of CONTRACTOR to comply with laws and regulations applicable to the furnishing or performing the Work. E/A is not responsible for CONTRACTOR's failure to perform or furnish the Work in accordance with the Contract Documents. Failure or omission of E/A to discover, or object to or condemn any defective Work or material shall not release CONTRACTOR from the obligation to properly and fully perform the Contract.

9.1.3 E/A is not responsible for the acts or omissions of CONTRACTOR, or of any Subcontractor, any Supplier, or of any other person or organization performing or furnishing any of the Work.

9.1.4 If OWNER and E/A agree, E/A will review the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds and certificates of inspection, tests and approvals and other documentation required to be delivered by Article 14, but only to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests and approvals that the results certified indicate compliance with, the Contract Documents.

9.1.5 The limitations upon authority and responsibility set forth in this paragraph 9.1 shall also apply to E/A's Consultants, Resident Project Representative and assistants.

9.2 E/A assisting Owner's Representative: E/A will assist the Owner's Representative designated under paragraph 8.1 during the construction period. The duties and responsibilities and the limitations of authority of E/A in assisting the Owner’s representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and E/A. E/A shall not have the authority to bind the Owner as that authority lies with the Owner’s representative, but E/A may communicate on behalf of Owner in all Project matters.

9.3 Visits to Site: If OWNER and E/A agree, E/A will make visits to the site at intervals appropriate to the various stages of construction as E/A deems necessary in order to observe

as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of CONTRACTOR's executed Work. Based on information obtained during such visits and observations, E/A will endeavor for the benefit of OWNER to determine, in general, if the Work is proceeding in accordance with the Contract Documents. E/A will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. E/A's efforts will be directed toward providing for OWNER a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and on-site observations, E/A will keep OWNER informed of the progress of the Work and will endeavor to guard OWNER against defective Work. E/A's visits and on-site observations are subject to all the limitations on E/A's authority and responsibility set forth in paragraph 9.1 and 9.2.

9.4 Resident Project Representative: If OWNER and E/A agree, E/A will furnish a Resident Project Representative to assist E/A in providing more continuous observation of the Work. The responsibilities and authority and limitations of any such Resident Project Representative and assistants will be as provided in paragraph 9.1, 9.2 and Division C. OWNER may designate another representative or agent to represent OWNER at the site who is not E/A, E/A's consultant, agent or employee.

9.5 Clarifications and Interpretations: E/A may determine that written clarifications or interpretations of the requirements of the Contract Documents (in the form of drawings or otherwise) are necessary. Such written clarifications or interpretations will be consistent with the intent of and reasonably inferable from the Contract Documents, will be issued with reasonable promptness by Owner's Representative and will be binding on OWNER and CONTRACTOR. If OWNER or CONTRACTOR believes that a written clarification or interpretation justifies an adjustment in the Contract Amount or the Contract Times, OWNER or CONTRACTOR may make a Claim therefore as provided in Article 11 or 12.

9.6 Rejecting Defective Work: E/A will recommend that OWNER disapprove or reject Work which E/A believes to be defective, or believes will not produce a completed Project that conforms to the Contract Documents or will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.

9.7 Shop Drawings: Refer to Contract documents for E/A's authority concerning Shop Drawings.

ARTICLE 10 - CHANGES IN THE WORK

10.1 Changes:

10.1.1 Without invalidating the Contract and without notice to any surety, OWNER may, at any time or from time to time, order additions, deletions or revisions in the Work. Such changes in the Work will be authorized by Change Order, Change Directive or Field Order. In the event that the OWNER and the CONRACTOR are unable to negotiate the terms of a Change Order for the performance of additional Work, the OWNER may, at its election, perform such additional Work with its own forces or with another contractor and such work will be considered "Other Work" in accordance with Article 7.

10.1.2 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and CONTRACTOR shall proceed promptly, unless otherwise provided in the Change Order, Change Directive or Field Order. CONTRACTOR’s proposals for changes in the Contract Amount and/or Contract Time shall be submitted within ten (10) Calendar Days of request by Owner’s Representative, including impacts to the approved Progress Schedule, unless Owner’s Representative grants an extension. OWNER will review each proposal and respond to CONTRACTOR within ten (10)

Calendar Days. After review by OWNER, CONTRACTOR shall provide any supporting data requested by Owner's Representative within seven (7) Calendar Days, unless Owner's Representative grants an extension. OWNER will determine within seven (7) Calendar Days whether to pursue the change in Work.

10.1.3 CONTRACTOR shall not be entitled to an increase in the Contract Amount or an extension of the Contract Times with respect to any Work performed that is not required by the Contract Documents as amended, modified and supplemented as provided in paragraphs 3.3.1 and 3.3.2, except in the case of an emergency as provided in paragraph 6.11.5 or in the case of uncovering Work as provided in paragraph 13.4.

10.1.4 Except in the case of an emergency as provided in paragraph 6.11.5, a Change Order or Change Directive is required before CONTRACTOR commences any activities associated with a change in the Work which, in CONTRACTOR's opinion, will result in a change in the Contract Amount and/or Contract Times.

10.1.5 If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Amount or Contract Times) is required by the provisions of any Bond to be given to a surety, the giving of any such notice will be CONTRACTOR's responsibility, and the amount of each applicable Bond will be adjusted accordingly.

10.2 Change Orders:

10.2.1 OWNER and CONTRACTOR shall execute appropriate written Change Orders covering:

.1 a change in the Work;

.2 the amount of the adjustment in the Contract Amount, if any; and

.3 the extent of the adjustment in the Contract Time, if any.

10.2.2 An executed Change Order shall represent the complete, equitable, and final amount of adjustment in the Contract Amount and/or Contract Time owed to CONTRACTOR or OWNER as a result of the occurrence or event causing the change in the Work encompassed by the Change Order.

10.3 Change Directives:

10.3.1 Without invalidating the Contract, OWNER may, by written Change Directive, using the Force Account method, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Amount and Contract Time being adjusted as necessary. "Force Account" means a basis of payment for the direct performance of Work with payment based on the actual cost of the labor, equipment and materials furnished and consideration for overhead and profit as set forth in Section 11.5, below. A Change Directive shall be used in the absence of complete and prompt agreement on the terms of a Change Order. Where practicable, any items of Work that may be agreed upon, prior to the performance of Work under this Section, will be included in a separate Change Order. For example, the cost of the installation of additional asphalt may be agreed upon based on the unit prices in the Bid.

10.3.2 If the Change Directive provides for an adjustment to the Contract Amount, the adjustment shall be based on the method provided in paragraph 11.5.

10.3.3 A Change Directive shall be effective immediately and shall be recorded later by preparation and execution of an appropriate Change Order.

10.3.4 Upon receipt of a Change Directive, CONTRACTOR shall promptly proceed with the change in the Work involved, provided, prior to the commencement of any Work under this section, the CONTRACTOR must submit its proposed Work plan, anticipated schedule, and a list of its work force and equipment proposed to be used in the Work for OWNER'S approval. Upon such approval, CONTRACTOR must promptly commence and make continuous progress in the Work. The OWNER reserves the right to withhold payment for low production or lack of progress.

10.4 Field Order:

10.4.1 Owner's Representative may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Amount or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These shall be accomplished by written Field Order and shall be binding on OWNER and on CONTRACTOR who shall perform the Work involved promptly.

10.4.2 If CONTRACTOR believes that a Field Order would require an adjustment in the Contract Amount and/or Contract Times, CONTRACTOR shall make a prompt written request to Owner's Representative for a Change Order. Any request by CONTRACTOR for an adjustment in Contract Amount and/or Contract Times must be made in writing prior to beginning the work covered by the Field Order.

10.5 No Damages for Delay: CONTRACTOR EXPRESSLY WAIVES ANY RIGHT TO AN ADJUSTMENT IN CONTRACT PRICE FOR ANY EVENT OF DELAY. CONTRACTOR'S SOLE REMEDY FOR ANY DELAY SHALL BE LIMITED TO AN ADJUSTMENT IN CONTRACT TIME.

ARTICLE 11 - CHANGE OF CONTRACT AMOUNT

11.1 The Contract Amount is stated in the Agreement and, including authorized adjustments, is the total amount payable by OWNER to CONTRACTOR for performance of the Work under the Contract Documents.

11.2 The original Contract Amount may not be increased by more than twenty-five percent (25%) and it may not be decreased more than twenty-five percent (25%) without the consent of the CONTRACTOR to such decrease, except in the event of a termination for convenience under paragraph 15.2 or the failure of the City Council to appropriate sufficient funding for the Project, in which events it is agreed that the consent of the CONTRACTOR will not be required.

11.3 The Contract Amount shall only be changed by a Change Order. Any claim for an adjustment in the Contract Amount shall be made by Written Notice delivered by the party making the Claim to the other party promptly (but in no event later than thirty (30) calendar days) after the start of the occurrence or event giving rise to the Claim and stating the general nature of the Claim. Notice of the amount of the Claim with supporting data shall be delivered within thirty (30) calendar days after Written Notice of Claim is delivered by claimant, and shall represent that the adjustment claimed covers all known amounts to which claimant is entitled as a result of said occurrence or event. If OWNER and CONTRACTOR cannot otherwise agree, all Claims for adjustment in the Contract Amount shall be determined as set out in Article 16.

11.4 Determination of Value of Work:

11.4.1 The value of any Work covered by a Change Order for an adjustment in the Contract Amount will be determined by one or more of the following methods:

.1 by application of unit prices contained in the Contract Documents to the quantities of the items involved.

.2 by a mutually agreed lump sum properly itemized and supported by sufficient substantiating data, including documentation by subcontractors performing the work, to permit evaluation.

.3 by cost of Work plus CONTRACTOR's fee for all overhead costs and profit (determined as provided in paragraph 11.5).

.4 No cost will be included in the change order for time spent preparing the change order, nor will costs be included for an estimate of time to negotiate the change order costs for machinery, tools, or equipment as described in subparagraph 11.5.3

11.4.2 Before using the method described in paragraph 11.4.1.3, OWNER and CONTRACTOR agree to negotiate a Change Order using the methods identified in paragraphs 11.4.1.1 and 11.4.1.2, as appropriate, to determine the adjustment in the Contract Amount.

11.5 Cost of Work: If neither of the methods defined in paragraphs 11.4.1.1 nor 11.4.1.2 can be agreed upon before a change in the Work is commenced which will result in an adjustment in the Contract Amount, then the change in the Work will be performed by Change Directive, using the Force Account method, and payment will be made as follows:

11.5.1 For all personnel, CONTRACTOR will receive actual field cost wage rates for each hour that said personnel are actually engaged in such Work, as substantiated by its certified payroll, to which will be added an amount equal to twenty-five percent (25%) of the sum thereof as compensation for CONTRACTOR's and any effected Subcontractor's total overhead and profit. No separate charge will be made by CONTRACTOR or its Subcontractor(s) for organization or overhead expenses. In no case will the rate of wage be less than the minimum shown in the Contract for a particular category. CONTRACTOR will also receive an amount equal to 55% of the wages paid personnel, excluding the 25% compensation provided above, for CONTRACTOR's and any effected Subcontractor's cost of premiums on public liability insurance, workers' compensation insurance, social security and unemployment insurance. The actual cost of CONTRACTOR's bond(s) on the extra Work will be paid based on invoices from surety. No charge for superintendence will be made unless considered necessary and ordered by OWNER.

11.5.2 CONTRACTOR will receive the actual cost, including freight charges, of the materials used and installed on such Work, to which costs will be added a sum equal to twenty-five percent (25%) thereof as compensation for CONTRACTOR's and any effected Subcontractor's total overhead and profit. In case material invoices indicate a discount may be taken, the actual cost will be the invoice price minus the discount.

11.5.3 For machinery, trucks, power tools, or other similar equipment (the "equipment") agreed to be necessary by OWNER and CONTRACTOR, OWNER will allow CONTRACTOR the applicable daily, weekly or monthly rate as given in the latest edition of the "Rental Rate Blue Book" as published by Equipment Watch (1-800-669-3282) for each hour that said equipment is in use on such work, which rate includes the cost of fuel, lubricants and repairs. The established equipment rates will be paid for each hour that the equipment is utilized in the Work. In the event that the equipment is used intermittently during the Work, full payment for an eight-hour day will be made if the equipment is not idle more than four (4) hours of the day. If the equipment is idle more than four (4) hours in a day, then payment will be made only for the actual hours worked. No additional compensation will be

allowed on the equipment for CONTRACTOR's or any affected Subcontractor's overhead and profit. OWNER may accept an actual rental invoice in lieu of the method of calculation set forth in paragraph 11.5.3 for equipment rented exclusively for Force Account Work or for equipment not included in the Rental Rate Blue Book.

11.5.4 The compensation, as herein provided for, shall be received by CONTRACTOR and any affected Subcontractor as payment in full for work done by Change Directive and will include use of small tools, and total overhead expense and profit. CONTRACTOR and Owner's Representative shall compare records of work done by Change Directive at the end of each day. Copies of these records will be made upon forms provided for this purpose by OWNER and signed by both Owner's Representative and CONTRACTOR, with one copy being retained by OWNER and one by CONTRACTOR. Refusal by CONTRACTOR to sign these records within two (2) working days of presentation does not invalidate the accuracy of the record.

11.6 Unit Price Work:

11.6.1 Where the Contract Documents provide that all or part of the Work is to be unit price Work, initially the Contract Amount will be deemed to include for all unit price work an amount equal to the sum of the established unit price for each separately identified item of unit price work times the estimated quantity of each item as indicated in the Bid. The estimated quantities of items of unit price work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Amount. Determinations of the actual quantities and classifications of unit price work performed by CONTRACTOR will be made by Owner's Representative. Owner's Representative will review with CONTRACTOR the preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise).

11.6.2 When "plan quantity" is indicated for a Bid item, CONTRACTOR shall be paid amount specified in the Contract Documents without any measurements.

11.6.3 Each unit price will be deemed to include an amount considered by CONTRACTOR to be adequate to cover CONTRACTOR's overhead and profit for each separately identified item.

11.6.4 A Major Item is any individual Bid item in the Bid that has a total cost equal to or greater than five percent (5%) of the original Contract Amount or $50,000, whichever is greater, computed on the basis of Bid quantities and Contract unit prices.

11.6.5 OWNER or CONTRACTOR may make a Claim for an adjustment in the Contract Amount in accordance with Article 11 if:

.1 the actual quantity of any Major Item should become as much as twenty percent (20%) more than or twenty percent (20%) less than that in the Bid; or

.2 CONTRACTOR presents documentation contesting accuracy of "plan quantity" and Owner's Representative verifies quantity and determines original value is in error by five percent (5%) or more;

Provided, however, in the event a Major Item is reduced by twenty percent (20%) or more of the amount in the Bid, no additional Article 11 profit or overhead will be added, if, due to other additions in the Work, the net value of the Contract Amount is not reduced.

ARTICLE 12 - CHANGE OF CONTRACT TIMES

12.1 Working Day and Calendar Day Contracts:

12.1.1 The Contract Times (or Milestones) may only be changed by Change Order or Time Extension Request duly executed by both CONTRACTOR and Owner's Representative. Any claim for an adjustment of the Contract Times (or Milestones) shall be made by Written Notice delivered by the party making the Claim to the other party promptly (but in no event later than thirty (30) calendar days after the start of the occurrence or event giving rise to the delay) and stating the general nature of the delay. Notice of the extent of the delay with supporting data shall be delivered within thirty (30) calendar days after Written Notice of Claim is delivered by claimant, and shall represent that the adjustment claimed is the entire adjustment to which claimant is entitled as a result of said occurrence or event. If OWNER and CONTRACTOR cannot otherwise agree, all Claims for adjustment in the Contract Times (or Milestones) shall be determined as set out in Article 16. No Claim for an adjustment in the Contract Times (or Milestones) will be valid if not submitted in accordance with the requirements of this paragraph.

12.1.2 When CONTRACTOR is at fault and OWNER stops the Work, so that corrections in the Work can be made by CONTRACTOR, no extension in time will be allowed.

12.1.3 When CONTRACTOR is prevented from completing any part of the Work within the Contract Times (or Milestones) due to delay beyond the control of both OWNER and CONTRACTOR, an extension of the Contract Times (or Milestones) in an amount equal to the time lost due to such delay shall be CONTRACTOR's sole and exclusive remedy for such delay. If performance by the CONTRACTOR or OWNER is interrupted by any occurrence not occasioned by its own conduct, whether such occurrence be an act of god or the result of war, riot, civil commotion, sovereign conduct, or the conduct of a third party, then such performance will be excused for a period of time necessary to remedy its effects, provided, however, in such an event, a conference will be held within three (3) business days to establish a proposed new Progress Schedule for the Project.

12.1.4 OWNER will consider time extension requests and may grant CONTRACTOR an extension of time because of:

.1 Changes ordered in the work which justify additional time.

.2 Failure of materials or products being at the Project site due to delays in transportation or failures of Suppliers, which are not the result of CONTRACTOR’s, Subcontractor’s or Supplier’s negligence. The request for an extension of time shall be supported by a citation of acts demonstrating that the delays are beyond CONTRACTOR's control, including, but not limited to, CONTRACTOR's efforts to overcome such delays documented as follows:

a) Copy of purchase order for delayed item(s) indicating date ordered by CONTRACTOR/ Subcontractor and date purchase order received by Supplier.

b) If item(s) require Shop Drawings or other submittal information in accordance with the Contract Documents, provide record of date submittal(s) forwarded to Owner's Representative, date submittal(s) returned to CONTRACTOR, and date submittal(s) forwarded to Supplier.

c) Copy of document(s) from Supplier, on Supplier's letterhead, indicating date(s) item(s) would be ready for shipment and/or actual shipment date(s).

d) Copies of all correspondence between CONTRACTOR / Subcontractor and Supplier indicating CONTRACTOR / Subcontractor's efforts to expedite item(s).

e) If item(s) are being purchased by a Subcontractor, provide correspondence, meeting notes, etc., that reflect CONTRACTOR's efforts with the Subcontractor to expedite delivery of the item(s).

.3 When acts of OWNER, E/A, utility owners or other contractors employed by OWNER delay progress of work through no fault of CONTRACTOR. The CONTRACTOR will only be entitled to an extension of time for delays that affect the Critical Path of the Work and that are not caused by the CONTRACTOR.

.4 When CONTRACTOR is delayed by strikes, lockouts, fires, losses from natural causes, or other unavoidable cause or causes beyond CONTRACTOR's control.

12.2 Calendar Day Contracts:

12.2.1 Under a Calendar Day Contract, CONTRACTOR may be granted an extension of time because of unusual inclement weather, including but not limited to unusual rainfall events, which are beyond the normal rainfall recorded and expected for Dripping Springs, Texas. However, the CONTRACTOR will not be granted an extension of time for "normal rainfall", as described below.

12.2.2 "Unusual Inclement Weather" is defined as a rain event or other weather related event which occurs at the site and is of sufficient magnitude to prevent CONTRACTOR from performing units of Work critical to maintaining the Progress Schedule.

12.2.3 Baseline Rain Day Determination. "Normal rainfall" compiled by the State climatologist, based on U.S. Weather Bureau Records for Dripping Springs, Texas, is considered a part of the Calendar Day Contract, and is not a justification for an extension of time. Listed below are the number of days in each month for which no compensatory days for rainfall events ("Rain Days") in such months may be claimed:

January	5 days	July	4 days
February	4 days	August	4 days
March	5 days	September	5 days
April	4 days	October	5 days
May	5 days	November	4 days
June	6 days	December	4 days

Rain Days in addition to the baseline Rain Day determination described above will be measured with the Owner's Representative's approval at the nearest operational public weather data collection facility to the site, including but not limited to the OWNER's early warning flood gauge system.

12.2.4 CONTRACTOR may receive credit in any month for Unusual Inclement Weather, and specifically for any Rain Days in that month which exceed the number of Rain Days

allocated to that month, if a Claim is made in accordance with paragraph 12.1.1 and the weather event meets the definition for "Unusual Inclement Weather", and as applicable, "Rain Day" and such claimed day is a day on which Work critical to maintaining the Progress Schedule is scheduled to be performed and is otherwise capable of being performed.

ARTICLE 13 - TESTS & INSPECTIONS; DEFECTIVE WORK

13.1 Notice of Defects: Prompt notice of all defective Work of which OWNER or E/A has actual knowledge will be given to CONTRACTOR. All defective Work may be rejected, corrected or accepted as provided in Article 13. CONTRACTOR must give OWNER and E/A prompt notice of any defective Work of which CONTRACTOR has actual knowledge.

13.2 Access to Work: OWNER, E/A, E/A's Consultants, other representatives and personnel of OWNER, independent testing laboratories and governmental agencies having jurisdiction will have access to the Work at reasonable times for observing, inspecting and testing. CONTRACTOR shall provide them proper and safe conditions for such access, and advise them of CONTRACTOR's site safety procedures and programs so that they may comply therewith as applicable.

13.3 Tests and Inspections:

13.3.1 CONTRACTOR shall give timely notice of readiness of the Work for all required inspections, tests or approvals, and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.

13.3.2 OWNER shall employ and pay for services of an independent testing laboratory to perform all inspections, tests or approvals required by the Contract Documents except:

.1 for inspections, tests or approvals covered by paragraph 13.3.3 below;

.2 that costs incurred with tests or inspections conducted pursuant to paragraph 13.4.3 below shall be paid as provided in paragraph 13.4.3;

.3 for reinspecting or retesting defective Work, including any associated costs incurred by the testing laboratory for cancelled tests or standby time; and

.4 as otherwise specifically provided in the Contract Documents. All testing laboratories shall meet the requirements of ASTM E-329.

13.3.3 If laws or regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested or approved by an employee or other representative of such public body, CONTRACTOR shall assume full responsibility for arranging and obtaining such inspections, tests or approvals, pay all costs in connection therewith and furnish Owner's Representative the required certificates of inspection or approval.

13.3.4 CONTRACTOR shall also be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests or approvals required for OWNER's and E/A's review of materials or equipment to be incorporated in the Work, or of materials, mix designs or equipment submitted for review prior to CONTRACTOR's purchase thereof for incorporation in the Work.

13.4 Uncovering Work:

13.4.1 If any Work (or the work of others) that is to be inspected, tested or approved is covered by CONTRACTOR without written concurrence of Owner's Representative,

or if any Work is covered contrary to the written request of Owner's Representative, it must, if requested by Owner's Representative, be uncovered and recovered at CONTRACTOR's expense.

13.4.2 If Owner's Representative considers it necessary or advisable that covered Work be observed, inspected or tested, CONTRACTOR shall uncover, expose or otherwise make available for observation, inspection or testing that portion of the Work in question, furnishing all necessary labor, material and equipment. If it is found that such Work is defective, CONTRACTOR shall pay all claims, costs, losses and damages caused by, arising out of or resulting from such uncovering, exposure, observation, inspection and testing and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others).

13.5 OWNER May Stop the Work:

13.5.1 If the Work is defective, or CONTRACTOR fails to supply sufficient skilled workers, suitable materials, and/or equipment; or fails to furnish or perform the Work in such a way that the Work in progress or the completed Work will conform to the Contract Documents, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of OWNER to stop the Work shall not give rise to any duty on the part of OWNER to exercise this right for the benefit of CONTRACTOR or any surety or other party.

13.5.2 If CONTRACTOR fails to correct defective Work or submit a satisfactory plan to take corrective action, with procedure and time schedule, OWNER may order CONTRACTOR to stop the Work, or any portion thereof, until cause for such order has been eliminated, or take any other action permitted by this Contract. A notice to stop the Work, based on defects, shall not stop calendar or working days charged to the Project.

13.6 Correction or Removal of Defective Work: If required by OWNER, CONTRACTOR shall promptly, as directed, either correct all defective Work, whether or not fabricated, installed or completed, or, if the Work has been rejected by Owner's Representative, remove it from the site and replace it with Work that is not defective. CONTRACTOR shall correct or remove and replace defective Work, or submit a plan of action detailing how the deficiency will be corrected, within the time frame identified in the notice of defective Work. CONTRACTOR shall pay all claims, costs, losses and damages caused by or resulting from such correction or removal (including but not limited to all costs of repair or replacement of work of others).

13.7 Warranty period:

13.7.1 If within two year after the date of Substantial Completion or such longer period of time as may be prescribed by laws or regulations or by the terms of any applicable special guarantee required by the Contract Documents or by any specific provision of the Contract Documents (e.g. paragraph 14.11.2), any Work, including work performed after the Substantial Completion date, is found to be defective, CONTRACTOR shall promptly, without cost to OWNER and in accordance with OWNER's written instructions:

(i) correct such defective Work, or, if it has been rejected by OWNER, remove it from the site and replace it with Work that is not defective, and

(ii) satisfactorily correct or remove and replace any damage to other Work or the work of others resulting there from.

If CONTRACTOR does not promptly comply with the terms of such instructions, or in an emergency where delay would cause serious risk of loss or damage, OWNER may have the defective Work corrected or the rejected Work removed and replaced, and

all claims, costs, losses and damages caused by or resulting from such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by CONTRACTOR. The warranty period will be deemed to be renewed and recommenced in connection with the completed items of Work requiring correction.

13.7.2 In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the warranty period for that item may start to run from an earlier date if so provided in the Contract Documents.

13.7.3 If correction of defective Work will affect the function or use of the facility CONTRACTOR shall not proceed with correction of defective Work without prior coordination and approval of OWNER.

13.7.4 The obligations of the CONTRACTOR to perform warranty work will survive the acceptance of the Work and any termination of the Contract.

13.8 Acceptance of Defective Work: If, instead of requiring correction or removal and replacement of defective Work, OWNER decides to accept it, OWNER may do so. CONTRACTOR shall pay all claims, costs, losses and damages attributable to OWNER's evaluation of and determination to accept such defective Work. If any such acceptance occurs prior to recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents and compensating OWNER for the diminished value of the defective Work. If the acceptance occurs after such recommendation, an appropriate amount will be paid by CONTRACTOR to OWNER after a calculation by OWNER of the diminution in value of the defective Work.

13.9 OWNER May Correct Defective Work: If CONTRACTOR fails within a reasonable time after Written Notice of OWNER to correct defective Work, or to remove and replace rejected Work, or if CONTRACTOR fails to perform the Work in accordance with the Contract Documents, or if CONTRACTOR fails to comply with any other provision of the Contract Documents, OWNER may, after seven (7) calendar days' Written Notice to CONTRACTOR, correct and remedy any such deficiency. If, in the opinion of the Owner's Representative, significant progress has not been made during this seven (7) calendar day period to correct the deficiency, the OWNER may exercise any actions necessary to remedy the deficiency. In exercising the rights and remedies under this paragraph, OWNER shall proceed expeditiously. In connection with such corrective and remedial action, OWNER may exclude CONTRACTOR from all or part of the site, take possession of all or part of the Work, and suspend CONTRACTOR's services related thereto, and incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere. CONTRACTOR shall allow OWNER, its agents and employees, OWNER's other contractors, E/A and E/A's consultants access to the site to enable OWNER to exercise the rights and remedies under this paragraph. All claims, costs, losses and damages incurred or sustained by OWNER in exercising such rights and remedies will be charged against CONTRACTOR and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work. Such claims, costs, losses and damages will include but not be limited to all costs of repair or replacement of work of others destroyed or damaged by correction, removal or replacement of CONTRACTOR's defective Work. CONTRACTOR shall not be allowed an extension of the Contract Times (or Milestones), or claims of damage because of any delay in the performance of the Work attributable to the exercise by OWNER of OWNER's rights and remedies hereunder.

ARTICLE 14 - PAYMENTS TO CONTRACTOR AND COMPLETION

14.1 Application for Progress Payment:

14.1.1 No more often than once a month, CONTRACTOR shall submit to Owner's Representative for review an Application for Payment, in a form acceptable to OWNER, filled out and signed by CONTRACTOR covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents.

14.1.2 Such applications shall not include requests for payment on account of changes in the Work which have been properly authorized by Change Directives but not yet included in Change Orders.

14.1.3 Such applications shall not include requests for payment of amounts the CONTRACTOR does not intend to pay to a Subcontractor or Supplier because of a dispute or other reason.

14.1.4 If payment is requested on the basis of materials or equipment not incorporated in the Work but delivered and suitably stored at the site or at another location agreed to in writing, the Application for Payment shall be accompanied by such bills of sale, data and other procedures satisfactory to OWNER substantiating OWNER's title to such materials or equipment or otherwise protecting OWNER's interest. Payment on account of such materials or equipment will not include any amount for CONTRACTOR's overhead or profit or relieve CONTRACTOR of its obligation to protect and install such materials or equipment in accordance with the requirements of the Contract and to restore damaged or defective Work. If materials or equipment are stored at another location, at the direction of the OWNER they shall be stored in a bonded and insured facility, accessible to E/A and OWNER, and shall be clearly marked as property of OWNER. Title to materials delivered to the site of the Work or a staging area will pass to OWNER upon payment by OWNER without the necessity for further documentation. Risk of loss will not pass to OWNER until acceptance.

14.1.5 Where the original Contract Amount is less than $400,000, OWNER will pay CONTRACTOR total amount of approved Application for Payment, less ten percent (10%) of amount thereof, which ten percent (10%) will be retained until final payment, less all previous payments and less all other sums that may be retained by OWNER under the terms of this Agreement. Where the original Contract Amount is $400,000 or more, OWNER will pay CONTRACTOR total amount of approved Application for Payment, less five percent (5%) of amount thereof, which five percent (5%) will be retained until final payment, less all previous payments and less all other sums that may be retained by OWNER under the terms of this Agreement. In either case, if the Work is near completion and delay occurs due to no fault or neglect of CONTRACTOR, OWNER may pay a portion of the retained amount to CONTRACTOR. CONTRACTOR, at OWNER's option, may be relieved of the obligation to complete the Work and, thereupon, CONTRACTOR shall receive payment of the balance due under the Contract subject to the conditions stated under paragraph 15.2.

14.1.6 Applications for Payment shall include the following documentation:

.1 updated Progress Schedule;

.2 monthly subcontractor report;

.3 any other documentation required under the Supplemental General Conditions.

14.2 CONTRACTOR's Warranty of Title: CONTRACTOR warrants and guarantees that title to all Work, materials and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to OWNER free and clear of all Liens no later than the time of payment to CONTRACTOR.

14.3 Review of Applications for Progress Payment:

14.3.1 Owner's Representative will, within ten (10) calendar days after receipt of each Application for Payment, either indicate a recommendation for payment and forward the Application for processing by OWNER, or return the Application to CONTRACTOR indicating Owner's Representative's reasons for refusing to recommend payment. In the latter case, CONTRACTOR shall make the necessary corrections and resubmit the Application.

14.3.2 Owner's Representative's recommendation of any payment requested in an Application for Payment will constitute a representation by Owner's Representative, based upon Owner's Representative's on-site observations of the executed Work and on Owner's Representative's review of the Application for Payment and the accompanying data and schedules, that to the best of Owner's Representative's knowledge, information and belief:

.1 the Work has progressed to the point indicated; and

.2 the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for unit price Work, and to any other qualifications stated in the recommendation).

14.3.3 By recommending any such payment, Owner's Representative will not thereby be deemed to have represented that:

.1 exhaustive or continuous on-site inspections have been made to check the quality or the quantity of the Work;

.2 examination has been made to ascertain how or for what purpose CONTRACTOR has used money previously paid on account of the Contract Amount;

.3 CONTRACTOR's construction means, methods, techniques, sequences or procedures have been reviewed; or

.4 that there may not be other matters or issues between the parties that might entitle CONTRACTOR to be paid additionally by OWNER or entitle OWNER to withhold payment to CONTRACTOR.

14.4 Decisions to Withhold Payment:

14.4.1 OWNER may withhold or nullify the whole or part of any payment to such extent as may be necessary on account of:

.1 defective Work not remedied;

.2 third party Claims filed or reasonable evidence indicating probable filing of such Claims;

.3 failure of CONTRACTOR to make payments properly to Subcontractors or for labor, materials or equipment;

.4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Amount;

.5 damage to OWNER or another contractor;

.6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

.7 failure of CONTRACTOR to submit a schedule of values in accordance with the Contract Documents;

.8 failure of CONTRACTOR to submit a submittal schedule in accordance with the Contract Documents;

.9 failure of CONTRACTOR to submit and update a construction Progress Schedule in accordance with the Contract Documents;

.10 failure of CONTRACTOR to maintain a record of changes on drawings and documents;

.11 failure of CONTRACTOR to maintain weekly payroll reports and, as applicable, provide copies of reports in a timely manner upon request of OWNER;

.12 failure of CONTRACTOR to submit monthly subcontractor reports;

.13 CONTRACTOR's neglect or unsatisfactory prosecution of the Work, including failure to clean up;

.14 failure of CONTRACTOR to comply with any provision of the Contract Documents.

14.4.2 When the above reasons for withholding payment are removed, CONTRACTOR shall resubmit a statement for the value of Work performed. Payment will be made within thirty (30) calendar days of receipt of approved Application for Payment.

14.5 Payment Becomes Due: Thirty days after presentation of the Application for Payment to Owner with E/A's recommendation, the amount recommended (subject to any Owner set-offs) will become due, and when due will be paid by Owner to Contractor.

14.6 Arrears: No money shall be paid by OWNER upon any claim, debt, demand or account whatsoever, to any person, firm or corporation who is in arrears to City for taxes; and City shall be entitled to counterclaim and automatically offset against any such debt, claim, demand or account in the amount of taxes so in arrears and no assignment or transfer of such debt, claim, demand or account after said taxes are due, shall affect the right of OWNER to so offset said taxes, and associated penalties and interest if applicable, against the same.

14.7 Substantial Completion:

14.7.1 When the CONTRACTOR considers that the Work, or a portion thereof which the OWNER agrees to accept separately, is substantially complete, the CONTRACTOR shall notify Owner's Representative in writing that the entire Work is substantially complete (except for items specifically listed by CONTRACTOR as Incomplete) and request a determination as to whether the Work or designated portion thereof is substantially complete. If Owner's Representative does not consider the Work substantially complete, Owner's Representative will notify CONTRACTOR giving reasons therefore. After performing any required Work, CONTRACTOR shall then submit another request for Owner's Representative to determine Substantial Completion. If Owner's Representative considers the Work substantially complete, Owner's Representative will prepare and deliver a certificate of Substantial Completion which shall establish the date of Substantial Completion, shall include a punch list of items to be completed or corrected before final payment, shall establish the time within which CONTRACTOR shall finish the punch list, and shall establish

responsibilities of the OWNER and CONTRACTOR for security, maintenance, heat, utilities, damage to the Work, warranty and insurance. Failure to include an item on the punch list does not alter the responsibility of CONTRACTOR to complete all Work in accordance with the Contract Documents. If a Certificate of Occupancy is required by public authorities having jurisdiction over the Work, said certificate shall be issued before the Work or any portion thereof is considered substantially complete. The certificate of Substantial Completion shall be signed by OWNER and CONTRACTOR to evidence acceptance of the responsibilities assigned to them in such certificate.

14.7.2 If some or all of the Work has been determined not to be at a point of Substantial Completion, Contractor shall reimburse Owner for any costs and expenses incurred by Owner for re-inspection or re-testing, such costs to be set off against subsequent payments or memorialized in a Change Order.

14.7.3 OWNER shall have the right to exclude CONTRACTOR from the Work after the date of Substantial Completion, but OWNER will allow CONTRACTOR reasonable access to complete or correct items on the punch list and complete warranty work.

14.8 Partial Utilization: Use by OWNER, at OWNER's option, of any substantially completed part of the Work which: (i) has specifically been identified in the Contract Documents, or (ii) OWNER and CONTRACTOR agree constitutes a separately functioning and usable part of the Work that can be used by OWNER for its intended purpose without significant interference with CONTRACTOR's performance of the remainder of the Work, may be accomplished prior to Substantial Completion of all the Work in accordance with the following:

14.8.1 OWNER at any time may request CONTRACTOR to permit OWNER to use any such part of the Work which OWNER believes to be ready for its intended use and substantially complete. If CONTRACTOR agrees that such part of the Work is substantially complete, CONTRACTOR shall certify to Owner's Representative that such part of the Work is substantially complete and request Owner's Representative to issue a notice specifying what portion of the Work is substantially complete for the purpose of payment and what Work remains to be done on the portion being accepted. CONTRACTOR at any time may notify Owner's Representative that CONTRACTOR considers any such part of the Work ready for its intended use and substantially complete and request Owner's Representative to issue a notice specifying what portion of the Work is partially completed for the purpose of payment and what Work remains to be done on the portion being accepted. The provisions of paragraphs 14.7.1 and 14.7.2 will apply with respect to the notice specifying what portion of the Work is partially completed for the purpose of payment and what Work remains to be done on the portion being accepted.

14.8.2 Such partial utilization is authorized by public authorities having jurisdiction over the Work.

14.9 Final Inspection: Upon Written Notice from CONTRACTOR that the entire Work or an agreed portion thereof is complete, Owner's Representative will make a final inspection with CONTRACTOR and provide Written Notice of all particulars in which this inspection reveals that the Work is incomplete or defective. CONTRACTOR shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

14.10 Final Application for Payment: CONTRACTOR may make application for final payment following the procedure for progress payments after CONTRACTOR has completed all such corrections to the satisfaction of Owner's Representative and delivered the following documents:

14.10.1 Affidavit by CONTRACTOR certifying the payment of all debts and claims;

14.10.2 Three (3) complete operating and maintenance manuals, each containing maintenance and operating instructions, schedules, guarantees, and other documentation required by the Contract Documents;

14.10.3 Record documents (as provided in paragraph 6.10);

14.10.4 Consent of surety, if any, to final payment. If surety is not provided, complete and legally effective releases or waivers (satisfactory to OWNER) of all claims arising out of or filed in connection with the Work;

14.10.5 Certificate evidencing that required insurance will remain in force after final payment and through the warranty period;

14.10.6 Any other documentation called for in the Contract Documents.

14.11 Final Payment and Acceptance:

14.11.1 If, on the basis of observation of the Work during construction, final inspection, and review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Owner's Representative is satisfied that the Work has been completed and CONTRACTOR's other obligations under the Contract Documents have been fulfilled and there are no outstanding claims, Owner's Representative will recommend the final Application for Payment and thereby notify the OWNER, who will pay to CONTRACTOR the balance due CONTRACTOR under the terms of the Contract. If the sole remaining unfinished item to complete the Work is the reestablishment of vegetation, CONTRACTOR may execute a revegetation letter with fiscal posted (letter of credit) to ensure completion of this item. This Work must be accomplished within one hundred twenty (120) Calendar Days of the date of Final Completion of the Work. When the permanent erosion control has been established, OWNER will initiate an inspection for final acceptance of the erosion controls. If the revegetation is not completed within the one hundred twenty (120) Calendar Days, OWNER, at its option, may complete the Work using the posted fiscal.

14.11.2 If the Contract measures Contract Time to Final Completion, rather than Substantial Completion, Owner's Representative will issue a letter of final acceptance to CONTRACTOR which establishes the Final Completion date and initiates the two-year warranty period. If the sole remaining unfinished item to complete the Work is the reestablishment of vegetation and CONTRACTOR has executed a revegetation letter with fiscal posted (letter of credit) to ensure completion of this item, the Owner's Representative will issue a letter of conditional acceptance to CONTRACTOR which established the Final Completion date and initiates the two-year warranty period.

14.11.3 Final payment is considered to have taken place when CONTRACTOR or any of its representatives negotiates OWNER's final payment check, whether labeled final or not, for cash or deposits check in any financial institution for its monetary return.

14.11.4 The OWNER will withhold funds sufficient to cover the amount of any unresolved contract claims from final payment for six months under the following limited conditions:

.1 CONTRACTOR must provide written notice to the claimant (via certified mail or hand delivery) that (i) OWNER will hold funds in the amount of the disputed claim for six (6) months from the date of the receipt of the notice and (ii) CONTRACTOR and the claimant have certain alternative dispute resolution rights; and

.2 CONTRACTOR must provide OWNER with a copy of the receipted notice.

Provided the claimant has received notice under this section, OWNER will release the withheld funds, if the CONTRACTOR provides a bond in substantial compliance with the provisions of Section 52.231 of the Texas Property Code; when the OWNER receives a settlement or release of the claim with accompanying instructions regarding payment; upon resolution of the claim in litigation, if suit is filed within such six (6) month period and the OWNER receives written notice of such filing; or when such six (6) month period has passed, if no such bond, settlement, release, or notice of filing of suit have been received. The above provisions notwithstanding, if efforts to timely resolve a disputed claim are not being made to OWNER'S reasonable satisfaction, OWNER may, in its complete discretion, file an interpleader action and deposit the withheld funds in the registry of a court of competent jurisdiction. In addition, CONTRACTOR must include a provision in each of its subcontracts that the prevailing party in any litigation arising thereunder will be entitled to recover its costs of court and reasonable attorney's fees.

14.12 Waiver of Claims: The making and acceptance of final payment will constitute:

14.12.1 a waiver of all claims by CONTRACTOR against OWNER other than those previously made in writing and still unsettled.

ARTICLE 15 - SUSPENSION OF WORK AND TERMINATION

15.1 OWNER May Suspend Work Without Cause: At any time and without cause, OWNER may suspend the Work or any portion thereof for a period of not more than ninety (90) calendar days by Written Notice to CONTRACTOR which will fix the date on which the Work will be resumed. CONTRACTOR shall resume the Work on the date so fixed. CONTRACTOR shall be allowed an adjustment in the Contract Amount or an extension of the Contract Times, or both, directly attributable to any such suspension if CONTRACTOR makes an approved Claim therefore as provided in Articles 11 and 12.

15.2 OWNER May Terminate Without Cause: Upon seven (7) calendar days' Written Notice to CONTRACTOR, OWNER may, without cause and without prejudice to any right or remedy of OWNER, elect to terminate the Agreement. In such case, CONTRACTOR shall be paid (without duplication of any items):

15.2.1 for completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;

15.2.2 for expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses; and

15.2.3 other reasonable expenses directly attributable to termination, including costs incurred to prepare a termination for convenience cost proposal.

15.3 OWNER May Terminate With Cause:

15.3.1 Upon the occurrence of any one or more of the following events:

.1 if CONTRACTOR persistently fails to perform the Work in accordance with the Contract Documents;

.2 if CONTRACTOR disregards laws or regulations of any public body having jurisdiction;

.3 if CONTRACTOR disregards the authority of Owner's Representative;

.4 if CONTRACTOR makes fraudulent statements;

.5 if CONTRACTOR fails to maintain a work force adequate to accomplish the Work within the Contract Time;

.6 if CONTRACTOR fails to make adequate progress and endangers successful completion of the Contract; or

.7 if CONTRACTOR otherwise violates in any substantial way any provisions of the Contract Documents;

OWNER may, after giving CONTRACTOR (and the surety, if any) seven (7) calendar days Written Notice terminate the services of CONTRACTOR. OWNER, at its option, may proceed with negotiation with surety for completion of the Work. Alternatively, OWNER may under these circumstances exclude CONTRACTOR from the site and take possession of the Work (without liability to CONTRACTOR for trespass or conversion), incorporate in the Work all materials and equipment stored at the site or for which OWNER has paid CONTRACTOR but which are stored elsewhere, and finish the Work as OWNER may deem expedient. In such case CONTRACTOR shall not be entitled to receive any further payment until the Work is finished. If the unpaid balance of the Contract Amount exceeds all claims, costs, losses and damages sustained by OWNER arising out of or resulting from completing the Work, such excess will be paid to CONTRACTOR. If such claims, costs, losses and damage exceed such unpaid balance, CONTRACTOR or surety shall pay the difference to OWNER.

15.3.2 Where CONTRACTOR's services have been so terminated by OWNER, the termination will not affect any rights or remedies of OWNER against CONTRACTOR and surety then existing or which may thereafter accrue. Any retention or payment of moneys due CONTRACTOR by OWNER will not release CONTRACTOR from liability. In the event OWNER terminates Contract with cause, OWNER may reject any and all future Bids submitted by CONTRACTOR.

15.4 CONTRACTOR May Stop Work or Terminate: If through no act or fault of CONTRACTOR, the Work is suspended for a period of more than ninety (90) calendar days by OWNER or under an order of court or other public authority, or (except during disputes) Owner's Representative fails to forward for processing any mutually acceptable Application for Payment within thirty (30) calendar days after it is submitted, or (except during disputes) OWNER fails for sixty (60) calendar days after it is submitted to pay CONTRACTOR any sum finally determined by OWNER to be due, then CONTRACTOR may, upon seven (7) calendar days' Written Notice to OWNER, and provided OWNER does not remedy such suspension or failure within that time, terminate the Agreement and recover from OWNER payment on the same terms as provided in paragraph 15.2. In lieu of terminating the Agreement and without prejudice to any other right or remedy, if (except during disputes) Owner's Representative has failed to forward for processing any mutually acceptable Application for Payment within thirty (30) calendar days after it is submitted, or (except during disputes) OWNER has failed for sixty (60) calendar days after it is submitted to pay CONTRACTOR any sum finally determined by OWNER to be due, CONTRACTOR may upon seven (7) calendar days' Written Notice to OWNER stop the Work until payment of all such amounts due CONTRACTOR, including interest thereon. The provisions of this paragraph 15.4 are not intended to preclude CONTRACTOR from making a Claim under Articles 11 and 12 for an increase in Contract

Amount or Contract Times or otherwise for expenses or damage directly attributable to CONTRACTOR's stopping Work as permitted by this paragraph.

15.5 Discretionary Notice to Cure: In its complete discretion, OWNER may, but is not required to, provide a Notice to Cure to CONTRACTOR and its surety to cure an event of default described above and/or an anticipatory breach of contract and, if required by OWNER, to attend a meeting with OWNER, regarding the Notice to Cure, the event of default, and/or the anticipatory breach of contract. The Notice to Cure will set forth the time limit in which the cure is to be completed or commenced and diligently prosecuted. Upon receipt of any Notice to Cure, CONTRACTOR shall prepare a report describing its program and measures to affect the cure of the event of default and/or anticipatory breach of contract within the time required by the Notice to Cure. The CONTRACTOR'S report must be delivered to OWNER at least three (3) days prior to any requested meeting with the OWNER and surety.

15.6 Bankruptcy: If CONTRACTOR declares bankruptcy or is adjudged bankrupt or makes an assignment for the benefit of creditors or if a receiver is appointed for the benefit of creditors or if a receiver is appointed by reason of CONTRACTOR'S insolvency, CONTRACTOR may be unable to perform this Contract in accordance with the Contract requirements. In such an event, OWNER may demand CONTRACTOR or its successor in interest provide OWNER with adequate assurance of CONTRACTOR'S future performance in accordance with the terms and conditions of the Contract. If CONTRACTOR fails to provide adequate assurance of future performance to OWNER'S reasonable satisfaction within ten (10) days of such a request, OWNER may terminate the CONTRACTOR'S services for cause or without cause, as set forth above. If CONTRACTOR fails to provide timely adequate assurance of its performance and actual performance, OWNER may prosecute the Work with its own forces or with other contractors on a time and material or other appropriate basis and the cost of which will be charged against the Contract balance.

15.7 Duty to Mitigate: In the event of any termination or suspension under this Contract, the CONTRACTOR agrees to and shall take all reasonable actions to mitigate its damages and any and all claims which may be asserted against the OWNER.

15.8 Responsibility during Demobilization: While demobilizing, the CONTRACTOR will take all necessary and reasonable actions to preserve and protect the Work, the site and other property of the OWNER or others at the site.

ARTICLE 16 - DISPUTE RESOLUTION

16.1 Filing of Claims:

16.1.1 Claims arising from the circumstances identified in paragraphs 3.2, 4.1, 4.2.2, 4.2.4, 6.4.2, 6.11.5.2, 6.17, 7.5, 8.6, 9.5, 10.4.2, 13.4.3, 13.8, 13.9, 15.1, 15.2, 15.3, or 15.4, or other occurrences or events, shall be made by Written Notice delivered by the party making the Claim to the other party within thirty (30) calendar days after the start of the occurrence or event giving rise to the Claim and stating the general nature of the Claim. Notice of the amount of the Claim with supporting data shall be delivered in writing within thirty (30) calendar days after Written Notice of Claim is delivered by claimant and shall represent that the adjustment claimed covers all known amounts and/or extensions of time to which claimant is entitled.

16.1.2 Within thirty (30) calendar days of receipt of notice of the amount of the Claim with supporting data, Owner's Representative and CONTRACTOR shall meet to discuss the Claim, after which an offer of settlement or notification of no settlement offer will be made to claimant. If claimant is not satisfied with the proposal presented, claimant shall have thirty (30) calendar days in which to: (i) submit additional

supporting data requested by the other party; (ii) modify the initial Claim; or (iii) request Alternative Dispute Resolution.

16.2 Alternative Dispute Resolution:

16.2.1 If a dispute exists concerning a Claim, the parties agree to use the following procedure prior to pursuing any other available remedies. OWNER reserves the right to include the E/A as a party.

16.2.2 Negotiating with Previously Uninvolved Personnel: Either party may make a written request for a meeting to be held between representatives of each party within fourteen (14) Calendar Days of the request or such later period that the parties may agree to. Each party shall endeavor to include, at a minimum, one (1) previously uninvolved senior level decision maker (an owner, officer, or employee of each organization) empowered to negotiate on behalf of their organization. If a previously uninvolved senior level decision maker is unavailable due to the size of the CONTRACTOR'S organization or any other reason, the CONTRACTOR shall nonetheless provide an appropriate senior level decision maker for the meeting. The purpose of this and any subsequent meetings will be good faith negotiations of the matters constituting the dispute. Negotiations shall be concluded within thirty (30) Calendar Days of the first meeting, unless mutually agreed otherwise. This step may be waived by a written agreement signed by both parties, in which event the parties may proceed directly to mediation as described below.

16.2.3 Mediation:

.1 If the procedure described in 16.2.2 proves unsuccessful or is waived pursuant to its terms, the parties shall initiate the mediation process. OWNER and CONTRACTOR agree to select within thirty (30) calendar days a mediator trained in mediation skills, to assist with resolution of the dispute. OWNER and CONTRACTOR agree to act in good faith in the selection of the mediator and to give consideration to qualified individuals nominated to act as mediator. Nothing in this agreement prevents the parties from relying on the skills of a person who also is trained in the subject matter of the dispute and/or a contract interpretation expert. Should the parties fail to agree on a mediator within thirty (30) calendar days of initiation of the mediation process, the parties agree to submit such claims to the jurisdiction of the State District Court of Hays County, Texas, which is the exclusive venue for final dispute resolution.

.2 Mediation is a forum in which an impartial person, the mediator, facilitates communication between parties to promote reconciliation, settlement, or understanding among them. The parties hereby agree that mediation, at a minimum, shall provide for (i) conducting an on-site investigation, if appropriate, by the mediator for fact gathering purposes, (ii) a meeting of all parties for the exchange of points of view and (iii) separate meetings between the mediator and each party to the dispute for the formulation of resolution alternatives. The parties agree to participate in mediation in good faith for up to thirty (30) calendar days from the date of the first mediation session, unless mutually agreed otherwise.

16.3 Resolution of Disputes between Contractor and Subcontractor or Supplier: If a dispute exists concerning a claim between a CONTRACTOR and a Subcontractor or Supplier, the CONTRACTOR agrees to participate with such Subcontractor and/or Supplier in a process substantially paralleling the steps set out in paragraphs 16.1 and 16.2 above, including the delivery of written notices, submission of supporting data, negotiation with previously uninvolved personnel, and, if such alternative dispute resolution process is unsuccessful,

mediation between the parties to the claim. If the CONTRACTOR and Subcontractor or Supplier agreement provides an alternative dispute resolution process, which provides substantially equivalent rights to those set forth herein, it may be followed, unless the CONTRACTOR and affected Subcontractor or Supplier agree to follow the process outlined above. The OWNER is not a party to the alternative dispute resolution process between the CONTRACTOR and Subcontractor or Supplier and will not pay any costs incurred in the process. Each party will be responsible for its own expenses incurred in the process, which will include an equal share of the mediation expenses, unless otherwise determined by the mediator. NOTICE: THE PROCESS SET FORTH HEREIN IS NOT A SUBSTITUTE FOR THE STATUTORY PAYMENT BOND CLAIM PROCESS.

16.4 RESERVED

ARTICLE 17 – MISCELLANEOUS

17.1 Venue: In the event of any suit at law or in equity involving the Contract, venue shall be exclusively in Hays County, Texas and the laws of the State of Texas shall apply to the interpretation and enforcement of the Contract.

17.2 Extent of Agreement: This Contract represents the entire and integrated agreement between the OWNER and CONTRACTOR with respect to the subject matter hereof and supersedes all prior negotiations, representations or agreements, either written or oral.

17.3 Cumulative Remedies: The rights and remedies available to the parties are not to be construed in any way as a limitation of any rights and remedies available to any or all of them which are otherwise imposed or available by laws or regulations, by special warranty or guarantees or by other provisions of the Contract Documents, and the provisions of this paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right and remedy to which they apply. Specifically, the OWNER is not required to only assess liquidated damages, and OWNER may elect to pursue its actual damages resulting from the failure of the CONTRACTOR to complete the Work in accordance with the requirements of the Contract Documents.

17.4 Severability: If any word, phrase, clause, sentence or provision of the Contract, or the application of same to any person or set of circumstances is for any reason held to be unconstitutional, invalid or unenforceable, that finding shall only effect such word, phrase, clause, sentence or provision, and such finding shall not effect the remaining portions of this Contract; this being the intent of the parties in entering into the Contract; and all provisions of the Contract are declared to be severable for this purpose.

17.5 Independent Contractor: The Contract shall not be construed as creating an employer/employee relationship, a partnership, or a joint venture. CONTRACTOR is an independent contractor and CONTRACTOR's services shall be those of an independent contractor. CONTRACTOR agrees and understands that the Contract does not grant any rights or privileges established for employees of OWNER.

17.6 Prohibition of Gratuities: OWNER may, by Written Notice to CONTRACTOR, terminate the Contract without liability if is determined by OWNER that gratuities were offered or given by CONTRACTOR or any agent or representative of CONTRACTOR to any officer or employee of OWNER with a view toward securing the Contract or securing favorable treatment with respect to the awarding or amending or the making of any determinations with respect to the performing of such Contract. In the event the Contract is terminated by OWNER pursuant to this provision, OWNER shall be entitled, in addition to any other rights and remedies, to

recover or withhold the amount of the cost incurred by CONTRACTOR in providing such gratuities.

17.7 Prohibition Against Personal Interest in Contracts: No officer, employee, independent consultant, or elected official of OWNER who is involved in the development, evaluation, or decision-making process of the performance of any solicitation shall have a financial interest, direct or indirect, in the Contract resulting from that solicitation. Any violation of this provision, with the knowledge, expressed or implied, of CONTRACTOR shall render the Contract voidable by OWNER.

17.8 OWNER'S Right to Audit:

17.8.1 Records means all records generated by or on behalf of CONTRACTOR and each Subcontractor and Supplier of CONTRACTOR, whether paper, electronic, or other media, which are in any way related to performance of or compliance with this Contract, including, without limitation:

.1 accounting records;

.2 written policies and procedures;

.3 subcontract files (including proposals of successful and unsuccessful Bidders, Bid recaps, etc.);

.4 original estimates and estimating work sheets;

.5 correspondence;

.6 Change Order files (including documentation covering negotiated settlements);

.7 back charge logs and supporting documentation;

.8 general ledger entries detailing cash and trade discounts earned, insurance rebates and dividends;

.9 lump sum agreements between CONTRACTOR and any Subcontractor or Supplier;

.10 records necessary to evaluate: Contract compliance, Change Order pricing, and any Claim submitted by CONTRACTOR or any of its payees; and

.11 any other CONTRACTOR record that may substantiate any charge related to this Contract.

17.8.2 CONTRACTOR shall allow OWNER'S agent or its authorized representative to inspect, audit, and/or reproduce, or all three, all Records generated by or on behalf of CONTRACTOR and each Subcontractor and Supplier, upon OWNER'S written request. Further, CONTRACTOR shall allow OWNER'S agent or authorized representative to interview any of CONTRACTOR'S employees, all Subcontractors and all Suppliers, and all their respective employees.

17.8.3 CONTRACTOR shall retain all its Records, and require all its Subcontractors and Suppliers to retain their respective Records, during this Contract and for three (3) years after final payment, until all audit and litigation matters that OWNER has brought to the attention of CONTRACTOR are resolved, or as otherwise required by law, whichever is longer. OWNER'S right to inspect, audit, or reproduce Records, or interview employees of CONTRACTOR or its respective Subcontractors or Suppliers exists during this Contract, and for three (3) years after final payment, until all audit and litigation matters that OWNER has brought to CONTRACTOR'S attention are resolved, or as otherwise required by law, whichever is longer, and at no cost to

OWNER, either from CONTRACTOR or any of its Subcontractors or Suppliers that may furnish Records or make employees available for interviewing.

17.8.4 CONTRACTOR must provide sufficient and accessible facilities during its normal business hours for OWNER to inspect, audit, or reproduce Records, or all three, and to interview any person about the Records.

17.8.5 CONTRACTOR shall insert these requirements in each written contract between CONTRACTOR and any Subcontractor or Supplier and require each Subcontractor and Supplier to comply with these provisions.

17.9 Survival: The terms and conditions of this Contract, which contemplate a period of time beyond completion or termination will survive such completion or termination and not be merged therein or otherwise terminated.

17.10 No Waiver: The waiver of any provision of this Contract will not be deemed to be a waiver of any other provision of this Contract. No waiver of any provision of this Contract will be deemed to constitute a continuing waiver unless expressly provided in writing, nor will a waiver of any default be deemed a waiver of any subsequent defaults of the same type. The failure at any time to enforce this Contract, whether the default is known or not, shall not constitute a waiver or estoppel of the right to do so.

17.11 Conditions Precedent to Right to Sue. Notwithstanding anything herein to the contrary, the CONTRACTOR will have at least 90 days to give notice of a claim for damages as a condition precedent to the right to sue on the Contract, subject to the contractual claim and alternative dispute resolution processes set forth herein.

17.12 Waiver of Trial by Jury. OWNER and CONTRACTOR agree that they have knowingly waived the right to trial by jury and have instead agreed that, in the event of any litigation arising out of or connected to this Contract, to proceed with a trial before the court, unless both parties subsequently agree otherwise in writing.

End of Document

Project Manual

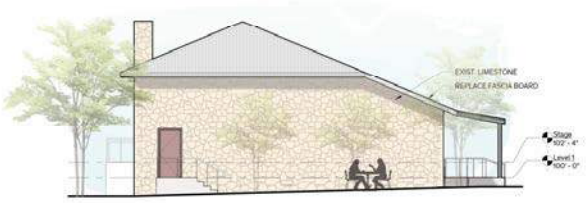
Stephenson School Building

Rehabilitation & Addition

Dripping Springs, Texas







ARCHITEXAS Project No. 2314

January 17, 2025

ISSUED FOR PERMIT & CONSTRUCTION



01/17/2025

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Dripping Springs, TX 78620

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Structural Engineer
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Dripping Springs, TX 78620

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SECTION 011100

SUMMARY OF WORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Project description.
2. Work by Others.
3. Contractor's use of site and premises.
4. Owner furnished Products.

1.2 PROJECT DESCRIPTION

A. Work of this Project is described as the renovation and addition to the existing Stephenson School building as a multi-purpose space for the city of Dripping Springs, Texas.

B. Work includes:
1. Selective interior and exterior demolition including lead and asbestos abatement to remove non-original or damaged elements, assemblies, and finishes.
2. Site construction including sidewalks, accent paver and aggregate paving areas, perimeter drain, planting areas, irrigation system, and re-grading, utilities.
3. Exterior restoration including masonry cleaning, selective repointing, stone replacement/repairs, replacement of galvanized metal area wells for crawlspace ventilation, installation of crawlspace vapor barrier, roof replacement, related roof flashings, gutters, and downspouts, window frame restoration including replacement of sashes, replacement of concrete stairs, ramps, and landings, addition of aluminum and glass storefront at main entrance.
4. Interior restoration including new MEP systems, fire sprinkler and alarm protection systems, AV system, structural reinforcing of existing wood framed roof and floor, restored wood flooring, restored and new wood and metal door assemblies, new gypsum board ceiling systems, restoration of flat plaster, restored and new standing and running trim, interior and exterior painting finishes, window treatments, new interior wood frame partitions with gypsum board finish.
5. Addition exterior work includes concrete slab on grade construction with wood framed exterior bearing cavity walls, cut stone veneer and corrugated metal exterior finish, aluminum and glass storefront entrances, aluminum clad wood windows, TPO roof and insulated corrugated metal roof systems.
6. Addition interior work includes polished concrete and carpet tile floor finishes, interior wood framed partitions with gypsum board finish, gypsum board and acoustic tile ceiling systems.

C. The Project will be constructed under a single prime contract.

1.3 WORK BY OTHERS

A. Separate Contracts:
1. The Owner may execute contracts for additional work at the site, that is excluded from the work of this Contract, including but not limited to the following:
a. Adjacent parking lot development work to be under separate contract.
2. Work under separate contract may be executed concurrent with Work of this Contract.
3. Cooperate with the Owner and separate contractors to accommodate this requirement.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

A. Limit use of site and premises to allow for:
1. Work by separate contractors.
2. Work by Owner.
3. Use of adjacent premises by the public.

B. Follow following best management practices for noise mitigation, in accordance with City of Dripping Springs and Owner requirements:
   1. If any work occurs in hours that are beyond limits set by City of Dripping Springs and/or Owner, submit schedule of work at least 48 hours in advance.
   2. Muffle or control construction equipment with high noise generating potential, including equipment powered by internal combustion engines.
   3. Turn off machinery, including motors, when not in use.
   4. Do not allow mobile equipment to run idle near residential areas.

C. Conform to City of Dripping Springs, Owner, and any neighborhood requirements for:
   1. Site access.
   2. Dust control.
   3. Working hours.

D. Move any stored products under Contractor's control that interfere with the operations of the Owner or separate contractors.

E. Assume full responsibility for protection and safekeeping of products under this Contract stored on site.

F. Obtain and pay for use of any additional storage or work areas needed for operations.

G. Coordinate use of site and premises with the Owner:
   1. Employee parking: In designated areas.
   2. Access to site and premises: In designated areas.
   3. Storage and staging areas: In designated areas.
   4. Transport materials and equipment to and from construction area along routes approved by Owner.

H. Do not use or store hazardous or flammable materials on premises without Owner's approval; follow requirements of governing authorities having jurisdiction over the work.

I. Prohibit smoking within interior spaces.

1.5 OWNER FURNISHED PRODUCTS

A. Owner's Responsibilities:
   1. Arrange for and deliver necessary Shop Drawings, Product Data and Samples to Contractor.
   2. Arrange and pay for product delivery to site, in accordance with Progress Schedule.
   3. Deliver supplier's bill of materials to Contractor.
   4. Inspect deliveries jointly with Contractor.
   5. Submit claims for transportation damage.
   6. Arrange for replacement of damaged, defective, and missing items.
   7. Arrange for manufacturers' warranties, service, and inspections, as required.

B. Contractor's Responsibilities:
   1. Designate delivery date for each product in Progress Schedule.
   2. Review Shop Drawings, Product Data and Samples. Submit to Architect with notification of any discrepancies or problems anticipated in use of product.
   3. Receive and unload products at site.
   4. Promptly inspect products jointly with Owner; record shortages, damage, and defective items.
   5. Handle products at site, including uncrating and storage.
   6. Protect products from exposure to elements and from damage.
   7. Assemble, install, connect, adjust, and finish products, as stipulated in respective specification section.
   8. Repair or replace any items damaged by Contractor.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 012100

ALLOWANCES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cash allowances.

B. Related Sections
   1. Section 012900 - Payment Procedures.
   2. Section 013216 - Construction Progress Schedules.
   3. Individual specification sections.

C. Include in Contract Sum cash allowances as scheduled at the end of this Section.

D. Designate in Construction Progress Schedule specified in Section 013216 delivery dates for products under each allowance.

E. Designate in Schedule of Values specified in Section 012900 quantities of materials specified under unit cost allowances.

1.2 CASH ALLOWANCES

A. General:
   1. Purchase products under each allowance as directed by Architect.
   2. Amount of allowance includes:
      a. Net cost of product, less any applicable trade discounts.
      b. Delivery to site.
      c. Applicable taxes.
      d. Labor required under allowance, only when labor is specified to be included in allowance.
   3. In addition to amounts of allowances, include in Contract Sum, Contractor's costs for:
      a. Handling at site, including unloading, uncrating, and storing.
      b. Protection from elements and from damage.
      c. Labor required for installation and finishing, except where installation is specified to be part of allowance.
      d. Other expenses required to complete installation.
      e. Overhead and profit.

B. Selection of Products:
   1. Architect's Duties:
      a. Consult with Contractor in consideration of products and suppliers.
      b. Make selection; designate products to be used.
      c. Prepare Change Orders.
   2. Contractor's Duties:
      a. Assist Architect in determining:
         1) Supplier or installer, as applicable.
         2) Cost, delivered and unloaded at site.
      b. Obtain proposals from suppliers when requested by Architect.
      c. Notify Architect of any effect anticipated by selection of product or supplier under consideration on construction schedule or contract sum.
      d. On notification of selection, enter into purchase agreement with designated supplier.

C. Delivery:
   1. Contractor's Duties:
      a. Arrange for delivery and unloading.
      b. Promptly inspect products for damage or defects.
      c. Submit any claims for transportation damage.

D. Installation: Comply with requirements of referenced specification section.

E. Use of Allowances:
   1. Use the allowance only as directed by the Architect for Owner's purposes.
   2. The Architect will submit a Proposal Request for allowance work. The Contractor will submit a Change Order Request for allowance amount used for approval by the Architect and Owner. The COR shall provide a break down for materials/labor and include invoices or other data to substantiate actual quantity used. Upon Owner approval, the Architect will issue a no-cost Change Order.
   3. At Project closeout, Architect shall credit unused amounts remaining in the allowance to Owner by Change Order.

F. Adjustment of Costs:
   1. Should actual purchase cost be more or less than specified amount of allowance, Contract Sum will be adjusted by Change Order equal to amount of difference.
   2. Amount of Change Order will recognize any changes in handling costs at site, labor, installation costs, overhead, profit, and other expenses caused by selection under allowance.
   3. For products specified under unit cost allowance, unit cost shall apply to quantity listed in Schedule of Values.
   4. Submit invoices or other data to substantiate quantity actually used.
   5. Submit any claims for additional costs at site or other expenses caused by selection under allowances, prior to execution of work. Failure to do so will constitute waiver of claims for additional costs.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 ALLOWANCE SCHEDULE

A. Allowance No. 1 – Window Restoration: Include a cash allowance of $5,000 for additional repairs beyond that indicated in the base contract.
   1. Related Specification Sections:
      a. Section 012200 – Unit Prices.
      b. Section 079200 – Joint Sealants.
      c. Section 080383 – Wood Window Restoration.
      d. Section 088000 – Glazing.
      e. Section 099100 – Painting.

B. Allowance No. 2 – Masonry Restoration: Include a cash allowance of $7,500 for additional masonry restoration work beyond that indicated in the base contract.
   1. Related Specification Sections:
      a. Section 012200 – Unit Prices.
      b. Section 040342 – Restoration Mortar.
      c. Section 040341 – Masonry Restoration.

C. Allowance No. 3 – Plaster Restoration: Include a cash allowance of $5,000 for additional interior finish repairs beyond that indicated in the base contract.
   1. Related Specification Sections:
      a. Section 012200 – Unit Prices.
      b. Section 090391 – Gypsum Plaster Restoration.
      c. Section 099100 – Painting.

D. Allowance No. 4 - Wood Floor Restoration: Include a cash allowance of $7,500 for additional replacement of wood floorboards beyond that indicated in the base contract.

   1. Related Specification Sections:
      a. Section 012200 – Unit Prices.
      b. Section 079200– Joint Sealants.
      c. Section 090396 – Wood Floor Restoration.
      d. Section 099100 – Painting.

E. Allowance No. 5 – Wood Restoration: Include a cash allowance of $5,000 for additional wood base replacement beyond that indicated in the base contract.
   1. Related Specification Sections:
      a. Section 012200 – Unit Prices.
      b. Section 060122 – Wood Restoration.
      c. Section 099100 – Painting.

G. Allowance No. 6 – Wood Restoration: Include a cash allowance of $5,000 for replacement of additional exterior fascia and soffit boards beyond that indicated in the base contract.
   1. Related Specification Sections:
      a. Section 012200 – Unit Prices.
      b. Section 060122 – Wood Restoration.
      c. Section 099100 – Painting.

H. Allowance No. 7 – Stage Light Bar: Include a cash allowance of $10,000 for a suspended light bar for owner's installation of owner-provided stage lights and control system.

I. Allowance No. 8 - Wood Rafter Tail Replacement: Include a cash allowance of $5,000 for replacement of additional rafter tails beyond that indicated in the base contract.
   1. Related specification sections:
      a. Section 012200 - Unit Prices
      b. Section 060122 - Wood Restoration
      c. Section 099100 – Painting

J. Allowance No. 9 - Carpet Tile: Include a cash allowance of $45 per square yard (materials only). Installation is included in base Contract work.
   1. Unit of Measurement: Per square yard.
   2. Quantity Allowance: 100% of total area as shown on construction drawings for carpet.
   3. Related Specification Sections:
      a. Section 096813 – Tile Carpeting

END OF SECTION

SECTION 012200

UNIT PRICES

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SUMMARY

A. This section specifies administrative and procedural requirements for unit prices.

1. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.

B. Unit prices include all necessary equipment, materials, overhead, and profit and applicable taxes.

C. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this Work measured by an independent surveyor acceptable to the Contractor at the Owner's expense.

PART 2 - PRODUCTS

A. Not used.

PART 3 - EXECUTION

2.1 UNIT PRICE SCHEDULE

A. Unit Price No. 1 – Stone Repairs

1. Limestone Removal and Replacement
   a. Unit of Measurement: Per square foot.
2. Limestone Re-pointing
   a. Unit of Measurement: Per lineal foot.
3. Limestone Patching Repair
   a. Unit of Measurement: Per location (not to exceed 6-inch x 6-inch by 1-inch deep).
4. Limestone Crack Repair
   a. Unit of measurement: Per location (not to exceed 18-inches long).
5. Related Specification Section(s):
   a. Section 024120 – Selective Demolition.
   b. Section 040341 – Restoration Mortar.
   c. Section 040342 – Masonry Restoration.

B. Unit Price No. 2 – Window Repairs

1. Brick Mold Replacement
   a. Unit of Measurement: Per window unit.
2. Wood Sill Replacement

a. Unit of Measurement: Per window unit.

3. Wood Dutchman Repair at Frame or Blind Stop
   a. Unit of Measurement: Per location.
4. Frame or Blind Stop Replacement in Lieu of Wood Dutchman Repair
   a. Unit of Measurement: Per Location.
5. Replace Mullion Cover Board.
   a. Unit of Measurement: Per location.
6. Related Specification Section(s):
   a. Section 080383 – Wood Window Restoration.

C. Unit Price No. 3 – Plaster Repair / Replacement

1. Plaster Finish Repair / Replacement.
   a. Unit of Measurement: Per square foot.
2. Related Specification Section(s):
   a. Section 090391 – Gypsum Plaster Restoration.

D. Unit Price No. 4 – Baseboard Replacement

1. Wood Baseboard Replacement
   a. Unit of Measurement: Per lineal foot.
2. Related Specification Section(s):
   a. Section 060122 – Wood Restoration

E. Unit Price No. 5 – Exterior Wood Trim Replacement

1. Wood Fascia Board Replacement
   a. Unit of Measurement: Per lineal foot.
2. Wood Roof Eave Soffit Board Replacement: Per lineal foot.
3. Wood Rafter Tail Replacement
   a. Unit of measurement: Per lineal foot.
4. Related Specification Section(s):
   a. Section 060122 – Wood Restoration

F. Unit Price No. 6 – Wood Floor Restoration

1. Wood Floorboard Replacement
   a. Unit of Measurement: Per lineal foot.
2. Related Specification Section(s):
   a. Section 090396 – Wood Flooring Restoration

END OF SECTION

SECTION 012300

ALTERNATES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes
1. Documentation of changes to Contract Sum and Contract Time.

B. Contract Documents contain pertinent requirements for materials and methods to accomplish work described herein.

C. Provide alternate costs for inclusion in Contract Sum if accepted by Owner.

1.2 RELATED REQUIREMENTS

A. Owner/Construction Manager Agreement: Alternates accepted by Owner for incorporation into the Work.

B. Individual specification sections identified.

1.3 PROCEDURES

A. Alternates will be exercised at the option of Owner.

B. Coordinate related work and modify surrounding work as required to complete the work, including changes under each Alternate, when acceptance is designated in Owner/Construction Manager Agreement.

1.4 SCHEDULE OF ALTERNATES

A. Alternate No. 1: Replace Windows at Existing Building:
1. Base Bid: Restore wood frames and replace sashes as indicated in Drawings and Section 080283.
2. Alternate Bid: Remove existing windows and frames throughout and replace with Mahogany Marvin Ultimate Wood Single Hung or Marvin Ultimate Wood Single Hung Magnum windows and frames with insulating glazing. Match original windows in style and muntin patterning. Customize as required for height of west elevation windows.

B. Alternate No. 2: Roof Thermal and Acoustic Insulation at Existing Building:
1. Base Bid: 5 1/2” rigid insulation between existing 2x6 rafters, 1/2” gypsum wallboard thermal barrier at underside of rafters, 2” spray applied acoustic insulation ceiling finish.
2. Alternate Bid: 5 1/2” batt insulation between existing 2x6 rafters, 2” black acoustic board at underside of rafters.

C. Alternate No. 3: Under-platform Storage at Existing Building:
1. Base Bid: Provide wood framed storage space below existing platform in Multi-Use B. Scope includes additional wood framing, reinforcement of existing framing, storage room floor and walls, and hinged access doors. Refer to drawings S2.01, A4.21, A6.05, and A6.11.
2. Alternate Bid: Omit all work associated with under-platform storage.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 012500

SUBSTITUTION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Product Substitution Procedures.

1.2 GENERAL

A. Definition: Proposal by Contractor to use manufacturer, product, material, or system different from one required in Contract Documents.

B. Do not substitute Products unless a substitution request has been approved by Architect.

C. Substitutions during Bidding: Refer to Instructions to Bidders.

D. Architect will consider substitution requests within 30 days after award of Contract. After initial 30 day period, substitutions requests will be considered only due to non-availability of a specified Product through no fault of Contractor.

E. In case of non-availability of a specified Product notify Architect in writing as soon as non-availability becomes apparent.

1.3 SUBSTITUTION REQUESTS

A. Submit substitution requests on form provided by Architect.

B. Document specified product and proposed substitution with complete data, including:
1. Product identification, including name and address of manufacturer.
2. Product description, performance and test data, and reference standards.
3. Sample, if requested.
4. Description of any anticipated effect that acceptance of proposed substitution will have on Progress Schedule, construction methods, or other items of Work.
5. Description of any differences between specified product and proposed substitution.
6. Difference in cost between specified product and proposed substitution.

C. Burden of proof for substantiating compliance of proposed substitution with Contract Document requirements remains with Contractor.

D. A request constitutes a representation that the Contractor:
1. Has investigated the proposed Product and determined that it meets or exceeds the quality level of the specified Product.
2. Will provide the same warranty for the substitution as for the specified Product.
3. Will coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
4. Waives claims for additional costs or time extension that may subsequently become apparent.
5. Will reimburse Architect for design services associated with re-approval by authorities or revisions to Contract Documents to accommodate the substitution.

E. Substitutions will not be considered if:
1. They are indicated or implied on Shop Drawings or other submittals without submittal of a substitution request.
2. Architect will require substantial revision of Contract Documents without additional compensation to Architect.

F. Submit electronically in Adobe PDF format.

G. Architect will notify Contractor of approval or rejection of each Substitution Request.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

DOCUMENT 012519

SUBSTITUTION REQUEST FORM

DATE: _____

TO: _____

ATTENTION: _____

PROJECT: _____

We submit for your consideration the following product as a substitution for the specified product:

Section No. Paragraph Specified Product

_____ _____ _____

Proposed Substitution: _____

_____

Reason for Substitution: _____

_____

Product Data:

Attach complete technical data for both the specified product and the proposed substitution. Include information on changes to Contract Documents that the proposed substitution will require for its proper installation.

Samples:

___ Attached ___ Will be furnished upon request

Does the substitution affect dimensions shown on Drawings?

___ No ___ Yes (explain) _____

_____

Effects of proposed substitution on other Work:

_____

_____

Differences between proposed substitution and specified Product:

_____

_____

Manufacturer's warranties of the proposed substitution are:

___ Same ___ Different (explain) _____

_____

Maintenance service and spare parts are available for proposed substitution from:

_____

_____

Previous installations where proposed substitution may be seen:

Project: _____ Project: _____

Owner: _____ Owner: _____

Architect: _____ Architect: _____

Date Installed: _____ Date Installed: _____

Cost savings to be realized by Owner, if proposed substitution is approved:

_____

Change to Contract Time, if proposed substitution is approved:

___ No Change ___ Add _____ days ___ Deduct _____ days

Submittal constitutes a representation that Contractor has read and agrees to the provisions of Section 012500.

Submitted by Contractor:

_____
Signature

_____
Firm

For Use by Architect:

Based on the information supplied by the Contractor, the Architect has reviewed the proposed substitution on the basis of design concept of the Work and conformance with information given in Contract Documents.

___ Approved ___ Approved as Noted ___ Rejected

Submit Additional Information: _____

_____

By: _____ Date: _____

SECTION 012600

CONTRACT MODIFICATION PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Supplemental Instructions.
2. Proposal Requests.
3. Contractor proposed changes.
4. Construction Change Directives.
5. Change Orders.

B. Related Sections:
1. Section 016000 - Product Requirements.

1.2 CHANGE PROCEDURES

A. Architect's Supplemental Instructions:
1. Format: AIA Document G710 - Architect's Supplemental Instructions.
2. Architect will advise of minor changes in Work not involving an adjustment to Contract Sum or Contract Time as authorized by the Conditions of the Contract.

B. Proposal Requests:
1. Format: AIA Document G709 - Proposal Request.
2. Architect may issue a Proposal Request that includes a detailed description of a proposed change with supplemental or revised Drawings and specifications.
3. Prepare and submit an estimate of any change to Contract Sum or Contract Time within 7 days after receipt. Include:
   a. Quantities and unit costs, with total cost or credit to Owner. If requested, furnish documentation of quantities.
   b. Taxes, delivery charges, equipment rentals, and trade discounts as applicable.
   c. If change in Contract Time is involved, provide updated Progress Schedule.
4. Do not stop work or initiate changes in response to a Proposal Request. If approved, Architect will prepare and issue a Change Order.
5. Submit electronically in Adobe PDF format.

C. Contractor Proposed Changes:
1. Format: Contractor’s standard.
2. Contractor may propose a change by submitting request for change to Architect.
3. Describe proposed change, reason for change, its full effect on Work, and any change to Contract Sum or Contract Time. Include:
   a. Quantities and unit costs, with total cost or credit to Owner. If requested, furnish documentation of quantities.
   b. Taxes, delivery charges, equipment rentals, and trade discounts as applicable.
   c. If change in Contract Time is involved, provide updated Progress Schedule.
4. Document any required substitutions in accordance with Section 016000.
5. Submit electronically in Adobe PDF format.

D. Construction Change Directive:
1. Architect may issue a directive, signed by Owner, instructing Contractor to proceed with a change for subsequent inclusion in a Change Order.
2. Documentation will describe changes in Work and designate method of determining any change to Contract Sum or Contract Time. Promptly execute change.
3. Format: AIA Document G713 - Construction Change Directive.

E. Change Orders:
   1. Format: AIA Document G701 - Change Order.
   2. Execution: Prepare Change Orders for signature of parties as provided in Conditions of the Contract.
   3. Submit electronically in Adobe PDF format.

1.3 DISTRIBUTION

A. Distribute copies of change procedure documents to Owner, Architect, and subcontractors and suppliers as applicable.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 012613

REQUESTS FOR INFORMATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Requests for Information (RFI's).

B. Related Sections:
   1. Section 012500 - Substitution Procedures.
   2. Section 012600 - Contract Modification Procedures.
   3. Section 013300 - Submittal Procedures.
   4. Section 017700 - Closeout Procedures.

1.2 GENERAL

A. Request for Information (RFI): Request from Contractor seeking interpretation or clarification of Contract Documents not involving Substitutions or changes to Contract Sum or Contract Time.

B. RFI's constitute a request for information only.

C. Do not submit RFI's:
   1. To request approval of Substitutions; refer to Section 012500.
   2. To request changes known to include changes to Contract Sum or Contract Time; refer to Section 012600.
   3. To request approval of submittals; refer to Section 013300.
   4. To submit Project Record Documents; refer to Section 017700.

1.3 SUBMITTAL

A. Submit RFI's on Contractor's Standard Form.

B. Include on each RFI:
   1. Name of Contractor.
   2. Project name.
   3. Date submitted.
   4. Sequential RFI number.
   5. Applicable Drawing sheet and detail numbers or Specification Section numbers.
   6. Date when response information is required to avoid impact on Construction Schedule and Construction Cost.
   7. Contractor's suggested resolution: If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
   8. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation
      a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

C. Review and sign RFI's submitted by Subcontractors, Sub-Subcontractors, or Suppliers prior to submittal to Architect.

D. Maintain log of RFI's showing RFI number and current status of each RFI.

E. When RFI's require submittal of drawings, follow submittal procedures specified for Shop Drawings in Section 013300.

F. Submit electronically in Adobe PDF format.

G. Allow minimum 7 days for Architect's review and response to each RFI.

H. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect or Construction Manager of additional information.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 012900

PAYMENT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Schedule of Values.
   2. Applications for Payment.

B. Related Sections:
   1. Section 017700 - Closeout Procedures.

1.2 SCHEDULE OF VALUES

A. General:
   1. Submit a Schedule of Values to Architect at least 20 days prior to submitting first Application for Payment.
   2. Upon request of Architect, furnish additional data to support values given that will substantiate their correctness.
   3. Approved Schedule of Values will be used as basis for reviewing Contractor's Applications for Payment.

B. Form and Content:
   1. Format: AIA Document G703 - Continuation Sheet of Application and Certification for Payment.
   2. Use Table of Contents of Project Manual as basis of format for listing costs of Work.
   3. List installed value of component parts of Work in sufficient detail to serve as basis for computing values for progress payments.
   4. Include separate line items for:
      a. Site mobilization.
      b. Bonds and insurance.
      c. Contractor's overhead and profit.
   5. For items on which payment will be requested for stored materials, break down value into:
      a. Cost of materials, delivered and unloaded , with taxes paid.
      b. Total installed value.
   6. For each line item that has a value of more than $25,000.00, break down costs to list major products or operations under each item.
   7. Total of costs listed in Schedule shall equal Contract Sum.

C. Submit electronically in Adobe PDF format.

D. Review and Resubmittal:
   1. After initial review by Architect, revise and resubmit if required.
   2. Revise and resubmit along with next Application for Payment when a Change Order is issued. List each Change Order as a new line item.

1.3 APPLICATIONS FOR PAYMENT

A. Preparation:
   1. Format: AIA Document G702 - Application and Certification for Payment, supported by AIA Document G703 - Continuation Sheet.
   2. Prepare required information in typewritten format or on electronic media format.
   3. Use data from reviewed Schedule of Values. Provide dollar value in each column for each line item representing portion of work performed.
   4. List each authorized Change Order as a separate line item, listing Change Order number and dollar value.
   5. Prepare Application for Final Payment as specified in Section 017700.

B. Waivers of Lien:
   1. Along with the each Application for Payment, submit waivers of lien from Contractor and each Subcontractor or Sub-subcontractor included on the current month's Application for Payment.
   2. Submit partial waivers on each item for amount requested, prior to deduction of retainage.
   3. For completed items, submit full or final waiver.

C. Substantiating Data:
   1. When Architect requires substantiating information, submit data justifying dollar amounts in question.
   2. Provide one copy of data with cover letter showing Application number and date, and line item number and description.

D. Submittal:
   1. Submit electronically in Adobe PDF format.
   2. Payment period: Submit at intervals stipulated in Owner/Contractor Agreement.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 013100

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Project coordination.
   2. Project meetings.

B. Related Sections:
   1. Section 017700 - Contract Closeout.

1.2 PROJECT COORDINATION

A. Submit required project submittals electronically in Adobe PDF format.

B. Coordinate scheduling, submittals, and work of various Sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements.

C. Verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service such equipment.

D. Coordinate space requirements and installation of mechanical and electrical items that are indicated diagrammatically on Drawings.
   1. Follow routing shown as closely as practical; place runs parallel with building lines.
   2. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.

E. In finished areas, conceal pipes, ducts, and wiring within construction. Coordinate locations of fixtures and outlets with finish elements.

F. Coordinate completion and clean up of work of separate Sections in preparation for Substantial Completion.

G. After Owner occupancy, coordinate access to site for correction of defective Work and Work not in accordance with Contract Documents to minimize disruption of Owner's activities.

1.3 PROJECT MEETINGS

A. Schedule and administer preconstruction conference, progress meetings, and pre-installation conferences.

B. Make physical arrangements for meetings; notify involved parties at least 4 days in advance.

C. Prepare the meeting agenda. Distribute the agenda to all invited attendees.

D. Record significant proceedings and decisions at each meeting; reproduce and distribute copies to parties in attendance and others affected by proceedings and decisions made.

1.4 PRECONSTRUCTION CONFERENCE

A. Schedule within 15 days after date of Notice to Proceed at Project field office.

B. Attendance:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Major subcontractors and suppliers as Contractor deems appropriate.

C. Review and Discuss:
   1. Relation and coordination of various parties, and responsible personnel for each party.
   2. Use of premises, including office and storage areas, temporary controls, and security procedures.
   3. Construction schedule and critical work sequencing.
   4. Processing of:
      a. Contract modifications.
      b. Shop Drawings, Product Data, and Samples.
      c. Applications for Payment.
      d. Substitutions.
      e. Requests for Information.
      f. Other required submittals.
   5. Adequacy of distribution of Contract Documents.
   6. Procedures for maintaining contract closeout submittals.
   7. Installation and removal of temporary facilities.
   8. Notification procedures and extent of testing and inspection services.

1.5 PROGRESS MEETINGS

A. Schedule periodic progress meetings.

B. Location: Project field office.

C. Attendance:
   1. Contractor.
   2. Owner.
   3. Architect.
   4. Subcontractors and suppliers as appropriate to agenda.
   5. Others as appropriate to agenda.

D. Review and Discuss:
   1. Work progress since previous meeting, including:
      a. Field observations, deficiencies, conflicts, and problems.
      b. Progress and completion date.
      c. Corrective measures needed to maintain quality standards, progress, and completion date.
   2. Status of:
      a. Requests for information.
      b. Submittals.
      c. Contract modifications.
   3. Coordination between various elements of Work.
   4. Maintenance of Project Record Documents.

1.6 PRE-INSTALLATION CONFERENCES

A. Where required in individual specification Section, convene a pre-installation conference at project site or other designated location.

B. Require attendance of parties directly affecting or affected by work of the specific Section.

C. Review conditions of installation, preparation and installation procedures, and coordination with related work.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 013216

CONSTRUCTION PROGRESS SCHEDULES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Construction progress schedule.

B. Related Sections:
1. Section 011100 - Summary of Work.
2. Section 012900 - Payment Procedures.

1.2 FORMAT

A. Prepare Progress Schedule as a horizontal bar chart with separate bar for each major portion of Work or operation, identifying first work day of each week.

B. Sequence of Listings: The chronological order of the start of each item of Work.

C. Scale and Spacing: To provide space for notations and revisions.

D. Sheet Size: Multiples of 8-1/2 x 11 inches.

1.3 CONTENT

A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.

B. Identify each item by specification Section number.

C. Identify work of separate floors and other logically grouped activities.

D. Provide subschedules to define critical portions of the entire Progress Schedule.

E. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.

F. Provide separate schedule of submittal dates for Shop Drawings, Product Data, and Samples, including:
1. Dates reviewed submittals will be required from Architect.
2. Decision dates for selection of finishes.
3. Delivery dates for Owner furnished products.

G. Coordinate content with Schedule of Values specified in Section 012900.

H. Revisions:
1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.

I. Provide narrative report to define problem areas, anticipated delays, and impact on Progress Schedule. Report corrective action taken, or proposed, and its effect.

1.4 SUBMITTAL

A. Submit initial Progress Schedule within 15 days after date of Notice to Proceed. After review, resubmit required revised data within 10 days.

B. Submit revised Progress Schedule with each Application for Payment.

C. Submit electronically in Adobe PDF format.

1.5 DISTRIBUTION

A. Distribute copies of approved Progress Schedule to project site file, Subcontractors, suppliers, and other concerned parties.

B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in Progress Schedule.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 013233

PHOTOGRAPHIC DOCUMENTATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Construction photographs.

1.2 PHOTOGRAPHY

A. Take construction record photographs during construction.

B. Provide photographs taken each month just prior to date for each scheduled Application for Payment.

C. Provide one aerial photograph of site at beginning and completion of work at site.

D. Provide photographs illustrating conditions prior to commencement of work.

E. Photograph project from ten different views at each specified time; views as directed by Architect.

F. After interior finish work is commenced, take ten additional photographs of interior; views as directed by Architect.

G. At successive periods of photography, take photographs from same overall view as previously taken.

H. Utilize digital technology at minimum 1216 x 912 capture resolution.

I. Provide factual presentation.

J. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

1.3 DIGITAL FILES

A. Index digital files in chronological sequence.

B. Identify each view by listing:
1. Name of Project.
2. Orientation of view.
3. Date taken.
4. Sequential photograph number.

1.4 SUBMITTAL

A. Submit each month’s digital files along with each Application for Payment.

B. Submit full set of digital files along with Project Record Documents.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 013300

SUBMITTAL PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Submittal procedures.
2. Proposed Products list.
3. Submittal schedule.
4. Shop Drawings.
5. Product Data.
6. Samples.
7. Quality control submittals.

B. Related Sections:
1. Section 014000 - Quality Requirements.

1.2 SUBMITTAL PROCEDURES

A. Number each submittal with Project Manual section number and a sequential number within each section. Number resubmittals with original number and an alphabetic suffix.

B. Identify Project, Contractor, Subcontractor or supplier, pertinent Drawing sheet and detail numbers, and specification Section number, as appropriate.

C. Submit all submittals listed under “Submittals for Review” simultaneously for each Product or Specification Section.

D. Where multiple Products function as an assembly, group submittals for all related Products into single submittal.

E. Architect will not review incomplete submittals.

F. Apply Contractor’s stamp, signed or initialed certifying that:
1. Submittal was reviewed.
2. Products, field dimensions, and adjacent construction have been verified.
3. Information has been coordinated with requirements of Work and Contract Documents.

G. Schedule submittals to expedite the Project, and deliver to Architect. Coordinate submittal of related items.

H. For each submittal, allow 14 days for Architect’s review, excluding delivery time to and from Contractor.

I. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of completed Work.

J. Revise and resubmit submittals when required; identify all changes made since previous submittal.

K. Distribute copies of reviewed submittals to concerned parties and to Project Record Documents file. Instruct parties to promptly report any inability to comply with provisions.

1.3 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit a complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

C. Submit electronically in Adobe PDF format. Architect will review Submittal Schedule for conformance to requirements of Contract Documents and will return one copy to Contractor with comments as applicable.

1.4 SUBMITTAL SCHEDULE

A. Within 15 days after date of Notice to Proceed, submit a submittal schedule showing all submittals proposed for project, including submittals listed as:
   1. Submittals for Review.
   2. Quality Control Submittals.
   3. Closeout Submittals.

B. Include for each submittal:
   1. Specification section number.
   2. Description of submittal.
   3. Type of submittal.
   4. Anticipated submittal date.
   5. For submittals requiring Architect’s review, date reviewed submittal will be required from Architect.

C. Submit electronically in Adobe PDF format.

D. Architect will review Submittal Schedule for conformance to requirements of Contract Documents and will return one copy to Contractor with comments as applicable.

1.5 SHOP DRAWINGS

A. Present information in clear and thorough manner.

B. Identify details by reference to sheet and detail numbers or room number shown on Drawings.

C. Reproductions of details contained in Contract Documents are not acceptable.

D. Submit electronically in Adobe PDF format. Architect will return one electronic copy to Contractor for printing and distribution.

1.6 PRODUCT DATA

A. Mark each copy to identify applicable products, models, options, and other data.

B. Supplement manufacturers' standard data to provide information unique to this Project.

C. Submit electronically in Adobe PDF format. Architect will return one electronic copy to Contractor for printing and distribution.

1.7 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.

B. Where so indicated, submit samples of finishes from the full range of manufacturers' standard colors, textures, and patterns for Architect's selection.

C. Include identification on each sample, with full Project information.

D. Unless otherwise specified in individual specifications, submit two of each sample.

E. Architect will notify Contractor of approval or rejection of samples, or of selection of color, texture, or pattern if full range is submitted.

1.8 QUALITY CONTROL SUBMITTALS

A. Quality control submittals specified in Section 014000 are for information and do not require Architect’s responsive action except to require resubmission of incomplete or incorrect information.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 013516

ALTERATION PROJECT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Definitions.
2. Historic significance.
3. Patching and extending existing work.
4. Transitions and adjustments.
5. Repair of damaged surfaces.
6. Hazardous material procedures.

B. Related Sections:
1. Section 078400 - Firestopping.

1.2 REFERENCES

A. Secretary of the Interior’s Standards for Rehabilitation. (www.nps.gov/tbs/standards/rehabilitation.htm)

B. Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings. (www.nps.gov/tps/standards.htm)

1.3 DEFINITIONS

A. Match Existing: Provide new materials to match the existing, in place material in all aspects as closely as possible. Existing materials are those which are visible in whole or in part in the building.

B. Match Original: Provide new materials to match the original material in all aspects as closely as possible. Original materials are those which were originally installed in the building at the time of its completion, prior to previous alterations, and which may predate existing materials.

C. Preservation: The act or process of applying measures necessary to sustain the existing form, integrity, and materials of an historic property.

D. Reconstruction: The act or process of reproducing, by means of new construction, the form, features, and detailing of a non-surviving building, structure, or object for the purpose of replicating its appearance at a specific period of time and in its historic location.

E. Restoration: The act or process of accurately depicting the form, features, and character as it appeared at a particular time by means of the removal of features from other periods in its history and reconstruction of missing features from the restoration period.

1.4 QUALITY ASSURANCE

A. Historic Significance:
1. Due to the unique historical significance of the existing building, special procedures and precautions must be used in selective demolition and renovation.

B. Renovation Procedures:
1. Follow the Secretary of the Interior's Standards for Rehabilitation and the Secretary of the Interior's Standards for the Treatment of Historic Properties at a minimum.
2. Preserve existing materials, finishes, and profiles.
3. Blend new and existing work to provide smooth transitions and uniform appearance.

4. Cease work, notify Architect, and await instructions if materials or conditions encountered at the site are not as indicated by the Contract Documents or if structure is in danger of movement or collapse.

C. Historic Artifacts: If artifacts of a historic nature are encountered during the Work:
1. Cease work in the affected area immediately.
2. Protect artifacts from damage.
3. Notify Owner and Architect and await instructions.
4. Salvage or dispose of artifacts as directed by the Owner.

PART 2 PRODUCTS

2.1 MATERIALS

A. New Materials:
1. Provide new materials to match existing adjacent materials for closing of openings, repairs, and reconstructions where suitable salvaged materials do not exist, are insufficient in quantity, or where reuse is not permitted.
2. Match existing materials in material, type, size, quality, color, finish, and other attributes.

B. Reused Materials:
1. Clean and prepare salvaged materials for reuse.
2. Do not use materials with objectionable chips, cracks, splits, dents, scratches, or other defects.
3. Repair operable items to function properly.

PART 3 EXECUTION

3.1 PREPARATION

A. Test materials to be used in repairs for compatibility with existing materials; do not use incompatible materials.

B. Cut, move, or remove items as necessary for access to alterations and renovation work. Replace and restore upon completion.

C. Remove, cut, and patch work in manner to minimize damage and to provide means for restoring products and finishes to their original or specified new condition.

D. Remove unsuitable materials not marked for salvage.

E. Remove debris and abandoned items from areas of work and from concealed spaces.

3.2 ALTERATIONS

A. Coordinate alterations and renovations to expedite completion.

B. Install products and finish surfaces as specified in individual sections, or where no specification section exists to match existing.

C. Refinish visible surfaces to specified condition, with neat transition to adjacent surfaces.

D. Finish patches to provide uniform color and texture over entire surface, with repairs not discernible from normal viewing distance. If finish cannot be matched, refinish entire surface to nearest intersections.

E. Where removal of partitions or walls results in adjacent spaces becoming one, rework finished surfaces to smooth plane, without breaks, steps, or bulkheads.

F. Where new work abuts or aligns with existing, provide smooth and even transition. Where a change in plane of 1/4 inch or more occurs, submit recommendation to Architect for transition.

G. Where alterations expose mechanical and electrical components that were previously concealed, renovate to be concealed in completed work.

H. In addition to specified replacement of equipment and fixtures, restore mechanical and electrical systems to full operational condition.

I. Patch holes in exposed surfaces left by removal of mechanical and electrical components.

3.3 HAZARDOUS MATERIAL PROCEDURES

A. A survey of hazardous materials was performed by the Owner; a copy of the report is available for review at the office of the Owner. Review report prior to commencement of work under this Contract.

END OF SECTION

SECTION 014000

QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. References.
2. Quality assurance and control of installation.
3. Mockups.
4. Manufacturer's field services and reports.
5. Design data and calculations.
6. Test reports and certifications.
7. Manufacturer's installation instructions.

1.2 REFERENCES

A. Comply with City of Dripping Springs code of ordinances with local amendments to codes.

B. For products or workmanship specified by reference to association, trade, or industry standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

C. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

D. Conform to edition of reference standard in effect as of date of Project Manual.

E. The contractual relationship of the parties to the Contract shall not be altered from the Contract Documents by mention or inference otherwise in any reference document.

1.3 QUALITY ASSURANCE AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, Products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply fully with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as a minimum quality for the Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Perform work by persons qualified to produce workmanship of specified quality.

F. Secure Products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion or disfigurement.

1.4 MOCKUPS

A. Definition:
1. Mockups are field samples constructed, applied, or assembled at the project site for review by the Owner and Architect that illustrate materials, equipment, or workmanship.
2. Approved mockups establish the standard of quality by which the Work will be judged.

B. Construct, apply, or assemble specified items, with related attachment and anchorage devices, flashings, seals, and finishes.

C. Perform work in accordance with applicable specifications sections.

D. Mockups will be free-standing or part of the building. Refer to individual specifications. Erect at project site at location acceptable to Architect. Protect from damage.

E. Removal:
   1. Mockups may remain as part of the Work only when so designated in individual specification sections.
   2. Do not remove mockups until removal is approved by Architect or upon Final Completion.
   3. Where mockup is not permitted to remain as part of the Work, clear area after removal of mockup has been approved by Architect.

1.5 MANUFACTURERS' FIELD SERVICES AND REPORTS

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, or startup of equipment, as applicable, and to initiate instructions when necessary.

B. Individuals to report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

C. Submit electronically in Adobe PDF format within 10 days after each observation.

1.6 DESIGN DATA AND CALCULATIONS

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide design data and calculations.

B. Accuracy of design data and calculations is the responsibility of the Contractor.

C. When so specified, prepare design data and calculations under the direction of a professional engineer licensed in the state in which the Project is located. Affix engineer’s seal to submittals.

D. Submit electronically in Adobe PDF format.

1.7 TEST REPORTS AND CERTIFICATIONS

A. When specified in individual specification Sections, require material or Product suppliers or manufacturers to provide test reports and manufacturers’ certifications.

B. Indicate that material or Product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.

C. Submittals may be recent or previous test results on material or Product, but must be acceptable to Architect.

D. Submit electronically in Adobe PDF format.

1.8 MANUFACTURER'S INSTALLATION INSTRUCTIONS

A. When Contract Documents require that Products be installed in accordance with manufacturer's instructions:
   1. Submit manufacturer's most recent printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, as applicable.
      a. Submit in quantities specified for Product Data.
      b. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.
      c. Identify conflicts between manufacturers' instructions and requirements of Contract Documents.
   2. Perform installation of Products to comply with requirements of manufacturer's instructions.
   3. If installation cannot be performed in accordance with manufacturer's instructions, notify Architect and await instructions.
   4. Submit electronically in Adobe PDF format.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 014213

ABBREVIATIONS AND ACRONYMS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

1. Abbreviations and acronyms of industry organizations.

1.2 ACRONYMS

A. Abbreviations and acronyms used in Contract Documents refer to recognized names of organizations according to following list.

B. Contract Documents may not contain all abbreviations and acronyms.

ACRONYM OR ABBREVIATION	ENTITY	WEBSITE
AA	Aluminum Association	www.aluminum.org
AAMA	American Architectural Manufacturers Association	www.aamanet.org
AAADM	American Association of Automatic Door Manufacturers	www.aaadm.com
AASHTO	American Association of State Highway and Transportation Officials	www.transportation.org
ABAA	Air Barrier Association of America	www.airbarrier.org
ACI	American Concrete Institute	www.aci-int.org
AI	Asphalt Institute	www.asphaltinstitute.org
AISC	American Institute of Steel Construction	www.aisc.org
AITC	American Institute of Timber Construction	www.aitc-glulam.org
AMCA	Air Movement and Control Association International, Inc.	www.amca.org
AISI	American Iron and Steel Institute	www.steel.org
ANSI	American National Standards Institute	www.ansi.org
APA	Engineered Wood Association	www.apawood.org
ASCC	American Society of Concrete Contractors	www.ascconline.org
ASCE	American Society of Civil Engineers	www.asce.org
ASHRAE	American Society of Heating, Refrigeration, and Air-Conditioning Engineers	www.ashrae.org
ASME	American Society of Mechanical Engineers	www.asme.org
ASTM	ASTM International	www.astm.org
AWI	Architectural Woodwork Institute	www.awinet.org
AWMAC	Architectural Woodwork Manufacturers of Canada	www.awmac.com
AWS	American Welding Society	www.aws.org
ASTM	ASTM International	www.astm.org
BHMA	Builders Hardware Manufacturers Association	www.buildershardware.com
CDA	Copper Development Association	www.copper.org

ACRONYM OR ABBREVIATION	ENTITY	WEBSITE
CISCA	Ceiling and Interior Systems Construction Association	www.cisca.org
CLFMI	Chain Link Fence Manufacturers Institute	www.chainlinkinfo.org
CRI	Carpet and Rug Institute	www.carpet-rug.com
CRRC	Cool Roof Rating Council	www.coolroofs.com
CRSI	Concrete Reinforcing Steel Institute	www.crsi.org
CSA	Canadian Standards Association	www.aamanet.org
CSI	Cast Stone Institute	www.caststone.org
CSSB	Cedar Shingle and Shake Bureau	www.cedarbureau.org
CSPC	United States Consumer Product Safety Commission	www.cpsc.gov
DASMA	Door and Access Systems Manufacturers Association	www.dasma.com
EIMA	EIFS Industry Manufacturers Association	www.eima.com
FGIA	Fenestration and Glazing Industry Alliance	www.fgiaonline.org
FM	Factory Mutual Insurance Co.	www.fmglobal.com
FSC	Forest Stewardship Council	www.fscus.org
GA	Gypsum Association	www.gypsum.org
GS	Green Seal, Inc.	www.greenseal.org
IGMA	Insulating Glass Manufacturers Alliance	www.igmaonline.org
ISO	International Organization for Standardization	www.iso.org
MFMA	Maple Flooring Manufacturer's Association	www.maplefloor.org
MPI	Master Painters Institute	www.mpi.net
MVMA	Masonry Veneer Manufacturers Association	www.ncma.org
NAAMM	National Association of Architectural Metal Manufacturers	www.naamm.org
NEMA	Association of Electrical and Medical Imaging Equipment	www.nema.org
NELMA	Northeastern Lumber Manufacturers Association	www.nelma.org
NGA	National Glass Association	www.glass.org
NFPA	National Fire Protection Association	www.nfpa.org
NFRC	National Fenestration Rating Council	www.nfrc.org
NFSI	National Floor Safety Institute	www.nfsi.org
NHLA	National Hardwood Lumber Association	www.nhla.org
NIST	National Institute of Standards and Technology	www.nist.gov
NLGA	National Lumber Grades Authority	www.nlga.org
NRCA	National Roofing Contractors Association	www.nrca.net
NTMA	National Terrazzo and Mosaic Association	www.ntma.com
NWFA	National Wood Flooring Association	www.nwfa.org
PCI	Precast/Prestressed Concrete Institute	www.pci.org
PEI	Porcelain Enamel Institute	www.porcelainenamel.com
PTI	Post-Tensioning Institute	www.post-tensioning.org

ACRONYM OR ABBREVIATION	ENTITY	WEBSITE
RCSC	Research Council on Structural Connections	www.boltcouncil.org
RFCI	Resilient Floor Covering Institute	www.rfci.com
RIS	Redwood Inspection Service	www.redwoodinspection.com
SCAQMD	South Coast Air Quality Management District	www.aqmd.gov
SDI	Steel Deck Institute	www.sdi.org
SDI	Steel Door Institute	www.steeldoor.org
SFIA	Steel Framing Industry Association	www.sfia.memberclicks.net
SIPA	Structural Insulated Panel Association	www.sips.org
SJI	Steel Joist Institute	www.steeljoist.org
SMACNA	Sheet Metal and Air Conditioning Manufacturer's Association	www.smacna.org
SPIB	Southern Pine Inspection Bureau	www.spib.org
SPRI	Single Ply Roofing Institute	www.spri.org
SSMA	Steel Stud Manufacturer's Association	www.ssma.com
SSPC	Society for Protective Coatings	www.sspc.org
SWI	Steel Window Institute	www.steelwindows.com
TCNA	Tile Council of North America	www.tileusa.com
TMS	The Masonry Society	www.masonrysociety.org
TPI	Truss Plate Institute	www.tpinst.org
TPI	Turfgrass Producers International	www.turfgrasssod.org
USDOJ	United States Department of Justice	www.ada.gov
USEPA	United States Environmental Protection Agency	www.epa.gov
USEPA	United States Environmental Protection Agency	www.energystar.gov
USGBC	U.S. Green Building Council	www.usgbc.org
USPS	United States Postal Service	www.usps.com
WCLIB	West Coast Lumber Inspection Bureau	www.wclib.org
WDMA	Window and Door Manufacturers Association	www.wdma.com
WI	Woodwork Institute	www.woodworkinstitute.com
WRCLA	Western Red Cedar Lumber Association	www.realcedar.com
WWPA	Western Wood Products Association	www.wwpa.org

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 014523

TESTING AND INSPECTION SERVICES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Laboratory selection and payment.
2. Laboratory duties.
3. Contractor's responsibilities.

B. Related Sections: Individual specifications sections contain specific tests and inspections to be performed.

1.2 QUALITY ASSURANCE

A. Owner will employ and pay for services of an independent testing laboratory to perform specified testing and inspection.

B. Contractor shall cooperate with the Testing Laboratory to facilitate performance of its work.

C. Employment of Testing Laboratory shall in no way relieve Contractor of his obligations to perform work in accordance with Contract Documents.

D. Refer to the Conditions of the Contract for provisions related to special inspections and testing.

E. Qualifications of Laboratory:
1. Meet requirements of ASTM C1077, D3666, D3740, E329, and E543.
2. Authorized to operate in State in which project is located.

1.3 LABORATORY DUTIES

A. Cooperate with Architect and Contractor; provide qualified personnel after due notice.

B. Perform specified inspections, sampling, and testing of materials and methods of construction:
1. Comply with specified standards.
2. Ascertain compliance or noncompliance of materials with requirements of Contract Documents.

C. Promptly notify Architect and Contractor of observed irregularities or deficiencies of Work or products.

D. Promptly submit report of each test and inspection; submit one copy electronically in Adobe PDF format to Architect, Owner, and Contractor.

E. Each report shall include:
1. Date issued.
2. Project title and number.
3. Testing Laboratory name, address, and telephone number.
4. Name of Inspector and signature of individual in charge.
5. Date and time of sampling or inspection.
6. Record of temperature and weather conditions.
7. Date of test.
8. Identification of product and specification section.
9. Location of sample or test in project.
10. Type of inspection or test.
11. Results of tests and compliance or noncompliance with Contract Documents.
12. Interpretation of test results when requested by Architect or Contractor.

F. Perform additional tests when required by Architect or Contractor.

G. Laboratory is not authorized to:
   1. Release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Approve or accept any portion of work.
   3. Perform any duties of Contractor.

1.4 CONTRACTOR'S RESPONSIBILITIES

A. Cooperate with Laboratory personnel, provide access to Work, and to manufacturer's operations.

B. When materials require testing prior to being incorporated into Work, secure and deliver to Laboratory adequate quantities of representative samples of materials proposed to be used.

C. Furnish copies of product test reports as required.

D. Furnish incidental labor and facilities:
   1. To provide access to work to be tested.
   2. To obtain and handle samples at site or at source of product to be tested.
   3. To facilitate inspections and tests.
   4. For safe storage and curing of test samples.

E. Notify Laboratory sufficiently in advance of operations to allow for Laboratory assignment of personnel and scheduling of tests.

F. When tests or inspections cannot be performed after such notice, reimburse Owner for Laboratory personnel and travel expenses incurred due to Contractor's negligence.

G. Make arrangements with Laboratory and pay for additional samples and tests required for Contractor's convenience.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 015000

TEMPORARY FACILITIES AND CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Temporary utilities.
2. Field offices and sheds.
3. Temporary controls.
4. Protection of installed Work.
5. Progress cleaning.
6. Water, erosion, sediment, dust, and mold and mildew control.
7. Access roads and parking areas.
8. Removal.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

3.1 TEMPORARY ELECTRICITY

A. Provide temporary electrical service of capacity and characteristics required for construction.

B. Where possible, connect to existing electrical system for electricity required during construction.
1. Cost of electricity used will be paid for by Owner. Exercise measures to conserve electricity.
2. Regulate system to prevent interference with Owner's normal usage.
3. Maintain continuous power operation of Owner's facilities during changeover of electrical services.
4. Notify Owner when unusually heavy loads will be connected, including welding and other equipment with special power requirements.
5. Provide and pay for required service of capacity or characteristics other than that currently available.

C. Provide power outlets for construction operations, with branch wiring and distribution boxes located as required. Provide flexible power cords as required.

D. Maintain distribution system and provide routine repairs.

3.2 TEMPORARY LIGHTING

A. Provide temporary lighting for construction and security purposes.

B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.

C. Maintain lamps and provide routine repairs.

D. Provide portable lights when required to provide minimum lighting levels necessary for specific work.

3.3 TEMPORARY HEAT

A. Provide temporary heating devices required to maintain specified ambient temperatures for construction.

B. Where possible, utilize existing facilities for heat required during construction.
   1. Extend and supplement with temporary heat devices required to maintain specified ambient temperatures for construction.
   2. Costs of fuel used from existing facilities will be paid for by Owner. Exercise measures to conserve fuel.

C. Maintain minimum ambient temperature of 50 degrees F in areas where construction is in progress, unless otherwise indicated in individual specification sections.

3.4 TEMPORARY VENTILATION

A. Ventilate enclosed areas to facilitate curing of materials, disperse humidity, and prevent accumulations of dust, fumes, vapors, or gases.

B. Where possible, utilize existing ventilation equipment. Extend and supplement with temporary fan units as required to maintain clean air for construction.

3.5 TEMPORARY TELEPHONE AND COMPUTER SERVICES

A. Contractor shall be accessible during normal business hours via mobile telephone with voice mail or an answering service.

B. Provide computer in Contractor’s field office with printer, Internet access, scanner, and email service.

3.6 TEMPORARY WATER

A. Provide temporary water required for construction.

B. Connect to existing water source for water required for construction.
   1. Regulate system to prevent interference with Owner's usage.
   2. Costs of water used will be paid for by Owner. Exercise measures to conserve water.

C. Extend branch piping and provide temporary hoses so that water is available at locations needed for work.

D. Protect from freezing.

E. Maintain distribution system and provide routine repairs.

3.7 TEMPORARY SANITARY FACILITIES

A. Provide chemical toilets for use during construction.

B. Existing and permanent toilets may not be used during construction.

C. Maintain facilities in clean and sanitary condition.

3.8 FIELD OFFICES AND SHEDS

A. Provide temporary field offices and storage sheds required for construction.

B. Areas on site designated by Owner may be used for field office and storage of materials subject to damage by weather. Store large materials and those not subject to damage by weather outside building.

C. Do not unreasonably encumber site or premises with excess materials or equipment.

D. Temporary Structures:
   1. Portable or mobile buildings, structurally sound, weathertight, with floors raised above ground.

2. Thermal transmission resistance: Compatible with occupancy and storage requirements.
3. Provide connections for utility services when required.
4. Provide steps and landings at entrances.

E. Field Office:
1. Size required for Contractor's use and to provide space for project meetings.
2. Adequate electrical power, lighting, heating, and cooling to maintain human comfort.
3. Provide facilities for storage of Project Record Documents.
4. Provide thermometer mounted at convenient outside location, not in direct sunlight.

3.9 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas , to allow Owner's use of site and premises, and to protect adjacent properties from construction operations.

B. Provide barricades required by governing authorities for public right-of-ways.

C. Fencing:
1. Provide temporary fencing for construction operations.
2. Construction: Contractor's option.
3. Height: 6 feet.
4. Locate to protect construction operations, materials, and equipment.
5. Provide vehicular and pedestrian gates.

D. Tree and Plant Protection:
1. Protect existing trees and plants at site that are designated to remain.
2. Remove roots and branches that interfere with construction. Employ qualified arborist/ tree surgeon to remove and to treat cuts.
3. Provide temporary barriers to height of 6 feet around individual or groups of trees and plants.
4. Do not permit vehicular traffic, parking, storage of materials, dumping of harmful chemicals or liquids, or standing or continuously running water within root zones.
5. Supervise earthwork operations to prevent damage to root zones.
6. Replace trees and plants that are damaged or destroyed due to construction operations.

3.10 EXTERIOR CLOSURES

A. Provide temporary weathertight closures for exterior openings to provide acceptable interior working conditions, to allow for temporary heating and maintenance of ambient temperatures required in individual specification sections, to protect the Work, and to prevent entry of unauthorized persons.

B. Provide access doors with locking hardware.

3.11 PROTECTION OF INSTALLED WORK

A. Protect installed work from construction operations; provide special protection when required in individual specification sections.

B. Minimize traffic, storage, and construction activities on roof surfaces. If traffic, storage, or activity is necessary, obtain recommendations for protection from roofing manufacturer.

C. Prohibit traffic from landscaped areas.

3.12 PROGRESS CLEANING

A. Maintain areas free from waste materials, debris, and rubbish. Maintain site in clean and orderly condition.

B. Provide containers for collection of waste materials, debris, and rubbish; remove and dispose of off site as required by construction activities.

C. Periodically clean interior areas to provide suitable conditions for finish work.

3.13 TEMPORARY CONTROLS

A. Water Control:
   1. Grade site to drain. Prevent puddling water.
   2. Maintain excavations free of water. Provide, operate, and maintain pumping equipment.
   3. Provide water barriers to protect site from soil erosion.

B. Erosion and Sediment Control:
   1. Plan and execute methods to control surface drainage from cuts, fills, borrow areas, and waste disposal areas. Prevent erosion and sedimentation.
   2. Minimize amount of bare soil exposed at any one time.
   3. Provide temporary measures such as silt fences, dikes, berms, settlement basins, and drainage systems to prevent water flow and sedimentation.
   4. Periodically inspect earthwork to detect erosion and sedimentation; promptly employ corrective measures.

C. Dust Control:
   1. Provide dust control materials and methods to minimize dust from construction operations.
   2. Prevent dust from dispersing into atmosphere.

D. Mold and Mildew Control:
   1. Provide continuous measures to prevent formation of mold and mildew in construction.
   2. Do not install materials sensitive to mold and mildew growth until protection can be provided.
   3. Promptly remove and replace materials exhibiting mold and mildew growth.

3.14 ACCESS ROADS AND PARKING AREAS

A. Existing roads designated by Owner may be used for construction purposes. Do not allow heavy vehicles or construction equipment in parking areas.

B. Provide for access by emergency vehicles.

C. Keep fire hydrants and water control valves free from obstruction and accessible for use.

D. Provide parking facilities for construction personnel. When parking needs exceed on site capacity, provide additional off site facilities.

E. Maintain existing construction, and restore to original or specified condition at completion of Work.

3.15 REMOVAL

A. Remove temporary utilities, equipment, facilities, and services when construction needs can be met by use of permanent construction or upon completion of Project.

B. Remove foundations and underground installations; grade site as indicated.

C. Clean and repair damage caused by installation or use of temporary work.

D. Restore permanent facilities used during construction to original or to specified condition.

END OF SECTION

SECTION 015800

PROJECT IDENTIFICATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Project identification sign.
2. Maintenance and removal.

1.2 QUALITY ASSURANCE

A. Project Sign:
1. Design sign and structure to withstand 50 MPH wind velocity.
2. Sign Painter: Experienced as a professional sign painter for minimum 3 years.
3. Finishes and painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

B. Do not erect other signs at site without Owner's approval, except those required by governing authorities.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Show content, layout, lettering, colors, structure, sizes, and grades of members.
2. Samples: 3 x 3 inch samples of each paint color.

PART 2 PRODUCTS

2.1 MATERIALS

A. Structure and Framing: New lumber, structurally adequate.

B. Sign Surfaces: Exterior grade plywood with medium density overlay, nominally 3/4 inch thick, standard large sizes to minimize joints.

C. Rough Hardware: Galvanized steel or aluminum.

D. Paints: Latex type, exterior quality, gloss sheen.

2.2 FABRICATION

A. Provide one sign of following design:
1. Area: 32 square feet.
2. Bottom edge of sign: 6 feet above ground.
3. Content:
   a. Project title and logo.
   b. Owner's name.
   c. Names and titles of Architect and Consultants.
   d. Name of Contractor and major Subcontractors.
4. Graphic design, colors, and lettering style: As designated by Architect.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install project identification sign within 30 days after date of Notice to Proceed.

B. Erect at designated location.

C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.

D. Install sign surface plumb and level, with butt joints. Anchor securely.

E. Paint exposed surfaces of sign, supports, and framing.

3.2 MAINTENANCE

A. Maintain signs and supports clean. Repair deterioration and damage.

3.3 REMOVAL

A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

END OF SECTION

SECTION 016000

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Products.
2. Transportation and handling.
3. Storage and protection.
4. Reuse of existing materials.
5. Product options.

B. Related Sections:
1. Section 012500 - Substitution Procedures.

1.2 PRODUCTS

A. Provide interchangeable components by the same manufacturer for identical items.

B. Do not use products containing asbestos or other known hazardous materials.

C. Do not reuse materials and equipment removed from existing construction in completed Work, except as specifically permitted by the Contract Documents.

1.3 TRANSPORTATION AND HANDLING

A. Coordinate delivery of Products to prevent conflict with Work and adverse conditions at site.

B. Transport and handle Products in accordance with manufacturer's instructions.

C. Promptly inspect shipments to ensure that Products comply with requirements of Contract Documents, are undamaged, and quantities are correct.

D. Provide equipment and personnel to handle products by methods to prevent damage.

1.4 STORAGE AND PROTECTION

A. Store and protect Products in accordance with manufacturer's instructions with manufacturer's seals and labels intact and legible.

B. Store Products on site unless prior written approval to store off site has been obtained from Owner.

C. Store Products subject to damage by elements in weathertight enclosures. Maintain temperature and humidity within ranges required by manufacturer's instructions.

D. Exterior Storage:
1. Store fabricated Products above ground; prevent soiling and staining.
2. Cover products subject to deterioration with impervious sheet coverings; provide ventilation to prevent condensation.
3. Store loose granular materials in well drained area on solid surfaces; prevent mixing with foreign matter.

E. Arrange storage areas to permit access for inspection. Periodically inspect stored products to verify that products are undamaged and in acceptable condition.

1.5 REUSE OF EXISTING MATERIALS

A. Carefully remove, handle, protect, and store Products.

B. Clean and refinish Products to original or specified condition.

C. Restore operable components to working condition.

D. Arrange and pay for transportation, storage, and handling of Products requiring off site storage, restoration, or renovation.

1.6 PRODUCT OPTIONS

A. Products specified by reference standard only:
   1. Select any Product meeting the specified standard.
   2. Submit Product Data to substantiate compliance of proposed Product with specified requirements.

B. Products specified by naming two or more acceptable Products: Select any named Product.

C. Products specified by stating that the Contract Documents are based on a Product by a single manufacturer followed by the statement "Equivalent products by the following manufacturers are acceptable":
   1. Select the specified Product or a Product by a named manufacturer having equivalent or superior characteristics to the specified Product and meeting the requirements of the Contract Documents.
   2. If the specified Product is not selected, submit Product Data to substantiate compliance of proposed Product with specified requirements.
   3. The specified Product establishes the required standard of quality.

D. Products specified by naming one or more Products followed by "or approved substitute" or similar statement:
   1. Submit a substitution request under provisions of Section 012500 for Products not listed.
   2. The specified Product establishes the required standard of quality.

E. Products specified by naming one or more Products or manufacturers followed by the statement "Substitutions: Under provisions of Division 01":
   1. Submit a substitution request under provisions of Section 012500 for Products not listed.
   2. The specified Product establishes the required standard of quality.

F. Products specified by naming one Product followed by the statement "Substitutions: Not permitted": Substitutions will not be allowed.

G. Products specified by required performance or attributes, without naming a manufacturer or Product:
   1. Select any Product meeting specified requirements.
   2. Submit Product Data to substantiate compliance of proposed Product with specified requirements.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 017123

FIELD ENGINEERING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Survey and field engineering.
   2. Submittals.
   3. Records.

B. Provide and pay for field engineering services required for Project:
   1. Survey work required in execution of Work.
   2. Other professional engineering services specified or required to execute Contractor's construction methods.

1.2 QUALIFICATIONS

A. Surveyor: Qualified land surveyor, licensed in State in which project is located.

1.3 SUBMITTALS

A. Submit documentation to verify accuracy of field engineering work upon Owner's or Architect's request.

B. Submit certification that elevations and locations of improvements are in conformance with Contract Documents.

1.4 SURVEY REFERENCE POINTS

A. Existing horizontal and vertical control points for project are those designated on Drawings.

B. Locate, verify, and protect control points prior to beginning Work; preserve permanent reference points during construction.

1.5 PROJECT SURVEY REQUIREMENTS

A. Establish minimum of two permanent bench marks on site, referenced to survey control points. Record locations on Project Record Documents.

B. Establish lines and levels, locate and lay out, by instrumentation:
   1. Site improvements:
      a. Stakes for grading, fill, and topsoil placement.
      b. Utility slopes and invert elevations.
   2. Building foundation and column locations, floor elevations, and other controlling dimensions.
   3. Controlling lines and levels required for mechanical and electrical trades.

C. Verify property corners, easements, building setbacks, and horizontal control dimensions with information contained in Contract Documents.

D. Promptly notify Architect of any errors or discrepancies noted; await instructions prior to proceeding with Work.

1.6 RECORDS

A. Maintain accurate log of control and survey work.

B. Provide final as-built survey.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 017329

CUTTING AND PATCHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Requirements and limitations for cutting and patching of work.

B. Related sections:
   1. Section 012500 - Substitution Procedures.

1.2 SUBMITTALS

A. Submit written request in advance of executing cutting or alteration that affects:
   1. Work of Owner or separate contractor.
   2. Structural integrity of project.
   3. Integrity or effectiveness of weather exposed or moisture resistant elements or systems.
   4. Efficiency, operational life, maintenance, or safety of operational elements.
   5. Visual qualities of sight exposed elements.

B. Include in Request:
   1. Identification of project.
   2. Description of work affected.
   3. Necessity for cutting or patching.
   4. Effect of cutting or patching on work of Owner or separate contractor, or on structural, weatherproof, or visual integrity of project.
   5. Description of proposed work:
      a. Scope of cutting and patching.
      b. Subcontractor and trades to execute work.
      c. Products proposed to be used.
      d. Extent of refinishing.
   6. Alternate to cutting and patching.
   7. Cost proposal, if applicable.
   8. Written permission of any separate contractor whose work will be affected.

C. If conditions of work or schedule necessitate a change of material from that originally installed, submit substitution request in accordance with Section 012500.

D. Submit written notice to Architect designating time work will be uncovered, to allow for observation.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 PREPARATION

A. Examine existing conditions of work, including elements subject to movement or damage during cutting and patching.

B. After uncovering work, examine conditions affecting installation of new products or performance of work.

C. Provide protection for other portions of project.

D. Provide protection from elements.

3.2 CUTTING AND PATCHING

A. Execute cutting to include excavating, fitting, and patching of Work required to:
   1. Make several parts fit properly.
   2. Uncover work to provide for installation of ill timed work.
   3. Remove and replace defective work.
   4. Remove and replace work not conforming to requirements of Contract Documents.
   5. Provide routine penetrations of nonstructural surfaces for installation of piping and electrical conduit.
   6. Interface new and existing work.

B. Execute fitting and adjustment of products to provide finished installation to comply with specified tolerances, and finishes.

C. Execute cutting and demolition by methods that will prevent damage to other work, and will provide proper surfaces to receive installation of repairs and new work.

D. Execute excavating and backfilling by methods that will prevent damage to other Work, and will prevent settlement.

E. Employ original installer or fabricator to perform cutting and patching for:
   1. Weather exposed or moisture resistant elements.
   2. Sight exposed finished surfaces.

F. Restore work that has been cut or removed; install new products to provide completed Work in accordance with requirements of Contract Documents.

G. Refinish entire surfaces as necessary to provide an even finish:
   1. Continuous surfaces: To nearest intersections.
   2. Assembly: Refinish entirely.

END OF SECTION

SECTION 017700

CLOSEOUT PROCEDURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Closeout procedures.
2. Final cleaning.
3. Adjusting.
4. Project record documents.
5. Operation and maintenance data.
6. Warranties.
7. Spare parts and maintenance materials.
8. Starting of systems.
9. Demonstration and instructions.

1.2 CLOSEOUT PROCEDURES

A. Final Inspection:
1. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with the Contract Documents and ready for Architect's inspection.
2. If Architect performs re-inspection due to failure of Work to comply with claims of status of completion made by Contractor, Owner will compensate Architect for such additional services and will deduct the amount of such compensation from final payment to the Contractor.

B. Submit final Application for Payment showing original Contract Sum, adjustments, previous payments, retainage withheld from previous payments, and sum remaining due.

C. Closeout Submittals:
1. Evidence of compliance with requirements of governing authorities.
2. Certificate of Occupancy.
3. Project Record Documents.
4. Operation and Maintenance Data.
5. Warranties.
6. Keys and keying schedule.
7. Spare parts and maintenance materials.
8. Evidence of payment of Subcontractors and suppliers.
9. Final lien waiver.
10. Certificate of insurance for products and completed operations.
11. Consent of Surety to final payment.
12. List of subcontractors and suppliers, indicating firm name, area of responsibility or specialty, address, and telephone number.

1.3 FINAL CLEANING

A. Execute final cleaning prior to final inspection.

B. Clean surfaces exposed to view:
1. Remove grease, dirt, fingerprints, stains, labels, dust and other foreign materials from interior and exterior finished surfaces
2. Wash windows, polish glass and bright metal surfaces, and clean plumbing fixtures, appliances, etc. to make ready for occupancy
3. Repair, patch, and touch-up marred surfaces to finish matching adjacent surfaces
4. Broom clean paved surfaces, and rake clean other surfaces of ground Replace air-conditioning filters if units were operated during construction (to be avoided if possible)

5. Clean ducts, blowers and coil if air-conditioning units were operated without filters during construction
6. Maintain cleaning until project or portion thereof is accepted by Owner
7. Final site clean at end of construction to include removal of construction debris and mulch and combing with magnet.

C. Clean equipment and fixtures to a sanitary condition.

D. Clean or replace filters of operating equipment.

E. Clean debris from roofs and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.4 ADJUSTING

A. Adjust operating Products and equipment to ensure smooth and unhindered operation.

1.5 PROJECT RECORD DOCUMENTS

A. Maintain following record documents on site; record actual revisions to the Work:
1. Drawings.
2. Specifications.
3. Addenda.
4. Change Orders and other Modifications to the Contract.
5. Reviewed Shop Drawings, Product Data, and Samples.
6. Material Safety Data Sheets.

B. Store Record Documents separate from documents used for construction.

C. Record information concurrent with construction progress.

D. Make entries neatly and accurately.

E. Label each set or volume with "PROJECT RECORD DOCUMENTS", project title, and description of contents.
1. Organize contents according to Project Manual table of Contents.
2. Provide table of contents for each volume.

F. Drawings: Mark each item to record actual construction including:
1. Measured depths of foundations in relation to finish floor datum.
2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
4. Field changes of dimension and detail.
5. Details not on original Drawings.

G. Specifications: Mark each Product section description of actual Products installed, including the following:
1. Manufacturer's name and product model and number.
2. Product substitutions or alternates utilized.
3. Changes made by Addenda and Modifications.

H. Shop Drawings: Mark each item to record actual construction including:
1. Field changes of dimension and detail.
2. Details not on original Shop Drawings.

I. Submit electronically in Adobe PDF format along with final Application for Payment.

1.6 OPERATION AND MAINTENANCE DATA

A. Identify as "OPERATION AND MAINTENANCE INSTRUCTIONS" and title of project.

B. Contents:
1. Directory: List names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
2. Operation and maintenance instructions: Arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
   a. Significant design criteria.
   b. List of equipment.
   c. Parts list for each component.
   d. Operating instructions.
   e. Maintenance instructions for equipment and systems.
   f. Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.
3. Project documents and certificates including:
   a. Shop drawings and product data.
   b. HVAC balance reports.
   c. Certificates.
   d. Copies of warranties and bonds.

C. Submittal:
1. Submit electronically in Adobe PDF format at least 15 days prior to final inspection.
2. Architect will notify Contractor of any required revisions after final inspection.
3. Revise content of documents as required prior to final submittal.
4. Submit revised documents electronically in Adobe PDF format within 10 days after final inspection.

1.7 WARRANTIES

A. Execute and assemble documents from Subcontractors, suppliers, and manufacturers.

B. Include Table of Contents.

C. Submit electronically in Adobe PDF format along with final Application for Payment.

D. For items of Work delayed beyond date of Substantial Completion, provide updated submittal within 10 days after acceptance, listing date of acceptance as start of warranty period.

1.8 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification Sections.

B. Deliver to Project site in location as directed; obtain receipt prior to final payment.

1.9 STARTING OF SYSTEMS

A. Notify Owner and Architect at least seven days prior to startup of each system or piece of equipment.

B. Prior to beginning startup verify that:
1. Lubrication has been performed.
2. Drive rotation, belt tension, control sequences, tests, meter readings, and electrical characteristics are within manufacturer's requirements.
3. Utility connections and support components are complete and tested.

C. Execute start-up under supervision of applicable manufacturer's representative or Contractor's personnel in accordance with manufacturers' instructions.

D. When specified in individual specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to startup, and to supervise placing equipment or system in operation.

E. Submit written report that equipment or system has been properly installed and is functioning correctly.

1.10 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize Operation and Maintenance Manuals as basis for instruction. Review contents of manual with Owners' personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed upon times, at equipment location.

E. Prepare and insert additional data in Operation and Maintenance Manuals when need for additional data becomes apparent during instruction.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

Not used

END OF SECTION

SECTION 019100

BUILDING SYSTEM COMMISSIONING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

B. Owner's Project Requirements and Basis-of-Design documentation are included by reference for information only.

1.2 SUMMARY

A. Section Includes:
1. General requirements for coordinating and scheduling commissioning.
2. Commissioning meetings.
3. Commissioning reports.
4. Use of test equipment, instrumentation, and tools for commissioning.
5. Construction checklists, including, but not limited to, installation checks, startup, performance tests, and performance test demonstration.
6. Commissioning tests and commissioning test demonstration.
7. Adjusting, verifying, and documenting identified systems and assemblies.

B. Related Requirements
1. Section Special Procedures - LEED Certification, if applicable
2. Section Closeout Procedures
3. Section Operation and Maintenance Data
4. Section Electrical Systems Commissioning

1.3 DEFINITIONS AND ABBREVIATIONS

A. Definitions set forth in the General Conditions, AIA Document A201, are applicable to this Section. In addition, the following definitions shall apply to the terms used in this section.
1. **"Acceptance Phase"** – Phase of construction after start-up and initial checkout when functional performance tests, O&M documentation review, and training occurs.
2. **"Approval"** – Acceptance that a piece of equipment or system has been properly installed and is functioning in the tested modes according to the Contract Documents.
3. **"Architect / Engineer (A/E)"** – The prime consultant (architect) and sub-consultants who comprise the design team, generally the HVAC mechanical designer / engineer, plumbing designer / engineer, and the electrical designer / engineer.
4. **"Basis of Design"** – The basis of design is the documentation of the primary thought processes and assumptions behind design decisions that were made to meet the design intent. The basis of design describes the systems, components, conditions, and methods chosen to meet the design intent.
5. **"Commissioning Authority (CxA)"** – An independent agent, not otherwise associated with the A/E team members or the Contractor/Construction Manager, though he / she may be hired as a subcontractor to them. The CxA directs and coordinates the day-to-day commissioning activities. The CxA does not take an oversight role.
6. **"Commissioning Plan"** – An overall plan, developed before or after bidding, that provides the structure, schedule, and coordination planning for the commissioning process.
7. **"Contract Documents"** – The documents binding on parties involved in the construction of this project (drawings, specifications, change orders, amendments, contracts, Cx Plan, etc.).
8. **"Contractor"** – The prime contractor for this project.

9. **"Control System"** – The central building energy management control system.
10. **"Construction Manager (CM)"** – Primary contractor for the project if defined as such in the Owner/Contractor Agreement.
11. **"Data-logging"** – Monitoring flows, currents, status, pressures, etc. of equipment using stand-alone data-loggers separate from the control system.
12. **"Deferred Functional Tests"** – FPT's that are performed later, after substantial completion, due to partial occupancy, equipment, seasonal requirements, design, or other site conditions that disallow the test from being performed.
13. **"Deficiency"** – A condition in the installation or function of a component, piece of equipment, or system that is not in compliance with the Contract Documents (that is, does not perform properly or is not complying with the design intent).
14. **"Design Intent"** – A dynamic document that provides the explanation of the ideas, concepts, and criteria are considered to be very important to the owner. It is initially the outcome of the programming and conceptual design phases.
15. **"Design Narrative"** or "Design Documentation" – Sections of either the Design Intent or Basis of Design.
16. **"Factory Testing"** – Testing of equipment on-site or at the factory by factory personnel with an Owner's representative present.
17. **"Field Installation Verification (FIV)"** – Verification of all installed systems for compliance to plans and specification. These inspections are to be described in detail in the commissioning plan. Primarily static inspections and procedures to prepare the equipment or system for initial operation (e.g., belt tension, oil levels, gages in place, balancing devices in place, etc.).
18. **"Functional Performance Test (FPT)"** – Test of the dynamic function and operation of equipment and systems using manual (direct observation) or monitoring methods. Functional testing is the dynamic testing of systems (rather than just components) under full operation. Systems are tested under various modes, such as during low cooling or heating loads, high loads, component failures, unoccupied, varying outside air temperatures, fire alarm, power failure, etc. The systems are run through all the control system's sequences of operation and components are verified to be responding as the sequences state. Traditional air or water test and balancing (TAB) must be completed prior to commencing the FPT. TAB's primary work is setting up the system flows and pressures as specified, while functional testing is verifying that which has already been set up. The commissioning authority develops the functional test procedures in a sequential written form, coordinates, oversees, and documents the actual testing, which is usually performed by the installing contractor or vendor. FPT's are performed after Field Installation Verification (FIV) and Operational Performance Tests (OPT) are complete.
19. **"Indirect Indicators"** – Indicators of a response or condition, such as a reading from a control system screen reporting a damper to be 100% closed.
20. **"Manual Test"** – Using hand-held instruments, immediate control system readouts, or direct observation to verify performance (contrasted to analyzing monitored data taken over time to make the "observation").
21. **"Monitoring"** – The recording of parameters (flow, current, status, pressure, etc.) of equipment operation using dataloggers or the trending capabilities of control systems.
22. **"Non-Compliance"** – see Deficiency.
23. **"Non-Conformance" –** see Deficiency.
24. **"Operational Performance Test (OPT)"** – Verification of proper start-up of all equipment and systems to be commissioned. These tests are to be described in detail in the commissioning plan.
25. **"Over-written Value"** – Writing over a sensor value in the control system to see the response of a system (e.g. changing the outside air temperature value from 50 F to 75 F to verify economizer operation). See also "Simulated Signal."
26. **"Owner-Contracted Test"** – Tests paid for by the Owner outside the Contractor/Construction Manager's contract and for which the CxA does not oversee. These tests will not be repeated during the functional performance testing.
27. **"Phased Commissioning"** – Commissioning that is completed in phases (by floors, for example) due to the size of the structure or other scheduling issues, in order to minimize the total construction time.
28. **"Project Manager (PM)"** – The contracting and managing authority for the owner over the

design and construction of the project.

29. **"Sampling"** – Operational or functional testing only a fraction of the total number of identical or near identical pieces of equipment. Refer to Part 3 Execution for details.
30. **"Seasonal Performance Tests"** – FPT that are deferred until the system(s) will experience conditions closer to their design conditions.
31. **"Simulated Condition"** – Condition that is created for the purpose of testing the response of a system (e.g. applying a hair blower to a space sensor to see the response in a VAV box.
32. **"Simulated Signal"** – Disconnecting a sensor and using a signal generator to send an amperage, resistance, or pressure to the transducer and DDC system to simulate a sensor value.
33. **"Specifications"** – The construction specifications of the Contract Documents.
34. **"Startup"** – The initial starting or activating of dynamic equipment, including executing OPT's.
35. **"Subs"** – The subcontractors to the Contractor/Construction Manager who provide and install building components and systems.
36. **"Test Procedures"** – the step-by-step process which must be executed to fulfill the test requirements. The test procedures are developed by the CxA.
37. **"Trending"** – Monitoring using the building control system.
38. **"Vendor"** – Supplier of equipment.
39. **"Warranty Period"** – Warranty period for entire project, including equipment components. Warranty begins at Substantial Completion and extends for at least one year, unless specifically noted otherwise in the Contract Documents and accepted submittals.

B. Abbreviations. The following are common abbreviations used in the Specifications and in the Commissioning Plan.

1. A/E: Architect and design engineers.
2. CxA: Commissioning Authority
3. CC: Controls Contractor
4. CM: Construction Manager. Primary contractor for the project if defined as such in the Owner/Contractor Agreement.
5. Cx: Commissioning
6. Cx Plan: Commissioning Plan document
7. DB: Design Build Contractor
8. EC: Electrical Contractor
9. FIV: Field Installation Verification
10. FPT: Functional Performance Test
11. O & M: Operation and Maintenance
12. MC: Mechanical Contractor
13. OPT: Operational Performance Test
14. PM: Project Manager (of the Owner)
15. Subs: Subcontractors to the General
16. TAB: Test and Balance Contractor

1.4 QUALITY ASSURANCE

A. Commissioning Agent Qualifications: The Firm and/or the designated Commissioning Agent shall have a minimum of (5) years' experience in providing Total Building Commissioning Services and shall be regularly employed as a Commissioning Provider. The Firm and/or designated Commissioning Agent shall have been the principal Commissioning Agent on a least three (3) comparable projects that have been successfully completed within the previous five (5) years.

B. The Commissioning Agent shall have current engineering knowledge and extensive hands-on field experience regarding building systems; the physical principles of building systems performance; building systems start-ups, test and balance, functional performance testing, and troubleshooting; operation and maintenance procedures; and the building design and construction process.

C. The Commissioning Firm and/or the designated Commissioning Agent shall have certifications from one of the following industry organizations or a recognized and established approved equal.
   1. CBCP – Certified Building Commissioning Professional – Association of Energy Engineers (AEE)
   2. CCP – Certified Commissioning Professional – Building Commissioning Association (BCxA)
   3. CPMP – Certified Process Management Professional – ASHRAE
   4. CxA – Certified Commissioning Authority – AABC Commissioning Group (ACG)
   5. NEBB CP – Building Certified Professional Certification – National Environmental Balancing Bureau (NEBB)
   6. QCxP – University of Wisconsin-Madison Certification
   7. Or an approved Commissioning Firm directed by the Owner.

1.5 SYSTEM DESCRIPTION

A. Commissioning:
   1. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the design intent and the owner's operational needs. This is achieved by beginning in the design phase and documenting design intent and continuing through construction, acceptance, and the warranty period with actual verification of performance. The commissioning process shall encompass and coordinate the traditionally separate functions of system documentation, equipment start-up, control system calibration, point-to-point check out, testing and balancing, performance testing, and owner/operator training.
   2. Commissioning during the construction phase is intended to achieve the following specific objectives according to the Contract Documents:
      a. Perform commissioning in accordance with the criteria and requirements set forth in the USGBC LEED v4 rating system.
      b. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by the installing contractors.
      c. Verify and document proper performance of equipment and systems.
      d. Verify that O&M documentation left on site is complete.
      e. Verify that the owner's operating personnel are adequately trained.

B. The commissioning process does not take away from or reduce the responsibility of the system designers or installing contractors to provide a finished and fully functioning product.

C. Systems to be commissioned: The following systems shall be commissioned in this project.
   1. Division 26 Electrical Systems
      a. Interior and exterior lighting systems
      b. Lighting systems controls
      c. Emergency Lighting system
   2. Flush Plan for EQ 3.2 (Applicable for LEED projects only)

1.6 COORDINATION

A. Commissioning Team:
   1. Commissioning Authority (CxA)
   2. Owner's Project Manager (PM)
   3. Designated representative of the Owner's (Owner's Rep) Project Management Services Provider
   4. Design Build Contractor (DB or Contractor)
   5. Architect
   6. Design Engineers (particularly the mechanical engineer)
   7. Mechanical Contractor (MC)
   8. Electrical Contractor (EC)

9. TAB representative (TAB)
10. Controls Contractor (CC)
11. Other installing contractors or suppliers of equipment
12. Owner's building or plant operator/engineer

B. Management. The CxA is hired by the Design Build Contractor. The CxA directs and coordinates the commissioning activities and the reports to the owner. All members work together to fulfill their contracted responsibilities and meet the objectives of the Contract Documents.

C. Scheduling.
1. The CxA will work with the PM according to established protocols to schedule the commissioning activities. The CxA will provide sufficient notice to the PM for scheduling commissioning activities. The Contractor/Construction Manager will integrate all commissioning activities into the master schedule. All parties will address scheduling problems and make necessary notifications in a timely manner in order to expedite the commissioning process.
2. The CxA will provide the initial schedule of primary commissioning events at the commissioning scoping meeting. As construction progresses more detailed schedules are developed by the CxA.

1.7 COMMISSIONING PROCESS

A. Commissioning Plan. A draft Commissioning Plan shall be developed by the CxA and will be provided at the scoping meeting. The commissioning plan provides guidance in the execution of the commissioning process. Just after the initial commissioning scoping meeting the CxA will update the plan which is then considered the "final" plan, though it will continue to evolve and expand as the project progresses. The final commissioning plan is binding on the Contractor. The Specifications will take precedence over the Commissioning Plan.

B. Commissioning Process. The following narrative provides a brief overview of the typical commissioning tasks during design and construction and the general order in which they occur.
1. Commissioning tasks during design include: evaluating scope and contract, develop specifications and commissioning plans, perform design reviews, assist with preparation of design documents through construction documents as dictated by scope.
2. Commissioning during construction begins with a scoping meeting conducted by the CxA where the commissioning process is reviewed with the commissioning team members.
3. Additional meetings will be required throughout construction, scheduled by the CxA with necessary parties attending to plan, scope, coordinate, schedule future activities, and resolve problems.
4. Equipment documentation is submitted to the CxA during normal submittals, including detailed startup procedures.
5. The CxA works with the subs in developing startup plans and startup documentation formats, including providing the subs with FIV and OPT checklists as a reference of items to be verified by the CxA.
6. In general, the checkout and performance verifications proceeds from simple to complex; from component level to equipment to systems and intersystem levels with FIV and OPT checklists being completed before functional performance testing. The CxA shall provide field installation inspection for each system and subsystem covered in the scope of work for this project and provide an installation observation report weekly to the Contractor / Construction Manager. The report shall cover any installation deficiencies from plans and specifications.
7. The Subs perform startup and initial checkout. The CxA documents that the startup was completed according to the approved plans. This shall include the CxA witnessing startup of selected equipment.
8. The CxA develops specific equipment and system functional performance test procedures. The Subs review the procedures.
9. The procedures are executed by the Subs under the direction of and documented by the CxA.
10. Items of non-compliance in material, installation, or setup are corrected at the Sub's expense

and the system retested.

11. The CxA reviews the O&M documentation for completeness.
12. Commissioning is completed before Substantial Completion.
13. The CxA reviews, pre-approves, and coordinates the training provided by the Subs and verifies that it was completed.

1.8 RESPONSIBILITIES

A. The responsibilities of various parties in the commissioning process are provided in this section. The responsibilities of the plumbing contractor reside in Division 22, the mechanical contractor, TAB, and controls contractor are in Division 23 and those of the electrical contractor in Division 26.

B. All Parties
   1. Assist in the development of the Final Commissioning Plan
   2. Follow the Final Commissioning Plan
   3. Attend commissioning scoping meeting and additional meetings as necessary.

C. Architect (of A/E)
   1. Construction and Acceptance Phase
      a. Attend the commissioning scoping meeting and selected commissioning team meetings.
      b. Perform normal submittal review, construction observation, as-built drawing preparation, O&M manual preparation, etc., as contracted.
      c. Provide any design narrative documentation requested by the CxA.
      d. Coordinate resolution of system deficiencies identified during commissioning, according to the contract documents.
      e. Prepare and submit final as-built design intent documentation for inclusion in the O&M manuals. Review and approve the O&M manuals.
   2. Warranty Period: coordinate resolution of design non-conformance and design deficiencies identified during warranty period commissioning.

D. Mechanical and Electrical Designers/Engineers (of the A/E)
   1. Construction and Acceptance Phase
      a. Perform normal submittal review, construction observation, as-built drawing preparation, etc., as contracted. One site observation should be completed just prior to system startup.
      b. Provide any design narrative and sequences documentation requested by the CxA. The designers shall assist (along with the contractors) in clarifying the operation and control of commissioned equipment in areas where the specifications, control drawings, or equipment documentation is not sufficient for writing detailed testing procedures.
      c. Attend commissioning scoping meetings and other selected commissioning team meetings.
      d. Participate in the resolution of system deficiencies identified during commissioning according to the contract documents.
      e. Prepare and submit the final as-built design intent and operating parameters documentation for inclusion in the O&M manuals. Review and approve the O&M manuals.
      f. From the Contractors red line drawings, edit and update one-line diagrams developed as part of the design narrative documentation and those provided by the vendor as shop drawings for the chilled and hot water, condenser water, domestic water, steam, and condensate systems, supply, return, and exhaust air systems, and emergency power system.
      g. Review the FIV and OPT checklists for major pieces of equipment for sufficiency prior to their use.
      h. Review the FPT procedure forms for major pieces of equipment for sufficiency prior to their use.
   2. Warranty Period: Participate in the resolution of non-compliance, non-conformance, and design deficiencies identified during the warranty period commissioning.

E. Commissioning Authority (CxA): The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving, non-conformance, or deficiencies, but ultimately that responsibility resides with the Contractor/Construction Manager and the A/E. The primary role of the CxA is to develop and coordinate the execution of a testing plan, observe and document the performance – that systems are functioning in accordance with the documented design intent and in accordance with the Contract Documents. The Contractors will provide all tools or the use of tools to start, check-out, and functionally test equipment and systems, except for specific testing with portable data loggers, which shall be supplied and installed by the CxA.

F. Owner's Representative or Project Management Services Provider
   1. Construction and Acceptance Phase
      a. Facilitate the coordination of the commissioning work by the CxA, and, with the Contractor/Construction Manager and CxA, ensure that commissioning activities are being scheduled into the master schedule.
      b. Review the final Commissioning Plan – Construction Phase.
      c. Attend commissioning scoping meetings and other selected commissioning team meetings.
      d. Perform the normal review of Contractor submittals.
      e. Furnish a copy of all construction documents, addenda, change orders, and approved submittals and shop drawings related to commissioned equipment to the CxA.
      f. Review and approve the functional performance test procedures submitted by the CxA prior to testing
      g. When necessary, observe and witness FIV, OPT, FPT of selected equipment.
      h. Review commissioning progress and deficiency reports.
      i. Coordinate the resolution of non-compliance and design deficiencies identified in all phases of commissioning.
      j. Assist the CxA in coordinating the training of owner personnel.

   2. Warranty Period: Assist the CxA as necessary in the seasonal or deferred testing and deficiency corrections required by the specifications.

G. Owner's Project Manager (PM)
   1. Construction and Acceptance Phase
      a. Manage the contract of the A/E and of the Contractor/Construction Manager
      b. Arrange for facility operating and maintenance personnel to attend various field commissioning activities and field training sessions according to the Commissioning Plan
      c. Provide final approval for the completion of the commissioning work.
   2. Warranty Period: Ensure that any seasonal or deferred testing and deficiency issues are addressed.

H. Design Build / Contractor (DB/Contractor)
   1. Construction and Acceptance Phase
      a. Facilitate the coordination of the commissioning work by the CxA, and with the Contractor/Construction Manager and CxA ensure that commissioning activities are being scheduled into the master schedule.
      b. Ensure that all Subs execute their commissioning responsibilities according to the Contract Documents and schedule.
      c. A representative shall attend the commissioning scoping meeting and other necessary meetings scheduled by the CxA to facilitate the Cx process
      d. Coordinate the training of owner personnel.
      e. Prepare the O&M manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
   2. Warranty Period
      a. Ensure that Subs execute seasonal or deferred functional performance testing.
      b. Ensure that Subs correct deficiencies and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.
   3. Plumbing, Mechanical, TAB, Controls, Electrical Contractor/s

a. Attend a commissioning scoping meeting and other necessary meetings scheduled by the CxA to facilitate the Cx process.
b. Contractors shall provide normal cut sheets and shop drawing submittals to the CxA of commissioned equipment.
c. Provide additional requested documentation, prior to normal O&M manual submittals, to the CxA for development of start-up and functional testing procedures.
    1. Typically, this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the CxA.
    2. The Commissioning Agent may request further documentation necessary for the commissioning process.
    3. This data request may be made prior to normal submittals.
d. Provide a copy of the O&M manuals submittals of commissioned equipment, through normal channels, to the CxA for review and approval.
e. Provide limited assistance to the CxA in preparing a full start-up and initial checkout plan using manufacturer's start-up procedures. Submit manufacturer's detailed start-up procedures and the full start-up plan and procedures and other requested equipment documentation to CxA for review.
f. Perform all completed start-up and system operational checkout procedures in the presence of the CxA.
g. Address current A/E punch list items before functional testing.
h. Provide skilled technicians to execute starting of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments, and problem-solving.
i. Perform functional performance testing under the direction of the CxA for specified equipment in this section. Assist the CxA in interpreting the monitoring data, as necessary.
j. Correct deficiencies (difference between specified and observed performance) as interpreted by the CxA, PM and A/E and retest the equipment.
k. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
l. Provide training of the Owner's operating personnel as specified.
m. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

4. Warranty Period
    1. Correct deficiencies and make necessary adjustments to O&M manual and as-built drawings for applicable issues identified in any seasonal testing.

I. Equipment Supplier
1. Provide all requested submittal data, including detailed start-up procedures and specific responsibilities of the Owner to keep warranties in force.
2. Assist in equipment testing per agreements with Subs.
3. Include all special tools, instruments, and software required for testing equipment according to these Contract Documents in the base bid pricing, except for stand-alone data-logging provided by the CxA.
4. Review test procedures for equipment installed by factory representatives.
5. Ensure that any seasonal or deferred testing and deficiency issues are addressed during the warranty period.

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT

A. All standard testing equipment required to perform startup and initial checkout and required functional performance testing shall be provided by the Division contractor for the equipment being tested. For example, the mechanical contractor of Division 23 shall ultimately be responsible for all standard testing equipment for the HVAC system and DDC system in Division 23, except for equipment specific to and used by TAB in their contractor responsibilities.

B. Special equipment, tools, instruments, software, (only available from vendor specific to a piece of equipment) required for testing equipment, according to these Contract Documents shall be included in the base bid price to the Contractor and left on site, except for stand-alone data-logging equipment that may be used by the CxA.

C. Data-logging equipment and software required to test equipment will be provided by the CxA, but shall not become the property of the Owner.

D. All testing equipment shall be of sufficient quality and accuracy to test and/or measure system performance with the tolerances specified in the Specifications. If not otherwise noted, the following minimum requirements apply temperature sensors and digital thermometers shall have an accuracy of ± 0.7° F with a resolution of 0.1° F. Water Pressure sensors shall have an accuracy of ± 2% of reading. All instruments shall be calibrated annually.

PART 3 - EXECUTION

3.1 MEETINGS

A. Scoping Meeting. Within 60 days of commencement of construction, the CxA will schedule, plan, and conduct a commissioning scoping meeting with the entire commissioning team in attendance. Meeting minutes will be distributed to all parties by the CxA. Information gathered from this meeting will allow the CxA to revise the Draft Commission Plan to its “final” version, which will also be distributed to all parties.

B. Miscellaneous Meetings. Other meetings will be planned and conducted by the CxA as construction progresses. These meetings will cover coordination, deficiency resolution and planning issues with the particular Subs.

3.2 REPORTING

A. The CxA will provide regular reports to the PM, depending on the management structure, with increasing frequency as construction and commissioning progresses. Standard forms are provided and referenced in the Commissioning Plan.

B. The CxA will regularly communicate with all members of the commissioning team, keeping them apprised of commissioning progress and scheduling changes through memos, progress reports, etc.

C. Testing or review approvals and non-conformance and deficiency reports are made regularly with the review and testing as described in later sections.

3.3 SUBMITTALS

A. The CxA will provide appropriate contractors with a specific request for the type of submittal documentation that the CxA requires to facilitate the commissioning work. These requests will be integrated into the normal submittal process and protocol of the construction team. At minimum, the request will include the manufacturer and model number, the manufacturer’s printed installation and

detailed start-up procedures, full sequence of operation, O&M data, performance data, any performance test procedures, control drawings, user interface graphics for each system, and details of owner contracted tests. In addition, the installation and checkout materials that are actually shipped inside the equipment and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the CxA. All documentation requested by the CxA will be included by the Subs in their O&M manual contributions.

B. The CxA will review submittals related to the commissioned equipment for conformance to the Contract Documents as it relates to the commissioning process, to the functional performance of the equipment and adequacy for developing test procedures. This review in intended primarily to aid in the development of functional testing procedures and only secondarily to verify compliance with equipment specifications. The CxA will notify the PM or A/E as requested of items missing or areas that are not in conformance with Contract Documents and which require resubmission.

C. The CxA may request additional design narrative from the A/E and Controls Contractor depending on the completeness of the design intent documentation and sequences provided with the specifications.

D. These submittals to the CxA do not constitute compliance for O&M manual documentation. The O&M manuals are the responsibility of the Contractor, though the CxA will review them.

3.4 FIELD INSTALLATION VERIFICATION AND OPERATIONAL PERFORMANCE TESTS

A. The following procedures apply to all equipment to be commissioned, according to Section 1.3, Systems to be commissioned.

B. General. FIV's and OPT's are important to ensure that the equipment and systems are hooked-up and operational. It ensures that functional performance testing (in-depth system checkout) may proceed without unnecessary delays. Each piece of equipment receives full FIV checkout. No sampling strategies are used. FIV's and OPT's for a given system must be successfully completed prior to formal functional performance testing of equipment or subsystems of the given system.

C. Start-up and Initial Checkout Plan. The CxA shall assist the commissioning team members responsible for start-up of any equipment in developing detailed start-up plans for all equipment. The primary role of the CxA in this process is to ensure that there is written documentation that each of the manufacturer-recommended procedures have been completed. The contractor is responsible to perform the start-up procedures of selected equipment in the presence of the CxA.
   1. The CxA develops the FIV and OPT checklists and procedures. These checklists indicate required procedures to be executed as part of start-up and initial checkout of the systems and the party responsible for their execution.
   2. These checklists and tests are provided by the CxA to the Contractor for reference during the construction process.
   3. The subcontractor responsible for the purchase of the equipment assists in the development of the full start-up plan by combining (or adding to) the CxA's checklists with the manufacturer's detailed start-up and checkout procedures from the O&M manual and the normally used field checkout sheets. The full start-up plan (at a minimum) shall consist of the following:
      a. The CxA's OPT checklist
      b. The manufacturer's standard written start-up procedures copied from the installation manuals.
      c. The manufacturer's normally used filed checkout sheets.
   4. The CxA reviews and approves the procedures and the format for documenting them, noting any procedures that need to be added.
   5. The full start-up procedures and the approval form may be provided to the PM for review and approval, depending on management protocol.

D. Controls System Verification
   1. The operation of all control system components shall be verified in the presence of the CxA.
   2. All procedures used shall be fully documented on the OPT checklists clearly referencing the

procedures followed and written documentation of initial, intermediate, and final results.
3. All control point OPT tests shall be verified through the graphic front end software.
4. All sensors and analog inputs shall be calibrated by manufacturer's standard procedures and to project calibration tolerances.
5. All analog outputs, actuators, and valves shall be ranged for correct action to the control signal.

E. Execution of FIV and OPT Procedures.
1. The CxA shall perform regular FIV's throughout the construction period.
2. Four weeks prior to start-up, the Subs and vendors schedule start-up and checkout with the PM, Contractor/Construction Manager, and CxA. The performance of start-up and checkout are directed and executed by the Sub or vendor in the presence of the CxA.
3. The CxA shall observe the start-up procedures for each piece of primary equipment.

F. Deficiency issue log.
1. The CxA shall provide a periodic commissioning issue log clearly listing any deficiencies or areas of concern from any FIV or OPT.
2. The issue log shall be provided to the PM for distribution to the appropriate parties for review, response, and action. All actions and results will be listed on the issue log for future reference (i.e. nothing is ever deleted).
3. Items left incomplete, which later cause deficiencies or delays during functional testing may result in back charges to the responsible party.

3.5 PHASED COMMISSIONING

A. The project may require start-up and initial checkout to be executed in phases. This phasing will be planned and scheduled in a coordination meeting of the CxA, PM, mechanical, TAB, controls, and the Contractor/Construction Manager. Results will be added to the master and commissioning schedules.

3.6 FUNCTIONAL PERFORMANCE TESTING

A. This sub-section applies to all commissioning functional testing for all divisions.

B. The general list of equipment to be commissioned is as specified herein.
Objective and Scope
1. The objective of functional performance testing is to demonstrate that each system is operating according to the documented design intent and Contract Documents. Functional tests will identify areas of deficient performance so they can be corrected, improving the operation, and functioning of the systems.
2. In general, each system should be operated through all modes of operation (seasonal, occupied, un-occupied, warm-up, cool-down, part and full load,) where there is a specified system response. Verifying each sequence in the sequences of operation is required. Proper responses to such modes and conditions as power failure, freeze condition, low oil pressure, no flow, equipment failure, etc. shall also be tested.

C. Development of Test Procedures
1. Before test procedures are written, the CxA shall obtain all requested documentation and a current list of change orders affecting equipment or systems, including an updated points list, program code, control sequences and parameters. The CxA shall develop specific test procedures and forms to verify and document proper operation of each piece of equipment and system. Each Sub or vendor responsible to execute a test, shall provide limited assistance to the CxA in developing the procedures review (answer questions about equipment, operation, sequences, etc.). Prior to execution, the CxA shall provide a copy of the test procedures to the Sub(s) who shall review the tests for feasibility, safety, equipment, and warranty protection. The CxA may submit the tests to the A/E for review, if requested.
2. The CxA shall review owner-contracted, factory testing or required owner acceptance tests

which the CxA is not responsible to oversee, including documentation format, and shall determine what further testing or format changes may be required to comply with the Specifications. Redundancy of testing shall be minimized.

3. The purpose of any given specific test is to verify and document compliance with the stated criteria of acceptance given on the test form.

D. Test Methods

1. Functional performance testing and verification may be achieved by manual testing (persons manipulate the equipment and observe performance) or by monitoring the performance and analyzing the results using the control system's trend log capabilities, or by stand-alone data loggers. The CxA may substitute specified methods or require an additional method to be executed, other than what was specified, with the approval of the PM. This may require a change order and adjustment in charge to the owner. The CxA will determine which method is most appropriate for tests that do not have a method specified.
2. Sampling Multiple identical pieces of non-life-safety or otherwise non-critical equipment with identical factory configured control sequences may be functionally tested using sampling strategy. Significant application differences and significant sequence of operation differences in otherwise identical equipment invalidates their common identity. A small size or capacity difference, alone, does not constitute a difference.

E. Coordination and Scheduling

1. The Subs shall provide sufficient notice to the CxA regarding their completion schedule for the start-up of all equipment and systems. The CxA will schedule functional tests through the Contractor/Construction Manager and affected Subs. The CxA shall direct, witness, and document the functional testing of all equipment and systems. The Subs shall execute the tests.
2. In general, functional testing is conducted after FIV's and OPT's have been satisfactorily completed. The control system is sufficiently tested and approved by the CxA before it is used for TAB or to verify performance of other components or systems. The air balancing and water balancing is completed and de-bugged before functional testing of air related or water related equipment or systems. Testing proceeds from components to subsystems to systems. When the proper performance of all interacting, individual systems has been achieved, the interface or coordinated responses between systems is checked.

F. Test Equipment. Refer to Part 2 – Products for test equipment requirements.

G. Problem Solving. The CxA will recommend solutions to problems found, however, the burden of responsibility to solve, correct, and re-test problems is with the Contractor/Construction Manager, Subs, and A/E.

H. Deferred Testing. If any check or test cannot be completed due to the building structure, required occupancy condition, or other deficiency, execution of checklists and functional testing may be delayed upon approval of the PM. These tests will be conducted in the same manner as the seasonal tests as soon as possible. Services of necessary parties will be negotiated.

3.7 DOCUMENTATION, NON-CONFORMANCE, AND APPROVAL OF TESTS

A. Documentation. The CxA shall witness and document the results of all functional performance tests using the specific procedural forms developed for that purpose. Prior to testing, these forms are provided to the PM for review and approval and to the Subs for review. The CxA will include the filled out forms in the O&M manuals.

B. Non-Conformance

1. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and reported to the PM on the standard commissioning issues log.
2. Corrections of minor deficiencies identified may be made during the tests at the discretion of

the CxA. In such cases the deficiency and resolution will be documented on the procedure form.

3. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues, unless there is an overriding reason to do so at the request of the PM.
4. As tests progress and a deficiency is identified, the CxA discusses the issue with the executing contractor.
    a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
        1. If the deficiency can be easily corrected it shall be corrected and the commissioning shall proceed.
        2. The CxA reschedules the test and the test is repeated.
    b. If there is a dispute about a deficiency, regarding whether it is a deficiency or who is responsible or the repair will take more than one hour:
        1. The deficiency shall be documented on the issue log or the test check sheet with the Sub's response and a copy given to the Contractor/Construction Manager and to the Sub representative assumed to be responsible.
        2. Resolutions are made at the lowest management level possible.
        3. The CxA documents the resolution process.
        4. Once the interpretation and resolution have been decided, the appropriate party corrects the deficiency, signs the statement of correction on the non-compliance form and provides it to the CxA. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.
5. Cost of re-testing.
    a. The cost for the Sub to re-test a OPT or FPT, if they are responsible for the deficiency, shall be theirs. If they are not responsible, any cost recovery for re-testing costs shall be negotiated with the Contractor/Construction Manager.
    b. For a deficiency identified, not related to any pre-functional checklist or start-up fault, the following shall apply: The CxA will direct the re-testing of the equipment once at no charge to the Contractor/Construction Manager for their time. However, the CxA's time for a second re-test will be charged to the Contractor/Construction Manager, who may choose to recover costs from the responsible Sub.
    c. The time for the CxA to direct any re-testing required because a specific FIV or OPT item, reported to have been successfully completed, but determined during functional testing to be faulty, will be back charged to the Contractor/Construction Manager, who may choose to recover costs from the party responsible.
6. The contractor shall respond in writing to the CxA at least as often as commissioning meetings are being scheduled concerning the status of each apparent outstanding discrepancy identified during commissioning. Discussion shall cover explanations of any disagreements and proposals for their resolution.
7. The CxA retains the original non-conformance forms until the end of the project.
8. Any required re-testing by any contractor shall not be considered a justified reason for a claim of delay or for a time extension by the prime contractor.

C. Failure Due to Manufacturer Defect. If 10%, or three, whichever is greater, of identical pieces (size alone does not constitute a difference) of equipment fail to perform to the contract Documents (mechanically or substantively) due to manufacturing defect, not allowing it to meet its submitted performance spec, all identical units may be considered unacceptable by the PM.

D. Approval. The CxA notes each satisfactorily demonstrated function on the test form. Formal approval of the functional test is made later after review by the CxA and by the PM, if necessary. The CxA recommends acceptance of each test to the PM using a standard form. The PM gives final approval on each test using the same form, providing a signed copy to the CxA and the contractor.

3.8 OPERATION AND MAINTENANCE MANUALS

A. Standard O&M Manuals
   1. The specific content and format requirements for the standard O&M manuals are detailed in Section 01 78 00. Special requirements for the controls contractor and TAB contractor shall be as specified in Div 23.
   2. CxA Review. Prior to substantial completion, the CxA shall review the O&M manuals, documentation, and final as-built drawings for systems that were commissioned to verify compliance with the Specifications. The CxA will communicate deficiencies in the manuals to the PM, A/E, as requested. Upon a successful review of the corrections, the CxA recommends approval and acceptance of these sections of the O&M manuals to the PM, or A/E. The CxA also reviews each equipment warranty and verifies that all requirements to keep the warranty valid are clearly stated. This work does not supersede the A/E's review of the O&M manuals according to the A/E's contract.

B. Commissioning Final Report
   1. Final Report Details. The final commissioning report shall include an executive summary, LEED commissioning statement sheet, list of participants, and roles, brief building description, overview of commissioning and testing scope and a general description of testing and verification methods. For each piece of commissioned equipment, the report should contain the FIV, OPT, and FPT completed check sheets. The report shall also include all issue logs and commissioning communication.
   2. Other documentation will be retained by the CxA.

3.9 TRAINING OF OWNER PERSONNEL

A. The Contractor/Construction Manager shall be responsible for training coordination and scheduling and ultimately for ensuring that training is completed.

B. The CxA shall be responsible for overseeing and reviewing the content and adequacy of the training of Owner personnel for commissioned equipment and systems.
   1. Each Sub and vendor responsible for training will submit a written training plan to the CxA for review and approval prior to training. All training methods shall include a classroom lecture and an actual operational demonstration of start-up, tear down, and maintenance procedures, as applicable and appropriate. A sample of elements contained in the plan is as follows:
      a. Equipment covered
      b. Intended audience
      c. Location of training
      d. Objectives
      e. Subjects covered
      f. Duration of training on each subject
      g. Instructor name, company, and qualifications
   2. For the primary HVAC equipment, the Controls Contractor shall provide a short discussion of the control of the equipment during the mechanical or electrical training conducted by others.
   3. The CxA develops an overall training plan and coordinates and schedules, with the Contractor/Construction Manager, the overall training for the commissioned systems. The CxA develops criteria for determining that the training was satisfactorily completed, including attending some of the training, etc. The CxA recommends approval of the training to the PM using standard form. The PM also signs the approval form.

END OF SECTION 019100

DOCUMENT 023200

GEOTECHNICAL INVESTIGATIONS

1.1 INVESTIGATION

A. Geotechnical investigations were conducted at the site, the results of which can be found in the report issued by Geotechnical Solutions, project No. 23-257, issued July 24, 2023.

B. A copy of the report is bound into the Project Manual as an Appendix.

1.2 INTERPRETATION

A. The report is provided only for bidder's information and convenience and is not part of the Contract Documents. Owner and Architect do not warrant the accuracy or extent of the report or locations of the test borings.

B. Opinions expressed in the report are those of the Geotechnical Engineer and represent the Geotechnical Engineer’s interpretation of subsoil conditions, tests, and results of analyses that the Geotechnical Engineer has conducted.

C. The report is based upon the assumption that uniform variation exists in soil properties between borings. Interpretation of the report is bidder's responsibility. Owner and Architect will not be responsible for interpretation of report by bidders.

D. Bidders are urged to examine the report and the site.

E. Additional soil borings or other exploratory operations may be made by bidders at no additional cost to Owner, provided such operations are approved by Owner in advance.

F. Refer to Conditions of the Contract for additional information.

END OF DOCUMENT

SECTION 024120

SELECTIVE BUILDING DEMOLITION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Removal, relocation and protection of existing items marked salvage for reuse or salvage for Owner.
2. Removal and disposal of existing items as indicated on the drawings.
3. Removal and disposal of debris.
4. Identification of utilities.
5. Abatement: The Contractor shall abate asbestos-containing materials and abate/remediate lead containing materials under this contract. Refer to Drawings and Specifications prepared by the Environmental Consultant contained in the Appendix of the project manual for scope of work.

B. Related Sections:
1. Division 01 - Administrative, procedural, and temporary work requirements.
2. Section 013516 - Alteration Project Procedures.
3. Appendix: Hazardous material testing reports and abatement specification.

1.2 REFERENCES

A. Secretary of the Interior’s Standards for Rehabilitation. (www.nps.gov/tbs/standards/rehabilitation.htm)

B. Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings. (www.nps.gov/tps/standards.htm)

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Indicate areas for demolition, removal sequence and location of salvageable items, and location and construction of temporary work.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements:
1. Follow the Secretary of the Interior's Standards for Rehabilitation and the Secretary of the Interior's Standards for the Treatment of Historic Properties with Guidelines for Preserving, Rehabilitating, Restoring and Reconstructing Historic Buildings at a minimum.
2. Conform to applicable code for demolition work, safety of structure, and dust control.
3. Obtain required permits from authorities.
4. Notify affected utility companies before starting work and comply with their requirements.
5. Conform to applicable codes when hazardous or contaminated materials are discovered.

B. Pre-Demolition Conference:
1. Convene at site 2 weeks prior to beginning work of this Section.
2. Attendance: Contractor, demolition subcontractor, Architect, and Owner.
3. Conduct conference at Project site.
2. Review and Discuss:
   a. Condition of construction to be demolished.
   b. Structural load limitations of existing structures.
   c. Building demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   d. Protection requirements.
   e. Procedures for noise control and dust control.
   f. Procedures for protection of adjacent buildings.

1.5 PROJECT CONDITIONS

A. Minimize interference with streets, walks, public right-of-ways, and adjacent facilities.

B. If hazardous materials are discovered beyond that indicated in the Asbestos Abatement Project Design contained in the appendix of the project manual, notify Owner and Architect and await instructions.

C. If any of the following conditions are encountered, cease work immediately, notify Owner and Architect, and await instructions:
   1. Structure is in danger of movement or collapse.
   2. Materials or conditions encountered differ from those designated in the Contract Documents.

PART 2 PRODUCTS

Not used

PART 3 EXECUTION

3.1 PREPARATION

A. Erect temporary partitions, barricades, warning devices, and controls.

B. Provide protective coverings, shoring, bracing, and supports for construction designated to remain.

C. Temporarily or permanently disconnect utilities as required.

3.2 DEMOLITION

A. The existing building is historic and precautions must be made to protect existing materials, refer to Sections 013516 for requirements.

B. Remove existing construction to extent indicated and as necessary to join new work to existing. Do not remove more than is necessary to allow for new construction.

C. Do not damage work designated to remain.

D. Minimize noise and spread of dirt and dust.

E. Assign work to trades skilled in procedures involved.

F. Plug ends of disconnected utilities with threaded or welded caps.

G. Protect and support active utilities designated to remain. Post warning signs showing location and type of utility and type of hazard.

H. Store items designated to remain property of Owner where directed by Owner.

I. Remove and dispose of waste materials off site.

END OF SECTION

SECTION 033000

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 033300 "Architectural Concrete" for general building applications of specially finished formed concrete.
2. Section 035300 "Concrete Topping" for emery- and iron-aggregate concrete floor toppings.
3. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.
4. Section 321313 "Concrete Paving" for concrete pavement and walks.
5. Section 321316 "Decorative Concrete Paving" for decorative concrete pavement and walks.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. W/C Ratio: The ratio by weight of water to cementitious materials.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site or via online conferencing platform.

1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.
b. Independent testing agency responsible for concrete design mixtures.
c. Ready-mix concrete manufacturer.
d. Concrete Subcontractor.

e. Special concrete finish Subcontractor.

2. Review special inspection and testing and inspecting agency procedures for field quality control, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, forms and form removal limitations, vapor-retarder installation, steel reinforcement installation, floor and slab flatness and levelness measurement, and concrete protection.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Design Mixtures: For each concrete mixture prepared in accordance with ACI 301, chapter 3.9. Each proposed mix design shall be accompanied by a complete standard deviation analysis based on at least 30 consecutive strength tests, or by three laboratory trial mixtures with confirmation tests. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing Drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

1. Location of construction joints is subject to approval of the Architect.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, testing agency.

B. Welding certificates.

C. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Form materials and form-release agents.
4. Steel reinforcement and accessories.
5. Fiber reinforcement.
6. Waterstops.
7. Curing compounds.
8. Floor and slab treatments.
9. Bonding agents.
10. Adhesives.
11. Vapor retarders.
12. Semirigid joint filler.
13. Joint-filler strips.
14. Repair materials.

15. Void forms.
16. Soil retainers

D. Material Test Reports: For the following, from a qualified testing agency:

1. Aggregates: Include sieve analysis.

E. Formwork Shop Drawings: Prepared by or under the supervision of a qualified professional engineer, detailing fabrication, assembly, and support of formwork.

1. Shoring and Reshoring: Indicate proposed schedule and sequence of stripping formwork, shoring removal, and reshoring installation and removal.

F. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.

G. Construction Joints: Submit drawings identifying proposed construction joints for other than those indicated on the Contract Drawings.

H. Field quality-control reports.

I. Minutes of preinstallation conference.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance. The qualified installer shall employ personnel qualified as ACI-certified Flatwork Technicians and Finishers.

B. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Testing Agency Qualifications: An independent agency, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.

1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Welding Qualifications: Qualify procedures and personnel according to AWS D1.4/D 1.4M.

1.8 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on concrete mixtures.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

1.10 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

1. When average high and low temperature is expected to fall below 40 deg F three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and as follows:

1. Maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301
2. ACI 117
3. ACI 347R.
4. ACI 318.
5. ACI 302.1R

2.2 FORM-FACING MATERIALS

A. Smooth-Formed Finished Concrete: Form-facing panels that provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Plywood, metal, or other approved panel materials.
2. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better.
b. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
c. Structural 1, B-B or better; mill oiled and edge sealed.
d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.

3. Overlaid Finnish birch plywood.

4. Modular steel forming system such as “Max-a-Form” system by Symons or equal.

B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.
1. Protective board over forms used for slabs-on-voids shall be 1/4" thick hardboard or plywood.

F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 inch minimum.

G. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

H. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

I. Form Ties: Factory-fabricated, removable or snap-off glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed.

B. Plain-Steel Wire: ASTM A 1064/A 1064M, galvanized

C. Plain-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from as-drawn steel wire into flat sheets.

D. Galvanized-Steel Welded-Wire Reinforcement: ASTM A 1064/A 1064M, plain, fabricated from galvanized-steel wire into flat sheets.

2.4 REINFORCEMENT ACCESSORIES

A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars, cut true to length with ends square and free of burrs.

B. Zinc Repair Material: ASTM A 780/A 780M.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire or CRSI Class 2 stainless-steel bar supports.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

2.5 CONCRETE MATERIALS

A. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C 150/C 150M, Type I, Type II.
2. Fly Ash: ASTM C 618, Class F. Carbon content of fly ash (LOI) shall not exceed 3 percent by volume.
3. Slag Cement: ASTM C 989/C 989M, Grade 100 or 120.
4. Silica Fume: ASTM C 1240, amorphous silica.

C. Normal-Weight Aggregates: ASTM C 33/C 33M,[Class 3S coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10

years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.

1. Maximum Coarse-Aggregate Size: **1 inch** nominal.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Lightweight Aggregate: ASTM C 330/C 330M, **1/2-inch** nominal maximum aggregate size.

E. Air-Entraining Admixture: ASTM C 260/C 260M.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

G. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

H. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

I. Water: ASTM C 94/C 94M and potable.

2.6 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513,[with factory-installed metal eyelets,] for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
1. Dimensions: 4 inches by 3/16 inch thick nontapered.

B. Flexible PVC Waterstops: CE CRD-C 572,[with factory-installed metal eyelets,] for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
1. Dimensions: 4 inches by 3/16 inch thick nontapered.

2.7 VAPOR RETARDERS

A. Sheet Vapor Barrier: ASTM E 1745, Class A, except with maximum water-vapor permeance of 0.01 perms per ASTM S 154. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Raven Industries, Inc.
    b. Reef Industries, Inc.
    c. Stego Industries, LLC.

2. Available Products for integrally bonded membrane (to be used for slabs-on-voids):
    a. Florprufe 120 by Grace Construction Products

B. Sheet Vapor Retarder: ASTM E 1745, Class A, except with maximum water-vapor permeance of 0.03 perms per ASTM E 154. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

    a. Fortifiber Building Systems Group.
    b. Reef Industries, Inc.
    c. Stego Industries.

C. Bituminous Vapor Retarder: 110-mil-thick, semiflexible, seven-ply sheet membrane consisting of reinforced core and carrier sheet with fortified asphalt layers, protective weathercoating, and removable plastic release liner. Furnish manufacturer's accessories, including bonding asphalt, pointing mastics, and self-adhering joint tape.
1. Water-Vapor Permeance: 0.0011 grains/h x sq. ft. x inches Hg; ASTM E 154.
2. Tensile Strength: 140 lbf/inch; ASTM E 154.
3. Puncture Resistance: 90 lbf; ASTM E 154.

2.8 FLOOR AND SLAB TREATMENTS

A. Slip-Resistive Aluminum Granule Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of not less than 95 percent fused aluminum-oxide granules.

B. Metallic Dry-Shake Floor Hardener: Unpigmented, factory-packaged, dry combination of portland cement, graded metallic aggregate, rust inhibitors, and plasticizing admixture; with metallic aggregate consisting of no less than 65 percent of total aggregate content.

2.9 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; that penetrates, hardens, and densifies concrete surfaces.

2.10 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.

C. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

D. Water: Potable.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

F. Clear, Solvent-Borne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.Retain "Clear, Waterborne, Membrane-Forming Curing and Sealing Compound" Paragraph below if a clear, nonyellowing, waterborne, membrane-forming curing and sealing compound is required. Although the EPA mandates maximum VOC emissions of 700 g/L for curing and sealing compounds, verify VOC emission limits of authorities having jurisdiction.

G. Clear, Waterborne, Membrane-Forming Curing and Sealing Compound: ASTM C 1315, Type 1, Class A.

2.11 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber

B. Joint Sealant: For control joints and construction joints in parking decks.

1. Available products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following, or approved equal:
   a. Eucolastic I & II (gun grade or selg level) by Euclid Chemical
   b. THC 900/901 (Horizontal) or Dymeric 240FC (Vertical) by Tremco, Inc.
2. Provide primers, cleaners and other materials required by the manufacturer for installation.

C. Bonding Agent: ASTM C 1059/C 1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, nonload bearing for bonding hardened or freshly mixed concrete to hardened concrete.

E. Reglets: Fabricate reglets of not less than 0.022-inch-thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

F. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

G. Adjustable wedge inserts for anchoring masonry shelf angles to concrete shall be Dayton/Richmond ("F" type) wedge inserts, by Dayton/Richmond Concrete Accessories or equal. Refer to the Contract Drawings for size, and capacity.

H. Non-Shrink Grout: Premixed cementitious compound containing non-metallic aggregate. Grout shall conform to ASTM C1107, Grade B or C when tested at fluid consistency equal to 20 to 30 seconds. Grout shall be bleed free and attain 7,000 psi compressive strength in 28 days at fluid consistency. Available grout manufacturers products are " Euco NS" by the Euclid Chemical Company or "Masterflow 713" by Master Builders.

I. High Flow Grout: Where high fluidity and/or increased placing time is required, use high flow grout. The factory pre-mixed grout shall conform to ASTM C1107, “Standard Specification for Packages Dry, Hydraulic-Cement Grout (Non-Shrink).” In addition, the grout manufacturer shall furnish test data from an independent laboratory indicating that the grout when placed at a fluid consistency shall achieve 95% bearing under a 18” x 36” base plate. Provide “Hi-Flow Grout” by The Euclid Chemical Co. or “Masterflow 928” by Master Builders.

J. Soil Retainers: SureRetainer by Motzblock or approved equal. Size as indicated or as required for void sizes indicated.

2.12 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by underlayment manufacturer.
4. Compressive Strength: Not less than 4100 psi at 28 days when tested according to ASTM C 109/C 109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C 150/C 150M, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
4. Compressive Strength: Not less than 5000 psi at 28 days when tested according to ASTM C 109/C 109M.

2.13 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, according to ACI 301

1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.

B. Cementitious Materials:[Use fly ash, pozzolan, slag cement, and silica fume as needed to reduce the total amount of portland cement, which would otherwise be used, by not less than 40 percent

C. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use high-range water-reducing or plasticizing admixture in concrete, as required, for placement and workability.
2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
3. Use water-reducing admixture in pumped concrete, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a w/c ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

D. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings, Foundation Walls, Slabs-on-Grade: Normal-weight concrete.

1. Minimum Compressive Strength: 4000 psi at 28 days.
2. Maximum W/C Ratio: 0.45
3. Slump Limit: 5 inches for concrete with verified slump of 2 to 4 inches before adding high-range water-reducing admixture or plasticizing admixture, plus or minus 1 inch
4. Air Content: **6** percent, plus or minus 1.5 percent at point of delivery for **1-inch** nominal maximum aggregate size.

2.15 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

2.16 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M and ASTM C 1116/C 1116M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F reduce mixing and delivery time to 60 minutes.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.

2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK INSTALLATION

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

C. Construct forms tight enough to prevent loss of concrete mortar.

D. Construct forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

1. Install keyways, reglets, recesses, and the like, for easy removal.
2. Do not use rust-stained steel form-facing material.

E. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

F. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

G. Do not chamfer exterior corners and edges of permanently exposed concrete.

H. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

I. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

J. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

K. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 EMBEDDED ITEM INSTALLATION

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
3. Install dovetail anchor slots in concrete structures as indicated.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for **24** hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material are not acceptable for exposed surfaces. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.4 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 (ACI 318M) and ACI 301 (ACI 301M) for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.5 VAPOR-RETARDER INSTALLATION

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder according to manufacturer's written instructions.

3.6 STEEL REINFORCEMENT INSTALLATION

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.

1. Do not cut or puncture vapor retarder. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Securely fasten steel reinforcement and wire ties against shifting during concrete placement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Weld reinforcing bars according to AWS D1.4/D 1.4M, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded-wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780/A 780M. Use galvanized-steel wire ties to fasten zinc-coated steel reinforcement.

3.7 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls 20'-0" o.c. max. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
7. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
2. Sawed Joints: The Soff-Cut Early Entry Dry-Cut Saw shall be used immediately after final finishing and to a depth of 1-1/4". Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.8 WATERSTOP INSTALLATION

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

3.9 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections are completed.

B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

C. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M).

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

1. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301 (ACI 301M).
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate. Do not permit vibrators to contact forms.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.
3. Screed slab surfaces with a straightedge and strike off to correct elevations.
4. Slope surfaces uniformly to drains where required.
5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

3.10 FINISHING FORMED SURFACES

A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.

C. Rubbed Finish: Apply the following to smooth-formed-finished as-cast concrete where indicated:

1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix 1 part portland cement to 1-1/2 parts fine sand with a 1:1 mixture of bonding admixture and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
3. Cork-Floated Finish: Wet concrete surfaces and apply a stiff grout. Mix 1 part portland cement and 1 part fine sand with a 1:1 mixture of bonding agent and water. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces. Compress grout into voids by grinding surface. In a swirling motion, finish surface with a cork float.

D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.11 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

3.12 MISCELLANEOUS CONCRETE ITEM INSTALLATION

A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.

2. Minimum Compressive Strength: 4000 psi at 28 days.
3. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
4. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
5. Prior to pouring concrete, place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
6. Cast anchor-bolt insert into bases. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel finish concrete surfaces.

3.13 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for remainder of curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:

    a. Water.
    b. Continuous water-fog spray.
    c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.

2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

    a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies does not interfere with bonding of floor covering used on Project.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

a. Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer[**unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project**].

4. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.14 LIQUID FLOOR TREATMENT APPLICATION

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
2. Do not apply to concrete that is less than seven days' old.
3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.15 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s). Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.16 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete. Limit cut depth to 3/4 inch. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar matches surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
2. After concrete has cured at least 14 days, correct high areas by grinding.
3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

7. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.17 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel reinforcement placement.
2. Steel reinforcement welding.
3. Headed bolts and studs, embedded plates, and deformed bar anchors.
4. Reinforcing steel welding.
5. Verification of use of required design mixture.
6. Continuous inspection of concrete placement, including conveying and depositing, for proper application techniques.
7. Maintenance of specified curing procedures and temperature.
8. Verification of concrete strength before removal of shores and forms from beams and slabs.
9. Formwork for shape, location, and dimensions of the concrete member being formed.
10. Floor and slab flatness and levelness.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172/C 172M shall be performed according to the following requirements:

1. Testing Frequency: Obtain one composite sample for:
   a. Each day's pour of each concrete mixture, but not less than
   b. Once for each 150 cu.yd.
   c. Once for each 5000 sq. ft. of slab or wall surface area.

   d. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C 231/C 231M, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.
5. Unit Weight: ASTM C 567/C 567M, fresh unit weight of structural lightweight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
6. Compression Test Specimens: ASTM C 31/C 31M.

    a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.

7. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.

    a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
    c. Additional tests at ages other than those specified above can be made by the Contractor, at the Contractor’s expense, to determine early strengths.

8. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
9. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
10. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
12. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness according to ASTM E 1155 (ASTM E 1155M) within 48 hours of finishing.

3.18 PROTECTION OF LIQUID FLOOR TREATMENTS

A. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION 033000

SECTION 033500

CONCRETE FINISHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Finishing existing interior concrete slab at existing Entry Vestibule.
2. Finishing exterior concrete landings, stairs, and ramps.
3. Finishing exterior concrete pathways
4. Floor sealer/hardener.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 033000 - Cast-in-Place Concrete.
3. Section 033536 - Polished Concrete Finishing.
4. Section 040344 - Cleaning of Masonry.
5. Civil Drawings and Specifications.
6. Structural Drawings and Specifications.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: Descriptive data for sealer/hardener.

1.3 QUALITY ASSURANCE

A. Mockup:
1. Construct mockup of each finish on previously placed concrete.
2. Size: 4 x 4 feet.
3. Show steel trowel finish and sealer. Final selection of sheen will be made from mockup.
4. Locate where directed.
5. Approved mockup may remain as part of the Work.

PART 2 PRODUCTS

2.1 MATERIALS

A. Concrete Materials: Refer to Structural Drawings and Specifications.

B. Floor Sealer:
1. Type: Colorless, penetrating sealer produced specifically for sealing and hardening concrete surfaces.
2. Product: Lapidolith by Degussa Building Systems or approved substitute.

2.2 CONCRETE MIX

A. Mix concrete in accordance with Structural Drawings and Specifications.

PART 3 EXECUTION

3.1 FINISHING INTERIOR FLOOR SURFACES

A. Place, finish, and cure concrete under provisions of Structural Drawings and Specifications.

B. Place concrete continuously between predetermined expansion and control joints. Do not interrupt successive placement such that cold joints occur.

C. Finish concrete floor surfaces in accordance with ACI 301 and ACI 302.1.

D. Steel trowel and fine broom finish surfaces to receive tile.

E. Polish exposed concrete where scheduled per Section 033536.

F. Seal all interior concrete floor surfaces that do not receive polished finish.

G. Steel trowel surfaces to be exposed where scheduled. Apply sealer/hardener in accordance with manufacturer's instructions. Burnish to smooth, even finish.

H. Tolerances:
   1. Maximum variation of surface flatness: 1/4 inch in 10 feet.
   2. Correct defects by grinding or removal and replacement of defective work. Re-measure corrected areas by same process.

I. Maintain concrete with minimal moisture loss at relatively constant temperature for a period necessary for hydration of cement and concrete hardening.

3.2 FINISHING EXISTING INTERIOR FLOOR SURFACES

A. Clean existing concrete per Section 040344.

B. Finish existing interior concrete porch with muriatic acid wash.

C. Seal concrete.

3.3 EXTERIOR SURFACES

A. Finish concrete surfaces in accordance with ACI 301.

B. Steel trowel and sandblast surfaces where scheduled:
   1. Finish exterior slabs, landings, stairs, and ramps with heavy sand blast finish.
   2. Finish exterior concrete pathways with light sandblast finish.

C. Sand Blast Finish:
   1. Blasting Operations and Requirements:
      a. Apply sandblasted finish to exposed concrete surfaces where indicated.
      b. Perform sand blasting at least 72 hours after placement of concrete. Coordinate with formwork construction, concrete placement schedule, and formwork removal to ensure that surfaces to be blast finished are blasted at the same age for uniform results.
      c. Determine type of nozzle, nozzle pressure, and blasting techniques required to match the Engineer's control samples.
      d. Abrasive blast corners and edge of patterns carefully, using back-up boards, to maintain uniform corner or edge line.
   2. Depths of Cut: Use an abrasive grit of proper type and gradation to expose aggregate and surrounding matrix surface to match the Engineer's control samples as follows:
      a. Brush Sand Blast Finish: Remove cement matrix to expose face of fine aggregate; no reveal.
      b. Light Sand Blast Finish: Expose fine aggregate with occasional exposure of coarse aggregate; maximum 1/16-inch reveal.

c. Medium Sand Blast Finish: Generally expose coarse aggregate; 3/16-inch to 1/4inch reveal.

3. Surface Continuity: Perform sand blast finishing in as continuous an operation as possible, utilizing the same work crew to maintain continuity of finish on each surface or area of work. Maintain patterns of variances in depths of cuts as indicated.
4. Construction Joints: Use technique acceptable to the Engineer to achieve uniform treatment of construction joints.
5. Protection and Repair:
   a. Protect adjacent materials and finishes from dust, dirt, and other surface or physical damage during abrasive blast finishing operations. Provide protection as required and remove from site at completion of the work.
   b. Repair or replace other work damaged by finishing operations.
6. Clean-up: Maintain control of concrete chips, dust, and debris in each area of the work. Clean up and remove such material at the completion of each day of operation. Prevent migration of airborne materials by use of tarpaulins, wind breaks, and similar containing devices.

D. Tolerances:
1. Maximum variation of surface flatness: 1/4 inch in 10 feet.
2. Correct defects by grinding or removal and replacement of defective work. Re-measure corrected areas by same process.

END OF SECTION

SECTION 033543

POLISHED CONCRETE FINISHING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Polished concrete finishing.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 033500 - Concrete Finishing.
   3. Structural Drawings and Specifications.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data: Manufacturer’s descriptive data and application instructions for concrete treatment products.

B. Quality Control Submittals:
   1. Applicator qualifications, including list of previous projects and certification issued by flooring system manufacturer.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Minimum 2 years documented experience in work of this Section.
   2. Certified by concrete treatment manufacturer.
   3. Certified by Concrete Polishing Council of ASCC.

B. Concrete:
   1. Mix Design: Free from admixtures and additives not specifically approved by concrete surface treatment manufacturer.
   2. Curing compound acceptable to concrete treatment manufacturer.

C. Mockup:
   1. Size: Minimum 25 square feet.
   2. Show polished finish.
   3. Locate where directed.
   4. Approved mockup may remain as part of the Work.

D. Pre-Installation Conference:
   1. Convene 2 weeks prior to beginning work of this section.
   2. Attendance: Owner, Architect, Contractor, and Subcontractor.
   3. Review and discuss:
      a. Staging and sequencing.
      b. Protection of completed work.

E. Coefficient of Friction: Minimum 0.43, tested to ANSI/NFSI B101.3 after polishing.

1.4 PROJECT CONDITIONS

A. Protect concrete surfaces scheduled to receive polished finish prior to finishing; prevent damage and staining:
   1. Prohibit vehicular traffic on surfaces to be polished.
   2. Prohibit pipe cutting operations on surfaces to be polished.
   3. Prohibit storage on surfaces to be polished for minimum 28 days after concrete placement.

4. Prohibit ferrous metals storage on surfaces to be polished.
5. Prevent liquid drippings from equipment on surfaces to be polished.
6. Prevent acids and acidic detergents from contacting surfaces to be polished.
7. Prevent painting over surfaces to be polished.

B. Apply concrete treatment when ambient and surface temperatures are between 35 and 90 degrees F.

C. Close areas to traffic during finishing and for minimum time period after finishing as recommended by concrete treatment manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Advanced Floor Products. (www.retroplatesystem.com)
2. Ameripolish. (www.ameripolish.com)
3. Sika. (www.sika.com)
4. Floor Seal Technology, Inc. (www.floorseal.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Dye: Translucent, water based, color to be selected by Architect from mockups.

B. Densifier: Odorless, non-hazardous, silicate that penetrates concrete to react with free lime and calcium hydroxide to produce permanent chemical reaction that hardens and densifies concrete surface.

C. Sealer: Non-film forming, stain resistant, food resistant, chemical stain resistant, impregnating sealant designed for use on concrete surfaces previously dyed and densified.

2.3 ACCESSORIES

A. Cleaning Products: Non-corrosive, neutral pH, of type recommended by concrete treatment manufacturer.

B. Patching Compound: 40 percent Portland cement, 45 percent limestone, and 15 percent vinyl acetate copolymer, mixed with dust salvaged from grinding process to form paste.

C. Grout: Clear modified silicate sealant, free from latexes, mixed with dust salvaged from grinding process to form paste that reacts with calcium hydroxide in concrete.

2.4 EQUIPMENT

A. Field Grinding and Polishing Equipment:
1. Variable speed, multiple head, counter-rotating, walk-behind machine with minimum 600 pounds of down pressure on grinding or diamond polishing pads.
2. If dry grinding, honing, or polishing, use dust extraction equipment with flow rate suitable for dust generated, with squeegee attachments.

B. Edge Grinding and Polishing Equipment: Hand-held or walk-behind machines producing same results as field grinding and polishing equipment without noticeable differences.

C. Burnishing Equipment: High speed walk-behind or ride-on machines capable of generating 1000 to 2000 revolutions per minute and with minimum head pressure of 20 pounds.

D. Metal Bonded Pads: Grinding pads with embedded industrial grade diamonds of varying grits.

E. Resin Bonded Pads: Polishing pads with embedded industrial grade diamonds of varying grits.

F. Burnishing Pads: Maintenance pads for use with high speed burnishing equipment.

PART 3 EXECUTION

3.1 PREPARATION

A. Testing Concrete Floors:
   1. Alkalinity:
      a. Test method: Measure pH according to ASTM F710.
      b. Acceptable results: pH between 8 and 10.
   2. Moisture Vapor Transmission:
      a. Test method: Perform anhydrous calcium chloride test to ASTM F1869.
      b. Acceptable results: Maximum 5 pounds per 1000 square feet in 24 hours.
   3. Relative humidity:
      a. Test method: Perform relative humidity test using in situ probes to ASTM F2170.
      b. Acceptable results: Maximum 75 percent.

3.2 POLISHING

A. Initial Grinding:
   1. Use grinding equipment with metal bonded grinding pads.
   2. Begin grinding in one direction using sufficient size grit pad.
   3. Make sequential passes with each pass perpendicular to previous pass using finer grit pad with each pass, up to 150 grit.
   4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
   5. Vacuum floor using squeegee vacuum attachment after each pass.
   6. Continue grinding until aggregate exposure matches approved mockup.

B. Treating Surface Imperfections:
   1. Mix patching compound and grout material with dust created by grinding operations to match color of adjacent concrete surface.
   2. Fill surface imperfections. Work compound and treatment until color differences between concrete surface and filled surface imperfections are not noticeable when viewed from 10 feet away under lighting conditions that will be present after construction.
   3. Honing:
      a. Use grinding equipment with resin bonded grinding pads.
      b. Grind concrete in one direction starting with 50 grit pad; make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 200 grit pad reaching maximum refinement with each pass before proceeding to finer grit pads.
      c. Auto scrub or vacuum floor using squeegee vacuum attachment after each pass.

C. Dye Application: Apply dye per manufacturer’s instructions and as required to match mockup.

D. Liquid Densifier Application: Apply undiluted solution to point of rejection, remove excess liquid, and allow to cure according to manufacturers instructions.

E. Grout Grinding:
   1. Use grinding equipment and appropriate grit grinding pads.
   2. While applying fresh grout material prior to surface, grind concrete in direction perpendicular to initial grinding to remove scratches.
   3. Vacuum floor using squeegee vacuum attachment after each pass.

F. Honing:
   1. Use grinding equipment with resin bonded grinding pads.
   2. Grind concrete in one direction starting with 50 grit pad; make as many sequential passes as required to remove scratches, each pass perpendicular to previous pass, up to 400 grit pad reaching maximum refinement with each pass before proceeding to finer grit pads.

3. Auto scrub or vacuum floor using squeegee vacuum attachment after each pass.

G. Polishing:
1. Use polishing equipment with resin bonded polishing and burnishing pads.
2. Begin polishing in one direction starting with 800 grit pad.
3. Make sequential passes with each pass perpendicular to previous pass using finer grit pad with each pass.
4. Achieve maximum refinement with each pass before proceeding to finer grit pads.
5. Auto scrub or vacuum floor using squeegee vacuum attachment after each pass.
6. Continue polishing until gloss appearance, as measured according to ASTM E430, matches approved mockup.

H. Final Polished Concrete Floor Finish: Class B - Fine Aggregate Finish: Remove maximum 1/16 inch of concrete surface by grinding and polishing resulting in majority of exposure displaying 85 – 95 % Fine Aggregate and 5 – 15 % Blend of Cement Fines and Coarse Aggregate; salt and pepper finish.

I. Final Concrete Floor Gloss: Level 2 - Satin (Honed) Gloss Appearance:
1. Procedure: Minimum five step process with full refinement of each diamond pad up to 400 grit resin bonded pad with one application of densifier.
2. Gloss reading: Distinctness-of-Image (DOI) Gloss Image Clarity Value 10 – 39 percent tested to ASTM D5767 and Haze Index less than 10 tested to ASTM D4039.

3.3 SEALING

A. Apply sealer to manufacturer’s recommend coverage.

B. Remove excessive sealer.

C. Using burnishing equipment and finest grit burnishing pads, burnish to uniform sheen matching approved mockup.

3.4 FIELD QUALITY CONTROL

A. Measure slip resistance using BOT-3000 slip-tester; ensure compliance with specified slip resistance rating.

3.5 PROTECTION

A. Close areas to traffic until concrete treatment has cured.

B. Protect completed work with nonstaining sheet coverings.

END OF SECTION

SECTION 040341

RESTORATION MORTAR

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Analysis of existing mortar.
2. Mortar materials.
3. Mortar mixes.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 040342 - Masonry Restoration.

1.2 SUBMITTALS

A. Submittals for Review:
1. Samples: Samples: 1/2 x 1/2 x 3 inch samples of proposed mortar. Two (2) samples for each color required. Samples will be compared to original unweathered samples to determine acceptability of match.
2. Submit proposed means and methods for review.

B. Quality Control Submittals:
1. Test Reports: Existing mortar analysis.

1.3 QUALITY ASSURANCE

A. Restorer Qualifications:
1. Minimum 3 years documented experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 5 years.

B. Preconstruction Testing Laboratory Services:
1. Remove minimum of 4 unweathered, undisturbed, full depth mortar samples from each original masonry system.
a. Select samples from different locations representative of various existing conditions.
b. Size: 6 inches wide, full depth.
c. Include all types of mortar present in each location.
2. Retain one sample from each original mortar system for later comparison with proposed mortar mixes.
3. Test mortar in accordance with ASTM C1324; report the following:
a. Volumetric proportions of aggregate, cement, lime, and other ingredients.
b. Type, composition, color, and gradation of aggregate.
c. Presence of pigments or additives.
4. Based on test results, provide recommended mortar mix for each masonry system in accordance with ASTM C270, compatible with physical and mechanical properties of original masonry materials.

C. Mockup:
1. Size: 4 feet high x 4 feet wide.
2. Show: Mortar joint profile and color, based on approved sample.
3. Locate where directed.
4. Approved mockup may remain as part of the Work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Protect materials from moisture absorption and damage; reject damaged containers.

B. Store sand to prevent inclusion of foreign matter.

1.5 PROJECT CONDITIONS

A. Do not apply materials during inclement or freezing weather, or if such conditions are anticipated within material curing period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Premixed Mortar:
1. Cathedral Stone Products. (www.cathedralstone.com)
2. U.S. Heritage Group, Inc. (www.usheritage.com)

B. Acceptable Manufacturers - Colorants:
1. Davis Colors. (www.daviscolors.com)
2. Solomon Colors. (www.solomoncolors.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Portland Cement:
1. Type: ASTM C150, Type I, containing maximum 0.60 percent alkali (sodium oxide) and maximum 0.15 percent water soluble alkali by weight.
2. Color: Use gray, nonstaining white, or combination thereof as required to match existing mortar.

B. Lime: ASTM C207, Type S, hydrated masonry type.

C. Sand: ASTM C144; color, size, and type to match existing mortar.

D. Water: Potable, clean, and free from deleterious amounts of acids, alkalis, and organic matter.

E. Colorant: Chemically pure mineral oxides, alkali proof and light fast.

F. Other Components: As determined by existing mortar analysis to produce visual and performance characteristics to match existing mortar.

G. Air Entraining, Antifreeze, Bonding, and Other Additives: Not permitted.

H. Premixed Mortar:
1. Premixed restoration mortar may be used in lieu of site mixed restoration mortar if requirements of Contract Document are met.
2. Provide custom engineered factory-blended pointing and bedding mortar designed to match the performance and visual characteristics of the original mortar.

2.3 MIXES

A. Proportions: As determined by existing mortar analysis.

B. Ultimate Compressive Strength: Not to exceed that of existing mortar or masonry.

C. Portland cement may be substituted for up to 20 percent of lime in mix.

2.4 MIXING

A. Thoroughly mix ingredients in quantities needed for immediate use.

B. Mix dry ingredients mechanically until uniformly distributed; add water to achieve workable consistency.

C. Discard lumpy, caked, frozen, and hardened mixes, and mixes not used within 2 hours after initial mixing.

D. Use mortar within 2-1/2 hours after initial mixing at ambient temperatures below 80 degrees F and within 1-1/2 hours after initial mixing at ambient temperatures over 80 degrees F.

E. Do not add antifreeze compounds to lower freezing temperature of mortar.

F. Provide consistent color for exposed mortar.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Follow requirements specified in referenced sections.

END OF SECTION

SECTION 040342

MASONRY RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Masonry repair and reconstruction at new or modified masonry openings.
2. Infilling existing masonry openings.
3. Selective repointing of mortar joints.
4. Repairs to and replacement of cement parging at window sills, door openings, and crawlspace vent sills.
5. Limited exterior repairs to stone masonry at removal elements:
    a. Stone Dutchman repair.
    b. Patching holes or minor damage in stone masonry at removed conduit, equipment, signage, and downspouts.
    c. Removal of fasteners including embedded anchors

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 03 30 00 – Cast-In-Place Concrete for concrete patching and repairs
3. Section 04 03 44 – Cleaning of Masonry
4. Section 04 03 41 – Restoration Mortar

5.Allowances

6.Unit Prices

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. C 97 - Absorption and Bulk Specific Gravity of Dimension Stone.
2. C 170 - Compressive Strength of Natural Building Stone.
3. C 295 - Petrographic Examination of Aggregates for Concrete.
4. ASTM C91-01: Standard ASTM C144-03: Standard Specification for Aggregate for Masonry.
5. ASTM C150-02ae1: Standard Specification for Portland Cement.
6. ASTM C207-97: Standard Specification for Hydrated Lime for Masonry Purposes.
7. ASTM C270-03: Standard Specification for Mortar for Unit Masonry.

B. IMIAC (International Masonry Industry All-Weather Council) - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

1.3 DEFINITIONS AND GOALS

A. Defective/Deteriorated Joint: Joints in which mortar is missing, loose, eroded, cracked, powdered, unsound, or weathered more than 1/8 inch from original plane.

B. Dutchman: The removal of areas of unsound stone from a single unit and the installation of a piece of the same stone, cut, carved and tooled to match.

C. Patching: The goal of patching is to remove areas of deteriorated stone from individual units and recreate missing lines, forms and shapes with a compatible material that has the color and texture of the original stone.

D. Re-pointing: The process of raking out (removing) mortar and replacing it with new mortar.

1.4 SUBMITTALS

A. Product Data: Submit manufacturer's technical data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with specified requirements. Submit Material Safety Data Sheets for each product proposed for use.

B. Samples: Submit, for verification purposes, prior to mock-up erection, three samples each of the following:

1. Each type of cementitious patching material, applied to a 12 inch by 12 inch plywood panel,
2. Samples of each stone type showing full color and texture range.
3. Remove two samples of existing mortar from different unweathered locations; submit for comparison to new mortar samples..

C. Qualification Statement: Restorer qualifications, including previous projects.

1.5 QUALITY ASSURANCE

A. Restoration Specialist:

1. Work of this Section must be performed by an experienced stone restoration firm that has completed work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance, having not less than 5 years comparable experience.
2. Field Supervision: Restoration specialist firm shall maintain an experienced full-time supervisor on the Project site during times that masonry restoration work is in progress.

B. Field-Constructed Mock-ups: Contractor shall prepare the following sample panels on the building where directed by the Architect. Obtain Architect's acceptance of visual qualities before proceeding with the work. Retain accepted panels in undisturbed condition as a standard for judging completed work.

1. Stone patching demonstrating removal of damaged limestone and installation and curing of specified patching mortar.
2. Re-pointing: Prepare two separate samples in-situ of two repair areas for each type of re-pointing required. One for demonstrating methods and quality of workmanship expected in removal of mortar from joints and the other for demonstrating visual qualities of pointing mortar and workmanship expected in pointing mortar joints.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Hot weather requirements: If ambient temperature is over 95 degrees F or relative humidity is less than 50 percent, protect from direct sun and wind exposure for minimum 48 hours after installation.

B. Cold weather requirements:

1. In accordance with IMIAC requirements.
2. Do not use frozen materials or build upon frozen work.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver masonry restoration materials to site in manufacturer's original and unopened containers and packaging, bearing labels as to type and names of products and manufacturer's.

B. Protect masonry restoration materials during storage and construction from wetting by rain, snow or ground water, and from staining or intermixture with earth or other types of materials.

C. Comply with manufacturer's recommendations for minimum and maximum temperature requirements for storage.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Patching Compound, Bonding Agents, and Epoxies:

1. Cathedral Stone Products.
2. Edison Coatings, Inc.

2.2 REPLACEMENT STONE AND STONE FOR DUTCHMAN REPAIR

A. General: Limestone Building Stone Standard: ASTM C568, Classification: III (High-Density).

B. Description: Provide natural Texas limestone from a single quarry with low clay content and with minimum average compressive strength parallel when load is applied to bedding plane: 2500 psi when tested in accordance with ASTM C110.

1. Type: Cordova Cream Limestone to match original in color and texture, as distributed by Texas Quarries, Cedar Park, TX, 512-258-1474.
2. Type: Texas Nicotine Limestone, sawn and chopped, random polygonal/ mosaic pattern. Final stone type to be determined with sample matching.

C. Grout for Dutchman Seams: Jahn M-40 Crack and Void Injection Grout, as manufactured by Cathedral Stone Products, Inc., Hanover MD, (800) 684-0901.

D. Anchor Setting Mortar: Single component, cementitious, non-shrink mortar for securing anchors in new or existing masonry structures.

1. Product: Jahn M-80 Anchor Setting Mortar, as manufactured by Cathedral Stone Products Inc., Hanover, MD, (800) 684-0901.

2.3 STONE PATCHING MATERIALS

A. Cementitious Patching Materials: Premixed cementitious patching material formulated to match the color and texture of the existing masonry. One-component, non-sag, mineral-based mortar, containing no synthetic polymers or additives for repair and reconstruction of natural stone surfaces. The mortar must be vapor permeable, frost and salt resistant, shrink resistant, and be physically compatible with the substrate, including, but not limited to porosity, tensile and compressive strength.

1. Product: Jahn M70 Stone Patching Mortar, as manufactured by Cathedral Stone Products, Inc., Jessup, Maryland, or approved substitute.
   a. Provide custom color as required to match the existing limestone.

B. Stain for patching mortar (if necessary):

1. General: Inorganic, breathable, color fast, mineral stain compatible with cementitious patching material specified.
   a. Silin Lasur Mineral Stain for Masonry, as manufactured by Cathedral Stone Products, Inc., Hanover, MD, (800) 684-0901.
   b. Epochrome S water-borne chemical toners for tinting unmatched mortar repairs, as manufactured by Cathedral Stone Products, Inc., Hanover, MD, (800) 684-0901.

2.4 CEMENT PARGING MATERIALS

A. Portland cement: ASTM C 150, Type I or II white or gray cement, containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Sand: Clean, sharp sand, ASTM C 144, free of excessive organic or deleterious matter.

C. Water: Clean, free of oils, acids, alkalis, salts and organic matter.

D. Mix shall be two-parts Portland Cement to three-parts sand.

2.5 MASONRY ACCESSORIES

A. Anchors:

1. Stainless Steel Threaded Rod, ASTM A 666, AISI Type 304, minimum 3/8-inch diameter.
2. Stainless Steel L-Anchor with Two Holes, ASTM A 666, AISI Type 304, minimum 1/8-inch thick, no. 341, as manufactured by Heckmann Building Products Inc., 800-621-4140.
3. Stainless Steel Spring Loaded Dowel, ASTM A 666, AISI Type 304, minimum 3/8-inch diameter, no. 355, as manufactured by Heckmann Building Products Inc., 800-621-4140.
4. Stainless Steel Screw on Split Bend Anchor, 666, AISI Type 304, minimum 1/8-inch thick, no. 274, as manufactured by Heckmann Building Products Inc., 800-621-4140.

B. Anchor Setting Mortar: Single component, cementitious, non-shrink mortar for securing anchors in new or existing masonry structures.

1. Product: Jahn M80 Anchor Setting Mortar, as manufactures by Cathedral Stone Products, Inc., Jessup, Maryland.

C. Retrofit Veneer Anchors: Helical retrofit anchor, 22-GA minimum Type 304 stainless steel.

D. Wall Ties: Corrugated stainless steel, 16 gauge by 1” wide, as manufactured by Hohmann & Barnard or approved substitute.

E. Bonding Agent: Two component modified epoxy resin.

F. Adhesive Anchoring System for anchoring through masonry construction with the quality of stone and mortar is inconsistent, use HIT HY20.

PART 3 - EXECUTION

3.1 SURFACE CONDITIONS

A. Inspection

1. Prior to work of this Section, carefully inspect the work of all other trades and verify that all such work is completed to the point where this installation may properly commence.
2. Verify that masonry may be completed in accordance with all pertinent codes and regulations, the referenced standards, and the original design.
3. Do not start work until mock-ups are accepted by the Architect.

B. In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been fully resolved.

3.2 STONE REMOVAL AND REPLACEMENT

A. At locations indicated, remove veneer stone. Carefully demolish or remove entire unit from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size unit.

B. Support and protect remaining stonework that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition.

C. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose masonry units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

D. Remove in an undamaged condition as many whole stone units as possible.

1. Remove mortar, loose particles, and soil from stone by cleaning with hand chisels, brushes, and water.
2. Remove sealants by cutting close to stone with utility knife and cleaning with solvents.
3. Store stone for reuse, as indicated.

E. Clean stone surrounding removal areas by removing mortar, dust, and loose particles in preparation for replacement.

F. Replace removed stone with new stone matching existing stone, including size. Butter vertical joints for full width before setting and set units in full bed of mortar, unless otherwise indicated. Replace existing anchors with new anchors of size and type indicated.

1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing stonework.
2. Rake out mortar used for laying stone before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing stone, and at same time as repointing of surrounding area where deteriorated.

G. Contractor is responsible for repair or replacement of stone that is damaged during removal where the stone is indicated to be salvaged for re-use.

3.3 STONE PATCHING

A. Surface Preparation for Installation of Repair Mortar:

1. Using methods approved via submittals, remove loose mortar, patches, and damaged unsound masonry to sound and solid substrate. Remove sealant residue.
2. Anchors that are free of rust, solidly embedded, and do not project beyond the surface of the masonry unit may remain. All others should be removed.
3. Cut the edges of the repair area to provide a minimum depth of ¼". The edges of the repair should be square cut. Do not allow any feathered edged in the repair area.

B. Mixing, Application, and Curing of Repair Mortar:

1. Mixing:
   a. General: Mix patching mortar in accordance with manufacturer's printed instructions.
   b. Do not mix more material than can be used within 30 minutes. Discard any material that has been mixed for 30 minutes or more.
   c. Mixing ratios:
      (1) Limestone: Jahn M70; Approximately 5 parts dry material to 1 part water.
   d. Add water to dry ingredients and mix well. Adjust amount of water according to the weather and the porosity of the substrate.
2. Application:
   a. Apply the mortar mix using a trowel in a series of 1-inch lifts allowing mortar to dry approximately 10-20 minutes between lifts. If applied in layers, scrape off any cement skin that has formed and continue application. Dampen the surface before applying the next layer. Work mortar firmly into the surface of the masonry, including the corners, and under and around all mechanical anchors.
   b. Build up patching material so that it is slightly above adjacent masonry surface. Allow 15 to 30 minutes to set slightly (Wait time will vary with temperature and humidity-longer in cool weather), then scrape off excess material using a brush until the desired profile is

reached. Do not press down or “float” the repair. Where patches occur at panel edges or corners, form mortar to match the profile of the surrounding masonry. In all cases, finish so that it is as indistinguishable as possible from the adjacent masonry.

3. Curing:
   a. Lightly mist patch with water to wet the entire surface of the finished patch approximately 30 minutes to 1 hour after completion on hot sunny days and approximately 2 hours or longer, on cool or cloudy days. Time will vary with temperature and humidity. Mist several times a day on the three days following the repair installation.

C. Finishing:

1. Upon initial cure, and in accordance with the manufacturer’s printed instructions, patch shall be finished to match the existing adjacent masonry.
2. Clean any mortar residue form area surrounding the patch by sponging as many times as necessary with clean water. This should be done before patching material sets.
3. After the repair has been cured and allowed to dry for at least one week, if the appearance of a repair does not meet the specifications of the job, the surface color of the repair is to be enhanced by applying a vapor permeable, mineral based pigmented stain.
   a. Remove dust and loose particulate matter from surfaces to receive coatings immediately prior to coating application.
   b. Protect all non-masonry surfaces such as glass, wood, metal, etc….
   c. Cracks and spalls must be repaired and cured prior to coating application.
   d. Apply specified coating to vertical surfaces only.
   e. Substrate must be completely dry before coating. Do not work when precipitation is expected within 48 hours of installation. The coating needs adequate time to bond to the substrate; Moisture disrupts the curing process.

D. Mixing Coating System:

1. It is recommended that proper eye protection be worn during mixing in case of accidental splashing. Mix component A (colored paint) with component B (Silin AZ Fixative) in the desired proportions (see chart below) before installation.
2. Mixing ratios will depend on the desired coating effect and the substrate surface.
   a. Transparent finish:
      (1) Parts of colored coating: 1
      (2) Parts of Silin AZ Fixative: 3-100+
   b. Refer to manufacturers data sheets for more detail on transparent finishes.

E. Adjustment and Cleaning:

1. Remove and replace all unsatisfactory patches, at no additional cost to the Owner. Conditions deemed unacceptable include, but are not limited to:
   a. Separation or shrinkage at the edge of a patch,
   b. Separation of the patch from the substrate,
   c. Surface crazing or cracking,
   d. “Burned” surfaces (from overly quick drying),
   e. Discoloration, or mis-matched color (compared to existing adjacent stone), and
   f. Mis-matched surface quality and finish (compared to existing adjacent stone).
2. Repair adjacent surfaces or other elements that have been marred or otherwise damaged during the work of this Section.
3. Remove uncured mortar from the perimeter of the repair before it dries using clean water and a rubber sponge. Repeat several times with clean water to prevent a halo effect. Cured mortar may only be removed chemically or mechanically.
   a. Should removal of cured mortar be necessary, Contractor shall submit proposed method of removal and obtain Architect’s approval prior to removal.

4. Once masonry patching work is complete, remove all unused materials, containers and equipment from the site, and dispose of all related debris.

3.4 STONE DUTCHMAN INSTALLATION

A. Inspection: Prior to cutting out for the installation of new stone dutchman, the Contractor shall verify all locations and dimensions of stone to be removed by inspecting those areas indicated on the Contract Documents as requiring dutchmen. The Contractor shall submit shop drawings indicating the location, sizes, and anchoring detail of each dutchman unit. Obtain Architect's approval for locations, sizes and anchor details prior to cutting out stone. The Contractor shall notify the Architect in writing if conditions in the field differ from those indicated on the Contract Documents or stone shop drawings.

B. Carefully cut out by hand, for installation of dutchman stone scheduled for removal. Cutting out of stone shall be in the locations indicated on the approved shop drawings. Cut out without damaging surrounding masonry to remain. Where anchors are encounter at cut outs for dutchman, provide new anchor in same side of existing stone. Where rectangular dutchman are specified, cut sides of stone reveals flat with 90 degree corners. Where dutchman is specified to fit area of missing stone cut sides flat and angled to tightly and consistently fit with angle of missing stone.

C. Remove mortar, loose particles, old patches and debris from existing surrounding masonry in preparation for replacement. Clean with stiff brushes or by flushing with water.

D. Stone Installation:

1. General: Dutchmen shall be installed level, plumb, square and true within the allowable tolerances. The units are to be positioned in such a manner that no dimensional error is allowed to occur. Horizontal and vertical seams shall be correctly aligned and of uniform width. Complete joint tooling after stone dutchman units have been installed.
2. Set dutchman with specified adhesive in the position to which it is assigned in accordance with the approved setting drawings.
3. Drill new holes into the new stone and into the existing masonry. The drilled holes shall be cleaned with stiff nylon or natural bristle brushes or by flushing with water.
4. The stainless steel threaded rod shall be cleaned and degreased as necessary to remove all contaminants, which may hinder the adhesive bond.
5. All surfaces that are in contact with adhesive must be free of dirt, dust, paint, glaze, grease, oil, rust, or other contaminant. Surface may be dry or damp (no free water). The adhesive shall come in contact with clean sound surfaces.
6. Grout face of dutchman seams with specified grout colored to match the adjacent stone.

3.5 ROUTING AND REPOINTING MORTAR JOINTS

A. Rake out and repoint mortar joints to the following extent:

1. All joints in areas indicated.
2. Joints where mortar is missing or where they contain holes.
3. Cracked joints, where mortar has separated from unit masonry.
4. Joints where they are worn back ¼-inch or more from surface of unit masonry.
5. Joints where they sound hollow when tapped by metal object.
6. Joints where they are deteriorated to point that mortar can be easily removed by hand.
7. Joints, other than those indicated as sealant-filled joints, where they have been filled with substances other than mortar

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows:

1. Remove mortar from joints to depth equal to 2-1/2 times joint width, but not less than 1/2 inch depth at which sound mortar is reached.
2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to exposed masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
    a. Cut out mortar by hand with chisel and mallet. Do not use power-operated grinders without Architect's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging masonry units. Quality-control program shall include provisions for supervising performance and preventing damage due to worker fatigue.
    b. Cut out center of mortar joints using angle grinders with diamond-impregnated metal blades. Do not use grinder on vertical head joints. Remove remaining mortar by hand with chisel and mallet. Strictly adhere to written quality-control program. Quality-control program shall include provisions for demonstrating ability of operators to use tools without damaging masonry, supervising performance, and preventing damage due to worker fatigue.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

E. Allow for one mortar colors at limestone material.

F. Point joints as follows:

1. Rinse masonry-joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen masonry-joint surfaces before pointing.
2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 3/8 inch until a uniform depth is formed. Fully compact layer thoroughly and allow it to become thumbprint hard before applying next layer.
3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 3/8 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry has worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar over edges onto exposed masonry surfaces or to featheredge mortar.
4. When mortar is thumbprint hard, tool joints to match original appearance of joints. Remove excess mortar from edge of joint by brushing.
    a. Original stone mortar joints: "V" profile.
    b. Below grade masonry or masonry not exposed to view: Flush joint.

G. Cure mortar by maintaining in thoroughly damp condition for at least 72 hours, including weekends and holidays.

1. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
2. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
3. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.6 ADJUST AND CLEAN

A. After mortar has hardened but before it has fully cured, thoroughly clean masonry surfaces of excess mortar using stiff nylon or natural bristle brushes and clean water; do not use metal brushes or scrapers.

B. Any masonry work that does not result in a consistent appearance with adjacent stonework shall be considered defective and shall be corrected by the Contractor at no additional cost to the Owner.

3.7 FIELD QUALITY CONTROL

A. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives use of scaffolding, as needed, to observe progress and quality of portion of the Work completed.

B. Notify Architect's Project representatives two weeks in advance of times when lift devices and scaffolding are scheduled to be relocated. Do not relocate lift devices and scaffolding until Architect's Project representatives have had reasonable opportunity to make inspections and observations of work areas at lift device or scaffold location and only when the completed work is accepted in writing by the Architect.

END OF SECTION

SECTION 040344

CLEANING OF MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Chemical cleaning of existing exterior stone masonry at the following locations:
   a. All limestone
   b. East concrete porch

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 04 03 41 – Restoration Mortar.
3. Section 04 03 42 - Masonry Restoration.
4. Section 07 92 00 – Joint Sealants.

1.2 DESCRIPTION OF WORK

A. Masonry cleaning shall be completed prior to masonry restoration and sealant work. After the masonry has been cleaned, it shall be protected from dirt and staining for the remainder of the project.

B. The goal of the work of this Section is to remove all stains, atmospheric dirt, biological staining, and other residue from all exposed masonry surfaces of the building scheduled for cleaning and to give the facade a clean, uniform appearance without blotches, streaks, runs or other kinds of spotty appearance. Any work that does not achieve this goal will be considered unsuccessful and will have to be re-cleaned until this goal is achieved, at no additional cost to the Owner.

1.3 REFERENCES

A. Preservation Brief 1: Assessing Cleaning and Water-Repellent Treatments for Historic Masonry Buildings, Robert C. Mack, FAIA, and Anne E. Grimmer. National Park Service, revised November, 2000.

1.4 DEFINITIONS

A. Pressure Spray:

1. Low-Pressure Spray: 100 to 400 psi; 4 to 6 gpm.
2. Medium-Pressure Spray: 400 to 800 psi; 4 to 6 gpm.
3. High-Pressure Spray: 800 to 1200 psi; 4 to 6 gpm.

B. Restoration: Process of bringing material back to its original appearance.

C. Etch: Action or effect of an acid-based compound on a surface.

1.5 SUBMITTALS

A. Product Data: Include product description, application procedures, precautions, and limitations in use of products.

B. Environmental Regulations:

1. Contractor is responsible for proper disposal of all waste and cleaning materials.

2. Submit, for Owner review, a letter of acceptance from local regulatory entities (such as Storm Sanitary Sewer Departments) indicating that procedure for disposal of cleaning effluent is compliant with relevant rules and regulations.

1.6 QUALITY ASSURANCE

A. Applicator:

1. Minimum 3 years documented experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 5 years.

B. Mockups:

1. Control Test Sample: Upon approval of product data and methods, prepare cleaning sample(s) approximately 10 square feet for each type of masonry and surface condition and for each type of cleaning product or water mist method proposed for use in locations approved by the Architect.
   a. Allow cleaning solutions to remain on surface for varying time periods in several locations to determine optimum time required.
   b. Perform multiple applications of varying concentrations of cleaning solutions to determine optimum concentration.
   c. Ensure that materials and procedures will not discolor or damage existing surfaces.
2. Allow a waiting period of not less than 7 days after completion of sample cleaning to permit a study of sample panels for negative reactions.

C. Miscellaneous

1. Methods of Application: Submit a written description of the full range of methods and procedures proposed for cleaning and stain removal including but not limited to: method of application, dilution of application, temperature of application, length of time of surface contact, method of rinsing surface (temperature, pressure, and duration), repetition of procedure, etc.
2. Methods of Protection: Submit a written description of proposed materials and methods of protection for preventing damage to any non-masonry surfaces in proximity to this work, including glass and metals. These methods and materials may include, but are not limited to, spray-on, peel-off type liquid materials and masking tape. Outline methods proposed to keep water from reaching the interior of the building.
3. If materials and methods other than those indicated are proposed for cleaning work, provide a written description, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.

1.7 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturer’s original sealed and labeled containers.

B. Store all materials in accordance with manufacturer’s recommendations and free from extremes of temperature.

1.8 PROJECT CONDITIONS

A. Clean stone surfaces only when air temperature is 50 deg F (10 deg C) and above and will remain so for at least 7 days after completion of cleaning.

B. Do not perform work when wind could carry materials to adjacent or underlying materials, or to adjacent property.

C. Perform all work of this Section in accordance with all Federal, State and local regulations regarding the transportation, storing, handling, application, removal and disposal of the products involved.

D. Protect workers and public from injury during this work. Provide all required temporary partitions, closures, guards, notices, and the like.

E. Protect the site and adjoining property, including vehicles, from damage that may result from this work. Trees and plants around the building shall be protected from contamination.

F. Take all measures required to ensure that the building remains completely watertight throughout the course of this work.

G. Repair damage to the building caused by penetration of water, or other factors resulting from failure to properly protect the building during work of this Section. Repairs shall be completed at no additional cost to the Owner, in a manner that fully restores all affected elements to their condition prior to damage.

PART 2 - PRODUCTS

2.1 GENERAL

A. Masonry cleaning materials used in this work shall be part of a system of products produced by one manufacturer, where possible, to ensure compatibility.

B. All materials shall be manufactured for the purpose in which they are proposed for use unless otherwise recommended by cleaning product manufacturer in writing, tested as indicated under Section 1.6.B Mock-ups, and approved by the Architect.

C. All chemical materials, compounds, liquids, etc. shall be safe and shall not violate state or federal environmental or safety regulations.

D. Injurious substances or any ingredients that independently or in combination with other compounds, fluids or solutions will damage masonry shall not be used. Methods or products causing abrasion or similar damage to the surface finish of the masonry shall not be used.

E. No sand, silica flour, or any other grit shall be used either singly or in combination with pressurized air, water or any other liquid.

2.2 CHEMICAL CLEANING SYSTEM FOR EXTERIOR LIMESTONE

A. Description: Begin with option 1 and progress to other options as required to achieve successful cleaning.

1. Liquid Cleaner, Option 1: Envio Klean ReVive biological soiling remover, as manufactured by PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255; Fax: (785) 830-9797.

2. Liquid Cleaner, Option 2: D/2 Biological Solutions as manufactured by D/2 Biological Solutions, Inc., Westport, MA 02790. Phone (917) 693-7441.

3. Liquid Cleaner, Option 3: Cleaning System
   a. Cleaning Product: EnviroKlean Reclaim Cleaner and Reclaim Activator, as manufactured by PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255.
   b. Neutralizer Product: SureKlean Limestone and Masonry Afterwash, as manufactured by PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255.

2.3 CLEAN MATERIALS AND EQUIPMENT

A. Water for Cleaning: Clean, potable, free of oils, acids, alkalis, salts, and organic matter.

1. Warm Water: Heat water to a temperature of 140 to 160 deg. F (60 to 71 deg. C).

B. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass and metal surfaces from damaging effects of acidic and alkaline masonry cleaners.

1. Products: Sure Klean Strippable Masking, as manufactured by PROSOCO, Inc., 3741 Greenway Circle, Lawrence, KS 66046. Phone: (800) 255-4255; Fax: (785) 830-9797.

C. Spray Equipment:

1. Provide equipment for controlled spray application of water and chemical cleaners, at rates indicated for pressure, measured at spray tip, and for volume. Adjust pressure and volume, as required, to ensure that damage to masonry does not result from cleaning methods.
   a. Pressure not to exceed 400 psi for limestone.
   b. For water spray application, provide a fan-shaped spray tip that disperses water at an angle of not less than 15 degrees.
   c. For heated water spray application, provide equipment capable of maintaining a temperature at flow rates indicated between 140 and 160 deg F (60 and 71 deg. C)
   d. For chemical cleaner spray application, provide low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with a con-shaped spray tip.

D. Brushes: Natural fiber bristle brushes (Nonmetallic).

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Comply with chemical cleaner manufacturer's written instructions for protecting building surfaces against damage from exposure to their products.

B. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from injury from masonry cleaning work.

1. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
2. Neutralize and collect alkaline and acid wastes. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

3.2 SEQUENCING OF WORK

A. Clean existing masonry surfaces using specified chemical cleaners to remove biological and atmospheric dirt.

B. Re-Clean difficult areas using specified chemical cleaners to remove staining if goal of cleaning work is not considered successful as determine by the Architect.

C. Selectively re-point deteriorated, cracked, and failing brick and stone masonry joints.

D. Replace and repair stone masonry.

E. Remove and replace existing sealant as specified in Section 07 92 00.

3.3 CLEANING MASONRY, GENERAL

A. Proceed with cleaning in an orderly manner, work from bottom to top and from one end of each elevation to the other.

B. Use only those cleaning methods indicated for each masonry material and location.

1. Use natural-fiber brushes only.
2. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.
   a. Equip units with pressure gages.

C. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

D. Chemical Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical cleaner manufacturer's written instructions.

1. Reapplying Chemical Cleaners: Do not apply chemical cleaners to same stone surfaces more than twice.

E. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting.

3.4 CHEMICAL CLEANING MASONRY

A. Remove dirt, hydrocarbons, grease, oil, environmental pollutants, biological growth, applied coatings, rust stains, and residues.

B. Sandblasting and the use of non-proprietary acids are prohibited.

C. Follow manufacturer's instructions and procedures established during preparation of mockups.

D. Working from bottom to top, prewet the surface with clean water, as recommended by Chemical Cleaning Manufacturer

E. Apply cleaning solution using synthetic roller, soft-bristled brush or spray applicator. Work into surface voids and irregularities.

F. Allow solution to stand on surfaces as recommended by Chemical Cleaning Manufacturer and as established by approved mock-ups. Do not allow to dry; reapply as necessary.

G. Gently scrub heavily soiled surfaces with medium hard bristle brush.

H. Working from bottom to top, rinse surfaces with medium pressure water. Hold nozzle perpendicular to surface; work at uniform rate and uniform distance from surface.

I. Continue rinsing until pH of washed stone is the same as pH of unwashed stone.

J. Repeat process if required until masonry is clean.

K. Do not damage existing surfaces. Leave surfaces uniform in appearance.

3.5 EXTERIOR MASONRY CLEANING – WATER MIST METHOD (OPTIONAL)

A. Fabricate, using non-ferrous materials, an armature and piping system that will allow a continuous and low pressure spray of surfaces to be cleaned. Install spray tips at intervals that are calculated to provide an even flow of water throughout the system.

B. Ensure that the building is completely watertight in all areas scheduled for this treatment. Fill all cracks and open joints, and correct other conditions that may allow for water penetration to interior surfaces of the facade or interior spaces of the building.

C. Apply a light water mist, for a maximum duration of two (2) hours, followed by a minimum drying time of one (1) hour. At the Contractor's option, an integral timer may be incorporated into the system, to accomplish this interval automatically.

D. Upon completion of a 24-hour cycle of mist-dry intervals, wash treated surfaces, using the pressure washer with 20° tip, at pressures not exceeding 600 psi.

E. Repeat the process as required until all surfaces are satisfactorily cleaned.

3.6 FINAL CLEANING

A. Contractor shall repeat the processes of the work of this Section until the goal of a clean, uniform surface is achieved.

B. Do not use acidic or alkaline cleaners for final cleaning.

END OF SECTION

SECTION 040513

MASONRY MORTARING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Mortar for new masonry construction.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 044000 - Stone Assemblies.

1.2 SUBMITTALS

A. Submittals for Review:
1. Samples: 1/2 x 1/2 inch x 3 inch long colored mortar samples.

B. Quality Control Submittals:
1. Test reports: Indicating mortar compliance with ASTM C270.
2. Delivery tickets: If mortar is delivered to site dry and pre-blended, furnish delivery tickets indicating quantity, mortar type, and date of manufacture.

1.3 QUALITY ASSURANCE

A. Perform Work in accordance with TMS 402/602.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver cement and lime in manufacturer's original, unopened packages or containers.

B. Protect materials from moisture absorption and damage; reject damaged containers.

C. Store aggregate to prevent inclusion of foreign matter.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Colorants:
1. Cathay Pigments. (www.cathaypigments.com)
2. Davis Colors. (www.daviscolors.com)
3. Solomon Colors. (www.solomoncolors.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Portland Cement:
1. ASTM C150/C150M, Type I.
2. For exposed surfaces, provide cement from one source throughout project.

B. Aggregate:
1. ASTM C144, standard masonry type.
2. For exposed surfaces, provide aggregate from one source throughout project.

C. Lime: ASTM C207, Type S.

D. Colorant: Pure mineral oxide type, color to be selected from manufacturer's full color range.

E. Water: Clean and free from oils, acids, alkalies, organic matter, and other substances in amounts deleterious to mortar or metals in masonry.

2.3 MIXES

A. Mortar Mixes: To ASTM C270 using the Proportion Method.
   1. Stone: Type N, color to be selected.

2.4 MIXING

A. Mix mortar in accordance with ASTM C270.

B. Incorporate waterproofing admixture in mortar for exterior concrete unit masonry walls per manufacturer's recommendations.

C. Jobsite Proportioning of Mortar:
   1. Mix using mechanical mixer. Hand mixing not permitted.
   2. Mix approximately three-quarters of required water, all of cement and lime, and one-half of aggregate for minimum of 2 minutes.
   3. Add remainder of water and aggregate; mix for minimum of 3 minutes.

D. Dry Preblended Mortar:
   1. Mix using continuous, self-cleaning mixer mounted at apex of silo cone.
   2. Set water flow valve to provide workable consistency.

E. Thoroughly mix ingredients in quantities needed for immediate use.

F. Discard lumpy, caked, frozen, and hardened mixes.

G. Mortar may be retempered by adding water as required. Use mortar within 2-1/2 hours after initial mixing at ambient temperatures below 80 degrees F and within 1-1/2 hours after initial mixing at ambient temperatures over 80 degrees F.

H. Do not add accelerators, retarders, water repellents, antifreeze compounds, or other additives without Architect's approval.

PART 3 EXECUTION

3.1 INSTALLATION

A. Follow requirements specified in referenced sections.

END OF SECTION

SECTION 044000

STONE ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Cut stone.
2. Integral flashings.
3. Ties and anchors.
4. Control joints in masonry, filled with joint fillers.
5. Miscellaneous masonry accessories.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 040513 - Masonry Mortaring.
3. Section 072500 - Weather Barriers.
4. Section 076500 - Flexible Flashings.
5. Section 079200 - Joint Sealants.
6. Structural Drawings and Specifications.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: Provide information on anchors including sizes, profiles, materials, and finishes.
2. Samples:
   a. 12 x 12 inch stone samples showing color and finish.
   b. Weep hole/vent colors.
3. Shop Drawings: Show fabrication and installation details for the following:
   a. Cut Stone and Trim Units: Show sizes, profiles, and locations of each stone and trim unit required.
   b. Control joint locations and details.

B. Quality Control Submittals:
1. Material Test Reports: From a qualified testing agency indicating and interpreting test results of the following for compliance with requirements indicated:
   a. Each type of stone unit required. Include test results, measurements, and calculations establishing net-area compressive strength of masonry units.

1.3 QUALITY ASSURANCE

A. Fabricator and Installer Qualifications: Minimum 2 years documented experience in work of this Section.

B. Obtain stone from a single quarry and from the same area within the quarry.

C. Perform Work in accordance with TMS 402/602.

D. Mockup Panels: Before installing unit masonry, build sample panels, using materials indicated for the completed Work, to verify selections made under sample Submittals and to demonstrate aesthetic effects. Build sample panels for each type of exposed unit masonry assembly in sizes approximately 48 inches long by 48 inches high by full thickness.
1. Locate panels in the locations indicated or, if not indicated, as directed by Architect.
2. Clean exposed faces of panels with masonry cleaner indicated.
3. Protect approved sample panels from the elements with weather-resistant membrane.
4. Maintain sample panels during construction in an undisturbed condition as a standard for judging the completed Work.

5. Approval of sample panels is for color, texture, and blending of masonry units; relationship of mortar and sealant colors to masonry unit colors; tooling of joints; aesthetic qualities of workmanship; and other material and construction qualities specifically approved by Architect in writing.
6. Demolish and remove sample panels when directed.

E. Preinstallation Conference: Conduct conference at Project site

1.4 DELIVERY, STORAGE AND HANDLING

A. Store stone off ground; prevent contact with materials that could cause staining or damage.

B. Protect anchors from corrosion.

1.5 PROJECT CONDITIONS

A. Wall Protection:
1. During erection, cover tops of partially completed walls with strong waterproof membrane at end of each day or work stoppage.
2. Extend cover minimum of 24 inches down both sides; hold securely in place.

B. Environmental Requirements:
1. Hot weather requirements: If ambient temperature is over 95 degrees F or relative humidity is less than 50 percent, protect from direct sun and wind exposure for minimum 48 hours after installation.
2. Cold weather requirements: Do not use frozen materials or build upon frozen work.
3. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
1. Protect base of walls from rain-splashed mud and from mortar splatter by coverings spread on ground and over wall surface.
2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Masonry Accessories:
1. Blok-Lok Ltd. (www.blok-lok.com)
2. Dur-O-Wal. (www.dur-o-wal.com)
3. Heckmann Building Products. (www.heckmannbuildingprods.com)
4. Hohmann and Barnard, Inc. (www.h-b.com)
5. Mortar Net USA Ltd. (www.mortarnet.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Exterior Stone:
1. General: Limestone Building Stone Standard: ASTM C568, Classification: III (High-Density).
2. Description: Provide natural Texas limestone from a single quarry with low clay content and with minimum average compressive strength parallel when load is applied to bedding plane: 2500 psi when tested in accordance with ASTM C110.

3. Type: Cordova Cream Limestone to match original window opening quoins in color and texture
4. Size: Refer to Drawings.
5. Thickness: Refer to Drawings.
6. Finish: To be selected by Architect.
7. Free from defects that could impair its structural integrity or function. Inherent variations characteristic to quarry from which it is obtained are acceptable.

2.3 ACCESSORIES

A. Mortar: Specified in Section 040513.

B. Anchors: Stainless steel, ASTM A666, Type 304 or 316; two piece with split tail type anchors.

C. Veneer Ties: Formed steel wire, 9 gage thickness, two piece adjustable type with backing plate, hot dip galvanized, ASTM A153/A153M, B2 finish, minimum 2 inch embedment into masonry.

D. Fasteners: Hot-dip galvanized or fluoropolymer coated steel minimum 3/4 inch penetration into framing.

E. Flashings: Stainless steel or flexible copper:
1. Stainless steel, ASTM A666, Type 304, minimum 0.018 inch thick.
2. 10 Oz Copper with Polymer Modified Rubberized Asphalt on both sides; No. DA1507 Copper Coated Thru-wall Flashing by Dur-O-Wal (www.dur-o-wal.com) or approved substitute.

F. Flexible Flashings: Specified in Section 076500.

G. Weeps: Recycled polyester mesh bonded with permanent adhesive, 90 percent open, 2.5 x 3.5 inches x 0.5 inch thick; Mortar Net Weep Vents by Mortar Net USA Ltd. or approved substitute, color to be selected from manufacturer's full color range.

H. Mortar Dropping Control: High density polyethylene or nylon, 90 percent open mesh, 10 inches high x thickness to suit cavity width; The Mortar Net by Mortar Net USA Ltd. or approved substitute.

I. Joint Sealant: Specified in Section 079200.

J. Cleaner: Type recommended by stone supplier.

PART 3 EXECUTION

3.1 PREPARATION

A. Establish lines, levels, and coursing. Protect from disturbance.

B. Clean stone prior to installation. Do not use wire brushes or implements that can mark or damage exposed surfaces.

C. Wet absorptive stone in preparation for placement to minimize moisture suction from mortar.

3.2 INSTALLATION

A. Arrange stone in coursed ashlar pattern indicated on Drawings, provide color uniformity.

B. Set stone plumb and level.

C. Isolate stone from structural members with compressible filler.

D. Completely fill beds and joints, then rake out for pointing.

E. Fill joints with pointing mortar; tool to profile approved by Architect.

F. Install anchors and place spacers to support stone and to establish joint dimensions.

G. Veneer Ties:
1. Space ties to provide one tie per 2.67 square feet at maximum spacing of 32 inches on center horizontally.
2. Locate ties within 12 inches of ends of masonry walls and openings.

H. Flashings:
1. Install flashing with outer edge flush with outside face of stone; extend up backup 8 inches minimum and seal to backup.
2. Lap end joints 4 inches minimum and seal.
3. Form end dams where flashing is stopped or interrupted.
4. Tie metal flashings into the weather barrier system using compatible self-adhering flashings, sealants, and mastics, per manufacturer recommendations.

I. Weeps:
1. Locate in head joints in first course above flashings at maximum 24 inches on center.
2. Set weeps flush with exterior face of masonry.

J. Control Joints:
1. Keep joints free from mortar and grout.
2. Install joint backing and joint sealant at control joints in accordance with Section 079200.

K. Install mortar dropping control continuously in cavities above flashings.

L. Installation Tolerances; Maximum variation from:
1. True plane of wall: Plus or minus 1/4 inch in 10 feet and 1/2 inch in 20 feet or more.
2. Plumb: Plus or minus 1/4 inch in 10 feet noncumulative; 1/2 inch in 20 feet or more.

3.3 CLEANING

A. Clean stone with detergent and water applied with fiber brush. No acid cleaners allowed.

B. If initial cleaning does not produce acceptable results, apply cleaner in accordance with manufacturer's instructions.
1. Protect adjacent surfaces.
2. Thoroughly rinse surfaces with clean water after completion of cleaning; remove all traces of cleaning solution.

3.4 PROTECTION

A. Protect stone subject to damage by use of nonstaining sheet coverings.

END OF SECTION

SECTION 055000

METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Shop fabricated metal components.
2. Loose lintels and shelf angles, miscellaneous framing from steel shapes.
3. Bronze handrails.
4. Galvanized steel exterior handrails and guard rails.
5. Crawl space vents.
6. Steel handrails.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 099100 - Painting.

1.2 SYSTEM DESCRIPTION

A. Minimum Design Loads:
1. Pedestrian loading:
   a. Uniform load of 100 PSF.
   b. Concentrated load of 300 pounds.
   c. Maximum deflection under loading: L/180.
2. Guard rails and handrails:
   a. 50 pounds per linear foot applied in any direction at top, transferred via attachments and supports to building structure.
   b. Concentrated 200 pound load applied in any direction at any point along top, transferred via attachments and supports to building structure.
   c. Maximum deflection under loading: L/120.
3. Concentrated and uniform loads do not need to be applied simultaneously.
4. Infill of Guards:
   a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
   b. Infill load and other loads need not be assumed to act concurrently.
5. Perform design under direct supervision of Professional Structural Engineer licensed in State in which Project is located, with minimum 2 years documented experience in work of this Section.

B. Fabricate guard rails and handrails in accordance with ASTM E985.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Submit for all products proposed for use, include manufactured components; indicate dimensions, profiles, materials, finishes, and attachments.
2. Shop Drawings: Show dimensions, metal thicknesses, finishes, joints, attachments, and relationship of work to adjacent construction.
3. Samples for Verification: For each type of exposed finish required, prepared on components indicated below and of same thickness and metal indicated for the Work. If finishes involve normal color and texture variations, include sample sets showing the full range of variations expected.
   a. 6-inch long sections of each distinctly different linear railing member, including handrails, top rails, posts, and balusters.
   b. Fittings and brackets.
4. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Minimum 3 years documented experience in work of this Section.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store steel above ground on platforms, skids, or other supports; separate with wooden separators.

B. Protect steel from corrosion.

C. Prevent damage to prime coat and galvanized coatings.

PART 2 PRODUCTS

2.1 MATERIALS

A. Steel:
1. Shapes: ASTM A36/A36M.
2. Plate: ASTM A283/A283M.
3. Sheet: ASTM A1008/A1008M.
4. Pipe: ASTM A501/A501M.
5. Tube: ASTM A500/A500M.
6. Bars: ASTM A108.

B. Grates: NAAMM MBG 531, Welded Steel.

C. Bronze:
1. Extrusions: C38500 (Architectural Bronze) meeting ASTM B455.
2. Drawn Tube: C27000.

2.2 ACCESSORIES

A. Exposed Screws: Same material as metal being fastened; Phillips flat head, countersunk, unless noted otherwise.

B. Bolts: ASTM A307, hexagonal head type.

C. Primer Paint: SSPC Paint 15, Type 1, red oxide.

D. Touch-up paint for galvanizing: ZRC Galvilite Galvanizing Repair.

E. Anchoring Cement: Non-shrink cementitious type.

2.3 FABRICATION

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

D. Exposed Mechanical Fastenings: Flush countersunk screws or bolts, unobtrusively located, consistent with design of component except where specifically noted otherwise.

E. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

F. Conceal fastenings where possible.

G. Welding:
1. Use welds for permanent connections where possible. Grind exposed welds smooth.
2. Tack welds prohibited on exposed surfaces.
3. Steel shapes, plate, pipe, and tube: Conform to AWS D1.1/D1.1M.
4. Steel sheet: Conform to AWS D1.3/D1.3M.

2.4 FINISHES

A. Exterior Ferrous Metal: Galvanized; ASTM A123/A123M, to 2.0 ounces per square foot. Shop clean and apply phosphate treatment in factory to surfaces to be painted in the field.

B. Exterior Ferrous Metal Guardrails and Handrails: Galvanized finish (final finish).

C. Other Interior Ferrous Metal:
1. Shop painted except steel to be encased in concrete and surfaces to be welded.
2. Surface preparation: SSPC SP2 - Hand Tool Cleaning or SP3 - Power Tool Cleaning.
3. Application: One coat; follow coating manufacturer's instructions.
4. Minimum dry film thickness: 2.0 mils.

D. Interior Bronze Components:
1. Unlacquered; Apply liquid patina.
a. Product: Brown Patina CB for Brass/Copper/Bronze, as manufactured by Sur-Fin Chemicals, (213) 264-7724.
2. Protective clear coating
a. Description: Semi-synthetic, chemically neutral, microcrysatalline wax free of damaging acids designed as a protective coating for bronze.
b. Product: Renaissance Microcrystalline Wax Polish as manufactured by Picreator Enterprises ltd.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install items in accordance with approved Shop Drawings.

B. Install components plumb, level, and rigid.

C. Welding:
1. Field weld components indicated on Shop Drawings.
2. Grind and fill exposed welds; finish smooth and flush.
3. Tack welds prohibited on exposed surfaces.
4. Steel shapes, plate, pipe, and tube: Conform to AWS D1.1/D1.1M.
5. Steel sheet: Conform to AWS D1.3/D1.3M.

D. Install sleeved components with anchoring cement.

E. Prevent contact of dissimilar metals by use of zinc rich paint, bituminous coating, or non-absorptive gaskets.

3.2 ADJUSTING

A. Clean and touch up damaged primer paint with same product as applied in shop.

B. Clean and touch up galvanized coatings at welded and abraded surfaces in accordance with ASTM A780, Annex A2.

3.3 SCHEDULE

A. This Schedule includes principal items only; refer to Drawings for additional items not listed.

B. Guard Rails and Handrails:
   1. Fabricate from steel pipe or tube stock of sizes and types indicated.
   2. Make bends uniform and free from buckles and other defects.
   3. Cut intersections square to within 2 degrees and to length within 1/8 inch. Remove burrs from cut ends.
   4. Miter and cope intersections within 2 degrees, fit to within 1/8 inch.
   5. Continuously weld connections.
   6. Where length exceeds that suitable for shipping and handling, fabricate in sections with concealed internal sleeves forming slip joints. Extend sleeves minimum 2 inches on both sides of joint; field weld and grind smooth.

C. Interior bronze handrails: Julius Blum 4535 railing, 304 bracket, 1 1/4” x 5/8” channel. Provide unlacquered components with bronze patina and wax finish.

D. Interior steel handrails:
   1. At Platform: Julius Blum 4435 railing, 385 bracket, 1 1/4" X 5/8" channel. Provide shop primed components.

E. Crawl space vents:
   1. Fabricate from steel angle sizes and types indicated and galvanized cloth wire insect screen.
   2. Install over treated wood blocking with flathead screws flush with angle frame.
   3. Install cementitious parge coat at exterior sill.

END OF SECTION

SECTION 060122

WOOD RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Wood Restoration:
   a. Replace missing and damaged fascia boards and restore existing.
   b. Restore / replace existing wood baseboards at existing building. Provide new to match existing where missing.
   c. Restore wood lathe ceiling, replace as necessary.
   d. Restore original wood beadboard at stage and replace missing trim and nosing.
   e. Restore exterior wood soffit boards, replace as necessary.
   f. Restore original beadboard ceiling and trim at entry vestibule.
   g. Restore exterior rafter tails, replace as necessary.
2. Consolidation.
3. Patching.
4. Replacement.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 012100 - Allowances.
3. Section 012200 - Unit Prices.
4. Section 090396 - Wood Flooring Restoration.
5. Section 099100 - Painting.

1.2 SUBMITTALS

A. Submittals for Review:
1. Samples:
   a. 12 inch long samples of each trim profile.
   b. Sample of each wood species proposed for repair work.

B. Quality Control Submittals:
1. Qualifications: Restorer qualifications, including previous projects.

1.3 QUALITY ASSURANCE

A. Restorer Qualifications:
1. Minimum 3 years experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 5 years.

B. Lumber Grading Agency: Certified to NIST PS 20.

C. Identify lumber and panel products by official grade mark.

D. Mockup:
1. Provide mockups of wood match with stained and painted finish.
2. Show: Each wood restoration process and finishing.
3. Include associated attachments, joints and junctions, and terminating items.
4. Locate where directed.
5. Approved mockups may remain as part of the Work.

E. Pre-Installation Conference:
1. Convene at site 2 weeks prior to beginning work of this Section.
2. Attendance: Architect, Owner, Contractor, and subcontractor performing the Work.
3. Review and discuss: Procedures and expected finished product for each type of repair.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials minimum 6 inches above ground on framework or blocking and cover with protective waterproof covering providing for adequate air circulation.

B. Do not store seasoned materials in damp location.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Consolidant and Patching Compound:
1. Abatron, Inc.
2. Advanced Repair Technology, Inc.

B. Epoxy Repair Material for Opaque Finish:
1. Consolidant: LiquidWood.
2. Patch: WoodEpox.

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Lumber:
1. Salvaged existing wood.
2. If salvaged existing materials are unsuitable for use or are not available in sufficient quantities, provide new materials or materials salvaged from an off-site source to match original wood in species, cut, appearance, and other characteristics.
3. Do not reuse rotten, split, termite damaged, or otherwise defective pieces.

2.3 ACCESSORIES

A. Consolidant: Low viscosity penetrating consolidant, 8 hour minimum cure time.

B. Patching Compound - For Painted Wood: Epoxy based, multiple component

C. Patching Compound - For Stained Wood: Latex based, single component, color matched to wood.

D. Fasteners: Type and size as required by conditions of use; plain steel for interior use; hot dip galvanized steel for exterior use.

2.4 FABRICATION

A. Quality: AWI Custom Quality Grade.

B. Fabricate new wood components with profiles and dimensions to match existing using salvaged materials as a template.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to installation, condition wood to average humidity that will prevail after installation.

B. Back prime exterior wood and wood in contact with masonry or cementitious materials prior to installation.

C. Prepare edges of existing wood to receive wood repair. Provide clean, square, and straight edges.

3.2 CONSOLIDATION OF EXISTING WOOD

A. Remove paint under provisions of Section 099100.

B. Apply consolidant in accordance with manufacturer's instructions.

C. Completely saturate damaged wood with consolidant; allow to cure 8 hours minimum.

D. Apply to end grain where exposed. Where end grain is not exposed, drill 1/8 inch holes staggered and at angles to side grain to expose as much end grain as possible.

E. Prevent leakage with wax or clay plugs. Clean leakage before it cures.

F. Apply second coat if first coat does not completely saturate and harden wood.

3.3 PATCHING EXISTING WOOD

A. Remove loose and deteriorated wood down to a point at which sound material is reached.

B. Apply consolidant as specified above.

C. After consolidant has cured, fill voids with patching compound. Mix and apply in accordance with manufacturer's instructions.

D. Embed wood in center of large patches to reduce amount of filler.

E. After filler has cured, sand, chisel, or plane off to smooth surface, flush with adjacent surfaces.

3.4 REPLACEMENT OF EXISTING WOOD

A. Remove existing damaged and deteriorated wood in manner to minimize damage to adjacent surfaces.

B. Fit new components to original profiles and lines.

C. Feather new materials into existing.

D. Secure at maximum 12 inches on center. Use concealed or exposed nailing to match existing.

E. Miter corners and end joints.

F. Scribe to adjacent construction with maximum 1/8 inch gaps.

G. Sand cut ends and edges smooth.

3.5 FINISHING WOOD

A. Paint per Section 099100.

END OF SECTION

SECTION 061000

ROUGH CARPENTRY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Wood blocking, nailers, and furring.
2. Telephone and electrical panel backboards.
3. Door and window frame construction.
4. Interior stud walls (non-bearing walls).
5. Exterior plywood sheathing.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Structural Drawings and Specifications.

1.2 QUALITY ASSURANCE

A. Lumber Grading Agency: Certified to NIST PS 20.

B. Identify lumber and sheet products by official grade mark.

C. Fire Retardant Treated Products: Bear label of recognized independent testing laboratory indicating flame spread rating of 25 or less, tested to ASTM E84.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store materials minimum 6 inches above ground on framework or blocking and cover with protective waterproof covering providing for adequate air circulation.

B. Do not store seasoned or treated materials in damp location.

C. Protect edges and corners of sheet materials from damage.

PART 2 PRODUCTS

2.1 MATERIALS

A. Structural Framing and Sheathing: Refer to Structural Drawings and Specifications.

B. Lumber:
1. Grading rules: SPIB.
2. Species: Southern Yellow Pine.
3. Grade: No. 2 or better.
4. Surfacing: Surfaced four sides (S4S) unless otherwise indicated.
5. Maximum moisture content: 19 percent.
6. Finger jointed, manufactured using low-emitting, urea formaldehyde-free binders.

C. Sheet Products:
1. Type: APA Plywood.
2. Panel grade: APA Rated Sheathing.
3. Exposure:
   a. Exterior applications: Exposure 1.
   b. Interior applications: Interior.

2.2 ACCESSORIES

A. Fasteners:
1. Type and size: As required by conditions of use.
2. Exterior locations and treated products: Hot-dip galvanized steel, ASTM A153/A153M, G90 coating class.
3. Other interior locations: Plain steel.

B. Adhesives: Compatible with panels and substrate; recommended by panel manufacturer.

2.3 FABRICATION

A. Preservative Treatment: Treat wood in contact with masonry or cementious materials:
1. Treat lumber and sheet products in accordance with AWPA U1:
a. Interior locations protected from moisture sources: Category UC1 - Interior/Dry.
b. Interior locations subject to sources of moisture: Category UC2 - Interior/Damp.
c. Exterior locations above ground: Category UC3A - Above Ground/Protected.
d. Exterior locations in contact with ground: Category UC4B - Ground Contact/Heavy Duty.
2. Treatment process: Type MCA - Micronized Copper Azole.

B. Fire Retardant Treatment; treat interior lumber and sheet products in accordance with AWPA U1:
1. Interior locations: Category UCFA - Fire Retardant/Interior.
2. Exterior locations: Category UCFB - Fire Retardant/Exterior.

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide blocking, nailers, grounds, furring, and other similar items required to receive and support work.

B. Set members level, plumb, and rigid.

C. Make provisions for erection loads, and for temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

D. Stud Framing:
1. Provide single bottom plate and double top plates for load bearing partitions.
2. Provide single bottom and top plates for non load bearing partitions.
3. Anchor bottom plates to concrete structure with anchor bolts.
4. Triple studs at corners and partition intersections.
5. Anchor studs abutting masonry or concrete with toggle or expansion bolts.
6. Frame openings with double studs and headers. Space short studs over and under opening to stud spacing.

E. Wall Sheathing:
1. Refer to Structural Drawings and Specifications for wall sheathing for use as corner bracing.
2. Place wall sheathing panels at remainder of exterior walls with ends over firm bearing.
3. Leave 1/8 inch expansion space at panel ends and edges.
4. Secure to supports with nails spaced maximum 6 inches on center along edges and maximum 12 inches on center in field of panels.

F. Install telephone and electrical panel backboards where indicated. Oversize panel by 12 inches on all sides.

G. Treat field cuts and holes in members providing structural support in accordance with AWPA M4.

END OF SECTION

SECTION 061753

SHOP-FABRICATED WOOD TRUSSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Wood roof trusses.
2. Wood floor trusses.
3. Wood girder trusses.

B. Related Requirements:

1. Section 313116 "Termite Control" for site application of borate treatment to wood trusses.

1.3 ALLOWANCES

A. Provide wood truss bracing under the Metal-Plate-Connected Truss Bracing Allowance as specified in Section 012100 "Allowances."

1.4 DEFINITIONS

A. Metal-Plate-Connected Wood Trusses: Planar structural units consisting of metal-plate-connected members fabricated from dimension lumber and cut and assembled before delivery to Project site.

1.5 ACTION SUBMITTALS

A. Product Data: For wood-preservative-treated lumber, metal-plate connectors, metal truss accessories, and fasteners.

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification from treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification from treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.

3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to truss fabricator.

B. Shop Drawings: Show fabrication and installation details for trusses.

1. Show location, pitch, span, camber, configuration, and spacing for each type of truss required.
2. Indicate sizes, stress grades, and species of lumber.
3. Indicate locations of permanent bracing required to prevent buckling of individual truss members due to design loads.
4. Indicate locations, sizes, and materials for permanent bracing required to prevent buckling of individual truss members due to design loads.
5. Indicate type, size, material, finish, design values, orientation, and location of metal connector plates.
6. Show splice details and bearing details.

C. Delegated-Design Submittal: For metal-plate-connected wood trusses indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For metal connector-plate manufacturer, professional engineer, and fabricator.

B. Material Certificates: For dimension lumber specified to comply with minimum specific gravity. Indicate species and grade selected for each use and specific gravity.

C. Product Certificates: For metal-plate-connected wood trusses, signed by officer of truss-fabricating firm.

D. Evaluation Reports: For the following, from ICC-ES:

1. Wood-preservative-treated lumber.
2. Fire-retardant-treated wood.
3. Metal-plate connectors.
4. Metal truss accessories.

1.7 QUALITY ASSURANCE

A. Metal Connector-Plate Manufacturer Qualifications: A manufacturer that is a member of TPI and that complies with quality-control procedures in TPI 1 for manufacture of connector plates.

1. Manufacturer's responsibilities include providing professional engineering services needed to assume engineering responsibility.
2. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Fabricator Qualifications: Shop that [participates in a recognized quality-assurance program, complies with quality-control procedures in TPI 1, and involves third-party inspection by an independent testing and inspecting agency acceptable to Architect and authorities having jurisdiction.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Handle and store trusses to comply with recommendations in SBCA BCSI, "Building Component Safety Information: Guide to Good Practice for Handling, Installing, Restraining, & Bracing Metal Plate Connected Wood Trusses."

1. Store trusses flat, off of ground, and adequately supported to prevent lateral bending.
2. Protect trusses from weather by covering with waterproof sheeting, securely anchored.
3. Provide for air circulation around stacks and under coverings.

B. Inspect trusses showing discoloration, corrosion, or other evidence of deterioration. Discard and replace trusses that are damaged or defective.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design metal-plate-connected wood trusses.

B. Structural Performance: Metal-plate-connected wood trusses shall be capable of withstanding design loads within limits and under conditions indicated. Comply with requirements in TPI 1 unless more stringent requirements are specified below.

1. Design Loads: As indicated.
2. Maximum Deflection under Design Loads:

a. Roof Trusses: Vertical deflection of 1/240 of span.

C. Comply with applicable requirements and recommendations of TPI 1, TPI DSB, and SBCA BCSI.

D. Wood Structural Design Standard: Comply with applicable requirements in AF&PA's "National Design Specifications for Wood Construction" and its "Supplement."

2.2 DIMENSION LUMBER

A. Lumber: DOC PS 20 and applicable rules of any rules-writing agency certified by the American Lumber Standard Committee (ALSC) Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. For exposed lumber indicated to receive a stained or natural finish, omit grade stamp and provide certificates of grade compliance issued by grading agency.
3. Provide dressed lumber, S4S.
4. Provide dry lumber with [15] [19] percent maximum moisture content at time of dressing.

B. Minimum Chord Size for Roof Trusses: 2 by 4 inches nominal for both top and bottom chords].

C. Minimum Specific Gravity for Top Chords: 0.50

D. Permanent Bracing: Provide wood bracing that complies with requirements for miscellaneous lumber in Section 061000 "Rough Carpentry."

2.3 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2[for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground].

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
2. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all trusses unless otherwise indicated.

2.4 FIRE-RETARDANT-TREATED WOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products according to test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Lumber by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.

3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use for interior locations where exterior type is not indicated.
4. Design Value Adjustment Factors: Treated lumber shall be tested according to ASTM D 5664, and design value adjustment factors shall be calculated according to ASTM D 6841.

C. Kiln-dry lumber after treatment to a maximum moisture content of 15 percent.

D. Identify fire-retardant-treated wood with appropriate classification marking of testing and inspecting agency acceptable to authorities having jurisdiction.

1. For exposed trusses and bracing indicated to receive a stained or natural finish, omit marking and provide certificates of treatment compliance issued by inspection agency.

E. For exposed trusses indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

F. Application: Treat items indicated on Drawings.

2.5 METAL CONNECTOR PLATES

A. General: Fabricate connector plates to comply with TPI 1.

B. Hot-Dip Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G60 coating designation; and not less than 0.036 inch thick.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless-Steel Sheet: ASTM A 666, [Type 304] [Type 316], and not less than 0.035 inch thick.

1. Use for exterior locations, wood-preservative-treated lumber, fire-retardant treated lumber, and where indicated.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. Provide fasteners for use with metal framing anchors that comply with written recommendations of metal framing manufacturer.
2. Where trusses are exposed to weather, in ground contact, made from pressure-preservative treated wood, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

2.7 METAL FRAMING ANCHORS AND ACCESSORIES

A. Allowable design loads, as published by manufacturer, shall comply with or exceed those [indicated] [of basis-of-design products] [of products of manufacturers listed]. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency. Framing anchors shall be punched for fasteners adequate to withstand same loads as framing anchors.

B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

1. Use for interior locations unless otherwise indicated.

C. Hot-Dip Heavy-Galvanized-Steel Sheet: ASTM A 653/A 653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 coating designation; and not less than 0.036 inch thick.

1. Use for wood-preservative-treated lumber and where indicated.

D. Stainless-Steel Sheet: ASTM A 666, Type 304.

1. Use for exterior locations and where indicated.

E. Truss Tie-Downs: Bent strap tie for fastening roof trusses to wall studs below, 1-1/2 inches wide by 0.050 inch thick. Tie fastens to one side of truss, top plates, and side of stud below.

F. Roof Truss Clips: Angle clips for bracing bottom chord of roof trusses at non-load-bearing walls, 1-1/4 inches wide by 0.050 inch thick. Clip is fastened to truss through slotted holes to allow for truss deflection.

G. Roof Truss Bracing/Spacers: U-shaped channels, 1-1/2 inches wide by 1 inch deep by 0.040 inch thick, made to fit between two adjacent trusses and accurately space them apart, and with tabs having metal teeth for fastening to trusses.

H. Drag Strut Connectors: Angle clip with one leg extended for fastening to the side of girder truss.

1. Angle clip is 3 by 3 by 0.179 by 8 inches with extended leg 8 inches long. Connector has galvanized finish.

2.8 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20, with dry film containing a minimum of 92 percent zinc dust by weight.

2.9 FABRICATION

A. Cut truss members to accurate lengths, angles, and sizes to produce close-fitting joints.

B. Fabricate metal connector plates to sizes, configurations, thicknesses, and anchorage details required to withstand design loads for types of joint designs indicated.

C. Assemble truss members in design configuration indicated; use jigs or other means to ensure uniformity and accuracy of assembly, with joints closely fitted to comply with tolerances in TPI 1. Position members to produce design camber indicated.

1. Fabricate wood trusses within manufacturing tolerances in TPI 1.

D. Connect truss members by metal connector plates located and securely embedded simultaneously in both sides of wood members by air or hydraulic press.

2.10 SOURCE QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections.

1. Provide special inspector with access to fabricator's documentation of detailed fabrication and quality-control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to approved construction documents and referenced standards.
2. Provide special inspector with access to places where wood trusses are being fabricated to perform inspections.

B. Correct deficiencies in Work that special inspections indicate do not comply with the Contract Documents.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wood trusses only after supporting construction is in place and is braced and secured.

B. If trusses are delivered to Project site in more than one piece, assemble trusses before installing.

C. Hoist trusses in place by lifting equipment suited to sizes and types of trusses required, exercising care not to damage truss members or joints by out-of-plane bending or other causes.

D. Install and brace trusses according to TPI recommendations and as indicated.

E. Install trusses plumb, square, and true to line and securely fasten to supporting construction.

F. Space trusses 24 inches o.c. as indicated; adjust and align trusses in location before permanently fastening.

G. Anchor trusses securely at bearing points; use metal truss tie-downs or floor truss hangers as applicable. Install fasteners through each fastener hole in metal framing anchors according to manufacturer's fastening schedules and written instructions.

H. Securely connect each truss ply required for forming built-up girder trusses.

1. Anchor trusses to girder trusses as indicated.

I. Install and fasten permanent bracing during truss erection and before construction loads are applied. Anchor ends of permanent bracing where terminating at walls or beams.

1. Install bracing to comply with Section 061000 "Rough Carpentry."
2. Install and fasten strongback bracing vertically against vertical web of parallel-chord floor trusses at centers indicated.

J. Install wood trusses within installation tolerances in TPI 1.

K. Do not alter trusses in field. Do not cut, drill, notch, or remove truss members.

L. Replace wood trusses that are damaged or do not comply with requirements.

1. Damaged trusses may be repaired according to truss repair details signed and sealed by the qualified professional engineer responsible for truss design, when approved by Architect.

3.2 REPAIRS AND PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect wood trusses from weather. If, despite protection, wood trusses become wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

C. Repair damaged galvanized coatings on exposed surfaces according to ASTM A 780/A 780M and manufacturer's written instructions.

3.3 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform special inspections to verify that temporary installation restraint/bracing and the permanent individual truss member restraint/bracing are installed in accordance with the approved truss submittal package.

END OF SECTION

SECTION 064000

ARCHITECTURAL WOODWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Interior standing and running trim at addition.
2. Interior wood ceilings at addition.
3. Custom wood threshold.
4. Wood shiplap interior wall finish.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 099100 - Painting.

1.2 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings:
a. Include dimensioned plans, sections, elevations, and details, including interface with adjacent work.
b. Designate wood species and finishes.
2. Samples: 12 inch samples showing each wood species and finish.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications:
1. Minimum 3 years documented experience in work of this Section.
2. Certified under AWI Quality Certification Program.

1.4 DELIVERY, STORAGE AND HANDLING

A. Do not deliver materials until proper protection can be provided, and until needed for installation.

1.5 PROJECT CONDITIONS

A. Environmental Requirements: Maintain following conditions in building for minimum 7 days prior to, during, and after installation of paneling:
1. Temperature: 60 to 80 degrees F.
2. Humidity: 25 to 55 percent.

PART 2 PRODUCTS

2.1 MATERIALS

A. Architectural Woodwork:
1. Graded in accordance with AWI Architectural Woodwork Standards for quality grade specified.
2. Wood Species: Species and cut to be selected, of quality for opaque or transparent finish as scheduled.
3. Moisture Content: 10-12 percent kiln dried.
4. Profiles: Refer to Drawings.

B. Interior Trim at Addition:
1. Species: Pine, paint finish.

C. Wood Tongue & Groove Ceiling at Addition:
1. Species: Douglas Fir, stain finish

2. 1"x4" planks.

D. Custom Threshold: Match existing wood trim species.

E. Wood Shiplap Interior Wall Finish: 1" x 6" Pine, paint finish.

2.2 ACCESSORIES

A. Fasteners: Type and size as required by conditions of use.

2.3 FABRICATION

A. General:
   1. Prior to fabrication, field verify dimensions to ensure correct fit.
   2. Where field fitting is required, provide ample allowance for cutting.

B. Wood:
   1. Quality: AWI Architectural Woodwork Standards:
      a. Opaque Finish: Custom Grade.
      b. Transparent Finish: Premium Grade.

2.4 FINISHES

A. Field Finishing: Paint or stain as scheduled, refer to Section 099100.

PART 3 EXECUTION

3.1 PREPARATION

A. Prior to installation, condition wood to average humidity that will prevail after installation.

B. Back prime wood installed against masonry or cementitious materials prior to installation.

3.2 INSTALLATION

A. Install in accordance with AWI Architectural Woodwork Standards.

B. Install in longest practical lengths.

C. Set plumb and level.

D. Miter ends, corners, and intersections.

E. Scribe to adjacent construction with maximum 1/16 inch gaps.

F. Fasten to supporting construction.

END OF SECTION

SECTION 064100

ARCHITECTURAL WOOD CASEWORK

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manufactured Casework:
      a. Catering kitchen cabinets.
      b. Office kitchenette cabinets.
      c. Dressing room counter.
   2. Custom Casework:
      a. Under stage storage doors.
      b. Crawlspace floor hatches.
   3. Shop finishing.
   4. Cabinet hardware.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 123600 - Countertops.
   3. Section 079200 - Joint Sealants.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data:
      a. Include product data for hardware accessories, finish materials and processes, hardwood veneer plywood and plastic laminate
   2. Shop Drawings:
      a. Include dimensioned plan, sections, elevations, and details, including interface with adjacent work.
      b. Designate wood species and finishes.
   3. Samples:
      a. 3 x 3 inch plastic laminate samples in each color and finish.
      b. 6 inch long lumber samples for transparent finish.
      c. 12 x 12 inch sheet product samples for transparent finish.
      d. Each hardware component.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Minimum 5 years documented experience in work of this Section.

B. Fire-Retardant Treated Product Requirements:
   1. Class C: Bear label of recognized independent testing laboratory indicating flame spread rating of 200 or less and smoke developed index of 450 or less, tested to ASTM E84 or UL 723.

1.4 DELIVERY, STORAGE AND HANDLING

A. Do not deliver materials until proper protection can be provided, and until needed for installation.

1.5 PROJECT CONDITIONS

A. Environmental Requirements: Maintain following conditions in building for minimum 7 days prior to, during, and after installation of casework:
   1. Temperature: 60 to 80 degrees F.
   2. Humidity: 25 to 55 percent.

PART 2 PRODUCTS

2.1 MATERIALS

A. Manufactured Plastic-Laminate-Faced Architectural Cabinets:
1. Source: Wilsonart, or approved substitute.
2. Grade: Custom.
3. Type of Construction: Frameless.
4. Interface Style: Flush Overlay.
5. Reveal Dimension: 1/2 inch.
6. Edges: ABS/PVC extruded fabrication.
7. Pattern Direction: Vertically for doors and fixed panels, horizontally for drawer fronts.
8. High-Pressure Decorative Laminate: NEMA LD 3, to be seleted from manufacturers full range of Wilsonart Cabinet Door series, including Woodgrain options.
9. Drawer sides and backs: Solid-hardwood lumber.
10. Drawer bottoms: Hardwood plywood.
11. Style: Narrow Shaker 4482: Shaker Drawer and Shaker Door, butt joint stiles and rails.

B. Sheet Products:
1. Graded in accordance with AWI Architectural Woodwork Standards for quality grade specified.
2. Sheet core:
   a. Wet Areas: Marine Grade Plywood.
   b. Other Locations: Medium Density Fiberboard meeting ANSI208.2, grade MD.
3. Exposed veneers: Species and cut to be selected, of quality for opaque finish.

C. Lumber: Graded in accordance with AWI Architectural Woodwork Standards for quality grade specified, average moisture content of 6 percent.

D. Dressing Room counter:
1. Solid Butcher block countertop and backsplash.
2. Species: Walnut, edge grain.
3. Thickness: 1-1/2 inches.
4. Finish: Transparent.
5. Edge Treatment: 1/16" Radius Edge.
6. Backsplash: 4" x 3/4" finished to match counter.
7. AWI Custom Grade.

2.2 ACCESSORIES

A. Countertops: Specified in Section 123600.

B. Recessed brackets at dressing room counter:
1. BOD: Rakks EH-1212 concealed EH Countertop Support Bracket.
2. Finish: Black powder coat finish.
3. Provide concealed counter support face plates (2"x2" T).

C. Fasteners: Type and size as required by conditions of use. Exposed fasteners to be tamper proof.

D. Adhesives:
1. Waterproof, water based type, compatible with backing and veneer and laminate materials.
2. Maximum volatile organic compound (VOC) content: 70 grams per liter.

E. Finish Hardware: As scheduled at end of Section or approved substitute.

F. Joint Sealants: Specified in Section 079200.

2.3 FABRICATION

A. Plastic-Laminate-Faced Architectural Cabinets:
1. BOD: Wilsonart Narrow Shaker Style -4482.

2. Description: 2.25" Shaker Drawer and 2.25" Shaker Door.

B. Under Stage Storage Doors: Dimensional lumber frame with plywood face covered with salvaged beadboard and wood base to blend with surrounding stage front.

C. Crawlspace Floor Hatches: Dimensional lumber frame, salvaged or new longleaf pine boards to match existing floor.

D. Shop assemble for delivery to project site in units easily handled.

E. Prior to fabrication, field verify dimensions to ensure correct fit.

F. Apply plastic laminate in full uninterrupted sheets; fit corners and joints to hairline. Slightly bevel arises. Apply laminate backing sheet to reverse side of laminate faced surfaces.

G. Where field fitting is required, provide ample allowance for cutting. Provide trim for scribing and site conditions.

H. Provide cutouts and reinforcement for plumbing, electrical, appliances, and accessories. Prime paint surfaces of cut edges.

PART 3 EXECUTION

3.1 PREPARATION

A. Prior to installation, condition cabinets to average humidity that will prevail after installation.

3.2 INSTALLATION

A. Install in accordance with AWI Architectural Woodwork Standards.

B. Set plumb, rigid and level.

C. Scribe to adjacent construction with maximum 1/8 inch gaps.

D. Adhere countertops, splashes, and skirts with beads of adhesive.

E. Fill joints between cabinets, tops, splashes, and adjacent construction with joint sealant as specified in Section 079200; finish flush.

3.3 FINISH HARDWARE SCHEDULE

	DESCRIPTION	MANUFACTURER	MODEL
CATERING KITCHEN AND OFFICE KITCHENETTE	Door and drawer pull	Richelieu	Modern Metal Pull 5632, brushed nickel finish, 4 1/32" length with 3 25/32" center to center
	Drawer slide	Blum	Blumotion, under mount, soft-closing
	Door hinge	Blum	Blumotion, soft-closing European style
	Adjustable shelf standards and brackets	Knape and Vogt	255 and 256, recess track flush with plywood
	Cabinet Lock		Finish to match cabinet pulls
UNDER PLATFORM STORAGE DOORS	Concealed Hinges	SOSS	Hercules Hinge 216H
	Threshold	Zero	627
	Heavy Duty Magnetic Push Latch	Hafele	246.65.331
	Cam Lock		
CRAWL SPACE ACCESS HATCH	Access Hatch Hinge		Continuous piano hinge
	Access Hatch Pull	Sugatsune	Folding Ring Pull #26700, stainless steel

END OF SECTION

SECTION 066400

PLASTIC PANELING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fiber-reinforced plastic paneling.
2. Trim.
3. Base.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 079200 - Joint Sealants.

1.2 SUBMITTALS

A. Submittals for Review:
1. Samples:
   a. 6 x 6 inch panel samples in each color.
   b. 6 inch long trim samples.

B. Quality Control Submittals:
1. Certificates of Compliance: Certification from an independent testing laboratory that panels meet fire hazard classification requirements.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2 years experience in work of this Section.

B. Fire Hazard Classification: Tested to ASTM E84.
1. Flame spread: Maximum 25.
2. Smoke density: Maximum 450.

1.4 PROJECT CONDITIONS

A. Do not install products if temperature, humidity, and ventilation requirements are outside limits recommended by manufacturer.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Crane Composites. (www.cranecomposites.com)

B. Other Acceptable Manufacturers:
1. Nudo Products, Inc. (www.nudo.com)
2. Panolam Industries International, Inc. (www.panolam.com)
3. Marlite. (www.marlite.com)

2.2 MATERIALS

A. Plastic Sheet Paneling:
1. Source: Crane Composites, or approved substitute.
2. Type: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D5319, USDA approved for incidental food contact.
3. Size: 0.075 inch thick x 48 inches wide x maximum practical length.
4. Scratch resistance: Minimum 35, tested to ASTM D2583.

5. Water absorption: Maximum 0.3 percent, tested to ASTM D570.
6. Impact resistance: Minimum 11.0 inch pounds, tested to ASTM D5420 without visible damage on finished side.
7. Color and surface texture: To be selected from manufacturer's standards.

2.3 ACCESSORIES

A. Trim:
   1. One piece extruded PVC, manufacturer's standard profile.
   2. Inside and outside corners, division bar, J-molding, and base.
   3. Color: To match panels.

B. Adhesive: Compatible with panels and substrate; recommended by panel manufacturer.

C. Joint Sealant: Specified in Section 079210.

D. Patching Compound: White latex type.

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare substrate to receive panels:
   1. Remove high spots.
   2. Fill low spots with patching compound; sand smooth.
   3. Remove loose and foreign matter that could impair adhesion.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Install trim:
   1. Panel-to-panel joints: Division bar.
   2. Internal and external corners.
   3. Exposed edges: J molding.
   4. Floor to wall: Base.
   5. Secure to substrate.

C. Cut panels to fit at perimeter and around penetrations. Ensure that trim will completely cover cut edges.

D. Maintain 1/8 to 3/16 inch expansion space at perimeter and around penetrations.

E. Adhere panels to substrate with continuous beads of adhesive.

F. Install continuous bead of joint sealant between panels and trim and between trim and adjacent construction.

END OF SECTION

SECTION 072113

BOARD INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Board insulation at exterior walls.
2. Board insulation at under side of roof, existing building.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: Indicate product composition and performance characteristics.

B. Quality Control Submittals:
1. Certificates of Compliance: Certification from an independent testing laboratory that insulation meets fire hazard classification requirements.

1.3 QUALITY ASSURANCE

A. Fire Hazard Classification:
1. Noncombustible, tested to ASTM E136.
2. Maximum flame spread/smoke developed rating of 25/450, tested to ASTM E84.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store insulation in clean, dry, sheltered area, off ground or floor, until used. Protect against wetting and moisture absorption.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Owens Corning. (www.owenscorning.com)
2. Hunter Panels. (www.hpanels.com)
3. OX Engineered Products. (www.oxengineeredproducts.com)
4. Rmax, Inc. (www.rmaxinc.com)
5. Johns Manville. (www.jm.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Board Insulation - Polyisocyanurate:
1. ASTM C1289, rigid polyisocyanurate faced both sides with aluminum foil facings, reinforced core.
2. Thermal resistance: Minimum R value of 6.5 per inch of thickness.
3. Thickness: Refer to Drawings.

B. Board insulation at underside of existing building roof - Extruded Polystyrene:
1. Source: Owens Corning Foamular
2. Polystyrene Board Insulation (XPS), ASTM C578, Type X, closed cell extruded polystyrene foam.

3. Thermal resistance: Minimum R value of not less than 5 per inch.
4. Thickness: Refer to Drawings

2.3 ACCESSORIES

A. Tape: Minimum 2 inches wide, pressure sensitive, waterproof.

B. Liquid Flashing: Type recommended by manufacturer.

C. Facade Anchors: Type recommended by insulation manufacturer.

D. Adhesive: Type recommended by insulation manufacturer.

E. Fasteners: Type best suited to application, hot-dip galvanized or fluoropolymer coated steel.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Place facade anchors in spacing recommended by manufacturer.

C. Friction fit insulation between facade anchors and use dollops of compatible sealant to adhere to moisture barrier.

D. Stagger end joints.

E. Butt edges and ends tight to adjacent boards, at perimeter, and around penetrations with maximum 1/8 inch gaps.

F. Apply tape to joints and edges.

G. Apply liquid flashing to all penetrations through insulation.

END OF SECTION

SECTION 072115

BATT INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Batt insulation in exterior wall and ceiling assemblies.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 012300 - Alternates.

1.2 SUBMITTALS

A. Quality Control Submittals:
1. Certificates of Compliance: Certification from an independent testing laboratory that insulation meets fire hazard classification requirements.

1.3 QUALITY ASSURANCE

A. Fire Hazard Classification:
1. Noncombustible, tested to ASTM E136.
2. Flame spread/smoke developed rating of 25/450 or less, tested to ASTM E84.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store insulation in clean, dry, sheltered area, off ground or floor, until used. Protect against wetting and moisture absorption.

1.5 PROJECT CONDITIONS

A. Do not install insulation until building is substantially water and weather tight.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Mineral Wool Insulation:
1. Roxul Inc. (www.roxul.com)
2. Johns Manville. (www.jm.com)
3. Knauf Insulation. (www.knaufinsulation.us)
4. Owens Corning. (www.owenscorning.com)

B. Acceptable Manufacturers - Glass Fiber Insulation:
1. Johns Manville. (www.jm.com)
2. Knauf Insulation. (www.knaufinsulation.us)
3. Owens Corning. (www.owenscorning.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Thermal Batt Insulation - Mineral Wool:
1. Type: Non-combustible, lightweight, mineral wool batt insulation to ASTM C665, Type 1, that provides fire resistance to ASTM E136 and a sound control to ASTM E90 and ASTM C423.
2. Size: Stud width x 48 inches.
3. Thermal resistance:

a. 5-1/2 inches thick: R-value of 23.00.
b. 7 inches thick: R-value of 30.00.

B. Thermal Batt Insulation - Glass Fiber:
1. Type: ASTM C665, glass fiber composition.
2. Size: Stud width.
3. Thickness: 5-1/2 inches.
4. Facing: Unfaced.
5. Stapling flanges: None.
6. Free from urea-formaldehyde resins.
7. Thermal resistance: Minimum R-value of 20.00.

PART 3 EXECUTION

3.1 INSTALLATION

A. Friction fit between framing members.

B. Butt insulation to adjacent construction. Butt ends and edges.

C. Carry insulation around pipes, wiring, boxes, and other components.

D. Ensure complete enclosure of spaces without voids.

E. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION

SECTION 072129

SPRAYED INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sprayed cellulose acoustical insulation.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: Manufacturer's literature for products furnished, including application instructions. Include data that the product meets or exceeds the specified requirements.

B. Quality Control Submittals:
1. Certificates of Compliance: Certification from an independent testing laboratory that insulation meets fire hazard classification requirements.

1.3 QUALITY ASSURANCE

A. Manufacturer Requirements:
1. Have a current Underwriters Laboratories (UL) Code Evaluation Report.
2. Be in compliance with the 2009-2021 International Building Code.
3. ISO 9001:2015 Certified.
4. Forest Stewardship Council (FSC) Chain-of-Custody Certified.
5. Must subscribe to independent laboratory follow-up inspection services of Underwriters Laboratories and Factory Mutual. Each bag shall be labeled accordingly.
6. Minimum 10-year successful performance history of producing and installing spray-applied cellulose on similar projects

B. Applicator Qualifications: Approved by manufacturer of insulation material.

C. Fire Hazard Classification: Maximum flame spread/smoke developed rating of 25/450, tested to ASTM E84.

D. Mock-up: Apply a 100 square foot representative sample to be reviewed by the Architect and/or Owner prior to proceeding.

E. Material must be tested in accordance with ASTM E 1042 by a NVLAP accredited testing laboratory.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to site with labels designating fire hazard classifications.

B. Store materials off ground or floor in protected, dry area; discard materials that have been exposed to weather prior to use.

1.5 PROJECT CONDITIONS

A. Environmental Requirements:
1. Do not apply insulation when air or surface temperature is less than 40 degrees F, nor when such temperatures are anticipated within 24 hours after application.
2. Consult manufacturer for application procedures during excessively humid or other adverse weather conditions.

1.6 SEQUENCING

A. Do not position ducts, piping, conduit, and other suspended equipment that will interfere with uniform application until after application.

B. Place conduit, boxes, wiring, plumbing lines, and other components prior to application of insulation where these can be anticipated in advance.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by International Cellulose Corp. (www.spray-on.com)

B. Other Acceptable Manufacturers:
1. Isolatek International. (www.cafco.com)
2. Monoglass, Inc. (www.monoglass.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Sprayed Cellulose Insulation:
1. Source: K-13 Insulation by International Cellulose Corp., or approved substitute.
2. Type: Treated cellulose fibers with integral binders, ASTM C1149.
3. Bond strength: Minimum 100 psf when tested in accordance with ASTM E736.
4. Bond Deflection: 6” Deflection in 10’ Span – No Spalling or Delamination per ASTM E 759.
5. Color: Black.
6. Each bag must be labeled with appropriate UL classification and FM markings
7. Each drum of adhesive must be labeled "SK-2000 adhesive to be used with K-13"
8. Thickness: As indicated on Drawings.

2.3 MIXES

A. Mix as recommended by insulation manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces to remove oil, grease, dirt, and other materials that could impair bond.

B. Test painted steel surfaces to verify that paint will not impair bond.

3.2 APPLICATION

A. Apply in accordance with manufacturer's instructions.

B. Spray apply to depth required to meet thermal requirements, to uniform monolithic density without voids.

C. Discard partially set, frozen, and caked materials. Stop application and revise mix as required if material does not properly adhere.

3.3 ADJUSTING

A. Inspect areas for complete coverage; correct unacceptable work and patch.

B. Patch damaged and cut areas.

C. Replace areas where excessive shrinkage or cracking is evident.

END OF SECTION

SECTION 072500

WEATHER BARRIERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fluid applied materials for controlling air and moisture movement at exterior wall assemblies.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 079200 - Joint Sealants.

1.2 QUALITY ASSURANCE

A. Provide continuous barrier to moisture infiltration, air infiltration and exfiltration, and water vapor transmission, flashed to discharge incidental condensation and water penetration.

B. Source limitations: Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

C. Mockup:
   1. Construct mockup of typical exterior wall, minimum 8 feet wide x full height.
   2. Incorporate back-up construction, weather barrier, typical opening, flashings, and critical junctions.
   3. Locate where directed.
   4. Approved mockup may remain as part of the Work.

D. Pre-Installation Conference:
   1. Convene at site 2 weeks prior to beginning work of this Section.
   2. Attendance: Architect, Construction Manager, weather barrier installer, and related trades whose work follows or affects weather barrier.
   3. Review and discuss:
      a. Surface preparation, minimum substrate curing period, and installation procedures.
      b. Special details and flashings.
      c. Sequence of construction, responsibilities, and schedule for subsequent operations.
      d. Mock-up requirements.
      e. Inspection, protection, and repair procedures.

1.3 SUBMITTALS

A. Submittals for Review:
   1. Product Data: Manufacturer's descriptive data.
   2. Samples: 12 x 12 inch weather barrier samples.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Fluid Applied Weather Barriers:
   1. Carlisle Coatings and Waterproofing. (www.carlisle-ccw.com)
   2. Henry Company. (www.henry.com)
   3. Tremco Incorporated. (www.tremcosealants.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Fluid-Applied Weather Barrier:
1. Source: Tremco ExoAir 230, or approved substitute.
2. Type: Fluid applied, water based, roller or spray grade, monolithic, elastomeric membrane.
3. Elongation: Minimum 340 percent, tested to ASTM D412.
4. Air permeance: Maximum 0.0001 CFM per square foot, tested to ASTM E2178 using free film method, 75 Pa.
5. Assembly air permeance: Maximum 0.002 CFM per square foot at 1.56 lb per square foot, tested to ASTM E2357.
6. Water leakage: None, tested to ASTM E331 at minimum 2.86 pounds per square foot for 15 minutes.
7. Water vapor permeance: 11 Perms, Wet Cup.

2.3 ACCESSORIES

A. General: Accessory materials as described in manufacturer's written installation instructions, recommended to produce complete air barrier assembly meeting performance requirements, and compatible with air barrier membrane material and adjacent materials.

B. Primer: Liquid primer meeting VOC limitations, recommended for substrate by membrane air barrier manufacturer, when installing modified bituminous self-adhered membranes.
1. Basis of Design Product: Tremco, Inc., ExoAir Primer

C. Transitions:
1. Counterflashing Strip: Modified bituminous, 40 mils (1.0 mm) thick self-adhering composite sheet consisting of 32 mils (0.8 mm) of SBS rubberized asphalt laminated to an 8 mils (0.2 mm) high-density, cross-laminated polyethylene film, for counterflashing of metal flashings and for substrate transitions and for termination of air barrier to bituminous roof membranes and to air barrier terminations at openings.
a. Basis of Design Product: Tremco, Inc., ExoAir TWF Thru-Wall Flashing.
2. High Temperature Flashing Strip and Underlayment: Butyl, 24 mil thick self-adhering composite sheet consisting of 20 mils of butyl laminated to 4 mil polyethylene film; thermally stable under intermittent, non-continuous exposure up to 240 deg F (115 deg C).
a. Basis of Design Product: Tremco, Inc., ExoAir 110AT.

D. Reinforcing Fabric: High strength mesh fabric consisting of open-weave glass fiber saturated with synthetic resins formulated for high moisture resistance, for reinforcing of liquid applications; not less than 2.5 oz/sq. yd (85 g/sq. m).
1. Basis of Design Product: Tremco, Inc., Tremco 2011.

E. Liquid Joint Sealants:
1. ASTM C 920, single-component polyurethane, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories.a.Basis of Design Product: Tremco, Inc., Dymonic 100.
2. ASTM C 920, single-component, neutral-curing silicone, approved by air barrier manufacturer for adhesion and compatibility with membrane air barrier and accessories post installation of the membrane.
a. Basis of Design Product: Tremco, Inc., Spectrem

F. Sprayed Polyurethane Foam Sealant: Sprayed Polyurethane Foam Sealant: Foamed-in-place, 1.5- to 2.0-lb/cu. ft. (24- to 32-kg/cu. m) density, with flame-spread index of 25 or less per ASTM E 162, for filling of gaps at openings and penetrations.
1. Basis of Design; Tremco Inc., Flexible Low Expanding Foam (LEF)

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces to receive weather barrier; remove loose and foreign matter that could impair adhesion

or performance.

B. Protect adjacent and underlying surfaces.

C. Fill voids, holes, and cracks over 1/16 inch in width with patching compound; finish flush with adjacent surfaces. Apply one coat of weather barrier over patched areas and allow to dry.

D. Apply joint tape centered over sheathing joints. Lap ends 2 inches minimum. Press to full bond with substrate without voids, wrinkles, bridging, or fishmouths.

3.2 APPLICATION - FLUID APPLIED WEATHER BARRIERS

A. Apply weather barrier in accordance with manufacturer's instructions.

B. Air barrier thickness: Wet film and dry film application thicknesses: As recommended by air barrier manufacturer’s product data.

C. Apply primer to joints in substrate, inside and outside corners, and around perimeter and penetrations. Apply joint tape over primer; press to full bond with substrate.

D. Apply weather barrier by roller or spray to continuous and uniform coverage with minimum mil thickness as recommended by manufacturer.

E. Seal to door and window frames, around penetrations, and at perimeter with flashing sheet. Press to full bond with substrate without voids, wrinkles, bridging, or fishmouths.

3.3 FIELD QUALITY CONTROL

A. Testing Services: Perform adhesion testing of minimum one area per day of application to confirm adequate adhesion to substrate. Submit reports to Owner and design team.

B. Inspect weather barrier for damage just prior to covering.

C. Clean damaged areas and cover with additional weather barrier material minimum 6 inches larger than damaged area on all sides.

D. Testing and Inspection Services:
1. Owner will employ an independent testing and inspection firm to perform air testing.
2. Perform tests after manufacturer’s recommended curing time has elapsed.
3. Air leakage testing: Perform qualitative air leakage testing per ASTM E1186.

END OF SECTION

SECTION 072600

VAPOR RETARDERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Vapor barrier and installation accessories for installation under concrete slabs.
2. Vapor barrier and installation accessories for installation in existing building crawlspace.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 033000 - Cast-In-Place Concrete.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: Include product description and performance characteristics.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Stego Industries. (www.stegoindustries.com)

B. Other Acceptable Manufacturers:
1. Griffolyn, Division of Reef Industries. (www.reefindustries.com)
2. Raven Industries. (www.rufco.com)
3. W.R. Meadows, Inc. (www.wrmeadows.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Vapor Barrier - Under Concrete Slabs:
1. Source: Stego Wrap Vapor Barrier by Stego Industries LLC., or approved substitute.
2. Exceed requirements of ASTM E1745, Class A.
3. Description: Reinforced two ply polyethylene film.
4. Water vapor permeance: Maximum 0.01 Perms as tested in accordance with mandatory conditioning tests per ASTM E1745.
5. Strength: ASTM E1745 Class A.
6. Thickness: 15 mils minimum.
7. Provide third party documentation that all testing was performed on a single production roll per ASTM E1745.

B. Vapor Barrier - Crawlspace Liner:
1. Source: StegoCrawl Vapor Barrier by Stego Industries, or approved substitute.
2. Water vapor permeance: Maximum 0.01 Perms as tested in accordance with mandatory conditioning tests per ASTM E1745.
3. Strength and Longevity: ASTM E1745.
4. Thickness: 15 mils minimum.

2.3 ACCESSORIES

A. Vapor Barrier - Crawlspace Liner Accessories:
1. Seams and Penetrations of Liner: StegoCrawl Tape by Stego Industries LLC.
2. Perimeter/edge seal:

a. StegoCrawl Term Bar by Stego Industries LLC.
b. StegoTack Tape (double sided) by Stego Industries LLC.

B. Vapor Barrier - Under Slabs on Grades:
1. Seams: Stego Tape by Stego Industries LLC.
2. Sealing Penetrations of Vapor barrier:
a. Stego Mastic by Stego Industries LLC.
b. Stego Tape by Stego Industries LLC.
3. Perimeter/edge seal:
a. Stego Crete Claw by Stego Industries LLC.
b. Stego Term Bar by Stego Industries LLC.
c. StegoTack Tape (double-sided sealant tape) by Stego Industries LLC.
4. Penetration Prevention:
a. Beast Foot by Stego Industries LLC.
b. Beast Form Stake by Stego Industries LLC.
5. Vapor Barrier-Safe Screed System
6. Beast Screed by Stego Industries, LLC.
7. Beast Hook by Stego Industries, LLC.

PART 3 EXECUTION

3.1 INSTALLATION - UNDER SLABS ON GRADE

A. Install vapor barrier in accordance ASTM E1643 and manufacturer's instructions:
1. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete placement and face laps away from the expected direction of the placement whenever possible.
2. Extend vapor barrier to the perimeter of the slab. If practicable, terminate it at the top of the slab, otherwise (a) at a point acceptable to the structural engineer or (b) where obstructed by impediments, such as dowels, waterstops, or any other site condition requiring early termination of the vapor barrier. At the point of termination, seal vapor barrier to the foundation wall, grade beam or slab itself.
a. Seal vapor barrier to the entire slab perimeter using Stego Crete Claw, per manufacturer's instructions.
b. Seal vapor barrier to the entire perimeter wall or footing/grade beam with double sided StegoTack Tape, or both Stego Term Bar and StegoTack Tape, per manufacturer's instructions. Ensure the concrete is clean and dry prior to adhering tape.
3. Overlap joints 6 inches and seal with manufacturer's seam tape.
4. Apply seam tape/Crete Claw to a clean and dry vapor barrier.
5. Seal all penetrations (including pipes) per manufacturer's instructions.
6. For interior forming applications, avoid the use of non-permanent stakes driven through vapor barrier. Use Beast Form Stake and Beast Foot as a vapor barrier-safe forming system. Ensure Beast Foot's peel-and-stick adhesive base is fully adhered to the vapor barrier.
7. If non-permanent stakes must be driven through vapor retarder, repair as recommended by vapor retarder manufacturer.
8. Use reinforcing bar supports with base sections that eliminate or minimize the potential for puncture of the vapor barrier.
9. Repair damaged areas with vapor barrier material of similar (or better) permeance, puncture and tensile.
10. For vapor barrier-safe concrete screeding applications, install Beast Screed (vapor barrier-safe screed system) per manufacturer's instructions prior to placing concrete.

3.2 INSTALLATION - CRAWLSPACE LINER

A. Install crawlspace liner in accordance to manufacturer's instructions:
1. Turn StegoCrawl Vapor Barrier up the foundation wall to a minimum height of six inches above the outside/exterior grade or in compliance with local building codes and terminate with StegoCrawl Term Bar. To form a complete seal, apply StegoTack Tape to the foundation wall prior to installing StegoCrawl Term Bar.

2. Seal StegoCrawl Vapor Barrier around all penetrations and columns using StegoCrawl Tape and/or StegoTack Tape.
3. Place StegoCrawl Vapor Barrier directly over the crawlspace floor. Where consistent with local code, if rigid insulation is to be used, install StegoCrawl Vapor Barrier prior to insulation (under insulation and between the foundation wall and insulation).
4. Overlap seams a minimum of six inches and seal with StegoCrawl Tape. Some codes require a minimum of a twelve inch overlap. Check appropriate codes prior to installation.
5. No penetration of the liner is allowed except for reinforcing steel and permanent utilities.
6. Repair damaged areas by cutting patches of vapor barrier, overlapping damaged area 6 inches and taping all sides with tape.

3.3 REPAIR

A. Inspect vapor retarder for damage just prior to covering.

B. Clean damaged areas and cover with additional vapor retarder material cut minimum 6 inches larger than damaged area on all sides. Seal to main vapor retarder with continuous tape.

END OF SECTION

SECTION 074113

METAL ROOF PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Preformed metal roof panel system.
2. Underlayment.
3. Flashings, trim, anchorage, and accessories.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 079200 - Joint Sealants.

1.2 SYSTEM DESCRIPTION

A. Design Requirements; design roof system to withstand:
1. Live and dead loads in accordance with Building Code.
2. Minimum wind pressures in accordance with ASCE 7, with maximum allowable deflection of L/240 , tested in accordance with ASTM E1592.
3. Movement caused by an ambient temperature range of 120 degrees F and a surface temperature range of 160 degrees F.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Show configuration of panels, trim members, and closures. Include and label sizes and spacings of attachments, clips/furring/sub-framing, and detail components that interface with adjacent construction.
2. Product Data: Show system components including panels, trim, and accessories.
3. Samples: Provide color card for initial color selection, then submit 12 inch long panel samples in selected finish.
4. Warranty: Sample warranty form.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 3 years documented experience in work of this Section.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockup of typical roof area and eave, including fascia, termination at soffit and ridge, and gutter and downspout as shown on Drawings; approximately 48 inches square by full length, including attachments, underlayment, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.5 DELIVERY, STORAGE AND HANDLING

A. Protect panels from contact with materials that could cause staining or discoloration of finish.

1.6 PROJECT CONDITIONS

A. Do not install underlayment at ambient or surface temperatures less than 40 degrees F or on wet or frozen substrate.

B. Do not install panels on wet or frozen substrate.

1.7 WARRANTIES

A. Furnish manufacturer's 20 year warranty providing coverage against chipping, cracking, fading, or delamination of panel finish.

B. Furnish manufacturer's 10 year watertightness warranty.

C. Furnish installer's 2 year watertightness warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Berridge Manufacturing Co. (www.berridge.com)

B. Other Acceptable Manufacturers:
1. AEP-Span. (www.aepspan.com)
2. Centria Architectural Systems. (www.centria.com)
3. Fabral. (www.fabral.com)
4. MBCI. (www.mbci.com)
5. Morin, A Kingspan Group Company. (www.kingspan.com)
6. Petersen Aluminum Corp. (www.pac-clad.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Metal Roof Panels:
1. Source: S-Deck Panel by Berridge Manufacturing Co., or approved substitute.
2. Profile: 7/8" corrugations spaced 2 1/2" on center, exposed fasteners.
3. Material: Prefinished Aluminum-Zinc Alloy Coated Steel Sheet, ASTM A792/A792M, Commercial Quality, AZ55 aluminum-zinc alloy coating, Grade 40, yield strength 40 ksi min.
4. Thickness: Minimum 24 gauge.
5. Finish: Unpainted metal with clear acrylic coating on both sides of material.

B. Underlayment:
1. Provide underlayment materials as approved by Berridge for a watertightness warranty, include one of the following:
   a. Grace Ice & Water Shield (40 mil)
   b. Grace Ultra (30 mil)
   c. Tamko TW Underlayment (40 mil)
   d. Tamko TW Metal & Tile (75 mil)
   e. Carlisle WIP 300 HT (40 mil)
   f. Soprema Lastobond Shield HT (40 mil)
   g. Polyglass Polystick MTS (60 mil)
   h. Mid-States Asphalt Quik-Stick HT Pro (60 mil)

2.3 ACCESSORIES

A. Fasteners:
1. Panels and trim: 300 Series stainless steel, type best suited to application; head color to match panels where exposed, with neoprene gasketed washers.

B. Joint Sealants: Specified in Section 079200.

2.4 FABRICATION

A. Trim: Profiles as indicated or as required, fabricated from same material as panels.

B. Roll form panels and trim to required profiles in longest practical lengths.

PART 3 EXECUTION

3.1 INSTALLATION OF UNDERLAYMENT

A. Install in accordance with manufacturer's instructions.

B. Starting at low edge, apply underlayment horizontally on roof. Weatherlap each sheet 4 inches over preceding sheet. Lap ends 6 inches minimum.

C. Press with roller to full bond with substrate without voids, wrinkles, bridging, or fishmouths. Seal ends and edges.

D. Lap underlayment minimum 12 inches over hips and ridges from both sides. Apply 36 inch wide strip centered lengthwise over ridge.

E. Extend minimum 6 inches up abutting vertical surfaces and wrap down over blocking behind fascia.

F. Flash penetrations, curbs, and similar projections through underlayment with membrane and sealant.

3.2 INSTALLATION OF METAL PANELS

A. Install in accordance with manufacturer's instructions and approved Shop Drawings.

B. Install clips and concealed cleats; seal fastener penetrations through underlayment with compatible sealant where roof panels are installed at less than manufacturer warranted slope.

C. Install aligned, level, and plumb.

D. Locate panel joints over supports. Lap end joints 4 inches minimum. Install panels in continuous lengths from eave to ridge without end joints.

E. Install trim to maintain visual continuity of system.

F. Install joint sealants and gaskets to prevent water penetration. Provide line of tape sealant for weathertightness at panel side laps and end laps.

G. Flash penetrations through roofing with metal trim to match panels:
   1. Lap flashings over roof panels 12 inches minimum on all sides and seal with double bead of joint sealant.
   2. Install metal draw band and joint sealant at top of pipe penetrations.
   3. Install metal cricket water diverter at uphill side of square and rectangular penetrations.

H. Installation Tolerances:
   1. Variation from location: Plus or minus 1/4 inch.
   2. Variation from plane: 1/4 inch in 10 feet.

END OF SECTION

SECTION 074213

FORMED METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Exposed-fastener, lap-seam metal wall panels.
2. Concealed-fastener, lap-seam metal wall panels.
3. Metal liner panels.

B. Related Sections:
1. Section 061000 – Rough Carpentry.
2. Section 072500 – Weather Barriers.
3. Section 074800 – Rainscreen Attachment System.
4. Section 076200 – Sheet Metal Flashing and Trim.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
7. Review temporary protection requirements for metal panel assembly during and after installation.
8. Review of procedures for repair of metal panels damaged after installation.
9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:

1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details.
2. Accessories: Include details of the flashing, trim, and anchorage systems, at a scale of not less than 3 inches per 12 inches (1:5).

C. Calculations:

1. Include calculations with registered engineer seal, verifying wall panel and attachment method resist wind pressures imposed on it pursuant to applicable building codes.

D. Samples for Initial Selection: For each type of metal panel indicated with factory-applied finishes.

1. Include Samples of trim and accessories involving color selection.

E. Samples for Verification: For each type of exposed finish, prepared on Samples of size indicated below:

1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in architectural sheet metal products.

B. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockup of typical metal panel assembly 100 sf, including corner, supports, attachments, and accessories.
2. Water-Spray Test: Conduct water-spray test of metal panel assembly mockup, testing for water penetration according to AAMA 501.2.
3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Remove strippable protective covering on metal panels during installation. Do not leave film on installed panels.

E. Copper Panels: Wear gloves when handling to prevent fingerprints and soiling of surface.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Galvalume Substrate Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including rupturing or perforating.
b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: 20 years and six months from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory- applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, chipping, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Recycled Content: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 29 percent.

B. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E 1592:

1. Wind Loads: As indicated on Drawings.
2. Deflection Limits: For wind loads, no greater than 1/240 of the span.

2.2 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for weathertight installation.

B. Wide-Reveal-Joint, Concealed-Fastener Metal Wall Panels: Formed with horizontal or vertical panel edges and a corrugated profile between panel edges, resulting in a wide reveal joint between panels.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Berridge Manufacturing Company; HC-16

2. Metallic-Coated Steel Sheet: Aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ55 (Class AZM155) coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A 755/A 755M.
   a. Nominal Thickness: 0.024 inch (0.61 mm).
   b. Surface: Smooth finish.
   c. Finish: Unpainted metal with clear acrylic coating on both sides of material.
3. Panel Coverage: 16 inches (406 mm).
4. Panel Height: 0.875 inches (22 mm).

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C 645, cold-formed, metallic-coated steel sheet, ASTM A 653/A 653M, G90 (Z275) hot-dip galvanized coating designation or ASTM A 792/A 792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.

1. Closures: Provide closures at eaves and rakes, fabricated of same metal as metal panels.
2. Backing Plates: Provide metal backing plates at panel end splices, fabricated from material recommended by manufacturer.
3. Closure Strips: Closed-cell, expanded, cellular, rubber or crosslinked, polyolefin-foam or closed-cell laminated polyethylene; minimum 1-inch- (25-mm-) thick, flexible closure strips; cut or premolded to match metal panel profile. Provide closure strips where indicated or necessary to ensure weathertight construction.

C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

E. Panel Sealants: Provide sealant type recommended by manufacturer that are compatible with panel materials, are nonstaining, and do not damage panel finish.

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended in writing by metal panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.4 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs if required for full length of panel.

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
2. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
3. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
4. Sealed Joints: Form nonexpansion, but movable, joints in metal to accommodate sealant and to comply with SMACNA standards.
5. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
6. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.

    a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Steel Panels and Accessories:

1. Two-Coat Fluoropolymer: AAMA 621. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat applied by panel manufacturer on continuous coil coating line, with top-side dry film thickness of 0.75 ±0.05 mil (0.019 ±0.0013 mm) over 0.2 ±0.05-mil (0.05 ±0.0013-mm) primer coat, to provide total dry film thickness of 0.95± 0.10 mil (0.024 ±0.0025 mm). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
2. Mica Fluoropolymer: AAMA 621. Two-coat fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat applied by panel manufacturer on continuous coil coating line, with top-side dry film thickness of 0.75 ±0.05 mil (0.019 ±0.0013 mm) over 0.2 ±0.05-mil (0.05 ±0.0013-mm) primer coat, to provide total dry film thickness of 0.95± 0.10 mil (0.024 ±0.0025 mm). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
3. Metallic Fluoropolymer: AAMA 621. Two-coat fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in color coat applied by panel manufacturer on continuous coil coating line, with top-side dry film thickness of 0.75 ±0.05 mil (0.019 ±0.0013 mm) over 0.2 ±0.05-mil (0.05 ±0.0013-mm) primer coat, to provide total dry film thickness of 0.95± 0.10 mil (0.024 ±0.0025 mm). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.35 mil (0.009 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.
2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C 754 and metal panel manufacturer's written recommendations.

3.3 METAL PANEL INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Steel Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use galvanized steel fasteners for surfaces exposed to the interior.
2. Aluminum Panels: Use stainless steel fasteners for surfaces exposed to the exterior; use stainless steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Lap-Seam Metal Panels: Fasten metal panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.

1. Lap ribbed or fluted sheets one full rib. Apply panels and associated items true to line for neat and weathertight enclosure.
2. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal panels.
3. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
4. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.

5. Flash and seal panels with weather closures at perimeter of all openings.

E. Watertight Installation:

1. Apply a continuous ribbon of sealant or tape to seal lapped joints of metal panels, using sealant or tape as recommend by manufacturer on side laps of nesting-type panels; and elsewhere as needed to make panels watertight.
2. Provide sealant or tape between panels and protruding equipment, vents, and accessories.
3. At panel splices, nest panels with minimum 6-inch (152-mm) end lap, sealed with sealant and fastened together by interlocking clamping plates.

F. Metal Liner Panels: Install panels on per approved Shop Drawings.

G. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal wall panel manufacturer; or, if not indicated, provide types recommended by metal panel manufacturer.

H. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks, and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal

flashing and trim to fit substrates and achieve waterproof performance.

2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (610 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).

3.4 FIELD QUALITY CONTROL

A. Testing Agency: [**Owner will engage**] [**Engage**] a qualified testing agency to perform tests and inspections.

B. Water-Spray Test: After installation, test area of assembly [**indicated on Drawings**] [**as directed by Architect**] **<Insert area>** for water penetration according to AAMA 501.2.

C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect completed metal wall panel installation, including accessories.

D. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.

E. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

F. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 074800

RAINSCREEN ATTACHMENT SYSTEM

PART 1 GENERAL

1.1 SYSTEM DESCRIPTION

A. Provide a thermally broken, rainscreen attachment system to sufficiently support cladding installed over exterior insulation while maintaining visual design concepts.

B. Design Requirements:
1. Employ qualified professional engineer licensed in State of Texas to perform structural design.
2. Design furring system to withstand live and dead loads in accordance with Building Code.
3. Minimum stud gauge of back-up wall assembly to be 43 mil thickness.
4. Continuous, solid, non-perforated framing profiles (including C- or Z-shaped sections or furring) penetrating insulation are not allowed.
5. Attachment system must have proven thermal isolation with a reduction in thermal bridging as indicated by calculations or finite element analysis in accordance with ASHRAE guidelines.
6. Fasteners: tension shall be taken as the sum of direct tension plus tension due to prying for eccentrically loaded connections. Prying may be reduced or eliminated if proven via engineering analysis or testing.

1.2 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Conference:
1. Attendance: Architect, Owner, Contractor, installer, and related trades.
2. Review: Project conditions, back-up wall framing, manufacturer requirements, delivery and storage, staging and sequencing, and protection of completed work.

1.3 SUBMITTALS

A. Action Submittals:
1. Drawings: Illustrate products, installation, spacing and connection to adjacent construction.
2. Product Data: Manufacturer’s descriptive data and product attributes.
3. Samples: Selection samples.

B. Informational Submittals:
1. Structural calculations: Manufacturer's comprehensive structural design analysis signed and sealed by a registered professional engineer.
2. Three-dimensional thermal modeling indicating framing system’s impact on exterior insulation rated R-value.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Firm specializing in work of this Section, with minimum 3 years’ documented experience.

B. Mock-Ups: Coordinate mock-up materials and requirements with mock-up specified in Division 01 and exterior cladding specification.

C. Single source responsibility: Furnish engineered rainscreen attachment system components under direct responsibility of single manufacturer.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in manufacturers' original, unopened and undamaged containers or crates. Keep materials clean, dry and free of dirt and other debris and protect from weather or construction activities. Follow manufacturers' recommendations.

1.6 WARRANTY

A. Manufacturer's 10-year limited warranty against structural failure of system; includes the labor and material cost for removal and replacement of defective material; includes the labor cost for removal and reinstallation of overlying façade finish panels as required to access defective materials. All materials and components to be supplied and installed per manufacturer's requirements. Excludes repairs, replacement, and corrective work to the substrate, primary structure, finish panels, and/or property – unless otherwise noted above.

B. Installer's 2-year warranty against defects in installation of system.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract Documents are based on products by Knight Wall Systems. www.knightwallsystems.com

B. Substitutions: Refer to Division 01.

2.2 MATERIALS

A. Steel Sheet:
   1. Steel classification: Structural steel, 50 ksi yield strength.
   2. Corrosion protection coating: ASTM A1046, zinc-aluminum-magnesium, minimum thickness ZM40.

2.3 COMPONENTS

A. Comply with ANSI/ASHRAE 90.1.

B. Primary Girts:
   1. Profile: ThermaZee; z-channel, front and back flanges of equal length, with attachment holes.
   2. Thickness: Minimum 18 gage.
   3. Web perforations: Minimum 50 percent open area.
   4. Depth: As indicated.
   5. Thermal isolation:
      a. Located between back flange and substrate; continuous along length of channel
      b. Minimum 0.25 inch thickness.
      c. Thermal conductivity: Less than 0.18 Watts per Meter Kelvin.
      d. Designed to prevent accumulation of liquid water on upper edge.
   6. Finish: Black PVDF coated.

C. Secondary Rails:
   1. Profile: PanelRail; square hat channel with stiffening lips, weep drains and attachment holes.
   2. Thickness: Minimum 18 gage.
   3. Web perforations: 3/4 inch diameter holes at maximum 4 inches on center.
   4. Fastening face width: As determined by structural analysis.
   5. Depth: 3/4 inch.
   6. Finish: Black PVDF coated.

D. Secondary Vertical Joint Rail:
   1. Profile: RevealRail; square hat channel with stiffening lips.

2. Thickness: Minimum 18 gage.
3. Dimensions: 2.0 inches at web, 1.625 inches at each flange, with 0.25 stiffening lips.
4. Depth: 3/4 inch.
5. Finish: Black PVDF coated.

2.4 ACCESSORIES

A. Thermal Insulation: Refer to Section 072113.

B. Formed Metal Wall Panels: Refer to Section 074213.

C. Wall Anchors: Corrosion resistant coated steel; thermally isolated with minimum 1/8 inch thick polymer washer; type, spacing and embedment as system engineer requires.

D. Bracing, Furring, Bridging, Plates, Gussets, and Clips: Formed sheet steel, thickness to meet structural requirements.

E. Galvanic Protection: Utilize tapes and other methods to separate and prevent contact between dissimilar metals.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved engineering calculations.

B. Place girts no greater than maximum spacings indicated.

1. Girt layout may need to be coordinated with cladding layout and fastening requirements.
2. Components must not be cut while installed on the building unless a shearing instrument is used.

C. Friction fit thermal insulation tight to girts.

D. Install metal wall panels as specified in Section 074213.

3.2 ADJUSTING

A. Clean and touch up damaged coatings.

END OF SECTION

SECTION 075400

THERMOPLASTIC MEMBRANE ROOFING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Rigid roof insulation.
2. Cover board.
3. Fully adhered single ply thermoplastic membrane roofing.
4. Base flashings.
5. Walkway pads.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 061000 - Rough Carpentry.
3. Section 076200 - Sheet Metal Flashing and Trim.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Design roofing system to resist minimum wind loads in accordance with Building Code and ASCE 7.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Indicate:
   a. Setting plan for insulation.
   b. Roof slopes.
   c. Layout of seams.
   d. Base flashing, termination, and special details.
   e. Fastener types and locations.
2. Product Data: Manufacturer's product specifications, installation instructions, and general recommendations for each product.
3. Samples: Walkway pad.
4. Warranty: Sample warranty form.

B. Quality Control Submittals:
1. Certificates of Compliance: Certification from an independent testing laboratory that roofing system meets fire hazard and windstorm classification requirements.

1.4 QUALITY ASSURANCE

A. Installer Qualifications:
1. Minimum 3 years documented experience in work of this Section.
2. Licensed or certified by roofing materials manufacturer.
3. Class A Fire Hazard Classification, tested to ASTM E108.

B. Pre-Installation Conference:
1. Convene at site 2 weeks prior to beginning work of this Section.
2. Attendance: Architect, Contractor, roofing applicator, roofing manufacturer's representative, and related trades.
3. Review and discuss: Contract Documents, roofing system manufacturer's literature, project conditions, scheduling, and other matters affecting application.
4. Tour representative areas of roofing substrates; discuss substrate construction, related work, work conditions, and materials compatibility.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store materials, other than membrane, in protected, dry area, between 60 and 80 degrees F until used; provide proper ventilation.

B. Protect sheet goods from damage and wetting.

1.6 PROJECT CONDITIONS

A. Do not apply roofing to damp or frozen substrate.

B. Do not apply roofing during inclement weather or at temperatures below 40 degrees F, or above 100 degrees F or if freezing weather is anticipated within 24 hours after application. Do not use frozen materials.

1.7 WARRANTIES

A. Furnish manufacturer's 20 year no dollar limit warranty providing coverage against water leakage through roofing system.
   1. Make repairs to roofing system required due to defects in materials or workmanship resulting in water leakage into or through roofing system.
   2. Include cost of labor and materials necessary to make required repairs.
   3. Cover all roofing system components including roofing membrane, built-up and metal flashings, high wall waterproof flashings, roof insulation, and preflashed accessories.
   4. Not limited to specific dollar amount.
   5. Transferable to subsequent building owners during warranty period.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - TPO Roofing System:
   1. Carlisle Syntec, Inc. (www.carlisle-syntec.com)
   2. Firestone Building Products Co. (www.firestonebpco.com)
   3. GAF. (www.gaf.com)
   4. Johns Manville. (www.jm.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Rigid Insulation:
   1. Type: ASTM C1289, Type II, rigid polyisocyanurate faced both sides with glass fiber mat facings.
   2. Thermal resistance: Minimum R value of 25. Provide insulation in two approximately equal thicknesses.
   3. Maximum board size: 4 feet x 4 feet.
   4. Provide board tapered to 1/2 inch per foot at crickets and minimum 1/4 inch per foot elsewhere.

B. Cover Board: Type required by roofing manufacturer for warranty requirements or as indicated below:
   1. Source: DensDeck Prime with Eonic Technology by GP Gypsum Corporation, or approved substitute.
   2. Type: ASTM C1177/C1177M; 48 inches wide x 1/2 inch thick, maximum practical length, square cut ends and edges.
   3. Mold resistance: 10, tested to ASTM D3273.

C. Roof Membrane:
   1. Type: ASTM D6878/D6878M, reinforced thermoplastic polyolefin (TPO), ultraviolet resistant.
   2. Size: Maximum sheet size permitted by application and job conditions.
   3. Thickness: 60 mils.
   4. Color: Manufacturer’s standard tan.

D. Flashing Sheet: Manufacturer's standard flashing sheet, color to match membrane.

2.3 ACCESSORIES

A. Accessories: By manufacturer of roofing system, including adhesives, tapes, solvents, sealants, water cutoff mastic, and prefabricated pipe flashings.

B. Low Rise Foam Adhesive: Type recommended by manufacturer for attachment of insulation and cover board layers.

C. Walkway Pads: Reinforced white thermoplastic material, 30 inch width x maximum length, textured top surface and smooth bottom surface for welding to TPO roofing membrane, recommended by roofing manufacturer, minimum 1/2 inch thick.

D. Fasteners: Hot-dip galvanized or fluoropolymer coated steel, approved by roofing system manufacturer, type and length suited to project conditions.

E. Insulation Fasteners: Hot-dip galvanized or fluoropolymer coated steel, approved by roofing system manufacturer, type and length suited to project conditions, with plastic plates.

F. Termination Bar: Corrosion resistant 6063-T6 extruded aluminum.

G. Nailers and Curbs:
   1. Preservative treated wood, specified in Section 061000.
   2. Nailers: 3-1/2 inch face dimension x insulation thickness.

H. Metal Flashings: Metal flashings, TPO-coated where recommended by manufacturer, specified in Section 076200.

I. Joint Sealants: Specified in Section 079200.

PART 3 EXECUTION

3.1 PREPARATION

A. Remove projections that could puncture membrane from substrate.

B. Clean substrate of loose and foreign material, oil, and grease.

C. Complete roof penetrations and preparation for drains, flashings, and other penetrations prior to beginning roofing.

D. Protect adjacent and underlying surfaces.

3.2 INSTALLATION - GENERAL

A. Install roofing system in accordance with roofing system manufacturer's instructions, NRCA Manual, and approved Shop Drawings.

3.3 INSTALLATION OF INSULATION

A. Apply base layer with long edges continuous and perpendicular to deck ribs. Stagger end joints in adjacent rows. Locate ends over solid bearing.

B. Adhere first layer to concrete substrates, fasten to wood/metal deck substrates in accordance with manufacturer's instructions.

C. Apply top layer with long edges perpendicular to those of base layer, with joints staggered in adjacent rows. Offset joints from those in base layer.

D. Adhere all subsequent layers to substrate in accordance with manufacturer’s instructions.

E. Fit insulation to other boards and at perimeter and around penetrations with maximum 1/4 inch voids.

3.4 INSTALLATION OF COVER BOARD

A. Apply panels with long edges continuous and perpendicular to direction of insulation. Stagger end joints in adjacent rows. Offset joints from those in insulation.

B. Adhere to substrate in accordance with manufacturer’s instructions.

C. Fit panels to other panels and at perimeter and around penetrations with maximum 1/4 inch voids.

3.5 INSTALLATION OF ROOF MEMBRANE

A. Position sheets without stretching; minimize wrinkles. Allow membrane to relax before proceeding.

B. Provide minimum 5-1/2 inch lap at joints between adjacent sheets.

C. Splice sheets by heat welding method.

D. Bond membrane to substrate with adhesive applied in accordance with manufacturer’s instructions.

E. Fasten membrane to perimeter nailers with fasteners spaced 6 inches on center maximum.

F. Daily Seal:
1. Ensure that water does not flow beneath completed sections of roof.
2. Temporarily seal loose edge of membrane with night seal when weather is threatening.
3. When work is resumed, pull sheet free before continuing installation.

3.6 INSTALLATION OF FLASHINGS

A. Construct in accordance with roofing system manufacturer's standard details.

B. Juncture of Horizontal and Vertical Surfaces:
1. Use longest practical length flashing to minimize joints.
2. Complete splice between flashing and main roof sheet before bonding flashing to vertical surface. Extend splice 3 inches beyond fasteners that attach membrane to horizontal surface.
3. Adhere flashing to substrate with full bed of adhesive.
4. Fasten top of flashing at 12 inches on center maximum with termination bar, under metal flashing.

C. Penetrations through Membrane:
1. Flash pipe with premolded pipe flashings wherever possible.
2. Where molded pipe flashings cannot be installed, use field fabricated pipe seals.
3. Seal clusters of pipes and unusually shaped penetrations with perimeter curb and sheet metal hood, with each penetration separately sealed through the side of the hood and oriented to slope downward away from the curb.

D. Roof Drains:
1. Taper insulation around drain to provide smooth transition from roof surface to drain clamping ring.
2. Seal between membrane and drain base with water cutoff mastic.

3.7 INSTALLATION OF WALKWAY PADS

A. Clean underside of pad; heat weld to roofing membrane.

B. Leave 2 inch space between pieces.

3.8 FIELD QUALITY CONTROL

A. Testing and Inspection Services: Perform Flood Testing of roof drains for min. 48 hours per ASTM D5957.

END OF SECTION

SECTION 076200

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Metal flashings and trim.
2. Copings.
3. Gutters and downspouts.
4. Gutter and downspout accessories.
5. Reglets.
6. Break metal closure at flat roof edges.
7. Counterflashings over membrane roof base flashings.
8. Counterflashings at roof mounted equipment and utility penetrations.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 079200 - Joint Sealants.

1.2 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Show locations, types and thicknesses of metal, profiles, dimensions, fastening methods, provisions for expansion and contraction, and joint details.
2. Samples:
a. Each flashing and trim profile, minimum 12 inches long. Include corners where applicable.
b. 3 x 3 inch prefinished metal samples in specified color.

1.3 QUALITY ASSURANCE

A. Fabricator and Installer Qualifications: Minimum 3 years documented experience in work of this Section.

B. Design, fabricate, and install metal copings in accordance with ANSI/SPRI ES-1.

1.4 WARRANTIES

A. Roof system associated flashings are to be included within Roofing System Manufacturer's Warranty. Refer to roofing sections for warranty requirements.

PART 2 PRODUCTS

2.1 MATERIALS

A. Galvanized Steel Sheet:
1. ASTM A755/A755M, Structural Quality, G90 galvanized coating class, 24 gage core steel unless noted otherwise.
2. Precoated where indicated: AAMA 621, fluoropolymer coating, containing minimum 70 percent PVDF resins, color to be selected from manufacturer's full color range.

B. Aluminum-Zinc Alloy Coated Steel Sheet (Galvalume):
1. ASTM A792/A792M, Commercial Quality, AZ55 aluminum-zinc alloy coating, 24 gage core steel unless noted otherwise.
2. Precoated where indicated: AAMA 621, fluoropolymer coating, containing minimum 70 percent PVDF resins, color to be selected by Architect.

C. Stainless Steel Sheet: ASTM A666, Type 304 or 316, 2D conventional annealed finish, 0.018 inch thick.

2.2 ACCESSORIES

A. Solder: ASTM B32.

B. Fasteners: Same material and finish as sheet metal, with neoprene gasketed washers where exposed.

C. Joint Sealants: Specified in Section 079200.

2.3 FABRICATION

A. Fabricate components in accordance with SMACNA Manual.

B. Fabricate counterflashings at roof membrane base flashings and equipment and utility penetrations, within 6 inches of grade and lower, and other high moisture exposure areas in Stainless Steel Sheet.

C. Gutter:
1. Material: Galvaume steel, natural finish.
2. Profile: 6" half-round.
3. Fabricate end caps, outlets, and hangers from same material as gutter in profile to suit gutter.
4. Provide downspout strainers at each downspout outlet.
5. Provide rain chains at porch roof gutters:
   a. Source: Kenchuki Stainless Steel Rain Chain.
   b. Description: 316L marine grade stainless steel, 2 1/2" wide x 4" high cylinder shaped cups on link chain, with installation V-hook.

D. Downspouts:
1. Material: Galvalume steel, natural finish.
2. Profile: Round, 4 inches, or as determined by SMACNA.
3. Locate seam on back of downspout; continuously lock and solder.
4. Fabricate transitions, elbows, and outlets from same material as downspout in profile to suit downspout.
5. Provide splash blocks at existing building downspouts:
   a. Source: Oberfields LLC 24" Splash Block #1.
6. 6. Provide cast iron boots at addition downspouts
   a. Source: J.R. Hoe O-Series Round Downspout Boot, 4" round, 16" length, light gray rust inhibitive primer.

E. Copings:
1. Fabricate in Precoated Galvanized or Aluminum-Zinc Alloy Coated Steel Sheet, minimum 0.0396 inches thick.
2. Fabricate copings to profiles indicated.
3. Furnish continuous cleats of same material as coping, one gage thicker, to support edge of external leg; drill elongated holes for fasteners on interior leg.
4. Fabricate vertical faces with bottom edge formed outward 1/4 inch at 45 degrees and hemmed to form drip.
5. Provide 6 inch wide joint cover plates in same material and gage as coping.
6. Fabricate corners in single units with minimum 18 inch long legs.
7. Provide expansion joints in lengths exceeding 15 feet:
   a. Place joints at 10 feet on center maximum and maximum 2 feet from corners and intersections.
   b. Joint width: Consistent with types and sizes of materials, minimum width 1/4 inch.

F. Solder shop formed joints except pop rivet and seal joints at prefinished metal. After soldering, remove flux and wash clean.

G. Fabricate corners in single units with minimum 18 inch long legs.

H. Fabricate vertical faces with bottom edge formed outward 1/4 inch and hemmed to form drip.

I. Form sections accurate to size and shape, square and free from distortion and defects.

J. Provide for thermal expansion and contraction in sheet metal:
   1. Provide expansion joints in sheet metal exceeding 15 feet in running length.
   2. Fabricate expansion joints in metal copings with backing and cover plates formed to flashing profile, minimum 8 inches long.
   3. Place expansion joints at 10 feet on center maximum and maximum 2 feet from corners and intersections.
   4. Joint width: Consistent with types and sizes of materials, minimum width 1/4 inch.

K. Unless otherwise indicated, provide minimum 3/4 inch wide flat lock seams; lap in direction of water flow.

L. Fabricate cleats and starter strips of same material as sheet metal, minimum one gage thicker than sheet metal.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install flashing and sheet metal as indicated and in accordance with SMACNA Manual.

B. Install cleats and starter strips before starting installation of sheet metal. Fasten at 6 inches on center maximum.

C. Expansion Joints:
   1. Center backing plate between flashing pieces at end joints.
   2. Apply two continuous beads of joint sealant between backing plate and flashing sections at each end.
   3. Install flashing pieces with 1/2 inch expansion space at abutting ends; apply sealant to expansion space.
   4. Apply two continuous beads of joint sealant between cover plate and flashing sections at each end.

D. Secure flashings at 12 inches on center minimum with concealed fasteners where possible.

E. Apply a roof manufacturer approved general purpose sealant for bedding metal flashings between metal and bituminous flashings.

F. Fit flashings tight, with square corners and surfaces true and straight.

G. Seam and seal field joints.

H. Separate dissimilar metals with roof manufacturer approved general purpose sealant or non-absorptive gaskets.

I. Reglets:
   1. Install reglets true to line and level. Seal top of surface mounted reglet with joint sealant.
   2. Install flashings into reglets to form tight fit. Secure with lead or plastic wedges at 9 inches on center maximum. Seal remaining space with joint sealant.

J. Gutters: Secure with straps spaced maximum 36 inches on center and within 12 inches of ends.

K. Downspouts:
   1. Secure with straps spaced maximum 8 feet on center and within 2 feet of ends and elbows.
   2. Flash downspouts into gutters and fasten.
   3. Flash upper sections into lower sections minimum 2 inches at joints; fasten sections together.

L. Apply joint sealants as specified in Section 079200.

3.2 CLEANING

A. Clean sheet metal; remove slag, flux, stains, spots, and minor abrasions without etching surfaces.

END OF SECTION

SECTION 076500

FLEXIBLE FLASHINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Stainless steel flexible flashing for concealed wall flashings.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 033000 - Cast-In-Place Concrete.
   3. Section 044000 - Stone Assemblies.
   4. Section 061000 - Rough Carpentry.
   5. Section 061600 - Exterior Sheathing.
   6. Section 072500 - Weather Barriers.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data: Manufacturer's descriptive data and installation instructions.

1.3 QUALITY ASSURANCE

A. Pre-Installation Conference:
   1. Convene at site 2 weeks prior to beginning work of this Section.
   2. Attendance: Contractor's site foreman, manufacturer's technical representative, installer, Owner's Representative, and Architect.
   3. Review and discuss:
      a. Construction schedule and availability of materials, Installer’s personnel, equipment, and facilities needed to make progress and avoid delays.
      b. Site use, access, staging, and set-up location limitations.
      c. Approved mockup procedures.
      d. Forecast weather conditions.
      e. Surface preparation and substrate condition and pretreatment.
      f. Installation procedures.
      g. Special details.
      h. Testing and inspection requirements.
      i. Site protection measures.
      j. Governing regulations if applicable.

1.4 PROJECT CONDITIONS

A. Do not apply flashings at ambient or surface temperatures less than 40 degrees F.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on 304 SA products by York Manufacturing, Inc. (www.yorkflashings.com)

B. Other Acceptable Manufacturers:
   1. GE Silicones, Inc.; GE Elemax SS Flashing
   2. Vapro Shield, Inc.; VaproThru-Wall Flashing SA

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Stainless Steel Flexible Flashing:
1. Source: 304 SA SS by York Manufacturing, Inc., or approved substitute.
2. Type: Stainless steel core with one uncoated (bare) stainless steel face (outward facing) with a butyl block copolymer adhesive (inward facing).
3. Stainless steel: Type 304, ASTM A240. Domestically sourced per DFARS 252.225-7008 and/or DFARS 252.225-7009.
4. Adhesive: block copolymer
5. No primer required.
6. UV resistant.
7. Fire resistant: ASTM E84 Class A material.
8. Mold resistant: passes ASTM D3273.
9. Passes AAMA 711-20.
10. Passes air barrier material test: ASTM E2178-13.
11. Size: Manufacturer's standard width rolls.

2.3 ACCESSORIES

A. Polyether sealant: York Manufacturing, Inc.; UniverSeal US-100.

B. Splice Tape: York Manufacturing, Inc.; York 304 SA.

C. Corner and End Dams: Form the stainless steel flashing in the field or use 26 gauge stainless steel pre-manufactured corners.

D. Mortar deflection:
1. Source: York Manufacturing; Weep-Armor.
2. Description: Polyester strands that will not degrade and keep the weep vents from clogging with mortar.

E. Termination bar: Rigid PVC or stainless steel termination bar with sealant catch lip:
1. York Manufacturing, Inc.; T-96 termination bar
2. York Manufactuirng, Inc.; SS Term Bar

PART 3 EXECUTION

3.1 INSTALLATION

A. Provide flexible flashings in exterior wall assemblies at:
1. Exterior door heads.
2. Window heads and sills.
3. Storefront heads.
4. Horizontal control joints.
5. Changes in veneer materials, vertically.
6. Other openings and penetrations through walls

B. Install in accordance with manufacturer’s instructions.

C. Extend flashing 6" minimum beyond the opening. Fold flashing ends at the end of openings or horizontal flashing terminations to form end dam or use pre-manufactured units of 26 gauge stainless steel.

D. Flashing width: Width required starting flush with the outside face of exterior wythe, extending through the cavity, rising height required to extend above lintel steel at least 2".

E. Splice end joints by overlapping flashing at least 2" and seal with a compatible sealant or metal splice tape.

F. Masonry back up:
   1. Surface apply after a dampproofing installation specified in Weather Barrier Section in accord with manufacturer's installation instructions.
   2. Fasten to masonry backup surface at the top by embedding in a layer of sealant or use a non-corrosive termination bar and fasten it to the backer wall at the top edge of the flashing and seal the top edge with compatible sealant or use a termination clamp, which is embedded in the block back up the wall.

G. Stud back up with sheathing: Fasten to stud backup at the top by embedding in a layer of sealant or use a non-corrosive termination bar and fasten it to the backer wall at the top edge of the flashing and seal the top edge with a compatible sealant.

H. Leave ready for certified compatible weather barrier installation lapping flashing top installed per Section 072500.

I. Fold ends of flashing at the end of the opening to form dam; seal with polyether sealant or use purchased manufacturers preformed end dams.

J. Inside and outside corners: Make in an industry-accepted manner using corner and splice material or purchase manufactured corners from the manufacturer.

K. Use stainless steel or copper drip edge at any location that the underside of the flashing will be exposed and/or deemed necessary by the design professional or AHJ on the project.

L. Cover flashing within a few days of installation to protect it from damage from the different trades, the environment, and falling debris. If the flashing is left unprotected and it is punctured, torn, or has loose poly, you should contact the manufacturer for repair instructions.

END OF SECTION

SECTION 078400

FIRESTOPPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Firestopping perimeter of and penetrations through fire and smoke rated assemblies.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SYSTEM DESCRIPTION

A. Provide continuous protection against passage of heat, fire, smoke, and gases at perimeter of and penetrations through rated assemblies.

1.3 SUBMITTALS

A. Submittals for Review:
   1. Product Data:
      a. Firestopping schedule; prepare in tabular format and identify:
         1) Type of assembly receiving firestop and required fire rating.
         2) Type of penetrating item.
         3) Proposed firestop system.
      b. Include UL or equivalent details for each firestop system.
   2. Test Reports: Indicate conformance with ASTM E814, ASTM E1966, ASTM E2307, UL 1479, or UL 2079.

B. Quality Control Submittals:
   1. Certificates of Compliance: Indicate conformance of installed systems with specified requirements.

1.4 QUALITY ASSURANCE

A. Applicator Qualifications: Minimum 3 years experience in work of this Section.

B. Firestopping: Fire resistance rating equivalent to adjacent construction; tested to ASTM E814, ASTM E1966, ASTM E2307, UL 1479, or UL 2079.

C. Pre-Installation Conference:
   1. Convene at site 2 weeks prior to beginning work of this Section.
   2. Attendance: Architect, Owner, Contractor, firestopping applicator, firestopping manufacturer's representative, and related trades.
   3. Review and discuss: Contract Documents, fire rating requirements, manufacturer's literature, job conditions, scheduling, and other matters affecting application.
   4. Tour representative areas of firestopping substrates; discuss substrate construction, related work, work conditions, materials compatibility, and protection after application.

1.5 PROJECT CONDITIONS

A. Do not apply sealants, mortars, or putties when temperature of substrate material and surrounding air is below 40 degrees F or is anticipated to drop below that temperature within 24 hours after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Hilti, Inc. (www.us.hilti.com)
2. 3M Fire Protective Products. (www.3m.com)
3. Rectorseal. (www.rectorseal.com)
4. Specified Technologies, Inc. (www.stifirestop.com)
5. Tremco, Inc. (www.tremcosealants.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Firestopping: One or more of the following:
1. Silicone elastomer compound: Single or multiple component, low modulus, moisture curing silicone sealant.
2. Ceramic sealant: Single component, moisture curing ceramic sealant.
3. Intumescent sealant: Single component, water based intumescent sealant.
4. Acrylic sealant: Single component acrylic sealant, suitable for painting.
5. Putty: Single component ceramic fiber base putty or intumescent elastomer putty that expands on exposure to surface heat gain.
6. Mortar: Hydraulic cementitious mortar.
7. Pillows or blocks: Formed intumescent or mineral fiber pillows or blocks.
8. Intumescent strips: Solvent free intumescent wrap strips.
9. Mechanical devices: Incombustible fillers or silicone elastomer covered with sheet stainless steel jacket, joined with collars, penetration sealed with flanged stops.
10. Cast-in-place devices: Containing intumescent material and smoke/water seals.

2.3 ACCESSORIES

A. Forming and Damming Materials: As recommended by firestopping manufacturer for intended use.
1. Permanent: Mineral fiber board, mineral fiber matting, or mineral fiber putty.
2. Temporary: Plywood, particle board, or other.

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare openings to receive firestopping as directed by manufacturer:
1. Remove incidental and loose materials from penetration opening.
2. Remove free liquids and oil from involved surfaces and penetration components.
3. Install damming materials to accommodate and ensure proper thickness and fire rating requirements and provide containment during installation.
4. Remove combustible materials and materials not intended for final penetration seal system.

3.2 INSTALLATION

A. Install firestopping at perimeter of and penetrations through fire and smoke rated assemblies.

B. Apply materials in accordance with manufacturer's instructions.

C. Apply firestopping material in sufficient thickness to achieve required ratings.

D. Compress fibered material to achieve a density of 40 percent of its uncompressed density.

E. Place foamed material in layers to ensure homogenous density, filling cavities and spaces.

F. Place sealant to completely seal junctions with adjacent dissimilar materials.

G. Place intumescent coating in sufficient coats to achieve rating required.

H. Remove dam material after firestopping material has cured.

I. Finish exposed surfaces to smooth, flush appearance.

END OF SECTION

SECTION 079200

JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Joint backup materials.
   2. Joint sealants.
   3. Acoustical joint sealants.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data: Indicate sealants, primers, backup materials, bond breakers, and accessories proposed for use.
   2. Samples: 1/2 x 1/2 x 3 inch long joint sealant samples in specified colors.
   3. Warranty: Sample warranty form.

B. Quality Assurance Submittals:
   1. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.
   2. Compatibility and Adhesion Test Reports: From sealant manufacturer indicating the following:a. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.b. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications: Minimum 3 years documented experience in work of this Section.

B. Mockups: Prior to the start of the sealant work but following the cleaning work, perform mock-up(s) using the proposed sealant for each combination of substrates to be sealed. In each, demonstrate all aspects of old sealant removal, joint preparation, installation of back-up materials, and installation of sealant where applicable.
   1. Retain approved mock-ups in place to establish standards and guidelines for acceptable installation of sealant work.

1.4 PROJECT CONDITIONS

A. Do not apply sealants at temperatures below 40 degrees F unless approved by sealant manufacturer.

B. Do not apply material if it is raining or snowing or if such conditions appear to be imminent.

C. Do not apply work of this Section on surfaces which are wet, damp, or have frost.

1.5 WARRANTIES

A. Furnish manufacturer’s 10 year warranty providing coverage for exterior sealants and accessories that fail to provide air and water tight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Dow. (www.dow.com)
2. GE Silicones. (www.siliconeforbuilding.com)
3. Pecora Corp. (www.pecora.com)
4. Sika Group. (www.sika.com)
5. Tremco, Inc. (www.tremcosealants.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Joint Sealant Type 1:
1. ASTM C920, Grade P, multiple component polyurethane type, self-leveling and slope grades.
2. Movement capability: Plus or minus 25 percent.
3. Color: To be selected from manufacturer's full color range.

B. Joint Sealant Type 2:
1. ASTM C920, Grade NS, single component silicone type, nonstaining, non sag, formulated to adhere to low energy surfaces.
2. Movement capability: Plus or minus 25 percent.
3. Color: White.

C. Joint Sealant Type 3:
1. ASTM C920, Grade NS, single component polyurethane type, non sag.
2. Movement capability: Plus or minus 25 percent.
3. Color: To be selected from manufacturer's full color range.

D. Joint Sealant Type 4:
1. ASTM C920, Grade NS, single component silicone type, nonstaining, non sag.
2. Movement capability: Plus or minus 25 percent.
3. Color: To be selected from manufacturer's full color range.

E. Joint Sealant Type 5:
1. ASTM C834, single component acrylic latex, non sag.
2. Movement capability: Plus or minus 7-1/2 percent.
3. Color: To be selected from manufacturer's full color range.

F. Joint Sealant Type 6:
1. ASTM C920, Grade NS, single component silicone, non sag, mildew resistant.
2. Movement capability: Plus or minus 25 percent.
3. Color: To be selected from manufacturer's full color range.

G. Joint Sealant Type 7:
1. ASTM C834, single component acrylic latex, non sag, non-hardening, non-corrosive, recommended by manufacturer for acoustical applications.
2. Movement capability: Plus or minus 7-1/2 percent.
3. Color: White.

2.3 ACCESSORIES

A. Primers, Bondbreakers, and Solvents: As recommended by sealant manufacturer.

B. Joint Backing:
   1. ASTM C1330, closed cell polyethylene foam or bi-cellular polyethylene foam, preformed round joint filler, non absorbing, non staining, resilient, compatible with sealant and primer, recommended by sealant manufacturer for each sealant type.
   2. Size: Minimum 1.25 times joint width.

2.4 MIXES

A. Mix multiple component sealants in accordance with manufacturer's instructions.
   1. Mix with mechanical mixer; prevent air entrainment and overheating.
   2. Continue mixing until color is uniform.

PART 3 EXECUTION

3.1 PREPARATION

A. Remove loose and foreign matter that could impair adhesion. If surface has been subject to chemical contamination, contact sealant manufacturer for recommendation.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Protect adjacent surfaces with masking tape or protective coverings.

D. Sealant Dimensions:
   1. Minimum joint size: 1/4 x 1/4 inch.
   2. Joints 1/4 to 1/2 inch wide: Depth equal to width.
   3. Joints over 1/2 inch wide: Depth equal to one half of width.

3.2 APPLICATION

A. Apply products in accordance with manufacturer's instructions.

B. Install sealants and accessories in accordance with ASTM C1193.

C. Install acoustical sealants and accessories in accordance with ASTM C919.

D. Install joint backing to maintain required sealant dimensions. Compress backing approximately 25 percent without puncturing skin. Do not twist or stretch.

E. Use bondbreaker tape where joint backing is not installed.

F. Fill joints full without air pockets, embedded materials, ridges, and sags.

G. Tool sealant to smooth profile.

H. Apply sealant within manufacturer’s recommended temperature range.

3.3 CLEANING

A. Remove masking tape and protective coverings after sealant has cured.

B. Clean adjacent surfaces.

3.4 SCHEDULE

JOINT LOCATION OR TYPE	SEALANT TYPE
Exterior Joints:	
Joints in horizontal surfaces subject to traffic	1
Joints in concealed above-grade surfaces at flexible flashings (if required)	2
Joints in plaster surfaces above grade where required for compatibility	3
Joints in other above-grade surfaces	4
Interior Joints:	
Joints in horizontal surfaces subject to pedestrian traffic	1
Joints in toilet rooms, countertops	6
Joints in acoustical assemblies	7
Other joints	5

END OF SECTION

SECTION 080381

WOOD DOOR AND FRAME RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Restoration and replacement of deteriorated wood.
2. Restoration of existing hardware.
3. Restoration and replacement of missing folding/sliding door leaves.
4. Replacement of damaged and missing hardware.
5. Refinishing.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 060122 - Wood Restoration.
3. Section 087100 - Door Hardware.
4. Section 099100 - Painting.

1.2 REFERENCES

A. National Park Service - Secretary of Interior Standards for Rehabilitation. (www.nps.gov/tps/standards.htm)

1.3 DEFINITIONS

A. Severe Deterioration: Deteriorated of the whole or part of an element to include voids and where the structural integrity of the element or the assembly in which the element is located is jeopardized.

B. Moderate Deterioration: Deterioration of the whole or part of an element to include voids and where the element is punctured under moderate pressure from a screwdriver, but where the structural integrity of the element or the assembly in which the element is located is not jeopardized.

C. Minor Deterioration: Deterioration of the whole or part of an element to the point where it feels soft but is not punctured under light pressure from a screwdriver, and voids do not exist.

1.4 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Documentation of each door to be restored and description of work to be done.

B. Quality Control Submittals:
1. Qualifications: Restorer qualifications, including previous projects.

1.5 QUALITY ASSURANCE

A. Restorer Qualifications:
1. Minimum 3 years experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 5 years.

B. Mockup:
1. Size: One typical door and frame.
2. Show: Each wood restoration process, hardware, glazing, and finishing.
3. Locate where directed.
4. Approved mockup may remain as part of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Hardware: Specified in Section 087100.

B. New wood: Compatible with existing, as specified in 060122.

PART 3 - EXECUTION

3.1 RESTORATION

A. This Section describes the overall restoration of existing doors, related wood trim, hardware, and glass. Other sections referenced under "Related Sections" specify portions of the Work in more detail.

3.2 REPAIR AND REPLACEMENT OF WOOD

A. Minor Deterioration: Consolidate soft wood as specified in Section 060122.

B. Moderate Deterioration: Consolidate soft wood and patch voids as specified in Section 060122.

C. Severe Deterioration:
1. Replace deteriorated wood door and frame members with new wood as specified in Section 060122.
2. Match new wood to profile and grain of existing wood.
3. Fit replacement wood to hairline joint, glue and nail. Stapling not permitted.

D. Missing Elements:
1. Replace missing wood door and frame members with new wood as specified in Section 060122.
2. Match new wood to profile and grain of original wood.
3. Fit replacement wood to hairline joint, glue and nail. Stapling not permitted.

3.3 REPAIR AND REPLACEMENT OF HARDWARE

A. Where reuse of existing hardware is indicated in the Documents, restore existing operable items to working condition.

B. Replace damaged and missing hardware.

C. Replace missing fasteners with new to match original. Tighten existing fasteners.

D. Lubricate operable parts.

E. Adjust for smooth operation.

3.4 REFINISHING WOOD

A. Refinish wood to match existing paint as specified in Section 099100.

B. Refinish exterior and interior faces of doors and exterior and interior side of frames.

C. Remove doors from frames to permit access to edges. Finish edges same as faces.

END OF SECTION

SECTION 080383

WOOD WINDOW RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Restore windows, work generally includes:
   a. Replacement of sashes, glass, parting strip, and exterior mullion trim to match existing.
   b. Reinforcing bottom rail of upper sashes.
   c. Restoration of frame, blind stop, sill, brick mold, interior stops, and existing hardware.
   d. Replacement of deteriorated wood.
   e. Refinishing.
2. Replacement of perimeter sealants.
3. Replacement of sash cords 100%, replacement of missing or damaged hardware beyond repair (Reuse existing where in restorable condition), replacement of weatherstripping, and reuse of sash weights.
4. Fixing sashes in place, including metal angles to support upper sash as indicated on the Drawings.

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 012200 – Unit Prices
3. Section 012300 – Alternates for replacing windows and frames.
4. Section 061000 – Rough Carpentry.
5. Section 079200 – Joint Sealants.
6. Section 088000 – Glazing.
7. Section 099100 – Painting for field painting.

C. Related Documents:

1. Lead-Based Paint abatement specifications provided by others.

1.2 REFERENCES

A. AWI – Architectural Woodwork Institute.

B. WDMA – Window and Door Manufacturers Association: I.S. 6A-01 Industry Standard for Architectural Stile and Rail Doors.

1.3 SUBMITTALS

A. Shop drawings:

1. Provide plans and elevations indicate materials, surface grain direction, profiles, assembly methods, joint details, fastening methods, accessories, hardware, and finishes.

a. Field Measurements: Obtain field measurements of each type of original window frame unit and sash to be replicated and indicate on shop drawings.

b. Where windows or sashes are scheduled to be replicated from existing similar assemblies, match exactly the dimensions, profiles, construction details, materials, and finish of original windows unless noted otherwise.

1.4 QUALITY REQUIREMENTS

A. Quality Standard: Comply with the following standard:

1. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute, Section 1000 for Premium Grade.

B. Fabricator/Installer Qualifications:

1. Minimum 5 years documented experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 5 years.

B. Mockups:

1. Provide mockup of one completely restored window with new sashes.
2. Show frame, sash, trim, joint sealants, paint, hardware, and weatherstripping.
3. Locate where directed.
4. Approved mockup may remain as part of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Lumber for opaque finish:

1. Species: Sapele, of quality suitable for opaque finish on interior and exterior faces.
2. Cut: Plain sawn
3. Maximum moisture content: 6 percent.

B. Hardware:

1. Existing original sash locks in good condition are to remain and be refinished to match original condition. Where sash locks are missing, provide new locks to match existing.
   a. Install restored and replica sash locks. Install original hardware in their existing location
2. Sash locks:
   a. Sash Lock: # 4 solid brass lock as manufactured by The Architectural Resource Center (brasswindowhardware.com), (800) 370-8808.
   b. Obtain hardware in un-lacquered brass, typical for all window hardware.
3. Sash Lift:
   a. Model LFD30 (1 per sash), solid brass, un-lacquered brass finish, as manufactured by Phelps Company, Brattleboro, VT, (802) 257-4314, or match existing.
4. Pulley (2 per window): Model SP250BBRE solid brass, , un-lacquered brass finish, as manufactured by Phelps Company, (802) 257-4314, or match existing.
5. Sash Cord: Cotton cord with nylon core at wood windows.

C. Weatherstripping:

1. Head: Series 6, item 1B, 12 gauge bronze, as manufactured by Zero International.
2. Jamb: Series 6, item 4B, 9 gauge bronze, as manufactured by Zero International.
3. Meeting Rail: Series 6, items 2B & 3B, (item 2, provide 10 gauge bronze; item 3 provide 9 gauge bronze), as manufactured by Zero International.
4. Sill: #8054S-Bk, kerf neoprene seal.

D. Perimeter Sealants: Specified in Section 07920.

E. Preservative Treatment: Bora-Care termite pretreatment, as manufactured by Nisus Corporation, or approved equal.

F. Glass and Glazing Accessories: Specified in Section 088000.

G. Paints and Coatings: Specified in Section 099100.

H. Consolidant: Low viscosity penetrating consolidant, 8 hour minimum cure time; LiquidWood by Abatron, Inc. Or approved substitute.

I. Epoxy Fill Patching Compound:

1. Exterior surfaces: Epoxy based, multiple component; WoodEpox by Abatron, Inc. Or approved substitute.
2. Interior surfaces: Minwax Wood Putty by Minwax Company or approved substitute, color matched to wood.

2.2 FABRICATION OF NEW COMPONENTS

A. Comply with AWI Section 1000.

B. Fabricate new windows and sashes with profiles to match existing.

C. Fabricate mullions and sash members with mortised and tenoned joints. Fit to hairline joint, glue and nail. Stapling not permitted.

D. Finger joints not permitted.

E. Form glass stops of solid wood, sloped for water wash.

F. Install hardware centered or symmetrically located.

G. Weatherstrip operable sash, seal fixed sash.

H. Form sills in one piece. Slope sills for water wash.

I. Size units to allow for tolerances of rough openings and shim space around perimeter.

PART 3 – EXECUTION

3.1 REPLACEMENT OF DETERIORATED AND MISSING WOOD

A. Replace deteriorated wood sash and trim members with new wood.

B. Match new wood to profile and grain of existing wood.

C. Fabricate frame and sash members with mortised and tenoned joints. Fit to hairline joint, glue and nail. Stapling not permitted.

D. If sashes are removed, provide temporary plywood infill that provides weather tight protection over opening. Coordinate installation procedures with Construction Manager. Install with a method of attachment that does not damage existing materials to remain.

3.2 EPOXY PATCHING OF EXISTING WOOD

A. Mix and apply epoxy in accordance with manufacturer's instructions

B. Apply epoxy putty to fill voids after consolidant has cured.

C. Embed wood in center of large patches to reduce amount of filler.

D. After filler has cured, sand, chisel or plane off to smooth surface, flush with adjacent surfaces.

3.3 CONSOLIDATION OF EXISTING WOOD

A. Remove damaged and deteriorated wood to sound material and apply consolidant.

B. Apply consolidant in accordance with manufacturer's instruction

C. Completely saturate damaged wood with consolidant; allow to cure 8 hours minimum.

D. Apply to end grain where exposed. Where end grain is not exposed, drill 1/8 inch holes staggered and at angles to side grain to expose as much end grain as possible.

E. Prevent leakage with wax or clay plugs. Clean leakage before it cures.

F. Apply second coat if first coat does not completely saturate and harden wood.

3.4 FIXING OPERABLE SASH IN PLACE

A. Fix all sashes in place.

B. Fix upper sash of double hung window in place by securing sash with countersunk or concealed fasteners into 3" x 3" x 1/8" thick bent metal plate. Embed in sash and frame each side to support top sash(es). Finish to match sash and frame. Coordinate placement of fasteners with Construction Manager.

C. Apply joint sealer to sash-to-frame joints at fixed window sashes.

3.5 REFINISHING WOOD

A. Refinish wood under provisions of Section 099100.

B. Paint exposed exterior surfaces; paint exposed interior surfaces.

C. Avoid damage to existing interior surfaces. Properly protect interior surfaces from damage.

D. Replacement members and existing adjacent interior members affected by construction are to be refinished to match existing surfaces.

3.6 REINFORCEMENT OF BOTTOM RAIL AT UPPER SASHES

A. Provide 3/16 inch thick stainless steel reinforcing plate, rout flush to bottom rail at all upper sashes as indicated on Drawings.

3.7 PREPARATION

A. Prior to installation, condition windows to average humidity that will prevail after installation.

3.8 INSTALLATION OF NEW WINDOWS

A. Install windows plumb and level.

B. Maintain alignment with adjacent construction.

C. Set units plumb, level, and square; shim as required.

D. Secure windows to adjacent construction without distortion or stress.

END OF SECTION

SECTION 081113

HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Hollow steel doors and frames.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 061000 - Rough Carpentry.
   3. Section 087100 - Door Hardware.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Show locations, elevations, dimensions, model designations, acoustic, fire, and thermal ratings, preparation for hardware, and anchoring details.
   2. Product Data: Show elevations, dimensions, gages of metal, hardware reinforcing gages and locations, and anchor types.
   3. Door Schedule: Use same reference designations as indicated on Drawings in preparing schedule for doors and frames.

B. Quality Control Submittals:
   1. Certificates of Compliance: Certification that products furnished comply with ANSI/SDI A250.3, ANSI/SDI 250.4, and ANSI/SDI A250.10.

1.3 QUALITY ASSURANCE

A. Doors: ANSI/SDI A250.8.
   1. Grade: II - Heavy Duty.
   2. Model: 2 - Full flush.
   3. Exterior doors: Maximum thermal transmittance (U-value) of 0.50, tested to ASTM C518.

B. Frames: ANSI/SDI A250.8, Grade II - Heavy Duty.

C. Fire Door and Frame Construction: Conform to UL 10C.

D. Installed Fire Rated Door and Frame Assemblies: Conform to NFPA 80.

E. Acoustic Door and Frame Assemblies: Minimum STC ratings as indicated in the Drawings, measured in accordance with ASTM E413.

1.4 DELIVERY, STORAGE AND HANDLING

A. Ship door frames with removable angle spreader; do not remove until frame is installed.

B. Store doors upright in protected, dry area, off ground or floor, with at least 1/4 inch space between individual units.

C. Do not cover with non vented coverings that create excessive humidity.

D. Remove wet coverings immediately.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Ceco Door (www.cecodoor.com)
2. Curries. (www.curries.com)
3. Pioneer Industries, Inc. (www.pioneerindustries.com)
4. Steelcraft. (www.steelcraft.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Hollow Metal Doors and Frames:
1. Exterior doors: Foamed-in-place polyurethane insulation manufactured using low-emitting, urea formaldehyde-free binders.
2. Interior doors: Resin impregnated fibrous honeycomb.

B. Steel Sheet: ASTM A1008/1008M, cold rolled.

C. Galvanized Steel Sheet: ASTM A653/A653M, hot dipped, Structural Quality, Class G40 galvanized.

2.3 ACCESSORIES

A. Primer: Zinc rich type.

B. Batt Insulation: Non-combustible, lightweight, mineral wool batt insulation to ASTM C665, Type 1.

2.4 FABRICATION

A. Fabricate doors and frames in accordance with ANSI/SDI A250.8.

B. Fabricate exterior doors and frames from galvanized steel sheet.

C. Fabricate exterior frames with 3/8 inch vinyl thermal break separating interior and exterior surfaces.

D. Doors:
1. Fabricate from minimum 18 gage sheets.
2. Close top and bottom edges of doors with steel channel, minimum 16 gage, extending full width of door, and spot welded to both faces, with top channel flush and bottom channel recessed.
3. Fill voids between vertical steel stiffeners with batt insulation.

E. Frames:
1. Fabricate from minimum 16 gage sheets.
2. Close corner joints tight with trim faces mitered and face welded, full profile welded, or continuously welded and ground smooth.
3. Anchors:
   a. Provide one anchor at each jamb for each 30 inches of door height.
   b. Design anchors to provide positive fastenings to adjacent construction.
   c. Provide one floor anchor welded to each jamb.

F. Accurately form to required sizes and profiles.

G. Grind and dress exposed welds to form smooth, flush surfaces.

H. Do not use metallic filler to conceal manufacturing defects.

I. Fabricate with internal reinforcement for hardware specified in Section 087100; weld in place.

J. Design Clearances:
   1. Between door and frame: Maximum 1/8 inch.
   2. Between meeting edges of pairs of doors:
      a. Non-fire rated doors: 3/16 inch plus or minus 1/16 inch.
      b. Fire-rated doors: 1/8 inch plus or minus 1/16 inch.
   3. Undercut:
      a. Non-fire rated doors: Maximum 3/4 inch.
      b. Fire-rated doors: Comply with NFPA 80.
   4. Between face of door and stop: 1/16 to 3/32 inch.

K. Manufacturing Tolerances: In accordance with SDI-117.

2.5 FINISHES

A. Dress tool marks and surface imperfections to smooth surfaces.

B. Clean and chemically treat steel surfaces.

C. Touch up damaged metallic coatings.

D. Apply manufacturer's standard rust inhibiting primer paint, air-dried or baked on, meeting requirements of ANSI/SDI A250.10.

PART 3 EXECUTION

3.1 INSTALLATION - GENERAL

A. Install doors and frames in accordance with ANSI/SDI A250.11.

B. Set plumb and level.

C. Secure to adjacent construction using fastener type best suited to application.

D. Install hardware in accordance with Section 087100.

E. Solidly pack batt insulation inside frames at metal stud partitions.

3.2 ADJUSTING

A. Touch up minor scratches and abrasions in primer paint to match factory finish.

END OF SECTION

SECTION 081433

STILE AND RAIL WOOD DOORS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood stile and rail doors.
   2. Factory finishing.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 087100 - Door Hardware.
   3. Section 088000 - Glazing.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Show locations, elevations, dimensions, and preparation for hardware.
   2. Samples:
      a. 6 x 6 inch door samples showing stile, rail, and panel.
      b. 6 x 12 inch wood samples showing selected stain color and finish.
   3. Warranty: Sample warranty form.

1.3 QUALITY ASSURANCE

A. Fire Door Construction: Conform to UL 10C.

B. Installed Fire Rated Door Assembly: Conform to NFPA 80.

1.4 DELIVERY, STORAGE AND HANDLING

A. Package doors in heavy plastic with identifying marks; slit plastic wrap on site to permit ventilation, but do not remove from plastic until ready to install.

B. Do not deliver doors until building is substantially water and weather tight.

C. Store doors flat and level, with spacers between doors to allow for air circulation, in protected, dry area.

D. Environmental Requirements: Maintain following conditions in building for minimum 7 days prior to, during, and after installation of doors:
   1. Temperature: 60 to 80 degrees F.
   2. Humidity: 25 to 55 percent.

1.5 WARRANTIES

A. Furnish manufacturer’s 5 year warranty providing coverage against:
   1. Defects in materials and workmanship.
   2. Warpage beyond specified amount.
   3. Telegraphing of core construction.
   4. Delamination of faces. and workmanship and warpage beyond specified amount.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Masonite. (www.masonite.com)
2. TruStile. (www.trustile.com)
3. VT Industries. (www.vtindustries.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Stile and Rail Wood Doors: AWI Architectural Woodwork Standards.
1. Exposed wood:
a. Transparent Finish: Refer to Drawings for species and cut, of quality suitable for transparent finish.
b. Opaque Finish: Refer to Drawings for species and cut, of quality suitable for opaque finish.
2. Adhesives: Waterproof type.
3. Thickness: 1-3/4 inches, typical at new doors.

2.3 ACCESSORIES

A. Glass and Glazing Accessories: Specified in Section 088000.

2.4 FABRICATION

A. Fabricate doors in accordance with AWI Architectural Woodwork Standards.
1. Grade: Premium.
2. Performance Level: Heavy Duty.
3. Panel and glass retention: Molding to be selected by Architect.
4. Stiles and rails: Solid wood construction.
5. Panels: Solid wood construction; flat type.

B. Prefitting; fit doors to frames at factory with following clearances:
1. Width: Cut hinge and lock edges equally.
2. Height: Cut bottom edge only; maximum 3/4 inch.
3. Edge clearances:
a. Jambs and head: 1/8 inch maximum between door and frame.
b. Sills without thresholds: 3/8 inch maximum between door and top of finish floor.
c. Sills with thresholds: 1/4 inch maximum between door and top of threshold.
d. Meeting stiles of pairs: 1/8 inch maximum between doors.
e. Double leaf pocket doors to be detailed to rabbit together when closed to eliminate sight gap between doors.
4. Lock edge: Bevel 1/8 inch in 2 inches.

C. Premachining: Machine doors at factory to receive hardware specified in Section 087100.

2.5 FINISHES

A. All door leaf, frame, and trim surfaces must be primed or sealed. Prime or seal mortises.

B. Factory Finishing:
1. Factory finish doors in accordance with AWI Architectural Woodwork Standards.
2. Finish system: 8 - UV Curable, Acrylated Epoxy, Polyester, or Urethane.
3. Color and Sheen: To be selected from manufacturer's full color range.

PART 3 EXECUTION

3.1 PREPARATION

A. Condition doors to average humidity that will be encountered after installation.

3.2 INSTALLATION

A. Install doors in accordance with AWI Architectural Woodwork Standards.

B. Install doors plumb and level.

C. If field cutting for height is necessary, cut bottom edge only, 3/4 inch maximum.

D. Seal field cut surfaces.

E. Install door hardware in accordance with Section 087100.

F. Install glass as specified in Section 088000.

G. Installation Tolerances:
   1. Warp: Maximum 1/4 inch in any 3'-0" x 7'-0" portion of door, measured with taut string or straight edge on concave face of door.

END OF SECTION

SECTION 083113

ACCESS DOORS AND FRAMES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Access doors and frames for wall and ceiling surfaces.
2. Access doors and frames for mechanical soffit in Multi-Use A and B

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Division 23 and Mechanical Drawings: For custom mechanical soffit access panels in Multi-Use A and B.

1.2 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Show layouts, sizes, and relationship to adjacent construction.
2. Product Data: Provide sizes, types, finishes, scheduled locations, and details of adjoining work.

1.3 QUALITY ASSURANCE

A. Fire Door Construction: Conform to UL 10B.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Acudor Products, Inc. (www.acudor.com) and mechanical soffit access products by Bauco Access Panel Solutions Inc. (www.accesspanelsolutions.com)

B. Other Acceptable Manufacturers:
1. Babcock-Davis, Inc. (www.babcockdavis.com)
2. J.L. Industries. (www.jlindustries.com)
3. Karp Associates, Inc. (www.karpinc.com)
4. Milcor. (www.milcorinc.com)
5. Nystrom, Inc. (www.nystrom.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Access Panels - Drywall Faced:
1. Source: Acudor Products, Inc, or approved substitute.
2. Description: Concealed hardware gypsum wallboard access panel.
3. Size: Refer to Drawings.

B. Access Panels - virtually invisible front-mounting recessed drywall access panel for walls:
1. Source: Bauco XL by Bauco Access Panel Solutions, Inc., or approved substitute.
2. Description: Heavy-duty non-fire rated recessed access doors with concealed hardware and gypsum board inlay for flush installation and virtually invisible finish. Install on the front of surrounding wallboard.
3. Size: Refer to Drawings.

C. Steel Sheet: ASTM A1008/A1008M, cold rolled.

D. Galvanized Steel Sheet: ASTM A653/A653M, Structural Quality.

2.3 FABRICATION

A. Fabricate door frame of steel sheet:
   1. Doors 16 x 16 inches and smaller: Minimum 18 gage.
   2. Doors over 16 x 16 inches: Minimum 16 gage.
   3. Fabricate frames with flange type to suit installation conditions.

B. Fabricate non-rated door panels of minimum 14 gage steel sheet.

C. Fabricate fire rated door panels of two sheets of minimum 20 gage steel sheet. Fill core with noncombustible insulation.

D. Provide drywall faced access panels in public areas.

E. Weld, fill, and grind joints to flush and square appearance.

F. Hardware:
   1. Continuous steel hinges, 175 degree opening.
   2. Screwdriver operated cam latch.
   3. Automatic closers for fire rated doors.

2.4 FINISHES

A. Exterior Doors and Interior Doors in Wet Locations: Hot dip galvanized, G90 coating class.

B. Other Interior Doors: One coat rust-inhibiting primer paint, sprayed and baked.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install plumb and level in openings. Secure rigidly in place.

C. Position units where indicated or where required to provide convenient access to concealed work requiring maintenance.

END OF SECTION

SECTION 084113

ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Aluminum entrance doors and frames.
2. Aluminum framed glazed storefronts.
3. Glass infill panels.
4. Door hardware.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 079200 - Joint Sealants.
3. Section 087100 - Door Hardware.
4. Section 088000 - Glazing.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Design exterior systems to withstand:
1. Design wind pressure in accordance with ASCE 7, with maximum allowable deflection of L/175, tested in accordance with ASTM E330.
2. Movement caused by an ambient temperature range of 120 degrees F and a surface temperature range of 160 degrees F.
3. Movement between storefront and adjacent construction.
4. Dynamic loading and release of loads.
5. Deflection of supports.
6. Overhead structure deflection of 1/2 inch.

B. Performance Requirements:
1. Air infiltration, tested to ASTM E283.
   a. Entrances:
      1) Single door: Maximum 0.5 CFM per minute per linear foot of perimeter crack, at static pressure differential of 6.24 PSF.
      2) Pairs of doors: Maximum 1.0 CFM per minute per linear foot of perimeter crack, at static pressure differential of 6.24 PSF.
   b. Storefront: 0.06 CFM per square foot of fixed area at static pressure differential of 6.24 PSF.
2. Water infiltration: No uncontrolled water leakage, tested to ASTM E331 at minimum test pressure of 6.24 PSF for inswing doors and 8.0 PSF for outswing doors and storefront.
3. Uniform structural loading: No glass breakage or permanent damage to fasteners or system components, tested to ASTM E330 at 1.5 times design pressure.
4. Thermal transmittance due to conduction (Uc): Maximum 0.60, tested to AAMA 1503 on two 6'-0" x 6'-0" units with 1 inch clear insulating glass.
5. Condensation resistance factor (CRF): Minimum 50, tested to AAMA 1503.
6. Solar Heat Gain Coefficient (SHGC) = .6 maximum.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, trim, sealers, hardware, and accessories.
2. Samples: 3 x 3 inch coating samples showing available colors.

B. Quality Control Submittals:
1. Test Reports: Certified results of previous tests by a recognized independent laboratory substantiating compliance with specified design and performance criteria, current within past 5 years.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 3 years documented experience in work of this Section.

B. Conform to applicable accessibility code for locating hardware and for door opening force requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. Handle products in accordance with AAMA CW-10.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Kawneer Co., Inc. (www.kawneer.com)

B. Other Acceptable Manufacturers:
1. EFCO Corporation. (www.efcocorp.com)
2. Oldcastle BuildingEnvelope. (www.oldcastlebe.com)
3. Tubelite, Inc. (www.tubeliteinc.com)
4. YKK AP America, Inc. (www.ykkap.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Aluminum:
1. Extrusions: ASTM B221, 6063-T5 alloy and temper.
2. Sheet: ASTM B209, alloy and temper best suited to application.

2.3 COMPONENTS

A. Storefront:
1. Source: EnCORE by Kawneer, or approved substitute.
2. Type: Flush glazing system designed to receive 1 inch glass by means of elastomeric gaskets; 1-3/4 inch face width x 4-1/2 inch depth, front glass application, thermally broken at exterior locations.

B. Entrances Doors:
1. Source: 190 Standard Entrances by Kawneer, or approved substitute.
2. Type: Narrow stile configuration with nominal 2-1/8 inch vertical stiles and top rail and 10 inch bottom rail, thermally broken at exterior locations.

C. Door Hardware: Specified in Section 087100.

2.4 ACCESSORIES

A. Fasteners:
1. Series 300 stainless steel for wet locations and exposed fasteners.
2. Stainless or fluoropolymer coated steel for other locations.

B. Joint Sealants: Specified in Section 079200.

C. Glass and Glazing Accessories: Specified in Section 088000.

D. Weatherstripping: Replaceable, nonporous synthetic wool pile type.

2.5 FABRICATION

A. Fabricate with minimal clearances and shim spaces around perimeter.

B. Accurately fit and secure joints and intersections. Make joints flush, hairline, and weathertight.

C. Fabricate in largest practical units.

D. Conceal fasteners and attachments from view.

E. Fabricate fascias, covers, closures, flashings, and trim members from same material as storefront.

F. Fabricate aluminum components with integral low conductance thermal barrier located between exterior and interior exposed components that eliminates metal-to-metal contact.

G. Doors:
1. Mechanically fastened and welded corner construction.
2. Fabricate stiles and rails of minimum 0.188 inch thick extrusions and glass stops from minimum 0.050 inch thick extrusions.
3. Provide weatherstripping at door head, jambs, meeting stiles, and sills.
4. Prepare with internal reinforcements for door hardware.

2.6 FINISHES

A. Aluminum: Kawneer Permanodic® AA-M10C21A44, AAMA 611, Architectural Class I Color Anodic Coating (Color to be selected by Architect from manufacturer’s full line).

B. Apply bituminous coating to aluminum surfaces in contact with cementitious materials.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved Shop Drawings.

B. Install components plumb and level, in proper plane, free from warp and twist.

C. Anchor to supporting construction.

D. Set thresholds and sill members exposed to weather in mastic and secure.

E. Install hardware using templates provided by manufacturer.

F. Install glass and accessories in accordance with Section 088000.

G. Installation Tolerances:
1. Maximum variation from plumb or level: 1/8 inch in 3 feet or 1/4 inch in any 10 feet, whichever is less.
2. Maximum misalignment of members abutting end to end: 1/32 inch.
3. Sealant space between framing members and adjacent construction: 1/2 inch plus or minus 1/8 inch.

3.2 ADJUSTING

A. Adjust hardware for smooth operation.

B. Adjust doors to operate with maximum opening forces in accordance with applicable accessibility code.

C. Touch up minor scratches and abrasions to match original finish.

D. Adjust weatherstripping to contact appropriate surfaces and form weather seal.

END OF SECTION

SECTION 085213

ALUMINUM-CLAD WOOD WINDOWS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Shop fabricated aluminum-clad wood windows, with fixed and operable sash.
2. Shop glazing.
3. Operating hardware.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 064000 - Architectural Woodwork.
3. Section 076500 - Flexible Flashings.
4. Section 079200 - Joint Sealants.
5. Section 088000 - Glazing.

1.2 SYSTEM DESCRIPTION

A. Windows: AAMA/WDMA/CSA 101/I.S.2/A440.
1. Product type:
   a. Operable Single Hung Window - H
   b. Fixed Wood Window - F.
2. Performance Classification: LC.
3. Performance Grade: 40.
4. Thermal transmittance of window assembly: Maximum U-value of 0.35 BTU/square foot per hour per degree F, tested to NFRC 100.
5. Forced entrance resistance: Conform to ASTM F588.

B. Design Requirements; design windows to withstand:
1. Design wind pressure in accordance with Building Code, with maximum allowable deflection of L/180.
2. Movement caused by an ambient temperature range of 120 degrees F and a surface temperature range of 160 degrees F.
3. Movement between system and adjacent construction.
4. Dynamic loading and release of loads.
5. Deflection of supports.
6. Overhead structure deflection of 1/8 inch.
7. Solar Heat Gain Coefficient (SHGC) = .3

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Include locations, dimensions, profiles, relationship to adjacent construction, and attachments.
2. Samples:
   a. Window corner, minimum 6 x 6 inches, showing corner construction, cross section, and finish.
   b. 3 x 3 inch finish samples showing available colors.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 3 years documented experience in work of this Section.

B. Conform to applicable accessibility code for locating hardware.

C. Windows: Energy Star qualified for project location; bear Energy Star label.

D. Mockup:
   1. Size: One full sized window unit.
   2. Locate where directed.
   3. Approved mockup may remain as part of the Work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver units factory assembled, with sash installed in frame.

1.6 WARRANTY

A. Standard exterior aluminum cladding finish is warranted against manufacturing defects resulting in chalk, fade and loss of adhesion (peel) per the American Architectural Manufacturer's Association (AAMA) Specification 2605-11 Section 8.4 and 8.9 for twenty (20) years from the date of Substantial Completion.

B. Factory-applied interior finish is warranted to be free from finish defects for a period of five (5) years from the date of Substantial Completion.

C. Hardware and other non-glass components are warranted to be free from manufacturing defects for ten (10) years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on Ultimate Series products by Marvin Windows. (www.marvin.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Aluminum-Clad Wood Windows:
   1. Source: Ultimate Single Hung G2 and Ultimate Picture by Marvin Windows, or approved substitute.
   2. Simulated divided lite with internal spacer bars painted black or bronze.
   3. Interior Sash Sticking: Standard Ogee
   4. Jamb Extensions: By trim installer
   5. Aluminum Extrusions: Mullion cap A116, Field-fit and applied Frame Expander A110.

B. Wood:
   1. Species and Grade: Douglas Fir, of quality suitable for opaque finish.
   2. Preservative treated in accordance with WDMA I.S.4, kiln dried to maximum 12 percent moisture content.

C. Glass and Glazing Accessories: Specified in Section 088000.

D. Exterior Cladding: Extruded aluminum, shop fit to profile of wood members.

E. Operating Hardware:
   1. Aluminum, stainless steel, plated steel, or other noncorroding material. Finish to be selected by Architect from Manufacturer's full range.
   2. Spiral steel extension spring-type balances on each sash, self-aligning sash lock and strike, and lift handles.
   3. Locking system that provides locking, unlocking, balancing, and tilting of the sash members
   4. Bottom Rail Lock Actuator Assembly - Lift Lock with Custodial design features.
      a. Material: Zinc die-cast, finish to be selected by Architect from Manufacturer's full range.

F. Weatherstripping: Manufacturer's standards.

2.3 ACCESSORIES

A. Fasteners: Stainless steel, hot-dip galvanized steel, or fluoropolymer coated steel; type best suite to application.

2.4 FABRICATION

A. Fabricate to AAMA/WDMA/CSA 101/I.S.2/A440.

B. Fabricate mullions and sash members with mortised and tenoned joints; fit to hairline joints.

C. Finger joints not permitted.

D. Form glass stops of solid wood, sloped for water wash.

E. Weatherstrip operable sash.

F. Form sills and stools in one piece. Slope sills for water wash.

G. Size units to allow for tolerances of rough openings and shim space around perimeter.

H. Clad exterior surfaces with aluminum. Match and align cladding for continuity of design and line.

I. Provide internal drainage to exterior for moisture entering glazing channels.

J. Provide exterior perimeter trim to match design and finish of exterior sash.

K. Form glass muntins of wood, applied to interior and exterior glass surface with spacer bars between glass.

2.5 FINISHES

A. Aluminum Cladding: AAMA 2605 fluoropolymer coating containing minimum 70 percent PVDF resins, matte black color to be selected from manufacturer's full color range.

B. Interior Wood: Factory-applied water-borne acrylic primer. Meets WDMA TM-11 requirements.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install windows in accordance with ASTM E2112, manufacturer's instructions, and approved Shop Drawings.

B. Set plumb, level, and rigid, free from warpage.

C. Anchor to supporting construction.

D. Installation Tolerances:
   1. Maximum variation from plumb or level: 1/8 inch in 3 feet or 1/4 inch in any 10 feet, whichever is less.
   2. Maximum misalignment of members abutting end to end: 1/32 inch.

3.2 ADJUSTING

A. Touch up minor scratches and abrasions in factory finish.

3.3 CLEANING

A. Remove visible labels and adhesive residue according to manufacturer’s instruction.

B. Leave windows and glass in a clean condition.

C. Protect windows from damage by chemicals, solvents, paint or other construction operations that may cause damage.

END OF SECTION

SECTION 087100

DOOR HARDWARE

PART 1 – GENERAL:

1.01 SUMMARY:

A. Section includes the supply and installation of the Finish Hardware.
   1. Include the termination of all Electrified Hardware.
   2. Include field verification of any existing doors, frames, or hardware.

B. Related Sections
   1. Division 1
   2. Sealants – Division 7 / Division7
   3. Openings – Division 8 / Division 8
   4. Finishes – Division 9 / Division9
   5. Fire Alarm – Division 13/ Division28
   6. Electrical – Division 16 / Division26
   7. Security – Division 16 / Division 28

1.02 REFERENCES:

A. Documents and Institutes that shall be used in estimating, detailing, and installing the items specified.
   1. International Building Code – Current/Adopted Edition
   2. ICC/ANSI A117.1 – Accessible and Usable Building and Facilities - Current/Adopted Edition
   3. NFPA 70 – Current/Adopted Edition
   4. NFPA80 –Standards for Fire Doors and Fire Windows–Current/Adopted Edition
   5. NFPA101 – Life Safety Code – Current/AdoptedEdition
   6. NFPA105 – Installation of Smoke-Control Door Assemblies – Current/Adopted Edition.
   7. ANSI - American National Standards Institute
   8. BHMA – Builders Hardware Manufacturers Association
   9. UL – Underwriters Laboratory
   10. DHI – Door and Hardware Institute
   11. Texas Accessibility Standards – Current Adopted Edition
   12. Local Building Codes

1.03 SUBMITTALS

A. Comply with pertinent provisions of Division01.

B. Finish Hardware Schedule to be in vertical format to include:
   1. Heading #/Hardware Set
   2. Door #, Location, Hand, Degree of Opening, Door Size and Type, Frame Size and Type, Fire Rating
   3. Quantity, type, style, function, product, product number, size, fasteners, finish, and manufacturer of each hardware item.
   4. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
   5. Keying schedule

6. Title Sheet, Index, Abbreviations, Manufacturers List, Template List and Templates.
7. Mounting locations for hardware.
8. Explanation of abbreviations, symbols, and codes contained in schedule. Date of the Finish Hardware Specification and Drawing / Door Schedule used in completing the Finish Hardware Schedule.
9. In Name, Company and Date of Field Verification if required.
10. Door Index; include door number, heading number, and hardware group.
11. Name and phone number for local manufacturer's representative for each product.
12. Submit in conjunction with Door and Frame Submittal.
13. Operation Description of openings with electrified hardware.

C. LEED Submittals:
1. Refer to Division 1 for any LEED submittal requirements.

D. Product Data: Provide product data in the form of a binder, manufacturer's technical product fact sheets for each item of hardware. Include whatever information may be necessary to show compliance with requirements, including instructions for installation and for maintenance of operating parts and finish.

E. Wiring Diagrams: Provide Riser/Elevation and Point to Point Wiring Diagrams for all openings with electrified hardware. Include all information that is necessary for coordination with other trades.

F. Samples: Provide samples as requested by Owner or Architect with Heading # and Door# marked on boxes. All samples will be returned to the contractor and used on doors for which they were marked.

G. Templates: Provide templates of finish hardware items to each fabricator of doors, frames and other work to be factory or shop prepared for the installation of hardware.

H. Keying Schedule: After meeting with the Owner, a keying schedule shall be submitted using keyset symbols referenced in DHI manual "Keying Systems and Nomenclature." The keying schedule shall be indexed by door number, keyset, hardware heading number, cross keying instructions and special key stamping instructions.

I. Operations and maintenance data: At the completion of the job, provide to the Owner one hard copies or one electronic copy of an Owner's operation and maintenance manual. The manual shall consist of a labeled hardcover three ring binder with the following technical information:
1. Title page containing: Project name, address, and phone numbers. Supplier's name, address, and phone numbers.
2. Table of Contents.
3. Copy of final (file and field use/as-installed) Finish Hardware Schedule.
4. Final Keying Schedule.
5. Maintenance instruction, adjustment, and preservation of finishes for each item of hardware.
6. Catalog pages for each item of hardware.
7. Installation Instructions for each item of hardware
8. Parts List for each item of hardware.
9. As installed point to point wiring diagrams for electrified hardware.
10. Warranties include Order #.

1.04 QUALITY ASSURANCES

Substitutions: Request for substitutions shall not be accepted within this project. Architect, Owner and Finish Hardware Consultant have selected one (1) specified and two (2) equals listed hereinafter in the Hardware Schedule. By this selection process they have established three (3) equal products for competitive pricing, while insuring no unnecessary delays by a substitution process. If any specified product is listed as a “No Substitution” product, this product will be supplied as specified, with no alteration or request of substitution. The reason for this is to comply with the uniformity established at this project. Parts and supplies are inventoried for these particular products for ease and standardization of replacement.

A. Supplier Qualifications: Supplier shall be recognized architectural finish hardware supplier, with warehousing facilities, who have been furnishing hardware in the project vicinity for a period of not less than 2 year and who is or employs a DHI Certified AHC, DHC, DHSC or person with a minimum of 10 years of experience as a hardware supplier. This person shall be available at reasonable times during the course of the work for consultation about products hardware requirements, to the Owner, Architect and General Contractor.

B. Installer Qualifications (Mechanical Hardware): All finish hardware shall be installed by the Finish Hardware Installer with a minimum of at least two (2) years documented experience. Installer shall attend a pre-installation meeting between the General Contractor, Finish Hardware Supplier/s, hardware manufacturer’s representative for locks, closers and exit devices, and all door / frame suppliers. The Finish Hardware Installer shall be responsible for the proper installation and function of all doors and hardware.

C. Installer Qualifications (Electrified Hardware): All electrified finish hardware (power source, electrified locking or control device, switching device, through wire device and monitoring device) shall be installed by an Electronic Access Control Installer licensed by the Texas Department of Public Safety. The Electrified Finish Hardware Installer shall have a minimum of at least two (2) years of documented experience. Installer shall attend a pre-installation meeting between the General Contractor, Finish Hardware Supplier/s, Electrical Contractor, Fire Alarm Contractor, Security Contractor, hardware manufacturer’s representative for electrified hardware, all door / frame suppliers. The Electrified Finish Hardware Installer shall be responsible for the proper installation, termination, and function of all opening with electrified hardware. Installation shall include termination of all electrified products (including the required wire to the power supply and/or junction box).

1.05 DELIVERY, STORAGE AND HANDLING

A. Marking and packaging: Mark each item or package separately, with identification related to hardware set number, door number and keyset symbol.

B. Delivery:
1. Deliver individually packaged and properly marked finish hardware at the proper time and location to avoid any delays in construction or installation.
2. At time of delivery, inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

C. Storage: Store hardware in enclosed, dry, and locked area.

1.06 WARRANTY

A. All finish hardware products shall be covered by a 1-year factory warranty from the date of substantial completion of the project.

B. Supply warranty verification to the owner for all products that provide factory warranty. Warranty should include Factory Order # and date.

1.07 MAINTENANCE:

A. Maintenance Service
1. None

B. Extra Materials:
1. All extra screws, fasteners, and all special installation tools furnished with the hardware shall be turned over to the owner at the completion of the job.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Screws and Fasteners:
1. All closers and exit devices provided for exterior doors, hollow metal doors, and all other required shall be provided with thru-bolts.
2. All finish hardware shall be installed to manufacturer's recommendations, using screws, attachments and installation tools provided with the hardware. No other screws or attachments are acceptable.

B. Hinges:
1. Template: Provide templated units only.
2. Exterior: All exterior hinges shall be stainless steel base with stainless steel pin and stainless-steel finish.
3. Interior: All interior hinges steel based.
4. Interior corrosive: All interior hinges at corrosive areas shall be stainless steel base with stainless still pin and stainless-steel finish.
5. All hinges on doors over 36" wide, with exit devices, or with push/pull shall be heavy weight.
6. Electric Hinge: Provide minimum 8 wire.
7. Provide non-removable pins for out swinging doors that are locked or are lockable.
8. All hinges on doors with door closers shall be ball bearing.
9. All hinges shall be full mortise.
10. Size: Provide 4 ½ x 4 ½ hinges on doors up to 3'0" in width. Provide 5 x 4½ hinges over 3'0" to 4'0" in width. Reference manufacturers catalog for all other sizes.
11. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.
12. Adjust hinge width as required for door, frame, trim and wall conditions to allow proper degree of opening.
13. Provide hinges conforming to ANSI/BHMA A156.1.

14. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.
15. Supply from the following list of manufacturers:
    Ives IVE
    Mckinney MCK
    Bommer BOM
16. Supply ball tips where indicated in finish to match.

C. Continuous Hinges
1. Continuous hinges to be manufactured of6063-T6aluminum.
2. Continuous hinge shall be certified to ANSI 156.26, Grade 1
3. Continuous hinge should be tested an approvedUL10C.
4. Electrified – Provide minimum 8 wire with removable panel.
5. Provide hinges 1 inch shorter in length than nominal height of door, unless otherwise noted.
6. Provide reinforcing for doors weighing over 450 pounds and up to 600 pounds.
7. Supply from the following list of manufacturers:
    Ives IVE
    Select SEL
    Stanley STA

D. Mortise Locks
1. All locks on this project should be manufactured by the same manufacturer.
2. Mortise locksets shall meet ANSI/BHMA A156.13, Series 1000, Grade 1 Operational with all standard trims and conventional mortise cylinders.
3. All mortise locks shall be UL Listed for 3-hourfire door. Review lock for any height restriction.
4. Provide locks with a standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latch bolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainlesssteel.
5. Provide dust box.
6. Supply from the following list of manufacturers:
    Schlage SCH
    Falcon FAL
    Best BES

E. Cylindrical Locks
1. All locks on this project should be manufacturer by the same manufacturer.
2. All locks shall meet the new ANSI/BHMA A156.2, Series 4000, Grade1.
3. All cylindrical locks shall be UL Listed for 3-hour fire door. Review lock for any height restriction.
4. Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with a 1/2-inch (13 mm) latch throw. Provide proper latch throw for UL listing at pairs.
5. Provide standard ASA strikes unless extended lip strike is necessary for frame/trim or 7/8” lip strike is necessary at pair with overlapping astragal.
6. Provide dust box.
7. Lockset shall adjust to fit door thickness from 1 ¾” to21/8”.

8 Supply from the following list of manufacturers:

9

Schlage	SCH
Falcon	FAL
Best	BES

F. Exit Devices

1. All exit device types on this project should be manufactured by the same manufacturer.
2. Exit devices are to be architectural grade touch bar type. Touchpad to extend one half of door width.
3. Mechanism case to be smooth.
4. Exit devices shall meet ANSI A156.3, Grade 1.
5. All exit devices are UL listed Panic Exit or Fire Exit Hardware.
6. All lever trim to match lock trim in design and finish.
7. Dogging: Non-rated devices are to be provided with dogging. Less dogging where shown in Hardware Sets (some exterior, electrical rooms, electrified) Cylinder dogging as shown in hardware sets.
8. Exit devices are to be supplied and installed with thru-bolts for exterior, hollow metal doors, or as required for application.
9. Provide proper power supply for exit devices as required. Coordinate with Fire Alarm, Electrical and Security Contractor.
10. Push pads shall be metal, no plastic inserts allowed.
11. Exit devices shall have a flush endcap.
12. Exit devices shall be ordered with the correct strike for application.
13. Exit devices shall be order in the proper length to meet door width.
14. Exit devices shall have dead latching.
15. Exit device shall be provided in width/height required based on door size.
16. Install exit devices with fasteners supplied by exit device manufacturer.
17. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits as required.
18. Provide proper concealed vertical rods for wood or hollow metal doors as required.
19. Factory or field drill weep holes for exit devices used in full exterior applications, highly corrosive areas, and where noted in the hardware sets.
20. Supply from the following list of manufacturers:

Von Duprin	VON	35/98 Series
Falcon	FAL	
Detex	DET	

G. Flush Bolts

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.
2. Supply from the following list of manufacturers:

Ives	IVE
Trimco	TRI
Rockwood	ROC

H. Coordinators

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers and surface vertical rod exit device strikes. Factory-prep coordinators for vertical rod devices and hardware as required.
3. Supply from the following list of manufacturers:

Ives	IVE
Trimco	TRI
Rockwood	ROCPull Plates/Pulls/Push Plate

4. Pull and Push Plates to meet ANSI 156.6 for .050" thickness.
5. Pull and Push Plate size to 4" x 16".
6. Pull Plate to have 10" center and 1" round on pull plate with concealed fasteners.
7. Provide straight and offset pulls with fasteners as required.
8. Provide concealed fasteners for all applications.
9. Prep plate for cylinder/lock as required.
10. Supply from the following list of manufacturers

Ives	IVE
Trimco	TRI
Rockwood	ROC

I. Door Closers

1. All door closers on this project should be manufactured by the same manufacturer.
2. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
3. Door closers shall be furnished with standard cover. Provide full cover as shown in hardware sets.
4. Size in accordance with the manufacturer's recommendations for door size and condition.
5. Door closers shall be furnished with delayed action, hold-open as listed in the Hardware Sets.
6. Door closers shall be mounted out of the line of sight wherever possible (i.e., room side of corridor doors, etc.) with parallel arm mounting on out swinging doors.
7. All closer installation shall include thru bolts on exterior, hollow metal doors or where required for application.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
9. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
10. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
11. Supply from the following list of manufacturers

Falcon	FAL SC70 / SC80
LCN	LCN 4011 /4111
Norton	NOR 78B/D

J. Door Protection Plates
1. Protective plates shall meet ANSI A156.6 requirements for .050 thickness.
2. Protection plates should be fabricated from stainless steel or brass based on finish.
3. Protection plate shall be height as shown in Hardware Sets. Width shall be 10" by 2" less than door width on single door or pair with a mullion and 1" less than door width on pair of doors without mullion.
4. Beveled 4 edges.
5. Provide kickplate on all doors with closers, unless not required for aesthetic reasons.
6. Prep protective plates for hardware as required.
7. Supply from the following manufacturers:

Ives	IVE
Rockwood	ROC
Trimco	TRI

K. Door Stops and Holders:
1. Supply wall stops at all openings to protect doors or door hardware. Install so lock does not lock unintentionally. Install blocking in wall where wall stop will be mounted.
2. When wall conditions do not permit use of wall stop provide floor stops with risers as needed to adjust for floor conditions.
3. When wall conditions do not permit use of wall stop provide overhead stops. Jamb mount where required to not be visible from Corridor.
4. Exterior Ground Level Doors: Provide security floor stop.
5. Exterior Roof Doors: Provide heavy duty overhead stop.
6. Supply from the following list of manufacturers:

Glynn Johnson	GLY
Rockwood	ROC
Trimco	TRI

L. Silencers
1. Provide silencers on all doors without seal. 3 for single doors and 2 for pairs.
2. Provide silencers as required for frame conditions. SR64 for hollow metal frames. SR65/SR66 for wood frames.
3. At wood frames, ensure height of stop is compatible with silencer.
4. Supply from the following list of manufacturer's

Ives	IVE
Rockwood	ROC
Trimco	TRI

M. Thresholds/Weatherstripping

1. Thresholds on doors in the accessible path shall conform to accessibility codes.
2. Threshold should be based on sill detail.
3. Smoke seal shall be teardrop design bulb seal.
4. Exterior seal/thresholds shall be silicone or brush as shown in hardware sets.
5. Drip strips shall protrude 2 ½" and be 4" wider than opening.
6. At S Label single doors provide seals on frame to comply with UL1784
7. At S Label pair of doors provide seals on frame and as meeting stile to comply with UL1784.

8 Automatic Door Bottom shall be mortised to comply with accessibility codes.
9 Supply from the following list of manufacturer's

Zero	ZER
National Guard	NGP
Pemko	PEM

N. Top Hung Interior Folding Partitions on Bi-Fold Track System

1 8 panel unit pivoted to one side with an additional single hung panel leaf.
2 Floor pivot socket to be flush to adjacent floor.
3 Longest track lengths are referred.
4 Supply from the following list of manufacturer's or similar.

Basis of design Brio	BRI

2.03 KEYING:

A. General: Finish Hardware Supplier shall meet in person with owner to finalize keying requirements prior to the locks and exit devices being ordered and match existing or start a new Master Key System for the project. During keying meeting all hardware functions should be reviewed with the owner to finalize lock and exit device functions. During keying meeting determine all expansion required.

B. Cylinders: Provide the correct and quantity of cylinders for all applications. Keys: Provide nickel silver keys only. Furnish 2 change keys for each lock: 5 control keys: 5 master keys for each master system and 5 grandmaster keys for each grandmaster key system. Deliver all keys to Owners Representative.

C. Cores and keys shall be provided with identification stamping.

D. Provide construction keying / construction cores for this project with constructions keys.

E. Provide Bitting List to Owner.

2.04 KEY CONTROL:

A. Key Management: Key control shall be provided, by supplying a complete key storage and management system. Each key shall be fully cut, indexed, tagged, and installed on cabinet hooks by the lock supplier and shipped with the locks. Key cabinet provided shall be wall-mounted type with capacity plus 50%.

PART 3 – EXECUTION:

3.01 EXAMINATION:

A. Examine doors, frames and related items for conditions that would prevent the proper application of any finish hardware items. Do not proceed with installation until all defects are corrected.

B. Existing Door and Frame Compatibility: Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION:

A. Follow Door and Hardware Institute Publication:
Recommended Location for Architectural Hardware for Standard Steel Doors and Frames
Recommended Location for Builder's Hardware for Custom Steel Doors and Frames
Recommended Locations for Architectural Hardware for Wood Flush Door

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Follow ANSI A117.1-1998 Accessible and Usable Building and Facilities and Texas Accessibility Standards.

D. Review mounting locations with Architect where required.

E. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers should not be visible in corridors, lobbies, and other public spaces where possible.

F. Locate power supplies in accessible location and indicate in as-builts where located.

G. Set threshold in full bed of sealant complying with requirements specified in Division 07.

H. Pre-Installation meeting required with attendees to include Architect, General Contractor, Mechanical Hardware Installer, Electrified Hardware Installer, Finish Hardware Supplier and Manufacturer's Representative for Exit Device, Locks and Closers and Door/Frame Suppliers before installation begins.

3.03 FIELD QUALITY CONTROL:

A. After installation has been completed, obtain the services of an Architectural Hardware Consultant to check for proper installation of finish hardware, according to the finish hardware schedule and keying schedule. In addition, check all hardware for adjustments and proper operation.

3.04 ADJUST AND CLEAN:

A. Adjust, clean, and inspect all hardware, to ensure proper operation and function of every opening. Replace items, which cannot be adjusted to operate freely and smoothly as intended for the application made.

3.05 PROTECTION:

A. The General Contractor shall use all means at his disposal to protect all finish hardware items from abuse, corrosion and other damage until the owner accepts the project as complete.

3.06 TRAINING

A. After installation has been completed, provide training to the Owner on the operation of the Finish Hardware and programming of any electrified hardware.

3.07 HARDWARE SCHEDULE

A. These hardware set shown below are for use as a guideline. Provide hardware as required to meet the requirements of the openings, security, and code requirements.

Door#	HwSet#
1	C714AJ
2A	S711J
2B	SC715J
3A	S711J
3B	001
4	S203JS
5	S711J
6	C2121SJ
7	S203J
8	S403J
9	343JS
10	203JS
11	2121SJ
13C	C715AJ
14	801CJ
15	801J
16	103S
17	343JS
18	203JS
19	343J
20	C714AJ
21	103J
22	103J

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Legend:
Link to catalog cut sheet

Hardware Group No. 001

For use on Door #(s):
3B

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)	643e	MCK
1		PUSH/PULL	8311	613	IVES
1		PUSH PLATE	8200	613	613
8		BI-FOLD PANEL ONE SIDE	BRIO	SN	BRI
		TRACK	350 (STANDARD LENGTHS)		
		BRACKET	1SS/250		
1		PIVOT SET	21HP/21HP-C		
3		HANGERS	21/4HN		
1		HANGERS	21HN		
21		HINGES	404/3S		
4		GUIDES	21RB/94		
		CHANNELS	94A,94B,94P,94A		
5		FLUSH PULLS	401		
5		FLUSH BOLTS	456		

COORDINATE WITH ARCHITECT TO RESTORE & UTILIZE EXISTING RECESSED PULL HARDWARE

Hardware Group No. 103J

For use on Door #(s):
21 22

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	OFFICE/ENTRY LOCK	L9050T LATA L583-363		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 103S

For use on Door #(s):
16

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	OFFICE/ENTRY LOCK	L9050T LATA L583-363		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	OH STOP	90S		643E/716	GLY
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 203JS

For use on Door #(s):
10 18

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	STOREROOM LOCK	L9080T LATA		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	OH STOP	90S		643E/716	GLY
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 343J

For use on Door #(s):
19

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	L9040 LATA L583-363 OS-OCC		643e	SCH
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 343JS

For use on Door #(s):
9 17

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	L9040 LATA L583-363 OS-OCC		643e	SCH

1	EA	OH STOP	90S		643E/716	GLY
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 801CJ

For use on Door #(s):
14

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	TRADITIONAL CAST PULL	RM5532		613	ROC
1	EA	TRADITIONAL PLAIN CAST PLATE 3.5" X 15"	RM5598B		613	ROC
1	EA	SPRING ARM CLOSER	UNI78B/D MTG BRKT, SPCR & PLATE AS REQ		613	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 801J

For use on Door #(s):
15

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	TRADITIONAL CAST PULL	RM5532		613	ROC
1	EA	TRADITIONAL PLAIN CAST PLATE 3.5" X 15"	RM5598B		613	ROC
1	EA	REGULAR ARM CLOSER	78B/D-RA		613	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 2121SJ

For use on Door #(s):
11

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	CONST LATCHING BOLT	FB61P		613	IVE
1	EA	DUST PROOF STRIKE	DP2		643E/716	IVE
1	EA	STOREROOM LOCK	L9080T LATA		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH

1	EA	OH HOLD-OPEN	90H		643E/716	GLY
1	EA	WALL STOP	WS406/407CCV		613	IVE
2	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. C714AJ

For use on Door #(s):
1 20

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONTINUOUS HINGE	112XY EPT		313AN	IVE
2	EA	POWER TRANSFER	EPT10 CON		SP313	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-3347A-EO-LBR-CON 24 VDC		313	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-3347A-NL-OP-LBR-388-CON 24 VDC		313	VON
1	EA	RIM CYLINDER	20-057 ICX W/ CONSTRUCTION CORE		613	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
2	EA	TRADITIONAL CAST PULL	RM5510		613	ROC
2	EA	SPRING ARM CLOSER	UNI78B/D MTG BRKT, SPCR & PLATE AS REQ		613	NOR
1	EA	RAIN DRIP	142D DOOR WIDTH + 4"		D	ZER
1	EA	PERIMETER SEAL	BY FRAME MANUFACTURER			B/O
1	EA	MEETING STILE SEAL	BY DOOR MANUFACTURER			B/O
2	EA	DOOR SWEEP	39D		D	ZER
1	EA	THRESHOLD	655D-E-223		D	ZER
1	EA	CREDENTIAL READER	BY SECURITY - DIVISION 28			B/O
2	EA	DOOR POSITION SWITCH	BY SECURITY - DIVISION 28			B/O
1	EA	POWER SUPPLY FOR ELEC PANIC	PS902 900-2RS 120/240 VAC		LGR	SCE

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY THE CREDENTIAL READER OR KEY OVERRIDE.
- FREE EGRESS AT ALL TIMES.
- DOORS WILL REMAIN LOCKED UPON LOSS OF POWER.
- COORDINATE POWER SUPPLY WITH SECURITY CONTRACTOR PRIOR TO SUBMITTALS.
- OMIT POWER SUPPLY WHERE PROVIDED BY THE SECURITY CONTRACTOR.

Hardware Group No. C715AJ

For use on Door #(s):
13C

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONTINUOUS HINGE	112XY EPT		313AN	IVE
1	EA	POWER TRANSFER	EPT10 CON		SP313	VON

1	EA	ELEC PANIC HARDWARE	RX-QEL-33A-NL-OP-388-299-CON 24 VDC		643E	VON
1	EA	RIM CYLINDER	20-057 ICX W/ CONSTRUCTION CORE		613	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	TRADITIONAL CAST PULL	RM5510		613	ROC
1	EA	SPRING ARM CLOSER	UNI78B/D MTG BRKT, SPCR & PLATE AS REQ		613	NOR
1	EA	RAIN DRIP	142D DOOR WIDTH + 4"		D	ZER
1	EA	PERIMETER SEAL	BY FRAME MANUFACTURER			B/O
1	EA	DOOR SWEEP	39D		D	ZER
1	EA	THRESHOLD	655D-E-223		D	ZER
1	EA	CREDENTIAL READER	BY SECURITY - DIVISION 28			B/O
1	EA	DOOR POSITION SWITCH	BY SECURITY - DIVISION 28			B/O
1	EA	POWER SUPPLY FOR ELEC PANIC	PS902 900-2RS 120/240 VAC		LGR	SCE

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY THE CREDENTIAL READER OR KEY OVERRIDE.
- FREE EGRESS AT ALL TIMES.
- DOORS WILL REMAIN LOCKED UPON LOSS OF POWER.
- COORDINATE POWER SUPPLY WITH SECURITY CONTRACTOR PRIOR TO SUBMITTALS.
- OMIT POWER SUPPLY WHERE PROVIDED BY THE SECURITY CONTRACTOR.

Hardware Group No. C2121SJ

For use on Door #(s):
6

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
5	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	ELECTRIC HINGE	TA2714 4.4 x 4.5 CC8 BT (BALL TIP)		643e	MCK
1	EA	CONST LATCHING BOLT	FB61P		613	IVE
1	EA	DUST PROOF STRIKE	DP2		643E/716	IVE
1	EA	ELEC MORTISE LOCK (FAIL SECURE)	L9092TEU LATA RX CON 12/24 VDC		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	OH STOP	90S		643E/716	GLY
1	EA	WALL STOP	WS406/407CCV		613	IVE
2	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE
1	EA	CREDENTIAL READER	BY SECURITY - DIVISION 28			B/O
2	EA	DOOR POSITION SWITCH	BY SECURITY - DIVISION 28			B/O
1	EA	POWER SUPPLY FOR ELEC LOCK	PS902 120/24 VAC		LGR	SCE

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY THE CREDENTIAL READER OR KEY OVERRIDE.
- FREE EGRESS AT ALL TIMES.
- DOORS WILL REMAIN LOCKED UPON LOSS OF POWER.
- COORDINATE POWER SUPPLY WITH SECURITY CONTRACTOR PRIOR TO SUBMITTALS.
- OMIT POWER SUPPLY WHERE PROVIDED BY THE SECURITY CONTRACTOR.

Hardware Group No. S203J

For use on Door #(s):
7

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	STOREROOM LOCK	L9080T LATA		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	WALL STOP	WS406/407CCV		613	IVE
1	EA	PERIMETER SEAL (FOR SOUND)	117SBK PSA		BK	ZER
1	EA	CONCEALED AUTO DOOR BOTTOM (FOR SOUND)	350AA		AA	ZER

Hardware Group No. S203JS

For use on Door #(s):
4

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	STOREROOM LOCK	L9080T LATA		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	OH STOP	90S		643E/716	GLY
1	EA	PERIMETER SEAL (FOR SOUND)	117SBK PSA		BK	ZER
1	EA	CONCEALED AUTO DOOR BOTTOM (FOR SOUND)	350AA		AA	ZER

Hardware Group No. S403J

For use on Door #(s):
8

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	PASSAGE SET	L9010 LATA		643e	SCH
1	EA	WALL STOP	WS406/407CCV		613	IVE

1	EA	PERIMETER SEAL (FOR SOUND)	117SBK PSA		BK	ZER
1	EA	CONCEALED AUTO DOOR BOTTOM (FOR SOUND)	350AA		AA	ZER
1	EA	KICK DOWN HOLDER	FS455		613	IVE

Hardware Group No. S711J

For use on Door #(s):
2A 3A 5

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	T4A3386 4.5 X 4.5 BT (BALL TIP)		613	MCK
1	EA	PANIC HARDWARE	55-L-01-SNB		643E	VON
1	EA	RIM CYLINDER	20-057 ICX W/ CONSTRUCTION CORE		613	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	PARALLEL ARM CLOSER	78B/D-PA		613	NOR
1	EA	ADJUSTABLE THRESHOLD	68 (2), 676		D	ZER
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	PERIMETER SEAL (FOR SOUND)	117SBK PSA		BK	ZER
1	EA	CONCEALED AUTO DOOR BOTTOM (FOR SOUND)	350AA		AA	ZER

Hardware Group No. SC715J

For use on Door #(s):
2B

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	T4A3386 4.5 X 4.5 BT (BALL TIP)		613	MCK
1	EA	ELECTRIC HINGE	T4A3386 4.5 X 4.5 -+CC8 BT (BALL TIP)		613	MCK
1	EA	ELEC EXIT DEVICE	RX-QEL-99-NL-OP-110MD-CON 24 VDC		313	VON
1	EA	RIM CYLINDER	20-057 ICX W/ CONSTRUCTION CORE		613	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	TRADITIONAL CAST PULL	RM5510		613	ROC
1	EA	SPRING ARM CLOSER	UNI78B/D MTG BRKT, SPCR & PLATE AS REQ		613	NOR
1	EA	RAIN DRIP	142D DOOR WIDTH + 4"		D	ZER
1	SET	GASKETING	328D H & J		D	ZER
1	EA	DOOR SWEEP	39D		D	ZER
1	EA	ADJUSTABLE THRESHOLD	68 (2), 269 (2), 675 (3)		D	ZER
1	EA	CREDENTIAL READER	BY SECURITY - DIVISION 28			B/O
1	EA	DOOR POSITION SWITCH	BY SECURITY - DIVISION 28			B/O
1	EA	POWER SUPPLY FOR ELEC PANIC	PS902 900-2RS 120/240 VAC		LGR	SCE

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY THE CREDENTIAL READER OR KEY OVERRIDE.
- FREE EGRESS AT ALL TIMES.
- DOORS WILL REMAIN LOCKED UPON LOSS OF POWER.
- COORDINATE POWER SUPPLY WITH SECURITY CONTRACTOR PRIOR TO SUBMITTALS.
- OMIT POWER SUPPLY WHERE PROVIDED BY THE SECURITY CONTRACTOR.

END SECTION 087100

SECTION 088000

GLAZING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Glass for other sections referencing this Section.
2. Unframed mirrors.
3. Glazing film.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SYSTEM DESCRIPTION

A. Glass Thicknesses:
1. Indicated thicknesses are minimums; select actual glass thicknesses by analyzing loads and conditions.
2. Size glass to withstand positive and negative wind pressure acting normal to plane in accordance with Building Code as measured in accordance with ASTM E330.
3. Provide glass in thicknesses and strengths to meet or exceed following criteria:
   a. Comply with ASTM E1300.
   b. Probability of breakage for vertical glazing: 8 lites per 1000 for lites set within 15 degrees of vertical and under wind load for load duration of 3 seconds.
   c. Thickness of tinted glass: Provide same thickness for each tint color for all applications.

B. Thermal and Optical Performance Properties: Provide glass meeting specified performance properties, based on manufacturer's published test data for units of thickness indicated:
1. U-factor: Per NFRC 100 expressed as Btu/square foot x hour x degree F.
2. Solar heat gain coefficient: Per NFRC 200.
3. Solar optical properties: Per NFRC 300.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Descriptive data and performance attributes for insulating glass.
2. Samples:
   a. 12 x 12 inch glass samples.
   b. 1/4 x 1/4 x 3 inch long sealant samples showing available colors.
3. Warranty: Sample warranty form.

B. Quality Control Submittals:
1. Test Report: Preconstruction adhesion and compatibility test report from glazing sealant manufacturer, based on submitted samples or acceptable data from previous testing of current formulations with similar products.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 3 years documented experience in work of this Section.

B. Regulatory Requirements:
1. Provide safety glass for locations subject to human impact as required by Building Code.
2. Safety glass: Tested and labeled to CPSC 16 CFR 1201.

C. Perform Work in accordance with:
1. NGA Engineering Standards Manual.
2. NGA Laminated Glazing Reference Manual.

3. NGA GANA Sealant Manual.
4. IGMA TB-3001.
5. IGMA TM-3000.

1.5 PROJECT CONDITIONS

A. Perform glazing when ambient temperature is above 40 degrees F.

B. Perform glazing on dry surfaces.

1.6 WARRANTIES

A. Insulating Glass Units: Provide manufacturer's 10 year warranty against material obstruction of vision through unit due to:
   1. Intrusion of dust or moisture.
   2. Internal condensation.
   3. Film formation on internal glass surfaces caused by failure of hermetic seal except failure caused in whole or in part by breakage or fracturing of any portion of glass surface.

B. Glass Coatings: Provide manufacturer's 10 year warranty against peeling, cracking, or deterioration of coating under normal conditions.

C. Mirrors: Provide manufacturer's 10 year warranty against silver spoilage resulting from manufacturing defects.

D. Glazing Film: Provide manufacturer's 5 year warranty against peeling, cracking, or deterioration of coating under normal conditions.

E. Laminated Glass Units: Provide manufacturer's 5 year warranty against manufacturing defects resulting in edge separation, delamination, or material obstruction of vision through glass surface.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Glass:
   1. Cardinal Glass Industries. (www.cardinalcorp.com)
   2. Guardian Industries Corp. (www.guardian.com)
   3. Oldcastle BuildingEnvelope. (www.obe.com)
   4. Pilkington Architectural. (www.pilkington.com)
   5. Viracon, Inc. (www.viracon.com)
   6. Vitro Architectural Glass. (www.vitroglazings.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS - GLASS

A. Clear Glass: ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select.

B. Clear Tempered Glass: ASTM C1048, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select, Kind FT fully tempered.

C. Clear Heat Strengthened Glass: ASTM C1048, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select, Kind HS heat strengthened.

D. Mirror Glass: ASTM C1036, Type I transparent flat, Class 1 clear, Quality q1 mirror select.

2.3 ACCESSORIES

A. Setting Blocks: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone; 80 to 90 Shore A durometer hardness.

B. Spacers: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone; 50 to 60 Shore A durometer hardness.

C. Glazing Gaskets:
   1. Dense compression gaskets: ASTM C864, neoprene or EPDM, or ASTM C1115, silicone or thermoplastic polyolefin rubber, molded or extruded shape to fit glazing channel retaining slot; black color.
   2. Soft compression gaskets: ASTM C509, Type II, black, molded or extruded, neoprene, EPDM, silicone or thermoplastic polyolefin rubber, of profile and hardness required to maintain watertight seal; black color.

D. Contact Sealant:
   1. Type: Single component, medium modulus, neutral moisture curing silicone sealant; ASTM C1184 and ASTM C920, Type S, Grade NS, Class 25, Use NT, M, G and A.
   2. Movement capability: 50 percent in extension and compression.
   3. Compatible with glass unit edge seals; tested to ASTM C1294.
   4. Color: To be selected from manufacturer's full color range.

E. Weatherseal Sealant:
   1. Type: Single component, low modulus, neutral moisture curing silicone sealant; ASTM C920, Type S, Grade NS, Class 25, Use NT, M, G and A.
   2. Movement capability: 50 percent in extension and compression.
   3. Compatible with glass unit edge seals; tested to ASTM C1294.
   4. Color: To be selected from manufacturer's full color range.

F. Glazing Sealant: ASTM C920, Type S, Grade NS, Class 25; single component silicone, low modulus, non sag, color to be selected from manufacturer's full color range.

G. Sealant Backing: ASTM C1330, Type O, size and density to control glazing sealant depth and produce optimum glazing sealant performance.

H. Primer: As recommended by glazing sealant manufacturer.

I. Glazing Tape: AAMA 800; closed cell polyvinyl chloride foam, maximum 2 percent water absorption by volume, designed for 25 percent compression percent for air barrier and vapor retarder seal, black color, coiled on release paper over adhesive on two sides; widths required for installation.

J. Glazing Compound: Modified oil type, non hardening, knife grade consistency, color to be selected from manufacturer's full color range.

K. Mirror Adhesive: Adhesive setting compound, produced specifically for setting mirrors by spot application method.

L. Mirror and Glass Attachment Accessories: Stainless steel clips.

M. Glazing Film: 3M Sun Control Window Film Prestige Exterior Series PR 70, or approved substitute.

N. Laminating Film: Polyvinyl butyral sheet, thickness as required.

2.4 FABRICATION

A. Annealed Glass: Comply with ASTM C1036.

B. Heat Strengthened and Tempered Glass:
   1. Comply with ASTM C1048.

2. Process in horizontal position so that inherent roller distortion will run parallel to building floor lines after installation.

C. Sealed Insulating Glass:
1. Comply with ASTM E2190.
2. Fabricate spacer bar frame of tubular aluminum filled with desiccant.
3. Bond spacer bar frame to glass panes with twin primary seals.
4. Fill space outside frame to glass edge with elastomeric sealant.

D. Laminated Glass:
1. Comply with ASTM C1172 and ANSI Z97.1.
2. Laminate glass with laminating film by manufacturer's standard heat and pressure process.
3. Cut glass to required size at factory.
4. Discard glass with voids, delamination, or entrapped dirt or foreign matter.

E. Low-E Coated Glass: Apply low-emissivity coating to scheduled glass surface.

F. Mirror Glass:
1. Apply one coat of silver, one coat of electroplated copper, and one coat of organic mirror backing compound to back surface of glass.
2. Ease and polish edges.

G. Fabrication Tolerances: ASTM C1036 and ASTM C1048.

H. Glass Identification:
1. Apply manufacturer's label indicating type and thickness to each light of glass. Show position of exterior face when installed, where applicable.
2. Etch manufacturer's label on each light of tempered glass.

I. Source Quality Control:
1. Preconstruction adhesion and compatibility testing:
a. Perform adhesion test including ultraviolet exposure through glass on production samples of metals and glass in accordance with ASTM C794.
b. Test glass units, glazing materials, and glass framing members with specified finish for sealant compatibility, priming, and preparation requirements for optimum adhesion and performance.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean glazing rabbets; remove loose and foreign matter.

B. Remove protective coatings on metal surfaces.

C. Clean glass just prior to installation.

3.2 INSTALLATION - GENERAL

A. Install glass in accordance with glass manufacturer's instructions.

B. Maintain manufacturer's recommended edge and face clearances between glass and frame members.

3.3 INSTALLATION - STRUCTURAL SILICONE GLAZING METHOD

A. Mask aluminum and glass surfaces adjacent to sealant pockets.

B. Install temporary glass retainers to align faces of glass.

C. Apply contact sealant; completely fill pockets. Tool joints and remove masking tape before sealant skim cure begins.

D. Allow sealant to cure minimum time required by manufacturer.

E. Remove temporary glass retainers.

F. Insert joint backing to fill void between glass unit edges and glass spacer.

G. Mask both sides of glass for full length of joint.

H. Apply weatherseal sealant; tool to smooth, slightly concave profile.

3.4 INSTALLATION - GASKET GLAZING METHOD

A. Fabricate gaskets to fit openings; allow for stretching of gaskets during installation.

B. Set soft compression gasket against fixed stop or frame with bonded miter cut joints at corners.

C. Set glass centered in openings on setting blocks.

D. Install removable stops and insert dense compression gaskets at corners, working toward centers of glass, compressing glass against soft compression gaskets to produce weathertight seal.

E. Seal joints in gaskets.

F. Allow gaskets to protrude past face of glazing stops.

3.5 INSTALLATION - SEALANT AND TAPE GLAZING METHOD

A. Apply tape to permanent stops, projecting slightly above sight line.

B. Press glass into contact with tape.

C. Install removable stops with spacer shims between stop and glass.

D. Fill gap between removable stop and glass with glazing sealant.

E. Trim protruding tape edges.

3.6 INSTALLATION - COMPOUND GLAZING METHOD

A. Locate and secure glass using glazing clips.

B. Fill voids between glass and stops with glazing compound; tool to straight line. Slope to exterior for watershed.

3.7 INSTALLATION - MIRRORS WITH ADHESIVE

A. Apply mirror adhesive in accordance with manufacturer's instructions to cover maximum 25 percent of back of mirror. Set mirror and press against substrate to ensure adhesive bond.

B. Leave minimum 1/8 inch open ventilation space between mirror and substrate over 75 percent of mirror area. Do not seal off ventilation space at edges.

C. Place plumb and level without distortion.

3.8 INSTALLATION - MIRRORS WITH CLIPS

A. Set mirrors and back painted glass wall surfaces with clips where indicated in the Drawings. Anchor rigidly to wall construction.

B. Place plumb and level without distortion.

3.9 INSTALLATION - GLAZING FILM

A. Install glazing film per manufacturer’s instructions.

3.10 PROTECTION

A. After installation, mark glass with an 'X' using removable plastic tape.

3.11 SCHEDULE

A. Type GL-1:
   1. Description:
      a. Outboard lite: 1/4 inch thick clear glass, heat strengthened or tempered where required, with low-e coating on No. 3 surface.
      b. Inboard lite: 1/4 inch thick clear glass, tempered where required.
   2. Total unit thickness: 1 inch.
   3. Locations: Aluminum Clad Wood windows. Aluminum-Framed Storefront.

B. Type GL-2:
   1. Description: Laminated glass to match existing thickness. Apply glazing film where indicated in Drawings.
   2. Locations: Restored exterior wood windows.

C. Type GL-3:
   1. Description: 1/4 inch thick clear tempered glass.
   2. Locations: Interior door vision panels.

D. Type GL-4:
   1. Description: Nominally 1/4 inch thick clear mirror glass, ease and polish exposed edges.
   2. Locations: Toilet Rooms, Dressing Room.

E. Type GL-5:
   1. Descriptions:
      a. Outboard 1/4" thick clear glass, heat strengthened and tempered with low-e coating on No. 3 surface
      b. Inboard lite: 1/4" thick clear tempered glass
   2. Total unit thickness: 3/4"
   3. Locations: Storefront doors.

F. Type GL-6:
   1. Descriptions: 1/4" thick frosted glass, tempered.
   2. Locations: Interior door vision panels at addition offices.

END OF SECTION

SECTION 089100

LOUVERS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Extruded aluminum, wind driven rain resistant, stationary louver with horizontally mounted sight proof blades.

1.2 RELATED SECTIONS

A. Section 061000 - Rough Carpentry.

B. Section 076200 – Sheet Metal Flashing and Trim.

C. Section 079200 - Joint Sealants.

D. Section 099100 - Paints.

E. Division 23 – Opening Requirements.

1.3 REFERENCES

A. AAMA 2604 – High Performance Organic Coatings on Architectural Extrusions and Panels.

B. AAMA 2605 - High Performance Organic Coatings on Architectural Extrusions and Panels.

C. AAMA 611 – Voluntary Specification for Anodized Architectural Aluminum.

D. AMCA 500 - Test Methods for Louvers, Dampers and Shutters.

E. AMCA 511 - Certified Ratings Program for Air Control Devices.

F. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

G. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.

H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.

I. ASTM D822 - Standard Practice for Filtered Open-Flame Carbon-Arc Exposures of Paint and Related Coatings

J. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.

K. ASTM D2244 - Standard Test Method for Calculation of Color Differences From Instrumentally Measured Color Coordinates.

L. USGBC: U.S. Green Building Council LEED® Rating System.

1.4 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.

C. Vertical Louver: Louver with vertical blades; i.e., the axes of the blades are vertical.

D. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

E. Rain-Resistant Louver: Louver that provides specified wind-driven rain performance, as determined by testing according to AMCA 500-L.

1.5 ACTION SUBMITTALS

A. Submit under provisions of Section 013300.

B. Product Data: For each product to be used, including:
1. Manufacturer's product data including performance data.
2. Preparation instructions and recommendations.
3. Storage and handling requirements and recommendations.
4. Installation methods.

C. Shop Drawings:
1. Submit shop drawings indicating materials, construction, dimensions, accessories, and installation details.

D. Product Schedule: For louvers. Use same designations indicated on Drawings.

E. Samples: Submit sample of louver to show frame, blades, bird screen, gutters, downspouts, vertical supports, sill, accessories, finish, and color.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Product Test Reports: For each type of louver, for tests performed by a qualified testing agency.

C. Field quality-control reports.

D. Sample Warranties: For manufacturer's warranties.

1.7 QUALITY ASSURANCE

A. Manufacturer Qualifications:
1. The manufacturer shall have implemented the management of quality objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.
2. Manufacturer shall be International Organization for Standardization (ISO) 9001 accredited.

B. Product Qualifications:
   1. Louvers licensed to bear AMCA Certified Ratings Seal. Ratings based on tests and procedures performed in accordance with AMCA 511 and comply with AMCA Certified Ratings Program. AMCA Certified Ratings Seal applies to air performance and water penetration ratings.
   2. Louvers shall be factory engineered to withstand the specified seismic loads.
      a. Minimum design loads shall be calculated to comply with ASCE – 7, or local requirements of Authority Having Jurisdiction (AHJ).

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.

C. Handling: Protect materials and finishes during handling and installation to prevent damage.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.9 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.10 WARRANTY

A. Manufacturer shall provide standard limited warranty for louver systems for a period of five years (60 months) from date of installation, no more than 60 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without cost to the Owner.

B. Manufacturer shall provide 20 year limited warranty for fluoropolymer-based finish on extruded aluminum substrates.
Finish coating shall not peel, blister, chip, crack or check.
Chalking, fading or erosion of finish when measured by the following tests:
   a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D4214.
   b. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D2244 and ASTM D822.
   c. Finish coating shall not erode at a rate in excess of 10%/ 5 year as determined by Florida test sample.

C. Manufacturer shall provide a 5 year limited warranty for Class I and a 3 year limited warranty for Class II anodized finish on extruded aluminum substrates.
   1. Seller warrants the Finish under normal atmospheric conditions.
      a. Will not crack, craze, flake or blister
      b. Will not change or fade more than (5) Delta-E Hunter units as determined by ASTM method D-2244
      c. Will not chalk in excess of ASTM D-4214-07 number (8) rating, determined by the procedure outlined in ASTMD-4214-07 specification test.

2. Any forming or welding must be done prior to finishing. Post forming or welding will void the warranty.
3. This Warranty applies only if the anodized aluminum product is installed in strict accordance with Seller's recommended practices and maintained in accordance with AAMA (American Architectural Manufacturers Association) publication number 609 and 610-09 ("Cleaning and Maintenance Guide for Architecturally Finished Aluminum").

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Ruskin Company; 3900 Dr. Greaves Road, Kansas City, Missouri 64030. Tel: (816) 761-7476.

B. Substitutions: Under provisions of Division 01.

2.2 STATIONARY BLADE LOUVER

A. Model: EME220DD as manufactured by Ruskin Company.

B. Fabrication: Extruded Aluminum stationary horizontal chevron louver style.
1. Design: Double drainable blades shall be contained within the frame with double downspouts in jambs and mullions. Louver design shall limit span between visible mullions to 120 inches (3048 mm).
2. Frame:
   a. Frame Depth: 2 inches (50 mm).
   b. Material: Extruded aluminum, Alloy 6063-T6.
   c. Wall Thickness: 0.060 inch (1.5 mm), nominal.
3. Blades:
   a. Style: Horizontal.
   b. Material: Extruded aluminum, Alloy 6063-T6.
   c. Exterior Wall Thickness: 0.045 inch (1.1 mm), nominal.
4. Fabrication:
   a. Mullion Style – Design incorporates visible mullions or frames at the perimeter of the louver and also at certain intervals within the louver perimeter to support the louver blades. Louver blade sightlines are interrupted at the mullion locations. No rear-mounted blade supports are utilized.
5. Minimum assembly size: 6 inches wide by 6 inches high (102 mm x 02 mm).
6. Maximum Factory Assembly Size: Single sections shall not exceed 120 inches wide by 90 inches high (3048 mm x 2286 mm) or 90 inches wide by 120 inches high (2286 mm x 3048). Louvers larger than the maximum single size shall be require field assembly of smaller sections.
7. Recycled Content: 18% post-consumer. 55% pre-consumer, post-industrial, total 73% by weight.

C. Performance Data:
1. Performance Ratings: AMCA licensed.
   a. Based on testing 48 inch by 48 inch (1219 mm by 1219 mm) size unit in accordance with AMCA 500.
2. Free Area: 43 percent, nominal.
3. Free Area Size: 6.86 sf (.64 sm).
4. Maximum Recommended Air Flow through Free Area: 680 feet per minute (3.5 m/s).
5. Air Flow: 4665 cubic feet per minute (2.2 m^3/s).

D. Wind Driven Water Penetration Performance:
   1. Based on testing 39 inches x 39 inches (1 m x 1 m) core area, 41 inches x 44 inches (1.04 m x 1.12 m) nominal size unit in accordance with AMCA 500-L.
   2. Wind Velocity: 29 mph (47 kph).
      a. Rainfall Rate: 3 inches/hour (76 mm/hour).
      b. Free Area Velocity: 1209 feet per minute (6.1 m/sec).
      c. Water Resistance Effectiveness: 99.3% (AMCA Class A).
   3. Wind Velocity: 50 mph (80 kph).
      a. Rainfall Rate: 8 inches/hour (203 mm/hour).
      b. Free Area Velocity: 757 feet per minute (3.8 m/sec).
      c. Water Resistance Effectiveness: 99.3% (AMCA Class A).

E. Design Windload: Per Code.

F. Louvers shall be factory engineered to withstand the specified seismic loads.
   1. Minimum design loads shall be calculated to comply with ASCE – 7, or local requirements of Authority Having Jurisdiction (AHJ).

2.3 ACCESSORIES

A. Aluminum Blank-Off Panels: 0.040 (1 mm) aluminum sheet, factory installed with removable fasteners and neoprene gaskets.

B. Insulated Aluminum Blank-Off Panels: 0.040 (1 mm) aluminum sheet, 1 inch (25 mm) aluminum skin insulated core, factory installed with removable fasteners and neoprene gaskets.

C. Hinged Frame: Continuous piano hinge attached to angle or channel subframe.

D. Filter Racks: Formed channel racks to accept standard [1 inch (25 mm)] [2 inch (51 mm)] thick filters. Unused bottom portion blanked off with 0.040 inch (1 mm) aluminum sheet.

E. Security Bars:
   1. Location: Front.
   2. Location: Rear.
   3. Construction: Aluminum, 3/4 inch x 1/2 inch (19 mm x 13 mm), welded to louver.
   4. Construction: Galvanized steel, 1/2 inch x 1/2 inch (13 mm x 13 mm), attached to louver with tamper-proof screws.
   5. Construction: Galvanized steel, 3/4 inch x 1/2 inch (19 mm x 13 mm), attached to louver with tamper-proof screws.

F. Bird Screen:
   1. Aluminum: Aluminum, 5/8 inch by 0.040 inch (16 mm by 1 mm), expanded and flattened. Frame: Removable.
   2. Aluminum: Aluminum, 1/2 inch by 0.063 inch (13 mm by 1.5 mm), expanded and flattened. Frame: Removable.

G. Insect Screens:
   1. Aluminum: 18-16 mesh, mill finish, .011 inch (0.3 mm) wire.
   2. Frame: Aluminum.

H. Extended Sills: Extruded aluminum, Alloy 6063-T6. Minimum nominal thickness 0.081 inch (2.1 mm).

I. Visible Mullions: Manufacturer's standard horizontal or vertical visible mullions for architectural accent as indicated on drawings.

2.4 FINISHES

A. Finish: Confirm finish with Architect:
1. 70 percent PVDF: Finish shall be applied at 1.2 mil total dry film thickness.
2. Coating shall conform to AAMA 2605. Apply coating following cleaning and pretreatment. Cleaning: AA-C12C42R1X.
3. 20-year finish warranty.

B. Color: To be selected from manufacturer’s standards.

PART 3 EXECUTION

3.1 EXAMINATION

A. Inspect areas to receive louvers. Notify the Architect of conditions that would adversely affect the installation or subsequent utilization of the louvers. Do not proceed with installation until unsatisfactory conditions are corrected.

B. If opening preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean opening thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install louvers at locations indicated on the drawings and in accordance with manufacturer's instructions.

B. Install louvers plumb, level, in plane of wall, and in alignment with adjacent work.

C. Install joint sealants as specified in Section 07 92 00.

D. Apply field topcoat within 6 months of application of shop prime coat. Apply field topcoat as specified in Section 09 91 00.

3.4 CLEANING

A. Clean louver surfaces in accordance with manufacturer's instructions.

B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 090391

GYPSUM PLASTER RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Gypsum plastering over interior masonry and wood framed walls, scope of work generally includes:
   a. Contractor shall sound/tap plaster finish throughout with a plastic mallet to determine extent of detached plaster finish and mark areas on wall. Contact Architect to review prior to complete removal.
   b. Repair plaster at removed interior partitions, ceilings, and other damaged areas, assume 10% of total wall area.
   c. Replace damaged, deteriorated, and detached plaster finish to sound substrate, assume replacement of 5% of total wall area, includes poor prior patches, and cracked areas.
   d. Replacement of complete plaster assembly and lath where missing at existing openings in wood framed walls, assume 10% of total wall area.
   e. Provide new plaster and lath assembly at infilled former window and door openings in Multi-Use spaces, assume 50 square feet.
   f. Repair plaster damage from channeling for MEP/AV/IT conduit and devices.
2. Repair plaster finish following installation of MEP devices and distribution systems.
3. Repair plaster finish following resetting of standing and running trim.
4. Metal lath, trim, and accessories.

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 012200 - Unit Prices
3. Section 012100 - Allowances
4. Section 024120 – Selective Demolition.
5. Section 040342 – Masonry Restoration for re-pointing of masonry walls.
6. Section 099100 – Painting
7. Hazardous Materials Testing Report in the appendix of the project manual.

1.2 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. C 28 - Gypsum Plaster.
2. C 631 - Bonding Compounds for Interior Plastering.
3. C 847 - Metal Lath.

B. Metal Lath/Steel Framing Association (ML/SFA) 920 - Guide Specifications for Metal Lathing and Furring.

C. Gypsum Construction Handbook, by the United States Gypsum Company, Latest edition.

D. Preservation Brief 21: Repairing Historic Flat Plaster – Walls and Ceilings, Mary Lee MacDonald, National Park Service, October, 1989.

1.3 QUALITY REQUIREMENTS

A. Applicator Qualifications:

1. Minimum 3 years documented experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 3 years.

B. Analysis of Existing Plaster:

1. Remove four samples of existing plaster from different locations.
2. Retain one sample for later comparison.
3. Break up remaining samples individually with mallet until constituent parts remain. Examine under microscope to determine:
   a. Approximate proportions of aggregate and gypsum.
   b. Type, size, and color of aggregate.
   c. Types of additives.
4. Based on analysis, provide recommended plaster mix compatible with physical and mechanical properties of original plaster materials.

B. Mock-Ups: Prior to installing plaster work, construct mock-up for each type of plaster repair and condition required to demonstrate aesthetic affects, as well as qualities of materials and execution. Build mock-ups to comply with the following requirements, using materials indicated for final unit of Work.

1. Erect sample panel straight plastering, minimum 20 square feet each by full thickness using materials proposed for final work, including lath. Mock-Ups shall be located adjacent to plaster finish scheduled to remain to verify seamless transition between existing and new plaster work.
2. Plaster patch, 24 inch by 24 inch, demonstrating preparation, patching, and finishing technique.
3. Crack repair, 4 lineal feet, demonstrating preparation, patching, and finishing technique.
4. Repair/replacement of delaminating skim coat.
5. Replacement of missing complete plaster assembly and lath at existing openings in walls.
6. Locate where directed by Architect.
7. Obtain Architect’s approval of mockups before start of plaster Work.
8. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed work.

1.4 SUBMITTALS

A. Product data: Submit manufacturer’s product specifications and installation instructions for each product, including data showing compliance with specified requirements.

B. Samples:

1. Lath, 12 inch by 12 inch sample for each type.
2. Metal accessories, 6” length sample for each type.
3. 12 x 12 inch plaster samples in proposed texture.
4. 12 x 12 inch plaster samples with embedded marble chips.

C. Hot Weather Procedures: Describe materials and procedures to be used.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original packages, containers, or bundles, labeled with manufacturer's name, product brand name, and lot number.

B. Store materials inside, under cover, and dry, protected form weather, direct sunlight, surface contamination, aging, corrosion, and damage from construction traffic and other causes.

C. Protect metal accessories from being bent or damaged.

1.6 PROJECT CONDITIONS

A. Environmental Requirements, General: Comply with requirements of referenced plaster application standards and recommendations of plaster manufacturer for environmental conditions before, during, and after plaster application.

B. Do not apply plaster when ambient or substrate temperature is less than 50 degrees F nor more than 85 degrees F.

C. Maintain minimum ambient temperature of 50 degrees F during and after application of plaster.

D. Ventilation: Ventilate building spaces as required to remove water in excess of that required for hydrating plaster. Begin ventilation immediately after plaster is applied and continue until it sets.

E. Protect contiguous work from soiling, splattering, moisture deterioration, and other harmful effects caused by plastering.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers – Plaster:

1. National Gypsum Co.
2. United States Gypsum Co.

2.2 MATERIALS

A. Plaster Materials:

1. Gypsum Plaster: ASTM C 28.
2. Aggregate: Natural sand, size, color, and texture to match existing original.
3. Additives: As determined by existing plaster analysis, to match existing original plaster.
4. Water: Clean and potable.

B. Metal Lath: ASTM C 847, expanded self-furring diamond mesh, galvanized.

2.3 ACCESSORIES

A. General: Comply with material provisions of ASTM C 1063 and the requirements indicated below; coordinate depth of accessories with thicknesses and number of plaster coats required.

1. Galvanized Steel Components: Fabricated from zinc-coated (galvanized) steel sheet complying with ASTM A 653, G40 minimum coating designation.

B. Metal Corner Reinforcement: Expanded, large-mesh, diamond-metal lath fabricated from zinc alloy or welded-wire mesh fabricated from 0.0475 inch diameter, zinc-coated wire and specially formed to reinforce external corners of Portland cement plaster on exterior exposures while allowing full plaster encasement.

C. Cornerbeads: Small nose cornerbeads fabricated from the following metal, with expanded flanges of large-mesh diamond-metal lath allowing full plaster encasement:

1. Galvanized Steel: Minimum 0.172 inch thick.

D. Casing Beads: Square-edged style, with expanded flanges of the following material:

1. Galvanized Steel: Minimum 0.172 inch thick.

E. Control Joints: Prefabricated, of material and type indicated below:

1. Galvanized Steel: Minimum 0.0172 inch thick.

F. Lath Attachment Devices: Material and type required by ASTM C 1063 for installations indicated.

C. Fasteners: Galvanized steel, minimum 5/8 inch penetration into supports.

D. Patching Compound: Premixed, containing gypsum and aggregate.

E. Tape: Woven glass fiber type, 4 inches wide.

F. Tie Wire: Galvanized annealed steel, minimum 18 gage.

G. Bonding Agent: ASTM C631; type recommended for bonding plaster directly to masonry surfaces:

1. Product: Plaster-Weld, as manufactured by Larsen Products Corp., (800) 633-6668, or approved equal.

2.4 MIXES

A. Scratch, Brown, and Finish Coats: Mix gypsum, additives, and aggregate in proportions to match original plaster. Add water to achieve workable consistency.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Substrates: With installer present, examine substrates to which plaster assemblies attach or abut for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Before applying plaster, clean and prepare substrates according to the manufacturer's instructions for each particular substrate condition and as specified. Roughen or remove substrates that could impair the bond with plaster.

3.2 PREPARATION

A. Prepare unit masonry substrates for plastering by re-pointing where required and cleaning to remove dirt, grease, oil, and other foreign matter and deposits that could impair bond with plaster.

B. Coordinate removal of plaster back to masonry or wood framing and to solid adjacent plaster. Make edges straight, clean, sharp and beveled inward. Repair or replace work to eliminate blisters, buckles, excessive crazing and check cracking, dry-outs, efflorescence and where bond to the substrate has failed.

C. Sequence plaster application with installation and protection of other work so that neither will be damaged by installation of other.

D. Mechanically mix plaster materials at the site; do not hand mix except where small amounts are needed, using less than one bag of plaster material.

3.3 INSTALLATION OF ACCESSORIES

A. Set level and true to line; screw or wire tie to framing at maximum 12 inches on center.

B. Casing Beads: Install where plaster abuts dissimilar material or stops with edge exposed.

C. Corner Beads: Install at external corners.

D. Control Joints: Unless otherwise indicated, locate as required to limit each area of plaster to 144 square feet with no dimension exceeding 12 feet.

E. Apply joint sealer to form waterstop behind joints at intersections.

3.4 INSTALLATION OF METAL LATH AND FURRING

A. General:

1. Interior Lathing and Furring: Install materials indicated of plaster to comply with ASTM C 841.
2. Install Supplementary framing, blocking, and bracing at terminations in Work and for support of fixtures, equipment services, heavy trim, and similar work to comply with details indicated or, if no otherwise indicated, to comply with applicable written instructions of plaster manufacturer or, if not available, of USG's "Gypsum Construction Handbook."
3. Isolation: Where lathing and metal support system abuts building structure horizontally and where partition or wall abuts overhead structure, sufficiently isolate from structural movement to prevent transfer of loading from building structure. Install slip- or cushion-type joints to absorb deflections but maintain lateral support.
    a. Frame both sides of control joint independently and do not bridge joints with furring and lathing or accessories.

B. Apply lathing with long dimension perpendicular to supports, with end joints staggered and occurring over supports.

C. Lap ends minimum 1 inch and sides minimum 1-1/2 inches.

D. Secure to framing with wire ties at maximum 6 inches on center.

E. Stop lath at each side of control joints and secure.

F. Reinforce corners of openings with 6 x 12 inch lath strip installed diagonally at each corner, wire tied to lath.

G. If lath is not continued minimum 3 inches on each side of internal corners, reinforce with 12 inch wide lath strip bent at 90 degrees and wire tied to lath.

3.5 APPLICATION OF PLASTER

A. General:

1. Prepare monolithic surfaces for bonded base coats and use bonding compound to comply with requirements of referenced plaster application standards for conditioning monolithic surfaces.
2. Tolerances: Do not deviate more than plus or minus 1/8 inch in 10 feet from a true plane in finished plaster surfaces, as measured by a 10-foot straightedge placed at any location on surface.
3. Sequence plaster application with installation and protection of other work so that neither will be damaged by installation of other.
4. Plaster flush with metal frames and other built-in metal items or accessories that act as a plaster ground, unless otherwise indicated. Where plaster is not terminated at metal frame by casing beads, cut base coat free from metal frame before plaster sets and groove finish coat at junctions with metal.
5. Apply thicknesses and number of coats of plaster as indicated or as required by referenced standards.

B. Plaster Application Standard: Apply plaster materials, composition, mixes, and finishes indicated to comply with ASTM C 842.

C. Number of Coats: Apply plaster of composition to match original as determined by analysis, to comply with the following requirements:

1. Three Coats: Over the following plaster bases:
   a. Metal lath.
2. Two Coats: Over the following bases:
   b. Unit masonry.
   c. Concrete, cast-in-place or precast when surface condition complies with ASTM C 842 for plaster bonded to solid base.
3. Finish Coats: Apply finish coats to match texture and finish of original adjacent plaster.

D. Installation Tolerances:

1. Plaster Tolerance: Maximum 1/8 inch in 10 feet variation from true flatness.
2. Trim Tolerance: Maximum 1/4 inch in 10 feet variation from plumb, level, or true plane, noncumulative.

E. Provide finish matching surrounding texture at each patch location and blend so that patches are indiscernible from original work.

3.6 REPAIR OF SMALL CRACKS AND MINOR DAMAGE

A. Remove existing damaged plaster back to a point at which sound material is reached.

B. Remove loose and foreign matter that could impair adhesion.

C. Fill voids with patching compound; apply with sufficient pressure to eliminate voids and ensure adhesion.

D. Finish to match adjacent surfaces.

3.7 REPAIR OF LARGE CRACKS

A. Remove existing damaged plaster back to a point at which sound material is reached.

B. Remove loose and foreign matter that could impair adhesion.

C. Fill voids with patching compound; apply with sufficient pressure to eliminate voids and ensure adhesion.

D. Embed tape in wet compound. Apply additional compound to cover tape.

E. Finish to match adjacent surfaces.

3.8 REPAIR OF DELAMINATED PLASTER LAYERS

A. Remove existing damaged plaster layers down to a point at which sound material is reached.

B. Remove loose and foreign matter that could impair adhesion.

C. Apply bonding agent in accordance with manufacturer's instructions.

D. Fill voids with patching compound; apply with sufficient pressure to eliminate voids and ensure adhesion.

E. Finish to match adjacent surfaces.

3.9 REPAIR OF DAMAGED PLASTER OVER METAL LATH

A. Remove existing damaged plaster down to lath.

B. Reattach loose lath with nails or wire ties.

C. Apply scratch, brown, and finish coats to thickness to match original plaster.

D. Finish to match adjacent surfaces.

3.10 REPAIR OF DAMAGED PLASTER OVER MASONRY

A. Remove existing damaged plaster down to masonry.

B. Rout out mortar joint to 5/8 inch depth.

C. Apply bonding agent in accordance with manufacturer's instructions.

D. Apply scratch, brown, and finish coats to thickness to match original plaster.

E. Finish to match adjacent surfaces.

3.11 SKIM COATING EXISTING PLASTER

A. Remove existing damaged plaster down to a point at which sound material is reached.

B. Remove loose and foreign matter that could impair adhesion.

C. Apply bonding agent in accordance with manufacturer's instructions.

D. Apply minimum 1/8 inch plaster skim coat over entire surface.

E. Finish to match original plaster.

3.12 ADJUSTING

A. Repair or replace damaged, discolored, and defective plaster.

3.13 CLEANING

A. Promptly remove plaster from surfaces, which are not to be plastered. Repair floors, walls and other surfaces, which have been stained, marred or otherwise damaged during plaster work. When plastering work is completed, remove unused materials, containers and equipment and clean floors of plaster debris.

B. Work shall be left in clean condition ready for painting.

END OF SECTION

SECTION 090396

WOOD FLOORING RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Replacement of damaged, deteriorated, or non-original wood flooring.
2. Removal and reinstallation of existing wood flooring as required for installation of structural reinforcement.
3. Epoxy patching of minor damage.
4. Screening, sanding, and/or chemically stripping to remove existing finishes.
5. Finishing with tung oil.

B. Related Sections:

1. Division 1: Administrative, procedural, and temporary work requirements.
2. Section 061000 – Rough Carpentry for wood sleepers and other carpentry not exposed to view.
3. Section 26 05 33 – Raceways, Conduits and Boxes

1.2 SUBMITTALS

A. Product data including manufacturer's installation instructions for wood flooring. Include instructions for handling, storage, dimensions of individual components, profiles, edge detail, finishing, protection, and maintenance.

B. Samples:

1. 24 inch long flooring samples, showing species, cut, and profile.
2. Stain samples on representative wood backing, showing available colors.
3. After color selection submit 24 inch long flooring samples, with selected stain and varnish. applied.

C. Qualification Statement: Installer qualifications, including previous projects.

1.3 QUALITY ASSURANCE

A. Installer Qualifications:

1. Minimum 3 years experience in work of this Section.
2. Successful completion of at least 3 projects of similar scope and complexity within past 5 years.

B. Source Quality Control: Obtain flooring of each type from a single manufacturer or source to ensure a match of quality, color, pattern, and texture.

C. Standards: Comply with applicable provisions of the following:

1. NOFMA: National Oak Flooring Manufacturer's Association – Installation Manual.
2. NOFMA: National Oak Flooring Manufacturers Association – Finishing / Refinishing Manual.
3. National Wood Flooring Association's Hardwood Flooring Manual.

D. Mockups:

1. Field Constructed Mock-ups: Prior to start of floor work, prepare the following sample areas in locations acceptable to the Architect. Obtain Architect's acceptance of visual qualities before

proceeding with the work. Retain acceptable areas in undisturbed condition, suitably marked, during construction as a standard for judging completed work.

a. Floor Repair: Samples showing repair of existing damage wood flooring (Each type) to demonstrate methods and quality of workmanship expected, size determine upon location and type of repair.
   1.) Wood dutchman repair.
   2.) Epoxy patching
   3.) Replacement of area of non-original wood flooring.
   4.) Repair of split or cracked flooring.
b. Floor Finish: One sample area approximately 6 foot by 6 foot showing screening, staining, and finishing of wood floor.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect wood flooring from exposure to moisture in shipment, storage, and handling. Deliver in unopened cartons or bundles and store in a dry place with adequate air circulation. Do not deliver material to building until concrete, plaster, masonry, ceramic tile, and other wet work is complete and cured to a condition of equilibrium and temperature and humidity are maintained at or near completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Solid Wood Flooring:
   1. Use salvaged existing flooring for patching holes and replacing deteriorated components. Do not reuse rotten, split, termite damaged, or otherwise damaged pieces.
   2. If salvaged materials are of insufficient quantity or are unsuitable for reuse, provide new solid wood flooring materials to match existing:
      a. Species: Recycled old growth Longleaf Yellow Pine.
      b. Profile: Tongued-and grooved and end-matched.
      c. Thickness: 1 inch actual. (Verify match with existing).
      d. Face width: 3 1/4 inch actual. (Verify match with existing).
      e. Lengths: Provide lengths as necessary to match variations found in historic.

2.2 EPOXY PATCHING MATERIAL FOR MINOR REPAIRS

A. Description: Adhesive putty and wood replacement system; high-strength non-shrink adhesive paste to fill, repair and replace wood, type compatible with stain or finish, pigmented if necessary to match approved finished wood flooring sample.

B. Product: The West System as manufactured by Gougeon Brothers, Bay City, MI (517) 684-7286.

2.3 ACCESSORY MATERIALS

A. Fasteners: Type and length recommended by flooring manufacturer and or installer, but not less than that recommended in NOFMA “Installation Manual.” Hot dip galvanized steel.

2.4 FINISHING MATERIALS

A. Stain and Varnish (Stain may be necessary for consistent finish where existing deep staining is exposed after screening, sanding, and or chemically stripping):
   1. Stain:
      a. Option 1: Oil-based pigment added to varnish (Preferred option for durability).

b. Option 2: Wood Classics Stain as manufactured by Sherwin Williams Co, or approved equal. Color to be selected from manufacturer's standards.

2. Varnish: Pure Tung Oil cut with mineral spirits (paint thinner), citrus solvent, or turpentine. Start with a ratio of one to one. Apply 3-5 coats.

B. Chemical Stripper:

1. Description: Water or solvent based paint & coatings remover formulated without methylene chloride for use on interior wood surfaces.
2. Product:
   a. Option 1: SmartStripPro Professional Strength Paint Remover, as manufactured by Dumond Chemicals Inc., www.dumondchemicals.com
   b. Option 2: Peel Away 7 Paint Removal Systems, as manufactured by Dumond Chemicals Inc., www.dumondchemicals.com

C. Sandpaper: 60 through 160 grit.

D. Cleaner: Trisodium Phosphate (TSP), 4 ounces to one gallon of hot water.

PART 3 - EXECUTION

3.1 PREPARATION

A. Do not install wood flooring until spaces are enclosed and at approximate humidity condition planned for occupancy. Open sealed packages of wood flooring to permit natural adjustment of moisture content and allow flooring to acclimate to the room conditions. Condition wood for 5 days before start of installation by placing in spaces to receive flooring and maintaining ambient temperature between 65 deg F. and 75 deg F (18 deg C and 24 deg C) before, during and after installation.

B. Protect floor outlets and wiring jacks as necessary to prevent damage. Clean and readjust as necessary after completion of work.

3.2 COATING REMOVAL

A. Coating Remover: Comply with manufacturer's written specifications for use of product.

1. Remove all loose and peeling coatings using dry scraping.
2. Apply a thick coating of specified remover to dry surface using a solvent-resistant brush or roller, putty knife, or airless paint sprayer.
3. Let stripper dwell 3-24 hours or until coating(s) “lifts” or shows signs of dissolving.
4. Remove stripper and residue with plastic scraper. Use nylon brush or general purpose Scotch Brite pad and clean water to remove remaining residue.
5. Dispose of resulting lead-based paint coatings as required by local environmental agency having jurisdiction.
6. Repeat process if required until all paint coatings are removed to exposed bare wood.

3.3 INSPECTION AND CLEANING

A. Clean existing floor to remove all residue left from carpet and tile adhesive. Consult with adhesive manufacturer to determine applicable methods.

B. Examine substrates where wood flooring will be installed and/or re-installed and conditions under which work will be performed. Do not proceed with wood flooring work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.4 REPAIR OF EXISTING WOOD FLOORING

A. Minor imperfections in the existing wood flooring are considered a part of the historic character of the building and may remain. Excessive sanding and filling to remove all imperfections is not required. The level of repair will be determined by the Architect based on the required mock-ups.

B. Repair minor defects including holes (Less than ½ inch diameter), gouges, cracks, dings, worn areas, and discolored areas using wood epoxy mixed with stainable pigment.

   a. Apply in accordance with manufacturer's instructions.
   b. After filler has cured, sand to smooth surface, flush with adjacent surfaces.

C. Repair major defects including split edges and holes (Larger than ½ inch diameter) with wood dutchman. New material shall match species, cut, and graining of existing adjacent wood. Graining of dutchman shall be installed in the same direction as existing adjacent wood.

D. Repair minor damage to wood with patching compound.

3.5 INSTALLATION OF SALVAGED WOOD FLOORING

A. General: Comply with instructions and recommendations in NOFMA “Hardwood Flooring Installation Manual,” where applicable for type of flooring to be installed.

B. Pattern: Install salvaged flooring in same direction as existing. Toothed in new boards into existing flooring so that pattern of new flooring is indistinguishable from existing.

C. Expansion space: Provide expansion space at walls and other obstructions and terminations of flooring of not less than ¾ inch unless otherwise indicated on the drawings.

D. Tongue and Groove Flooring Installation: Blind-nail flooring to substrate in accordance with NOFMA recommendations.

E. Accessories: Nail baseboard to wall and shoe molding or other trim to baseboard rather than to flooring.

3.6 SANDING

A. Remove any adhesive or other residue to the fullest extent possible using hand scrappers. Do not damage historic flooring.

B. Machine-sand or screen, existing flooring to remove finish, offsets and non-level conditions, ridges, cups and prior sanding machine marks that would be noticeable after finishing.

   1. Sand and prepare floor using NOFMA-accepted sanding methods.
   2. Machine sanding shall be by drum sander. Rotary or oscillator type sander will not be permitted.
   3. Make sanding passes parallel to the direction of the flooring.
   4. Use three grades of sandpaper, ending with 100 grade.
      a. For stained floor, make final cut with 80-grit paper and screen with 80-100-grit screen.
      b. For unstained floor make final cut with 80-100 grit paper and screen with 120-150 grit screen.
   5. Hand sand areas not accessible by the drum sander.
   6. Following sanding operations, vacuum thoroughly, tack clean and immediately apply finish.

3.7 STAIN / PENETRATING SEALER APPLICATION

A. Comply with manufacturer’s written recommendations for application of finish system

   1. Apply stain / sealer by hand wiping with rags, by brushing, or with a lambs wool applicator.

2. Start application in one corner along one edge of the room and move with the direction of the flooring. Use a paint brush to apply to flooring at wall lines.
3. Distribute material evenly across wood floor. Do not leave puddles or heavy excess on the surface. Avoid lap marks, brush strokes, handprints, and other visible imperfections.
4. Wipe up excess stain/penetrating sealer. Do not allow stain/penetrating sealer to dry before wiping.
5. Repeat application and wiping process as necessary to achieve match to approved mock-up.

3.8 FINISH APPLICATION

A. Apply floor finish according to manufacturer's instructions. Apply as many coats as needed to build a minimum dry film thickness of 3.0 mils. Sand between coats as recommended by manufacturer.

3.9 MISCELLANEOUS

A. Reinstall wood base and replacement wood base in original locations after floor has completely cured.

B. Install miscellaneous electrical floor cover plates.

3.10 PROTECTION

A. Do not cover finished floors with kraft paper, rugs or other material until finish reaches full cure, typically 6 to 7 days or as recommended by manufacturer.

B. Cover flooring with protective covering until ready for final cleaning.

END OF SECTION

SECTION 092900

GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Acoustical insulation.
2. Gypsum board.
3. Gypsum board applied to wood flooring.
4. Suspended metal channel ceiling framing.
5. Cementitious panels.
6. Cement backerboard sub floor.
7. Taping and bedding of gypsum board.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 079200 - Joint Sealants.
3. Section 099100 - Painting.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data:
a. Illustrate panel product types, thicknesses, and locations; acoustical insulation; and accessories.
b. Illustrate framing types, gages, and locations.

1.3 QUALITY ASSURANCE

A. Fire Resistance Ratings:
1. Construct assemblies to achieve fire resistance ratings indicated on Drawings, in accordance with applicable GA or UL design number.
2. If requirements of assembly numbers referenced conflict with Contract Document requirements, conform to assembly requirements.

B. Acoustic Ratings: Construct assemblies to achieve acoustic ratings indicated on Drawings, tested to ASTM E90 and classified in accordance with ASTM E413.

C. Metal Framing Manufacturer: Current member of SFIA or SSMA.

D. Installer Qualifications: Minimum 3 years documented experience in work of this Section.

E. Deflection Limits - Metal Framing:
1. Limit deflection of partitions to following limits, based on 5 PSF uniform design load.
a. Partitions to receive tile: L/240.
b. Other partitions: L/120.
c. If partition height exceeds stud manufacturer's limiting height for applicable loading and deflection, install bracing above ceiling, decrease stud spacing, or increase stud gage.
2. Limit deflection of ceilings to L/360.

1.4 PROJECT CONDITIONS

A. Do not install gypsum board until building is substantially weathertight.

B. Maintain temperature in spaces in which work is being performed above 50 degrees F during and after installation.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers - Gypsum Panels:
1. CertainTeed Gypsum, Inc. (www.certainteed.com)
2. National Gypsum Co. (www.nationalgypsum.com)
3. USG Corporation. (www.usg.com)
4. GP Gypsum Corporation. (www.gp.com)

B. Acceptable Manufacturers - Cementitious Panels:
1. James Hardie Building Products, Inc. (www.jameshardie.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS - GYPSUM PANELS

A. Regular Gypsum Board: ASTM C1396; 48 inches wide x thickness indicated, maximum practical length, tapered edge.

B. Fire Resistant Gypsum Board: ASTM C1396, Type X; 48 inches wide x 5/8 inch thick, maximum practical length, tapered edge; apply to fire rated assemblies.

2.3 MATERIALS - CEMENTITIOUS PANELS

A. Cementitious Panels: ANSI A 118.9, high density, cementitious with glass fiber reinforcing, thickness indicated x 48 inches wide, maximum practical length, ends and edges square cut, apply to walls to receive tile.

2.4 MATERIALS - METAL FRAMING

A. Steel: ASTM A653/A653M or ASTM A1003/1003M, Class G40 hot dip galvanized.

B. Provide components in accordance with ASTM C645.

C. Suspended Ceiling Framing - Runner and Furring Channels:
1. Runner channels: 1-1/2 inches deep, cold roll formed, channel shaped, 16 gage base steel thickness.
2. Furring channels: Hat shaped, 7/8 inch deep, 25 gage base steel thickness.
3. In lieu of runner and furring channels, install proprietary framing system:
   a. ASTM C635; manufactured specifically for suspended gypsum board ceiling applications.
   b. Tees: Double web design; 1-1/2 inches high with 1-3/8 inch wide knurled faces, with interlocking ends and punched holes for cross tees and hanger wires.
   c. Material: Galvanized steel.

2.5 ACCESSORIES

A. Fasteners: ASTM C1002, Type W or screws as applicable, minimum 5/8 inch penetration into framing.

B. Wire: ASTM A641, galvanized steel.
1. Hanger wire: 8 gage base steel thickness.
2. Tie wire: 18 gage base steel thickness, soft annealed.

C. Acoustical Insulation: Non-combustible, lightweight, mineral wool batt insulation to ASTM C665, Type 1, that provides fire resistance to ASTM E136 and sound control to ASTM E90 and ASTM C423.

D. Adhesive: Type recommended by gypsum panel manufacturer.

E. Trim Accessories: ASTM C1047.

1. Material: Formed steel, minimum 26 gage core steel, hot dip galvanized finish, expanded flanges.
2. Corner reinforcement: GA-216, Type CB-100 x 100.
3. Casing: GA-216, Type LC.
4. Control joint.

F. Acoustical Sealant: Specified in Section 079200.

G. Joint Treatment Materials: Reinforcing tape and joint compound; ASTM C475.

PART 3 EXECUTION

3.1 INSTALLATION OF CEILING FRAMING - RUNNER AND FURRING CHANNELS

A. Install in accordance with ASTM C754 and manufacturer's instructions.

B. Space hanger wires 36 inches on center maximum along runner channels and within 6 inches of ends of channels; secure to structure above.

C. Space runner channels 48 inches on center maximum and within 6 inches of abutting construction.
1. Position channels for ceiling height; level and saddle tie along channels.
2. Provide 1 inch clearance between channels and abutting construction.
3. Overlap channel ends 12 inches at splices; secure each end with double loop tie wire.

D. Space furring channels 16 inches on center maximum, perpendicular to runners and within 6 inches of abutting construction.
1. Provide 1 inch clearance between channels and abutting construction.
2. Secure to runners with clips on alternate sides of runners; saddle tie if clips cannot be alternated.
3. Overlap channel ends 8 inches at splices; secure each end with double loop tie wire.

E. Where openings interrupt furring or runner channels, install reinforcing to restore stability.

F. Provide double runner or furring channels side by side where expansion and control joints occur; do not continue channels over joints.

3.2 INSTALLATION OF CEILING FRAMING - PROPRIETARY FRAMING SYSTEM

A. Install in accordance with ASTM C636/C636M and manufacturer’s instructions.

B. Space hanger wires maximum 48 inches on center. Install additional hangers where required to support light fixtures and ceiling supported equipment.

C. Do not suspend hangers directly from metal deck. Attach steel channel horizontally to adjacent framing members; place hanger at regular spacing.

D. Hang suspension system independent of walls, columns, ducts, pipes, and conduit.

E. Where ducts or other equipment prevent regular spacing of hangers:
1. Reinforce nearest related hangers to span extra distance, or:
2. Suspend steel channel horizontally beneath duct or equipment; place hanger at regular spacing.

F. Install main tees at maximum 48 inches on center. Fully engage end locks.

G. Install cross tees perpendicular to main tees to form 16 x 48 inch modules. Lock cross tees to main tees.

3.3 INSTALLATION OF GYPSUM PANELS

A. Install panels and accessories in accordance with ASTM C754, GA-216, and manufacturer's instructions.

B. Accurately cut panels to fit around openings and projections. Do not tear face paper or break gypsum core.

C. Apply panels at non fire-rated assemblies in most economical manner, with ends and edges occurring over supports.

D. Apply panels at fire-rated assemblies as required by design assembly.

E. Stagger joints on opposite sides of partitions.

F. Do not locate joints to align with edges of openings unless a control joint is installed.

G. Mechanically fasten single layer panels to framing. Place fasteners minimum 3/8 inch from edges of panels; drive heads slightly below surface. Stagger fasteners at abutting edges.

H. Apply face layer of double layer applications with joints offset from those in base layer; secure with mechanical fasteners to framing or with adhesive to base layer.

I. At deflection compensating head tracks, cut panels 1/2 inch short of structure at head; do not secure panels to top runner channel.

J. Treat cut edges and holes in moisture resistant gypsum board with joint sealer.

K. Where recessed items occur in fire rated partitions, box item on all sides with gypsum board as required to maintain continuity of fire rating.

L. Ceiling Panels:
   1. Apply panels perpendicular to framing, with end joints staggered.
   2. Support panels around openings in ceiling.
   3. Mechanically fasten to framing.

3.4 INSTALLATION OF ACOUSTICAL PARTITIONS

A. Extend acoustical partitions past intersecting non-acoustical partitions.

B. Install acoustical insulation:
   1. Butt to framing members and adjacent construction.
   2. Carry around pipes, wiring, outlets, and other construction without voids.
   3. Press against one gypsum board surface to form slight air space on opposite side.

C. Seal acoustical partitions at perimeter and around penetrations:
   1. Apply continuous bead of sealer between gypsum panel edges and adjacent construction.
   2. Seal space between gypsum panels at control joints, prior to installing metal control joint.
   3. Apply sealer to penetrations through partitions.
   4. In fire rated partitions, use firestopping sealer specified in Section 078400. In non-fire rated partitions, use acoustical sealer.

3.5 INSTALLATION OF CEMENTITIOUS PANELS

A. Install in accordance with ANSI A108.11 and manufacturer's instructions.

B. Apply panels horizontally, with ends occurring over supports. Stagger end joints in adjacent rows.

C. Cut panels to fit around openings and projections.

D. Mechanically fasten panels to framing at maximum 12 inches on center.

3.6 INSTALLATION OF ACCESSORIES

A. Install in accordance with manufacturer's instructions.

B. Install corner reinforcement at outside corners. Use single lengths where length of corner does not exceed standard length.

C. Install casings where indicated and where gypsum board abuts dissimilar materials or stops with edge exposed.

D. Install control joints at ceilings:
   1. At maximum 50 feet on center.
   2. Where ceiling framing changes direction.

E. Install control joints at walls and partitions:
   1. At changes in backup material.
   2. At maximum 30 feet on center.
   3. Above both jambs of openings in partitions.

3.7 JOINT TREATMENT

A. Treat joints and fasteners in gypsum board in accordance with GA-214.

B. Levels of Finish:
   1. Surfaces in plenums, janitor closets: Level 1 finish.
   2. Surfaces to receive tile: Level 2 finish.
   3. Surfaces in Mechanical, Electrical, Machine Rooms and similar support spaces: Level 3 finish.
   4. Other surfaces to receive paint: Level 4 finish.

END OF SECTION

SECTION 093000

TILING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Tile floor and wall finishes.
   2. Marble thresholds.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 079200 - Joint Sealants.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data: Manufacturer's installation, cleaning, and maintenance instructions.
   2. Samples:
      a. Tile: Full size samples in each color.
      b. Grout: 1/2 x 1/2 x 3 inch long samples showing available colors.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2 years experience in work of this Section.

B. Dynamic Coefficient of Friction for Floor Tile: Minimum 0.42, tested in accordance with ANSI A137.1 using BOT-3000 tribometer.

C. Mockups:
   1. Provide tile mockup.
   2. Locate where directed.
   3. Size: 3' x 3'.
   4. Mockup may not remain a part of the Work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Deliver mortar and grout containers bearing hallmark certifying compliance with reference standards.

1.5 PROJECT CONDITIONS

A. Environmental Requirements: Maintain minimum ambient temperature of 50 degrees F during and after installation.

1.6 MAINTENANCE

A. Extra Materials: One unopened carton of each tile.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on tile products by Daltile. (www.daltile.com)

B. Acceptable Manufacturers - Setting and Grouting Materials:
   1. Bostik, Inc. (www.bostik-us.com)
   2. Laticrete International, Inc. (www.laticrete.com)
   3. Mapei Corporation. (www.mapei.us)

4. Sika Corporation. (www.sika.com)
5. TEC. (www.tecspecialty.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Floor Tile:
1. BOD: Daltile Keystones
2. Unglazed ceramic mosaic floor tile: windmill pattern, 1”x2” and 1”x1” tiles, two color pattern
3. Tile type 1:
   a. Size: 1"x 2" x 1/4" thick
   b. Color: Desert Gray D014
4. Tile type 2:
   a. Size: 1”x1”x1/4” thick
   b. Color: Biscuit D317

B. Wall Tile:
1. BOD: Daltile Classic Color Wheel Collection
2. Polished glazed ceramic wall wainscot subway tile with accent base and bullnose trim
3. Tile type 3 - field tile
   a. Size: 6" wide x 3" high x 5/16" thick
   b. Color: Biscuit K175
4. Tile type 4a - accent surface bullnose S-4269
   a. Size: 6" wide x 2" high x 5/16" thick
   b. Color: Desert Gray X114
5. Tile type 4b - accent surface bullnose S-4269
   a. Size: 6" wide x 2" high x 5/16" thick
   b. Color: Galaxy 1469
6. Tile type 4c - accent surface bullnose S-4269
   a. Size: 6" wide x 2" high x 5/16" thick
   b. Color: Garden Spot 0141
7. Tile type 5a - accent flat top cove base, A-3601
   a. Size: 6" wide x 6" high x 5/16" thick
   b. Color: Desert Gray X114
8. Tile type 5b - accent field tile for base (at polished concrete floor)
   a. Size: 6" wide x 6" high x 5/16" thick
   b. Color: Galaxy 1469
9. Tile type 5c - accent field tile for base (at polished concrete floor)
   a. Size: 6" wide x 6" high x 5/16" thick
   b. Color: Garden Spot 0141

C. Trim units:
1. Furnish inside and outside corners as required.
2. Color to match field or accent tile.

2.3 ACCESSORIES

A. Improved Latex-Portland Cement Mortar: ANSI A118.15, polymer modified, high performance, dry set type. Utilize mortar designed for mosiac and glass tiles for those applications.

B. Dry Set Mortar for Large and Heavy Tiles: ANSI A118.1, A118.4, A118.11, or A118.15; thin set mortar formulated by manufacturer to minimize slump and to facilitate thicker bond coat.

C. Water: Clean, potable.

D. Grout:
1. Kitchens: A118.3, epoxy type.
2. Other Locations: ANSI A118.7, high performance polymer modified type.
3. Colors: To be selected from manufacturer's full color range.

E. Joint Sealants: Specified in Section 079200.

F. Crack Suppression Membrane: ANSI A118.12, load bearing, single component, cold liquid applied type, High Performance Class.

G. Joint Tape: Waterproof, perforated bedding tape.

H. Metal Trim and Transitions: By Schluter (www.schluter.com), profiles to suit conditions.

I. Base Trim:
1. Source: Schluter DILEX-AHKA base trim, size to be confirmed with tile selection.
2. Finish: To be selected from manufacturer's full line.
3. Provide 90 degree outside and inside corner accessories

J. Thresholds:
1. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
   a. Bevel edges as 1:2 slope, with lower edge of bevel aligned with or up to 1/4 inch above adjacent floor surface. Finish bevel to match top surface of threshold. Limit height of threshold to 1/2 inch or less above adjacent floor surface.
2. Marble Thresholds: ASTM C503/C503M, with minimum abrasion resistance of 12 according to ASTM C1353 or ASTM C241/C241M and honed finish.
   a. Source: Botticino Fiorito Marble #M704 by American Olean (www.americanolean.com), or approved substitute.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces to remove loose and foreign matter that could impair adhesion.

B. Remove ridges and projections. Fill voids and depressions with patching compound compatible with setting materials.

C. Allowable Substrate Tolerances:
1. Maximum variation in substrate surface: 1/8 inch in 8 feet.
2. Maximum height of abrupt irregularities: 1/32 inch.

D. Test concrete substrate to ASTM D4263; do not install tile until surfaces are sufficiently dry.

3.2 INSTALLATION

A. Methods:
1. Walls: ANSI A108.5, thin set with latex-Portland cement mortar.
2. Floors:
   a. Install crack suppression membrane in accordance with manufacturer’s instructions.
   b. Install tile in accordance with ANSI A108.5, thin set with latex-Portland cement mortar; utilize dry set mortar for heavy or large tiles (one or more edges exceeding 15 inches, or 5 pounds per square foot or heavier).

B. Minimize pieces less than one half size. Locate cuts to be inconspicuous.

C. Lay tile to pattern furnished by Architect. Do not interrupt tile pattern through openings.

D. Joint Width: 1/8 inch, plus or minus 1/16 inch.

E. Install metal trim and transitions per manufacturers recommendations.

F. Make joints watertight, without voids, cracks, excess mortar, or excess grout. Align joints in wall and floor of same-sized tile.

G. Fit tile around projections and at perimeter. Smooth and clean cut edges. Ensure that trim will completely cover cut edges.

H. Allow tile to set for a minimum of 48 hours before grouting.

I. Grout tile joints in accordance with ANSI A108.10 without excess grout.

J. Control Joints:
   1. Provide control joints at:
      a. Changes in backup material.
      b. Changes in plane.
      c. Over joints in substrate.
      d. Maximum 24 feet on center except maximum 8 feet at surfaces exposed to direct sunlight.
   2. Form joints per TCNA Method EJ-171.
   3. Install joint backing and joint sealant as specified in Section 079200.

3.3 ADJUSTING

A. Remove and replace pieces that have been damaged during installation.

3.4 PROTECTION

A. Provide protection for completed work using nonstaining sheet coverings.

B. Prohibit traffic on tile floors for minimum 3 days after installation.

END OF SECTION

SECTION 095100

ACOUSTICAL CEILINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Suspended metal ceiling grid system.
2. Acoustical panels.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
1. Samples:
a. 12 x 12 inch acoustical panel samples.
b. 6 inch long suspension system samples showing each profile.

B. Quality Control Submittals:
1. Certificates of Compliance: Certification from an independent testing laboratory that acoustical panels meet fire hazard classification requirements.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2 years experience in work of this Section.

B. Fire Hazard Classification: Class A rated, tested to ASTM E1264.

1.4 PROJECT CONDITIONS

A. Environmental Requirements: Install in approximately same conditions of temperature and humidity as will prevail after installation.

1.5 MAINTENANCE

A. Extra Materials: One unopened carton of each acoustical panel.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Armstrong. (www.armstrong.com).

B. Other Acceptable Manufacturers:
1. Certainteed Corporation. (www.certainteed.com)
2. USG Interiors, Inc. (www.usg.com)

C. Substitutions under provisions of Division 01.

2.2 MATERIALS

A. Suspension Grid System:
   1. Source: Suprafine by Armstrong, or approved substitute.
   2. ASTM C635, intermediate duty, die cut, interlocking ends.
   3. Material: Hot dipped galvanized steel.
   4. Runners: 1-1/2 inches high, 9/16" exposed tee.
   5. Perimeter molding: Angle shape.
   6. Finish: Factory applied enamel paint, sprayed and baked, white finish to match acoustical panels.
   7. Accessories: Stabilizer bars, clips, and splices.

B. Acoustical Ceiling Tile:
   1. Source: Ultima Tegular by Armstrong, or approved substitute.
   2. Size: 2 feet x 2 feet.
   3. Profile: 9/16" Beveled Tegular.
   4. Color: White.

2.3 ACCESSORIES

A. Support Channels: Galvanized steel; size and type to suit application.

B. Hanger Wire: ASTM A641, minimum 12 gage galvanized steel.

C. Touch-Up Paint: Color to match acoustical panels and suspension grid.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install ceilings in accordance with ASTM C636, CISCA Handbook, and manufacturer’s instructions.

B. Install sloped ceilings where indicated in the Drawings.

C. Minimize panels less than one half size.

D. Install molding around perimeters and abutting surfaces. Miter molding at exterior corners; cut flanges and bend web to form interior corners.

E. Space hanger wires maximum 48 inches on center. Install additional hangers where required to support light fixtures and ceiling supported equipment.

F. Do not suspend hangers directly from metal deck. Attach steel channel horizontally to adjacent framing members; place hanger at regular spacing.

G. Hang suspension system independent of walls, columns, ducts, pipes, and conduit.

H. Where ducts or other equipment prevent regular spacing of hangers:
   1. Reinforce nearest related hangers to span extra distance, or:
   2. Suspend steel channel horizontally beneath duct or equipment; place hanger at regular spacing.

I. Install main tees at maximum 48 inches on center.

J. Install cross tees to form 24 x 24 or 48 inch modules as indicated in the Drawings. Lock cross tees to main tees.

K. Support ends of tees on flange of perimeter molding.

L. Place acoustical panels with edges resting flat on suspension grid.

M. Cutting Acoustic Units:
   1. Cut to fit irregular grid and perimeter edge trim and around penetrations.
   2. Locate cuts to be concealed.

N. Installation Tolerances: Ceilings level to 1/8 inch in 12 feet measured in any direction.

3.2 ADJUSTING

A. Touch up minor scratches and abrasions to match factory finish.

END OF SECTION

SECTION 096513

RESILIENT BASE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Resilient wall base.
2. Carpet tile.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: For each type of product.
2. Samples: 4 inch long samples in each color.

1.3 DELIVERY, STORAGE AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F or more than 90 deg F.

1.4 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:
1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg For more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

1.5 MAINTENANCE

A. Extra Materials: One unopened carton of each profile and color.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Mannington Commercial. (www.manningtoncommercial.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Resilient Base:
1. Source: Burkebase by Mannington Commercial, or approved substitute.
2. Material: Thermoplastic rubber wall base.
3. Height: 4 inches.
4. Profile:

a. Carpet Tile locations: Straight.
b. Other locations: Coved.

5. Color: To be selected by manufacturer's full line.

2.3 ACCESSORIES

A. Adhesive:
1. Water based, waterproof, recommended by base manufacturer.
2. Maximum volatile organic compound (VOC) content: 50 grams per liter.

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare surfaces to receive base:
1. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
2. Remove materials that could interfere with adhesion.
3. Fill low spots with patching compound; finish flush with adjacent surface.
4. Remove high spots, ridges and nibs.

B. Do not install resilient products until they are the same temperature as the space where they are to be installed.
1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

C. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply adhesive continuously to back of base.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. Job-Formed Corners:
1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
a. Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.
a. Miter corners to minimize open joints.

G. Scribe to door frames and other interruptions.

3.3 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.

B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from exposed surfaces.
   2. Sweep and vacuum horizontal surfaces thoroughly.
   3. Damp-mop horizontal surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

SECTION 096813

TILE CARPETING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Tile carpeting.
   2. Edgings.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 012100 - Allowances.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Indicate carpet tile locations, dye lot limitations, direction of carpet tile in each room or area, and type and location of edgings.
   2. Samples:
      a. Carpet tile: Full size samples in each color and pattern.
      b. Edgings: 4 inch long samples showing selected profiles and colors.
   3. Warranty: Sample warranty form.

B. Quality Control Submittals:
   1. Certificates of Compliance: Certification from an independent testing laboratory that carpet tiles meet fire hazard classification requirements.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 3 years documented experience in work of this Section.

B. Fire Hazard Classification: Maximum flame spread/smoke developed rating of 75/125, tested to ASTM E84.

1.4 PROJECT CONDITIONS

A. Do not begin installation until painting and finishing work have been completed.

B. Environmental Requirements:
   1. Temperature of spaces and subfloor between 65 and 90 degrees F.
   2. Humidity in spaces to receive carpet tiles between 20 and 65 percent.

1.5 WARRANTIES

A. Furnish manufacturer’s 10 year warranty providing coverage against:
   1. Defective materials and workmanship.
   2. Excessive fading.
   3. Loss of static control.
   4. Edge raveling.
   5. Runs.
   6. Loss of tuft bind strength.
   7. Loss of face fiber.
   8. Excessive wear.

PART 2 PRODUCTS

2.1 MATERIALS

A. Carpet Tiles: Product and color to be selected based on allowance.

2.2 ACCESSORIES

A. Adhesive:
   1. Waterproof, pressure-sensitive, latex based cement formulated specifically for installing carpet tiles; recommended by carpet tile manufacturer.
   2. Maximum volatile organic compound (VOC) content: 50 grams per liter.

B. Transition Strips: Preformed rubber or metal, profile required to suit conditions, color to be selected from manufacturer's full color range.

C. Leveling Compound: Premixed, latex based.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that concrete floors have cured a minimum 28 days and do not exhibit negative alkalinity, carbonization, or dusting.

3.2 PREPARATION

A. Clean substrate to ASTM D4258.

B. Fill cracks, voids, and depressions with leveling compound.

C. Grind ridges and high spots smooth.

D. Test Substrate:
   1. Moisture vapor: Test to ASTM F1869; do not install carpet tiles until moisture emission level is acceptable to carpet manufacturer.
   2. Humidity: Test to ASTM F2170; do not install carpet tiles until relative humidity is acceptable to carpet manufacturer.
   3. Alkalinity: Test to ASTM F710; do not install carpet tiles unless pH is acceptable to carpet manufacturer.

3.3 INSTALLATION OF CARPET TILES

A. Install in accordance with CRI 104.

B. Install carpet tile and adhesive in accordance with manufacturers' instructions.

C. Blend carpet tiles from different cartons to ensure minimal variation in color match.

D. Lay out each room or area to minimize tiles less than one half size.

E. Cut tile clean. Fit tiles tight to intersection with vertical surfaces without gaps.

F. Lay carpet tile to manufacturer's recommended pattern, set parallel to building lines and with corners aligned.

G. Locate change of color or pattern between rooms under door centerline.

H. Fully adhere carpet tiles to substrate.

I. Bind cut edges where not concealed by edge strips.

3.4 INSTALLATION OF EDGINGS

A. Install strips where carpet tiles abut dissimilar flooring materials; secure to subfloor.

B. Center strips under doors where carpet tiles terminate at door openings.

C. Install in longest practical lengths; butt ends tight.

D. Scribe to abutting surfaces.

3.5 CLEANING

A. Clean spots as recommended by carpet tile manufacturer.

B. Cut off loose threads flush with top surface.

C. Clean with commercial vacuum cleaner.

END OF SECTION

SECTION 098413

ACOUSTICAL PANELS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fabric covered acoustical wall panels.
   2. Acoustical insulation panels.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 012300 - Alternates.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Indicate panel locations, sizes, attachment, and relationship to adjacent construction.
   2. Product Data: Manufacturer's descriptive data for wall panels.
   3. Samples:
      a. 6 x 6 inch fabric samples showing available colors.
      b. After fabric selections submit 24 x 24 inch panel samples showing backing, facings, and edges.

B. Quality Control Submittals:
   1. Certification: Manufacturer's certification that Products comply with requirements for fire hazard classification.

1.3 QUALITY ASSURANCE

A. Fabric: Tested to ASTM E84 with following results:
   1. Flame spread: Maximum 25.
   2. Smoke density: Maximum 450.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials in clean, dry storage area at minimum 40 degrees F and normal humidity.

1.5 PROJECT CONDITIONS

A. Maintain minimum temperature of 50 degrees F in areas to receive wall panels for three days prior to, during, and after installation.

1.6 MAINTENANCE

A. Extra Stock: 2 percent extra fabric in each color and pattern.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on Colorsonix Wall Panel products by MBI Products Company, Inc. (www.mbiproducts.com)

B. Approved Manufacturers - Acoustical Wall Panels:
   1. Acoustics America. (www.acousticsamerica.com)
   2. Armstrong. (www.armstrong.com)

3. Kinetics Noise Control (www.kineticsnoise.com)
4. MBI Products Company, Inc. (www.mbiproducts.com)
5. RPG Acoustical Systems. (www.rpgacoustic.com)
6. Wall Technology, an Owens Corning Company. (www.owenscorning.com)
7. FabricMate. (www.fabricmate.com)

2.2 MATERIALS

A. Acoustical Wall Panels:
1. Source: Colorsonix Wall Panel products by MBI Products Company, Inc., or approved substitute.
2. Description: Fabric-Wrapped Acoustic Wall Panels.
3. Core: 6 PCF fiberglass board with hardened edges.
4. Depth: 2 inches.
5. NRC: Minimum 1.00.
6. Fabric: To be selected by Architect from manufacturer’s selections.
7. Mounting: Z-bar attachment.
8. Edge: Beveled.

B. Acoustical Insulation Panels (Alternate #2):
1. Source: Owens Corning SelectSound Black Acoustic Board, or approved substitute. Description: Black matt faced semi-rigid insulation complying with ASTM E136 and ASTM C423.
2. Thickness: 2 inches.
3. Density: 3.0 pcf.
4. R-value: 4.3 per inch.

2.3 ACCESSORIES

A. Mounting Accessories: Type best suited to application. Compliant with Volatile Organic Compound (VOC) and Emissions content for adhesives, if applicable.

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare substrate to receive wall panels:
1. Remove high spots.
2. Clean surfaces of materials that could impair adhesion.

3.2 INSTALLATION

A. Install panels in accordance with manufacturer's instructions and approved Shop Drawings.

B. Secure panels with maximum 24 inches on center.

C. Apply pressure over panel face to ensure tape bond to substrate.

D. Place panels plumb, level, and evenly spaced.

END OF SECTION

SECTION 099100

PAINTING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Surface preparation and field application of paints and stains.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 055000 - Metal Fabrications.
3. Section 064000 - Architectural Woodwork.
4. Section 080381 - Wood Door and Frame Restoration.
5. Section 080383 - Wood Window Restoration.
6. Section 081113 - Hollow Metal Doors and Frames.
7. Section 081433 - Stile and Rail Wood Doors.
8. Section 083113 - Access Doors and Frames.
9. Section 085200 - Wood Windows.
10. Section 090391 - Gypsum Plaster Restoration.
11. Section 090396 - Wood Floor Restoration.
12. Section 092900 - Gypsum Board Assemblies.
13. Division 22, 23, 26 and 28 for painting exposed MEP distribution systems and devices.

1.2 SUBMITTALS

A. Submittals for Review:
1. Product Data: Manufacturer's data on materials proposed for use including:
   a. Product designation and grade.
   b. Product analysis and performance characteristics.
   c. Standards compliance.
   d. Material content.
   e. Mixing and application procedures.
2. Samples: 3 x 6 inch samples of each coating system on representative substrate. Step back successive coats so that all coats remain exposed. Indicate type of material used for each coat.
3. Paint Schedule: Indicate types and locations of each surface, paint materials, and number of coats to be applied.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications: Minimum 2 years documented experience in work of this Section.

B. Materials, Preparation, and Workmanship: Conform to MPI Painting Manual.

C. Mockup - Decorative Paint Finishes:
1. Size: 4 x 4 feet.
2. Locate where directed.
3. Approved mockup may remain as part of the Work.

1.4 DELIVERY, STORAGE AND HANDLING

A. Container Labels: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage rates, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

B. Paint Materials: Store at ambient temperature from 45 to 90 degrees F in ventilated area, or as required by manufacturer's instructions.

1.5 PROJECT CONDITIONS

A. Do not apply materials when surface and ambient temperatures or relative humidity are outside ranges required by paint manufacturer.

B. Maintain ambient and substrate temperatures above manufacturer's minimum requirements for 24 hours before, during. and after paint application.

C. Do not apply materials when relative humidity is above 85 percent or when dew point is less than 5 degrees F different than ambient or surface temperature.

D. Provide lighting level of 30 footcandles at substrate surface.

1.6 MAINTENANCE

A. Extra Materials: 1 gallon of each color and sheen.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
1. Benjamin Moore and Co. (www.benjaminmoore.com)
2. Devoe Paint Co. (www.devoepaint.com)
3. Kelly-Moore Paints. (www.kellymoore.com)
4. PPG Paints. (www.ppgpaints.com)
5. Pratt and Lambert Paints. (www.prattandlambert.com)
6. Sherwin Williams. (www.sherwin-williams.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Paints:
1. As scheduled at end of Section, or approved substitute.
2. Free from all forms of lead and mercury.

B. Maximum Volatile Organic Compound (VOC) Content for interior paints, coatings, and accessories, tested to ASTM D6886:
1. Primers: 100 grams per liter.
2. Flat paints and coatings: 50 grams per liter.
3. Non-flat paints and coatings: 50 grams per liter.
4. Rust preventative coatings: 100 grams per liter.
5. Clear wood finishes: 275 grams per liter.
6. Stains: 100 grams per liter.
7. Dryfall coatings: 150 grams per liter.

C. Gloss Ratings:

Gloss Designation	Units at 60 Degrees	Units at 85 Degrees
Flat	0 to 5	Maximum 10
Eggshell	10 to 25	10 to 35
Satin	20 to 35	Minimum 35
Semigloss	35 to 70	
Gloss	70 to 85	

High Gloss Minimum 85

2.3 ACCESSORIES

A. Accessory Materials: Paint thinners and other materials required to achieve specified finishes; commercial quality.

B. Patching Materials: Latex filler.

C. Fastener Head Cover Materials: Latex filler.

2.4 MIXES

A. Deliver paints pre-mixed and pre-tinted.

B. Uniformly mix to thoroughly disperse pigments.

C. Do not thin in excess of manufacturer's recommendations.

D. Re-mix paint during application; ensure complete dispersion of settled pigment and uniformity of color and gloss.

PART 3 EXECUTION

3.1 EXAMINATION

A. Test shop applied primer for compatibility with subsequent coatings.

B. Measure moisture content of surfaces using electronic moisture meter. Do not apply coatings unless moisture content of surfaces are below following maximums:
   1. Gypsum board: 12 percent.
   2. Masonry: 12 percent.
   3. Wood: 15 percent, measured to ASTM D4442.

3.2 PREPARATION

A. General:
   1. Protect adjacent and underlying surfaces.
   2. Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.
   3. Correct defects and clean surfaces capable of affecting work of this section.
   4. Seal marks that may bleed through surface finishes with waterborne stain blocker.

B. Impervious Surfaces: Remove mildew by scrubbing with solution of trisodium phosphate and bleach. Rinse with clean water and allow to dry.

C. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

D. Masonry:
   1. Remove dirt, loose mortar, scale, salt and alkali powder, and other foreign matter. Methods to include medium pressure water spray and hand scraping. Take care not to damage or remove existing brick below paint.
   2. Remove oil and grease with solution of trisodium phosphate; rinse and allow to dry.
   3. Remove stains caused by weathering of corroding metals with solution of sodium metasilicate after thoroughly wetting with water. Allow to dry.

E. Galvanized Steel: SSPC Method SP1 - Solvent Cleaning.
   1. Shop clean surfaces and apply phosphate film at factory for surfaces to be painted in the field.

F. Aluminum: SSPC Method SP1 - Solvent Cleaning.

G. Uncoated Ferrous Metals: SSPC Method SP2 - Hand Tool Cleaning or Method SP3 - Power Tool Cleaning.

H. Shop Primed Ferrous Metals:
1. SSPC Method SP2 - Hand Tool Cleaning or Method SP3 - Power Tool Cleaning.
2. Feather edges to make patches inconspicuous.
3. Prime bare steel surfaces.

I. Exterior and Interior Wood:
1. Wipe off dust and grit.
2. Seal knots, pitch streaks, and sappy sections with sealer.
3. Fill nail holes and cracks after primer has dried; sand between coats.
4. Reference Drawings and additional preparation requirements at existing historic woodwork.

J. Existing Surfaces:
1. Remove loose, flaking, powdery, and peeling paints.
2. Lightly sand glossy painted surfaces.
3. Fill holes, cracks, depressions and other imperfections with patching compound; sand flush with surface.
4. Remove oil, grease, and wax by scraping; solvent wash and thoroughly rinse.
5. Remove rust by wire brushing to expose base metal.

3.3 APPLICATION

A. Apply paints in accordance with manufacturer’s instructions and MPI Painting Manual, Custom Grade finish requirements.

B. Apply primer or first coat closely following surface preparation to prevent recontamination.

C. Do not apply finishes to surfaces that are not dry.

D. Apply coatings to minimum dry film thickness recommended by manufacturer.

E. Apply each coat of paint slightly darker than preceding coat unless specified otherwise.

F. Apply coatings to uniform appearance without laps, sags, curtains, holidays, and brush marks.

G. Allow applied coats to dry before next coat is applied.

H. When required on deep and bright colors apply an additional finish coat to ensure color consistency.

I. Continue paint finishes behind wall-mounted accessories.

J. Sand between coats on interior wood and metal surfaces.

K. Match final coat to approved color samples.

L. Where clear finishes are specified, tint fillers to match wood. Work fillers into grain before set. Wipe excess from surface.

M. Prime concealed surfaces of interior wood in contact with masonry or cementitious materials with one coat primer paint.

N. Mechanical and Electrical Components:
1. Paint factory primed equipment.
2. Remove unfinished and primed louvers, grilles, covers, and access panels; paint separately.
3. Paint exposed and insulated pipes, conduit, boxes, ducts, hangers, brackets, collars, and supports unless factory finished.

4. Do not paint name tags or identifying markings.
5. Paint exposed conduit and electrical equipment in finished areas.
6. Paint duct work behind louvers, grills, and diffusers flat black to minimum of 18 inches or beyond sight line.

O. Do not Paint:
1. Surfaces indicated on Drawings or specified to be unpainted or unfinished.
2. Surfaces with factory applied finish coat or integral finish.
3. Architectural metals, including brass, bronze, stainless steel, and chrome plating.

3.4 ADJUSTING

A. Touch up or refinish disfigured surfaces.

3.5 CLEANING

A. Remove paint from adjacent surfaces.

3.6 PAINT SCHEDULE

A. Types of paint listed herein are set forth as standard of quality and type of coating required for each type of surface.
1. Paint exposed surfaces of types listed in Paint Schedule.
2. Paint other exposed surfaces not specifically listed with not less than two coats of appropriate type of coating.

B. Prime coat consists of touch up on shop primed surfaces with intact coatings.

SUBSTRATE	MANUFACTURER	PRIMER	TOP COATS
Exterior Surfaces:			
Ferrous and Galvanized Metals	Sherwin Williams	One coat Pro-Cryl Universal Water Based Primer	Two coats Pro Industrial Acrylic Semi-Gloss
Galvanized Metals (unfinished, for touch up)	ZRC		Galvilite Galvanizing Repair
Wood, Opaque Finish	Sherwin Williams	One coat A-100 Exterior Latex Wood Primer	Two coats Duration Exterior Latex Satin Coating
Interior Surfaces:			
Gypsum Board - Ceilings, Latex Flat Finish	Sherwin Williams	One coat ProMar 200 Zero VOC Interior Latex Primer	Two coats ProMar 200 Zero VOC Interior Latex Flat Wall Paint
Gypsum Board - Walls, Latex Eggshell/Satin Enamel Finish	Sherwin Williams	One coat ProMar 200 Zero VOC Interior Latex Primer	Two coats ProMar 200 Zero VOC Interior Latex Eg-Shel Enamel
Gypsum Board, Latex Semi-Gloss Finish	Sherwin WIlliams	One coat ProMar 200 Zero VOC Interior Latex Primer	Two coats ProMar 200 Zero VOC Interior Latex Semi-Gloss Enamel
Ferrous and Galvanized Metals - Semi-Gloss	Sherwin Williams	One coat Pro-Cryl Universal Water Based Primer	Two coats Pro Industrial Acrylic Semi-Gloss

SUBSTRATE	MANUFACTURER	PRIMER	TOP COATS
Wood, Opaque Finish	Sherwin Williams	One coat Premium Wall & Wood Interior Latex Primer	Two coats ProMar 200 Zero VOC Interior Latex Semi-Gloss
Wood, Transparent finish	Sherwin Williams	One coat Wood Classics Interior Stain	Two coats Wood Classics Polyurethane Varnish, Satin
Wood floors at existing building, wood ceiling at addition link	Sherwin Williams	One coat Wood Classics Interior Oil Stain	Three-five coats Pure Tung Oil cut with Mineral Spirits

END OF SECTION

SECTION 101423

INTERIOR PANEL SIGNS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Interior panel signs.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Include sign locations, sizes, mounting heights, and content.
2. Samples:
a. 3 x 3 inch sign samples showing available colors.
b. After color selection, submit typical sign illustrating pictograms, characters, and Braille indications.

1.3 QUALITY ASSURANCE

A. Provide signage as required by Authorities Having Jurisdiction.

B. Conform to applicable accessibility code for sign design, construction, location, and mounting height.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on 1000 ADA System products by Mohawk Sign Systems, Inc. (www.mohawksign.com)

B. Other Acceptable Manufacturers:
1. APCO Graphics, Inc. (www.apcosigns.com)
2. Best Sign Systems, Inc. (www.bestsigns.com)
3. 290 Signs by Mohawk Sign Systems, Inc. (www.mohawksign.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Signage: 1000 ADA System by Mohawk Sign Systems, Inc., or approved substitute.

B. Graphic Process:
1. All signs shall be manufactured using Graphic Process Series 200A - Sand Carved® using Format D.
a. Tactile characters shall be raised the required 1/32" inches from sign face. Glue-on letters or etched backgrounds are not acceptable.
b. All text shall be accompanied by Grade 2 braille. Braille shall be separated 1/2" from the corresponding raised characters or symbols. Grade 2 braille translation to be provided by signage manufacturer.
c. All letters, numbers and/or symbols shall contrast with their background, either light characters on a dark background or dark characters on a light background. Characters and background shall have a non-glare finish.
2. Plaque material: Special Purpose SP125 decorative thermosetting high pressure laminate. Material to be 1/8” thick laminate with a melamine resin surface and a phenolic resin core which

provides resistance to abrasion, stains, alcohol, solvents, boiling water, and heat. The materia shall be NEMA rated and have flammability and smoke values that meet the standards for flammability of interior materials.

3. Background color as selected by architect from manufacturer's actual color samples.
4. Letterform: Gill Sans upper case letters and numbers.
5. Size of letters and numbers:
   a. Room numbers shall be 1".
   b. Lettering for room ID signs shall be 5/8" or as noted.
   c. Symbol size shall be 4".
   d. Standard Grade 2 braille shall be 1/2" below copy.
   e. Corners: 1/2" radius
6. Copy position: CC (centered/centered), or as indicated on Drawings.

2.3 ACCESSORIES

A. Mounting: Vinyl tape and silastic adhesive. Provide mechanical mounting for larger signs as recommended by manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces of loose and foreign matter.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved Shop Drawings.

B. Locate signs on wall adjacent to scheduled doors.

3.3 SCHEDULE

Room No.	Quantity	Inscription	Type	Size (H x W)
9	1	Restroom Note: Include 4" international symbol for accessibility	C	8" x 6"
10	1	Janitor	A	3" x 6"
11	1	Storage	A	3" x 6"
7	1	Catering	A	3" x 6"
6	1	AV/IT	A	3" x 6"
14	1	Women's Restroom Note: Include 4" international symbol for accessibility and gender symbol	C	8" x 6"
15	1	Men's Restroom Note: Include 4" international symbol for accessibility and gender symbol	C	8" x 6"
16	1	Dressing Room	A	6" x 6"
17	1	Restroom Note: Include 4" international symbol for accessibility	C	8" x 6"
18	1	Mechanical	A	3" x 6"
19	1	Restroom Note: Include 4" international symbol for accessibility	C	8" x 6"
21	1	Office	B	6" x 6"
22	1	Office	B	6" x 6"
2, 3	2	Maximum Occupancy Signs (TBD)		Size per local code official

END OF SECTION

SECTION 102113

TOILET COMPARTMENTS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. HDPE toilet partitions.
2. HDPE urinal screens.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 102813 - Toilet Accessories.

1.2 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Include layout, dimensions, materials, panel construction, finishes, hardware, and accessories.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on Hiny Hider products by Scranton Products. (www.scrantonproducts.com)

B. Other Acceptable Manufacturers:
1. AJW Architectural Products. (www.ajw.com)
2. Accurate Partitions Corp. (www.accuratepartitions.com)
3. Global Partitions Corp. (www.globalpartitions.com)
4. Knickerbocker Partition Corp. (www.knickerbockerpartition.com)
5. Metpar Corp. (www.metpar.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Doors, Panels and Pilasters:
1. High density polyethylene (HDPE), fabricated from polymer resins compounded under high pressure, forming single thickness panel.
2. Waterproof and nonabsorbent, with self-lubricating surface, resistant to marks by pens, pencils, markers, and other writing instruments.
3. 1 inch thick with edges rounded to 1/4 inch radius.
4. Color: To be selected from manufacturer’s full color range.

B. Aluminum Extrusions: ASTM B221, 6463-T5 alloy and temper.

C. Stainless Steel: ASTM A167, Type 304.

2.3 HARDWARE

A. Hinges: Regal hinge fabricated from heavy-duty cast aluminum, wrap around flanges, adjustable on 30-degree increments, through bolted to doors and pilasters.

B. Door Strike and Keeper:

1. 6 inches long, fabricate from heavy-duty extruded aluminum with bright dip anodized finish, wi wrap-around flanges secured to pilasters with stainless steel tamper resistant Torx head sex bolts.
2. Bumper: Extruded black vinyl.

C. Latch and Housing:
1. Heavy-duty extruded aluminum.
2. Latch housing: Bright dip anodized finish.
3. Slide latch and paddle.

D. Coat Hook/Bumper:
1. Combination type, chrome plated Zamak.
2. Equip outswing handicapped doors with second door pull and door stop.

E. Door Pulls: Chrome plated Zamak.

2.4 COMPONENTS

A. Doors and Dividing Panels: 55 inches high, mounted 14 inches above finished floor, with aluminum heat-sinc fastened to bottom edges.

B. Pilasters: 82 inches high, fastened to pilaster sleeves with stainless steel tamper resistant Torx head sex bolt.

C. Pilaster Sleeves: 3 inches high, 20 gage stainless steel, secured to pilaster with stainless steel tamper resistant Torx head sex bolt.

D. Wall Brackets: 54 inches long, heavy-duty aluminum, bright dip anodized finish, fastened to pilasters and panels with stainless steel tamper resistant Torx head sex bolts.

E. Headrail: Heavy-duty extruded aluminum, anti-grip design, clear anodized finish, fastened to headrail bracket with stainless steel tamper resistant Torx head sex bolt and at top of pilaster with stainless steel tamper resistant Torx head screws.

F. Headrail Brackets: 20 gage stainless steel, satin finish, secured to wall with stainless steel tamper resistant Torx head screws.

2.5 ACCESSORIES

A. Fasteners: Stainless steel, theft resistant where exposed.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer’s instructions and approved Shop Drawings.

B. Set partitions straight, plumb, level, and aligned.

C. Locate bottom edge of doors and panels 14 inches above finished floor.

D. Provide 3/8 to 1/2 inch vertical clearances between walls and panels and between walls and end pilasters.

E. Attach panel brackets to walls using appropriate anchor devices.

F. Adjust for floor variations with screw jack integral in pilasters. Conceal floor fastenings with pilaster shoes.

G. Support pilasters from built-in framing using adjustable hanging studs providing vertical leveling. Conceal ceiling fastenings with pilaster shoes.

H. Equip doors with two hinges, door latch, door strike and keeper, and bumper/coat hook.

3.2 ADJUSTING

A. Adjust hardware for proper operation.

B. Adjust door hinges to hold door open 10 degrees when not latched.

END OF SECTION

SECTION 102813

TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Toilet accessories.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data:
      a. Schedule accessories by room; show plans and elevations, and identify room name and number, type and quantity of accessories, and mounting heights.
      b. Include manufacturer's brochures showing sizes, details of function, finishes, and attachment methods.
   2. Samples: One of each accessory, if requested.
   3. Warranty: Sample warranty form.

1.3 QUALITY ASSURANCE

A. Locate accessories at heights indicated in the Drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by American Specialties. (www.americanspecialties.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Toilet Accessories: As scheduled at the end of the Section, or approved substitute. Refer to Drawings for locations.

B. Stainless Steel:
   1. Sheet: ASTM A666, Type 304, rollable temper.
   2. Tubing: ASTM A269.

C. Galvanized Steel: ASTM A1008/1008M.

2.3 ACCESSORIES

A. Fasteners: Stainless steel where exposed, hot dip galvanized where concealed; type best suited to substrate conditions.

2.4 FABRICATION

A. Use stainless steel for exposed surfaces; galvanized steel may be used in concealed locations.

B. Form exposed surfaces from single sheet of stock, free from joints, and flat, without distortion.

C. Weld joints of fabricated components and grind smooth.

D. Fabricate grab bars of tubing, free of visible joints, return to wall with end attachment flanges.

E. Fabricate soap dispensers to operate with less than 5 pound force.

F. Provide hangers, adapters, anchor plates, and accessories required for installation.

G. Key locks alike; furnish six keys.

H. Shop assemble units and package complete with anchors and fittings.

2.5 FINISHES

A. Stainless Steel: No. 4 satin.

B. Galvanizing: ASTM A123/A123M to 1.25 ounces per square foot.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Set plumb, level, square, and rigid.

3.2 SCHEDULE

MARK	DESCRIPTION	MANUFACTURER	MODEL NO.
D	Surface Mounted Paper Towel Dispenser & Waste Receptacle	American Specialties	0467-9
G	Surface Mounted Paper Towel Dispenser	American Specialties	0210
A	Semi-Recessed Twin Hide-A-Roll Toilet Tissue Dispenser	American Specialties	0031
A	Surface Mounted Twin Hide-A-Roll Toilet Tissue Dispenser	American Specialties	0030
F	Inter-Lok Stainless Steel Framed Mirror	American Specialties	0600, 24" x 36"
P	Surface Mounted Vertical Soap Dispenser	American Specialties	0359
E	Surface Mounted Sanitary Napkin Receptacle	American Specialties	0852
B, C	1" Diameter Stainless Steel Grab Bars w/ Concealed Mounting	American Specialties	3000 Series x lengths indicated on the Drawings
J	Surface Mounted Stainless Steel Baby Changing Station	American Specialties	9013-9
I	Robe Hook (Single) - Surface Mounted	American Specialties	7340-S

END OF SECTION

SECTION 104413

FIRE EXTINGUISHERS AND CABINETS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Portable fire extinguishers.
2. Cabinets.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Indicate bracket locations and mounting heights.
2. Product Data: Include data on extinguishers, operational features, materials, finishes, and anchorage.

B. Closeout Submittals:
1. Maintenance Data: Include test, refill, or recharge schedules and re-certification requirements.

1.3 QUALITY ASSURANCE

A. Provide fire extinguishers complying with UL 711 and applicable code.

B. Conform to applicable accessibility code for locating extinguishers.

1.4 PROJECT CONDITIONS

A. Do not install extinguishers when ambient temperature may cause freezing of extinguisher ingredients.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by JL Industries. (www.jlindustries.com)

B. Other Acceptable Manufacturers:
1. Larsen's Manufacturing Company. (www.larsensmfg.com)
2. Potter Roemer. (www.potterroemer.com)

C. Substitutions: Under provisions of Division 01.

2.2 COMPONENTS

A. Extinguishers:
1. Kitchens: Wet chemical type, stainless steel tank, Class 2A-1B:C:K, 6 L nominal capacity.
2. Other Locations: Multi-purpose dry chemical type, UL 299, cast steel tank, Class 4A:60B:C, 10 pound nominal capacity.
3. Free from CFCs, HCFCs, and Halons.

B. Cabinets:
1. Product: JL Industries Ambassador Steel Fire Extinguisher Cabinet
2. Configuration: Semi-recessed cabinet, sized to accommodate extinguishers.
3. Trim: 1 1/2" square trim.

4. Door: Vertical duo panel with pull handle.

2.3 ACCESSORIES

A. Mounting Hardware: Type best suited to application.

2.4 FINISHES

A. Extinguishers: Baked enamel, red color.

B. Cabinets: White powder-coated finish.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install cabinets in accordance with manufacturer's instructions.

B. Set plumb, level, and rigid.

C. Place an extinguisher in each cabinet.

END OF SECTION

SECTION 107500

FLAGPOLES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Aluminum flagpole, ground set.
2. Concrete base.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.
2. Section 033000 - Cast-In-Place Concrete.
3. Section 079200 - Joint Sealants.

1.2 SYSTEM DESCRIPTION

A. Design Requirements: Design flagpole and anchorage devices in accordance with ANSI/NAAMM FP 100197.

B. Pole Description:
1. Type: Ground set, fixed.
2. Pole: Cone tapered.
3. Exposed height: 25 feet.

1.3 SUBMITTALS

A. Submittals for Review:
1. Shop Drawings: Include pole and base dimensions, materials, finishes, and accessories.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 3 years documented experience in work of this Section.

1.5 DELIVERY, STORAGE AND HANDLING

A. Handle products in accordance with AAMA CW-10.

B. Wrap poles in heavy paper to prevent damage during shipping and handling.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Concord American Flagpole. (www.concordamericanflagpole.com)

B. Other Acceptable Manufacturers:
1. American Flagpole, Inc. (www.americanflagpole.com)
2. Ewing International Corp. (www.ewingflagpole.com)
3. Pole-Tech Co., Inc. (www.poletech.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Flag Pole: Concord American External Single Revolving Ground Set Flagpole, Estate Series Flagpoles – ESS-GS, 25', or approved substitute.

B. Aluminum: ASTM B241, seamless 6063-T6 aluminum alloy.

C. Concrete: ASTM C94; 3000 psi 28 day strength, 2 to 3 inch slump.

2.3 COMPONENTS

A. Poles: Seamless aluminum pipe, 6 inch diameter.

B. Fittings:
1. Ball: Spun aluminum.
2. Truck: Revolving, non fouling, cast aluminum.
3. Halyard: External type, 3/8 inch diameter braided nylon rope with two stainless steel swivel snap hooks.
4. Winch: Internally mounted, with removable crank handle and automatic brake allowing flag to be set at any position, with counterweight and beaded retainer ring.
5. Door: Flush with compression lock. Key locks alike; furnish four keys.
6. Cleat: 9 inch long cast aluminum.
7. Cleat box cover: Hinged cover with padlock provisions.
8. Collar: Cast aluminum, minimum 1 inch larger in diameter than foundation sleeve.
9. Foundation sleeve: 16 gage, 10 inch diameter, galvanized, corrugated steel with 3/8 inch base plate. Provide minimum 12 inch long lightning rod with setting plate and one set each steel and hardwood centering wedges.

2.4 ACCESSORIES

A. Grout: Cement based, non shrink.

B. Joint Sealant: Specified in Section 079200.

2.5 FINISHES

A. Aluminum: AAMA 611, Architectural Class I anodized to 0.0007 inch minimum thickness, clear.

B. Apply bituminous coating to that part of flagpole to be set in base, inside and out.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install flagpoles and accessories in accordance with manufacturer’s instructions and approved Shop Drawings.

B. Install foundation sleeve in concrete footing.

C. Center pole in sleeve using steel wedges; plumb with hardwood wedges. Fill sleeve with clean, dry sand; top off with grout.

D. Install collar to conceal sleeve.

E. Apply joint sealant around pole at top of grout and collar.

END OF SECTION

SECTION 121230

PICTURE HANGING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Work Included:

1. Provide hanging display system at the east and west walls of 5 Gallery. Locate track on wall tight to ceiling.
2. Provide labor, materials and equipment necessary to complete the work of this Section including the following.

    a. Rail systems.
    b. Hooks and cords for rail systems.
    c. Related hanging systems.
    d. Complimentary products.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 061000 - Rough Carpentry for blocking in walls.
2. Section 090391 – Gypsum Plaster Restoration.

1.2 SUBMITTALS

A. Product Data: Submit for each product indicating materials, dimensions, and profiles. Include installation instructions.

B. Shop Drawings: Submit shop drawings indicating plans, elevations, details of construction, and relationship with adjacent construction.

C. Schedule: Submit a written schedule with model numbers, colors, accessories and location of picture hanging systems.

D. Verification Samples: Submit representative sample of picture hanging systems specified.

1.3 QUALITY ASSURANCE

A. Manufacturer: Minimum of 5 years manufacturing similar products.

B. Installer: Minimum of 2 years installing similar products.

C. Mock-Up: Provide an in-place mock-up of first installation for each type for review of workmanship. Accepted mock-ups may remain in place.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

B. Storage and Handling: Comply with manufacturer's recommendations for storage and handling. Protect from weather damage.

1.5 WARRANTY

A. Warranty: Provide manufacturer's standard limited warranty against defects in manufacturing.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis-of-Design Manufacturer: STAS picture hanging systems, Tel. 888-312-6971, Fax 508-556-0052 www.picturehangingsystems.com, or approved equal.

1. Materials: Aluminum and steel, as standard with manufacturer.

2.2 RAIL SYSTEMS

A. STAS cliprail max (Lengths TBD):

1. RC10215 cliprail max white 150 cm.
2. RC10220 cliprail max white 200 cm.
3. RC10230 cliprail max white 300 cm.
4. RD40100 railclip (metal, 3 per m1).
5. RD40200 rail connector (metal).
6. SR30600 screw torx.
7. SR50700 plug 6 x 30 mm hard / soft wall.

2.3 HOOKS AND CORDS FOR RAIL SYSTEMS

A. STAS hooks and cords (Lengths TBD):

1. HA30501 zipper (15 kg perlon + 20 kg steel).
2. SC10110 cobra + steelcable 100 cm.
3. SC10115 cobra + steelcable 150 cm.
4. SC10120 cobra + steelcable 200 cm.
5. SC10125 cobra + steelcable 250 cm.
6. SC10130 cobra + steelcable 300 cm.
7. SC10140 cobra + steelcable 400 cm.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine existing conditions to determine that they are suitable for installation. Proceed with installation only when unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install units in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.

3.3 ADJUSTING AND CLEANING

A. Adjust units for proper operation and uniform appearance.

B. Clean exposed and semi-exposed surfaces using materials acceptable to manufacturer.

END OF SECTION

SECTION 122113

HORIZONTAL LOUVER BLINDS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Horizontal slat louver blinds for installation at all exterior windows with the exception of windows in multi-use spaces.
   2. Operating hardware.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data: Describe blind construction and finishes.
   2. Samples: 3 inch long slat samples showing available colors. in each color.

1.3 PROJECT CONDITIONS

A. Do not install blinds until painting and finishing work is complete.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on Custom Real Wood Blinds by Levolor. (www.levolor.com)

B. Other Acceptable Manufacturers:
   1. Hunter Douglas, Inc. (www.hunterdouglas.com)
   2. Springs Window Fashions. (www.springswindowfashions.com)

C. Substitutions: Under provisions of Division 01.

2.2 COMPONENTS

A. Horizontal Louver Blinds: Type to be selected:
   1. Wood Louver Slats: 2 inches wide, solid wood horizontal slats; North American hardwood, flame-retardant treated; with flat profile and radiused corners, beaded edges and double beaded edges.

B. Slat Support: Woven polypropylene ladders.

C. Head Rail: Prefinished, formed aluminum or steel box, internally fitted for hardware, pulleys, and bearings for blind operation. Provide snap-on hardwood valance to match slats.

D. Cord: Braided nylon or polypropylene.

E. Control Wand: 3/8" diameter hardwood to match slats, height of window opening less 12 inches.

F. Support Brackets: Suitable for wall or soffit mounting, formed metal to match head rail, allowing removal of head rail for maintenance without removing bracket.

G. Operation: Full range lift locking. Top locking only.

2.3 FABRICATION

A. Fabricate blinds to fit openings with uniform edge clearance of 1/4 inch.

B. At openings requiring multiple blind units, provide separate blind assemblies with space of 1/4 inch between assemblies, occurring at window mullion centers.

2.4 FINISHES

A. Slats:
   1. Color: To be selected by Architect from manfacturer’s full color range.

B. Head Rails and Brackets: Static-reducing Baked enamel, to be selected from manufacturer's full color range.

C. Ladders and cords: Dyed to closely match slats.

D. Control Wands: Color to be selected by Architect from manfacturer’s full color range.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install blinds in accordance with manufacturer's instructions.

B. Secure with concealed fasteners.

C. Place intermediate head supports at maximum 48 inches on center.

D. Installation Tolerances:
   1. Maximum gap at window opening perimeter: 1/4 inch.
   2. Maximum offset from level: 1/8 inch.

3.2 ADJUSTING

A. Adjust blinds for proper operation.

END OF SECTION

SECTION 122413

ROLLER WINDOW SHADES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Roller shades, manual operation and accessories.

B. Shade fabric.

1.2 RELATED SECTIONS

A. Section 061000 - Rough Carpentry: Wood blocking and grounds for mounting roller shades and accessories.

B. Section 092900 - Gypsum Board Assemblies: Coordination with gypsum board assemblies for installation of shade pockets, closures and related accessories.

C. Section 095100 - Acoustical Ceilings: Coordination with acoustical ceiling systems for installation of shade pockets, closures and related accessories.

1.3 REFERENCES

A. ASTM International (ASTM):
1. ASTM G21 and E 2180 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. Cradle to Cradle Products Innovation Institute (C2C):
1. C2C (DIR) - C2C Certified Products Registry.

C. National Fire Protection Association (NFPA):
1. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films.

D. Window Covering Manufacturers Association (WCMA):
1. ANSI/WCMA A100.1-2022- Safety of Window Covering Products; 2022.

1.4 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: One week prior to commencing work related to this section. Require attendance of all affected installers.

B. Sequencing:
1. Do not fabricate shades until field dimensions for each opening have been taken with finished conditions in place. "Hold to" dimensions are not acceptable.
2. Do not install shades until final surface finishes and painting are complete.

1.5 SUBMITTALS

A. See Section 013300 for submittal procedures.

B. Bid Submittal: Information Required with Submittal of Bid: In order to evaluate proposals for integrated lighting control and window shade systems, the Architect requires the following information be submitted prior to the award of the system.
   1. Bid proposal shall be accompanied with a document that notes all deviations from these specifications on a line-by-line basis.

C. Product Data: Manufacturer's catalog pages and data sheets for products specified including materials, finishes, dimensions, profiles, mountings, and accessories.
   1. Preparation instructions and recommendations.
   2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes , accessories, and operating instructions.
   3. Storage and handling requirements and recommendations.
   4. Mounting details and installation methods.
   5. Manufacturer's Instructions: Include storage, handling, protection, examination, preparation, and installation.
   6. Project Record Documents: Record actual locations of control system components and show interconnecting wiring.
   7. Operation and Maintenance Data: Component list with part numbers, and operation and maintenance instructions.

D. Shop Drawings: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work.
   1. Prepare shop drawings on AutoCad or MicroStation format using base sheets provided electronically by the Architect.
   2. Provide location plan showing all manual shade control locations. Cross-reference furniture plans for optimal positioning of chains.
   3. Provide elevation drawings showing shade band layout. Indicate any necessary seam or batten locations, and align with horizontal mullions where possible.

A. Window Treatment Schedule: For all roller shades. Use same room designations as indicated on the Drawings and include opening sizes and key to typical mounting details.

B. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements.
   4. Shadecloth Sample: Mark face of material to indicate interior faces.
      a. Test reports indicating compliance with specified fabric properties.
      b. Verification Samples: 6 inches (150 mm) square, representing actual materials, color and pattern.

C. Maintenance Data: Bill of materials for all components with part numbers. Methods for maintaining roller shades, precautions regarding cleaning materials and methods, instructions for operating hardware and controls.

D. Warranty: Provide manufacturer's warranty documents as specified in this Section.

1.6 QUALITY ASSURANCE

A. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

B. Manufacturer Qualifications: Obtain roller shades system through one source from a single manufacturer with a minimum of ten years experience and minimum of five projects of similar scope and size in manufacturing products comparable to those specified in this section.

C. Installer for Roller Shade System - Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
   1. Requirements for Roller Shade Installer/Contractor:
      a. Roller Shade Hardware, shade fabric and all related controls shall be furnished and installed as a complete assembly.

D. Product Listing Organization Qualifications: Organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

E. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.

F. ShadeCloth Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC9644 and ATCC9645, and E2180.

G. ShadeCloth Cleanability and Disinfecting: ShadeCloth must meet cleanability and disinfecting requirements via 3rd party testing to comply with BIFMA HCF 8.1-2014 standards using chemical solutions compliant with EPA guidelines for use against COVID-19.

H. Environmental Certification: Submit written certification from the manufacturer, including third party evaluation, recycling characteristics, and perpetual use certification as specified. Initial submittals, which do not include the Environmental Certification will be rejected. Materials that are simply 'PVC free' without identifying their inputs shall not qualify as meeting the intent of this specification and shall be rejected.

I. Third Party Evaluation: Provide documentation stating the shade cloth has undergone third party evaluation for all chemical inputs, down to a scale of 100 parts per million, that have been evaluated for human and environmental safety. Identify any and all inputs, which are known to be carcinogenic, mutagenic, teratogenic, reproductively toxic, or endocrine disrupting. Also identify items that are toxic to aquatic systems, contain heavy metals, or organohalogens. The material shall contain no inputs that are known problems to human or environmental health per the above major criteria, except for an input that is required to meet local fire codes.

J. Recycling Characteristics: Provide documentation that the shade cloth can, and is part of a closed loop of perpetual use and not be required to be down cycled, incinerated or otherwise thrown away. Scrap material can be sent back to the mill for reprocessing and

recycling into the same quality yarn and woven into new material, without down cycling. Certify that this process is currently underway and will be utilized for this project.

K. Perpetual Use Certification: Certify that at the end of the useful life of the shade cloth, that the material can be sent back to the manufacturer for recapture as part of a closed loop of perpetual use and that the material can and will be reconstituted into new yarn, for weaving into new shade cloth. Provide information on each shade band indicating that the shade band can be sent back to the manufacturer for this purpose.

1.7 MOCK-UP

A. Provide a mock-up of one roller shade assembly for evaluation of mounting, appearance and accessories.
   1. Locate mock-up in window designated by Architect.
   2. Mockup Size: Full size.
   3. Mockup Size (WxH): 3 x 3 feet minimum.
   4. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
   5. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
   6. Do not proceed with remaining work until, mock-up is accepted by Architect.
   7. Retain mock-up during construction as a standard for comparison with completed work.
   8. Do not alter or remove mock-up until work is completed or removal is authorized.
   9. Full-sized mock-up may become part of the final installation.
   10. Full-sized mock-up will become the property of the Owner to be used for spare parts.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in Window Treatment Schedule.

B. Store and handle products per manufacturer's recommendations.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Install roller shades after finish work including painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.10 WARRANTY

A. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating, transferrable warranty for interior shading.
   1. Shade Hardware - 10 years unless otherwise indicated:
      a. Mecho/7 including bead chain with ThermoVeil, EuroTwill, Soho, Equinox, Midnite, Chelsea, or Classic Blackout shade fabric: 25-years.
   2. Standard Shadecloth: Manufacturer's standard 25-year warranty.
   3. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas, which are deemed owners responsibility.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer for Window Shade Control System as basis of design, performance and warranty: Mecho, which is located at: 42-03 35th St.; Long Island City, NY 11101; ASD Tel: 718-729-2020; Fax: 718-729-2941; Email: marketing@mechoshade.com; Web: www.mechoshade.com. For your local Mecho rep: https://www.mechoshade.com/find-a-rep/

B. Requests for substitutions will be considered in accordance with provisions of Section 01600.

2.2 APPLICATIONS/SCOPE

A. Roller Shade Schedule:
1. Shade Type: Manual operating, chain drive, sunscreen single roller shades and related mounting systems and accessories as indicated on Drawings.
2. ADA Compliance: All spaces requiring full ADA compliance to be motorized with an accessible wall switch.
3. CPSC Compliance: All manually operated window coverings with accessible cords, chains, continuous loop cords, etc. shall meet all current Federally mandated CPSC (Consumer Products Safety Commission) safety standards at time of manufacturing. Depending on the product type, additional hardware components may be required and added to meet new regulatory compliant anti-ligature requirements.
4. WCMA Compliance: Chain tensioning device complying with ANSI/WCMA A100.1-2022 manufacuted on every manual roller shade.

2.3 ROLLER SHADES, MANUAL OPERATION AND ACCESSORIES

A. Shade System; General:
1. Components capable of being removed or adjusted without removing mounted shade brackets, or cassette support channel.
2. Smoothly operation raising or lowering shades.
3. Cradle-to-Cradle certified and listed in C2C (DIR).
4. Environmental Product Declaration (EPD): Published disclosure of product's environmental impacts based on a full Life Cycle Assessment (LCA). Manufacturer must have EPD certification by independent 3rd party evaluation service.

B. Basis of Design: Mecho/7 System as manufactured by Mecho.
1. Description: Manually operated fabric window shades.
a. Shade Type: Single Roller.
b. Universal drive capability to offset drive chain for reverse or regular roll shades.
c. Drop Position: Regular roll.
d. Mounting: As indicated on Drawings.
l. Size: As indicated on Drawings.
m. Fabric: As indicated under Shade Fabric article.
2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
a. Material: Steel, 1/8 inch (3 mm) thick. Styrene based plastics, and /or polyester, or reinforced polyester shall not be accepted.
b. Single Shade Operation Width: Up to 180 inches (4572 mm) dependent on fabric.
c. Multiple Shade Band Operation: Provide hardware as necessary to operate a maximum of six shade bands, totaling up to 50lbs hanging weight or 360 inches (9144 mm) wide; depending on fabric weight whichever is greater, using a single clutch operator.
3. Roller Tubes:

a. Material: Extruded aluminum.
b. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.
c. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge. Shade band to be removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.
d. Roller tubes to be capable of being removed and reinstalled without affecting roller shade limit adjustments.

4. Hembars: Designed to maintain bottom of shade straight and flat.
   a. Style: Full wrap fabric-covered bottom bar, flat profile with heat sealed closed ends.
   b. Style: Exposed aluminum bottom bar with matching finials.
      1) Profile: Rectangular.
      2) Color: To be selected by Architect from manufacturer's standard color selection.
   c. Room-Darkening Shades: Provide a slot in bottom bar with wool-pile light seal.
5. Clutch Operator: Manufacturer's standard material and design integrated with bracket/brake assembly.
   a. Heavy-duty, 1/8" steel mounting bracket and integrated steel brake, clutch and sprocket assembly rigidly affix the shade support and user control to the building structure fully independent of the roller tube components.
   b. Permanently lubricated maintenance-free brake assembly employs an oil-impregnated steel hub with wrapped spring clutch.
   c. Brake must withstand minimum pull force of 50 pounds (22.7 kg) in the stopped position.
   d. Direct drive clutch requires no interstitial gear stages or plastic parts between the building structure and clutch ensuring reliable operation across the full range of shade sizes.
   e. Urethane dampened clutch protects bead chain and clutch from failure due to high shock loads during shade operation minimizing down time.
   f. Maximum shade hanging weight of 50 pounds (22.7 kg).
   g. Clutch shall be upgradable to motorized drive on compatible tubes without requiring change in mounting attachment method/location, roller tube or fabric band.
   h. Motorized drive options available require no additional wiring to be added for power or communication capability for switch or automated operation.
6. Drive Chain: Continuous loop T304 stainless steel beaded ball chain, 100 pound (45 kg) minimum breaking strength warranted from breaking for the life of the shade system hardware under prescribed operation. Provide upper and lower limit stops.
   a. Chain Tensioner: Chain tensioning device complying with ANSI/WCMA A100.1-2022.
   b. Limit stops: Bead stops affixed to the chain maintain consistent shadeband alignment at the top and bottom of shade travel across multiple shades, and help prevent shade damage resulting from unmanaged user control.
7. Mecho/7, Managed Lift Force, Hardware: Lifts single band or multiband shade assemblies:
   a. Lifting Force: 5 pound max pull force to lift shade assemblies with a shade band hanging weight, not including mounting hardware, of up to 50 pounds (22.7 kg).
   b. Direct drive clutch with Managed Lift Force provides the best user experience by managing the user pull force while using the fewest number of chain pulls to

position a shade.

c. Backward compatible to Mecho/5 components including fascia, regular and reverse roll, pockets, and wall-mounting accessories.

d. Includes offset drive capability, left/right, front, or back to allow for utilization of blackout channels.

e. Allows for ease of operation when obstructions do not allow for direct drive chain access.

f. Offset chain drive shall not cause an increase of friction or pull force when operated up to a 26 degree angle from vertical.

8. Accessories:

a. Fascia: Removable extruded aluminum fascia, size as required to conceal shade mounting, attachable to brackets without exposed fasteners.

1) Finish: Baked enamel.

1) Shade Band: Removable and replaceable without removing roller tube from brackets or inserting spline from the side of the roller tube.

14. Hembars: Maintains bottom of shade straight and flat.

a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.

b. Style: Exposed aluminum bottom bar with matching finials.

1) Profile: Rectangular.

2) Color: To be selected from manufacturer's standard color selection.

c. Room-Darkening Shades: Slotted bottom bar with wool-pile light seal.

15. Manual Operation:

a. Clutch Operator: Manufacturer's standard material and design integrated with brackeUbrake assembly.

1) Brake Assembly: Mounted on a low-friction plastic hub with wrapped spring clutch.

a) Brake must withstand minimum pull force of 25 lbs (12 kg) in stopped position.

2) Clutch/Brake Mounting: On support brackets, independent of roller tube components.

b. Drive Chain: Continuous loop beaded ball chain. Upper and lower limit stops.

1) Breaking Force: 45 lbf (200 N) minimum.

c. Chain Tensioner: Chain tensioning device complying with ANSI/WCMA A100.1-2022.

d. Lift Assist Mechanism: Contained in idler end of roller tube. When hanging weights exceed roller tube weight limits. Manufacturer's standard.

16. Accessories:

a. Fascia: Removable extruded aluminum. Size as required to conceal shade mounting. Attachable to brackets without exposed fasteners.

1) Finish: To be selected by Architect.

2) Can be installed across two or more shade bands in one piece.

3) Profile: To be selected by Architect.

4) Configuration: Captured, fascia stops at captured bracket end.

5) Configuration: Continuous, fascia extends past continuous bracket.

6) Configuration: Captured and continuous, as indicated on drawings.

b. Ceiling Pockets: Manual Premanufactured metal shade pocket with removable closure panel, for recess mounting in acoustical tile or drywall ceilings; size and configuration as indicated on drawings.

1) Removable closure panel.

2) 7/8" ceiling tile support.

3) Use 2" closure assembly by Mecho or 2" ceiling tile receiver by others in

lieu of 7/8" ceiling tile support where applicable by code (i.e.: projects in seismic zones).

2.4 ROLLER SHADE FABRICATION

A. Field measure finished openings prior to ordering or fabrication.

B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
1. Horizontal Dimensions: Inside Mounting.
a. Symmetrical Light Gaps on Both Sides of Shade: Maximum 3/4 inch (19.05 mm) total.

C. Openings Requiring Continuous Multiple Shade Units with Separate Rollers: Locate roller joints at window mullion centers; butt rollers end-to-end.

2.5 SHADE FABRIC

A. Basis of Design: Shade fabric as manufactured by MechoShade Systems LLC.
1. Fabric: To be selected from manufacturer's standard solar shadecloths.
2. Color: Selected from manufacturer's standard colors.
3. Performance Requirements:
a. Flammability per NFPA 701: Pass. Large or small scale test.
b. Fungal Resistance: No growth when tested per ASTM G21.
c. Cleanability and Disinfecting: ShadeCloth must meet cleanability and disinfecting requirements via 3rd party testing to comply with BIFMA HCF 8.1- 2014 standards using chemical solutions compliant with EPA guidelines for use against COVID-19.
4. Fabrication:
a. Fabric Orientation: Railroaded, fabric is turned 90 degrees off the roll.
b. Battens: Manufacturer's standard material, full width of shade, and enclosed in welded shade fabric pocket; locate as indicated on drawings.
c. Seams for Railroaded Fabric: Manufacturer's standard seam; locate as indicated on drawings.
d. Welded Zipper Edge: Full height on both sides of fabric ensuring smooth operation within ShadeLoc channels.

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Start of installation shall be considered acceptance of substrates.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

C. Coordinate with window installation and placement of concealed blocking to support

shades.

3.3 INSTALLATION

A. Contractor Furnish and Install Responsibilities:
   1. Window Covering Contractor (WC) shall provide an on site, Project Manager, and shall be present for all related jobsite scheduling meetings.
   2. WC shall supervise the roller shade installation, and setting of intermediate stops of all shades.
   3. WC shall be responsible for field inspection on an area-by- area and floor-by-floor basis during construction to confirm proper mounting conditions per approved shop drawings.
   4. Verification of Conditions: examine the areas to receive the work and the conditions under which the work would be performed and notify General Contractor and Owner of conditions detrimental to the proper and timely completion of the work. Do not proceed until unsatisfactory conditions have been corrected. Commencement of installation shall constitute acceptance of substrate conditions by the installer.
   5. WC shall provide accurate to 0.0625" inch; field measurements for custom shade fabrication on the Roller Shades manufacturers input forms.
   6. WC Installer shall install roller shades level, plumb, square, and true according to manufacturer's written instructions, and as specified here in. Blocking for roller shades installed under the contract of the interior General Contractor shall be installed plumb, level, and fitted to window mullion as per interior architect's design documents and in accordance with industry standard tolerances. The horizontal surface of the shade pocket shall not be out-of-level more than 0.625" (15.875mm) over 20 linear feet (6.096 meters)
   7. Shades shall be located so the shade band is not closer than 2 inches (50 mm) to the interior face of the glass. Allow proper clearances for window operation hardware.
   8. Adjust, align and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
   9. Installer shall set Upper and Lower limits of all manual shade bands, and assure alignment in accordance with the above requirements.
   10. Clean roller shade surfaces after installation, according to manufacturer's written instructions.
   11. WC shall train Owner's maintenance personnel to adjust, operate and maintain roller shade systems.
      a. Use operation and maintenance manual as a reference, supplemented with additional training materials as required.

1.2 PROTECTION AND CLEANING

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.
   1. Clean soiled shades and exposed components as recommended by manufacturer.
   2. Replace shades that cannot be cleaned to "like new" condition.

END OF SECTION

SECTION 123600

COUNTERTOPS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Countertops.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.
   2. Section 064100 - Architectural Wood Casework.
   3. Section 079200 - Joint Sealants.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Indicate dimensions, component sizes, fabrication details, attachment provisions and coordination requirements with adjacent work.
   2. Product Data: Indicate product description, fabrication information and compliance with specified performance requirements.
   3. Samples: 2 x 2 inch samples in each color.

B. Closeout Submittals:
   1. Maintenance Data: Include recommended cleaning materials and procedures and damage repair.

1.3 QUALITY ASSURANCE

A. Fabricator Qualifications: Minimum 2 years experience in work of this Section.

B. Fire Hazard Classification: Class A flame spread/smoke developed rating, tested to ASTM E84.

PART 2 PRODUCTS

2.1 MATERIALS

A. Countertops:
   1. Catering kitchen: Solid surface counter.
   2. Office kitchenette: Solid surface counter.
   3. BOD: Corian solid surface, Wilsonart solid surface.

2.2 ACCESSORIES

A. Adhesive:
   1. Type recommended by solid surfacing manufacturer.
   2. Maximum volatile organic compound (VOC) content: 70 grams per liter.

B. Joint Sealant: Specified in Section 079200.

2.3 FABRICATION

A. Solid Surfacing Countertops:
   1. Fabricate components in shop to sizes and shapes indicated, in accordance with manufacturer's instructions and approved Shop Drawings.
   2. Fabricate splashes and skirts from solid surfacing in color to match countertops.
   3. Form joints to be inconspicuous in appearance and without voids. Join pieces with adhesive.

4. Provide holes and cutouts for mounting of sinks, trim, and accessories.
5. Finish exposed edges to smooth, uniform profile as selected by Architect.
6. Ease exposed edges.

B. Allowable Tolerances:
   a. Maximum variation in size: 1/8 inch.
   b. Maximum variation in location of openings: 1/8 inch from indicated location.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved Shop Drawings.

B. Set plumb, level, and rigid.

C. Adhere countertops, splashes, and skirts with beads of adhesive.

D. Seal perimeter with joint sealant as specified in Section 079200. Finish smooth and flush.

E. Allowable Tolerances:
   1. Maximum variation from level and plumb: 1/8 inch in 10 feet, noncumulative.
   2. Maximum variation in plane between adjacent pieces at joint: Plus or minus 1/32 inch.

3.2 ADJUSTING

A. Buff out minor scratches and abrasions.

3.3 PROTECTION

A. Protect surfaces from damage with nonstaining coverings.

END OF SECTION

SECTION 210055

BASIC FIRE SUPPRESSION MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following basic Fire Suppression materials and methods to complement other Fire Suppression Sections.
   1. Piping materials and installation
   2. Escutcheons.
   3. Sleeves.
   4. Mechanical sleeve seals.
   5. Installation requirements common to equipment specification sections.
   6. Fire Suppression Piping and Equipment Demolition.
   7. Painting and finishing.

B. Pipe and pipe fitting materials are specified in Plumbing piping system Sections, if applicable.

1.2 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

A. Product Data: For escutcheon, sleeves, and mechanical sleeve seals.

1.4 QUALITY ASSURANCE

A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

B. Equipment Selection: Equipment of higher electrical characteristics, physical dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. Additional costs shall be approved in advance by appropriate Contract Modification for these increases. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate Fire Suppression equipment installation with other building components.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for plumbing installations.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of plumbing materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

E. Coordinate connection of Fire Suppression systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Mechanical Sleeve Seals:
      a. Calpico, Inc.
      b. Metraflex Co.
      c. Thunderline/Link-Seal.

2.2 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.

   1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe materials and size of pipe.
   2. Pressure Plates: Stainless steel.
   3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.3 PIPING SPECIALTIES

A. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:
   1. Steel Sheet Metal: 16 gage, galvanized, round tube closed with welded longitudinal joint.
   2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.

3. Sleeve Fasteners: Manufactured, steel clips for securement during pour. Equal to B-line, BD40, BE-5-8 or BE-9-12.

B. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type if required to conceal protruding fittings and sleeves.
   1. ID: Closely fit around pipe, tube, and insulation of insulated piping.
   2. OD: Completely cover opening.
   3. Cast Brass: One piece, with set screw. (split face acceptable for existing piping)
      a. Finish: Polished chrome-plate.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS AND APPLICATIONS

A. General: Install piping as described below, unless piping Sections specify otherwise. Individual piping Sections specify unique piping installation requirements.

B. General Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.

C. Install piping at indicated slope.

D. Install components with pressure rating equal to or greater than system operating pressure.

E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

F. Install piping free of sags and bends.

G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.

H. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

I. Install piping to allow application of insulation plus 1-inch clearance around insulation.

J. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

K. Install fittings for changes in direction and branch connections.

L. Install couplings according to manufacturer's written instructions.

N. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Specification Section "Penetration Firestopping" for firestop materials and installations.
   1. Fire-stop all sleeves at floor penetrations of multistory buildings including underfloor penetrations.

3.2 ESCUTCHEON REQUIREMENTS

A. Install escutcheons at pipe penetrations of walls, ceilings, and floors in finished areas.
   1. Escutcheons for New Piping:
      a. Piping exposed through floors and walls in finished areas: One piece, cast brass with polished chrome-plated finish with set screw. Deep escutcheons to be provided where standard depth will not fit.

b. Escutcheons shall cover entire hole penetration.
c. Escutcheon to be appropriately sized for pipe.

2. Escutcheons for Existing piping:
   a. Piping exposed through floors and walls in finished areas: Split plate, cast brass with polished chrome-plated finish with set screw. Deep escutcheons to be provided where standard depth will not fit.
   b. Escutcheons shall cover entire hole penetration.
   c. Escutcheon to be appropriately sized for pipe.
3. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.3 PIPE SLEEVE INSTALLATION REQUIREMENTS

A. Sleeves are required for all through floor and wall penetrations. Sleeves to be set and poured in place (in slab applications), secure all sleeves with fasteners. Sleeves to extend 2 inches past face of floor or wall. Pipe sleeve in finished areas to be flush with wall or floor for installation of escutcheon. Install sleeves in new partitions, slabs, and walls as they are built.

B. Pipe sleeves are required at all through wall and floor penetrations.

C. Install sleeve materials according to the following applications:
   1. Sleeves for Piping Passing through Concrete Floor Slabs: galvanized steel pipe.
   2. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Galvanized-steel pipe sleeves.
      a. Extend sleeves 2 inches above finished floor level.
      b. For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
      c. Sleeves for Piping Passing through Gypsum-Board Partitions:
         1) Galvanized-steel pipe sleeves, or galvanized-steel sheet metal sleeve.
         2) Exception: Sleeves are not required for water supply tubes and waste pipes for individual plumbing fixtures if escutcheons will cover openings.
      d. Sleeves for Piping Passing through Concrete Roof Slabs: Reference Structural/Architectural details.
      e. Sleeves for Piping Passing through Concrete Walls:
         1) Galvanized-steel pipe sleeves.
         2) Install sleeves that are large enough to provide 1-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.

D. Ratproofing: The open space around all piping, ductwork, etc. passing through the ground floor and/or exterior walls shall be ratproofed in a manner acceptable to the Owner's Representative.

E. Mechanical sleeve seals
   1. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building. Sleeves must be poured in place. Installation of sleeves after wall is constructed is not acceptable.
   2. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
   3. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals specified in this Section.
      a. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated. Seal annular space with

water tight sealant (equal to NP-1). All sleeves and penetrations to maintain rating of wall/floor. Seal pipe penetrations with fire-stopping materials.

F. Piping Connections: Make connections according to the following, unless otherwise indicated:
   1. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.
   2. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.

3.4 EQUIPMENT INSTALLATION – COMMON REQUIREMENTS

A. Install equipment to provide maximum possible headroom, if mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations.

E. Install equipment giving right of way to piping installed at required slope.

3.5 PAINTING AND FINISHING

A. Apply paint to exposed piping according to the following, unless otherwise indicated:
   1. Interior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
   2. Interior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
   3. Interior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
   4. Exterior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.
   5. Exterior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
   6. Exterior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.

B. Do not paint piping specialties with factory-applied finish.

C. Extend paint up to, not including, sprinkler heads.

D. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.6 DEMOLITION

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for Fire Suppression installations. Perform cutting by skilled mechanics of trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.7 CUTTING AND PATCHING

A. Disconnect, demolish, and remove Work specified in Fire Suppression Sections.

B. If pipe or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Work Abandoned in Place: Cut and remove underground pipe a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from Project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

END OF SECTION 210055

SECTION 210100

SPECIAL CONDITIONS FOR ALL FIRE SUPPRESSION WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. This section covers the general provisions of the fire suppression specifications applicable to the following systems:
   1. Fire Protection.

1.2 DRAWINGS

A. These specifications are accompanied by drawings of the building and details of the installations showing the locations of equipment, piping, etc. The drawings and these specifications are complementary to each other; requirements described in one or the other shall be considered binding as if described in both.

B. If any departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted to the Owner's Representative for approval. No departures shall be made without prior written approval by the Owner's Representative.

C. There are intricacies of construction which are impractical to specify or indicate in detail; means and methods for performing such work shall adhere to commonly accepted industry standards.

D. It is the Contractor's responsibility to properly use all information found on the Architectural, Structural, Mechanical and Electrical drawings and applicable shop drawings where such information affects his work.

E. For new buildings, all final dimensions shall be scaled from the drawings, unless otherwise noted. For work associated with existing buildings (renovations and additions), all final dimensions shall be field verified.

1.3 CONSTRUCTION REQUIREMENTS

A. The architectural, civil, structural, electrical, plumbing, fire protection and Fire Suppression drawings, and specifications are all part of the Contract Documents. In many instances there are details described another trade's drawings that are not necessarily included or referenced in the fire suppression drawings. It is the Contractor's responsibility to review in detail all parts of the Contract Documents prior to submitting a bid. Failure to comply with this requirement shall not relieve the Contractor of responsibility or be used as cause for additional compensation because architectural, structural, or electrical details were not included in the fire suppression drawings.

B. It is the intent of the Contract Documents to provide complete and fully functional installation in every respect. Material and/or construction details not specifically described in the Contract Documents, but commonly considered incidental to the industry, are required by the Contractor.

C. The Contractor shall be responsible for fitting his material and apparatus into the building and shall carefully lay out his work at the site to conform to the structural conditions, to avoid all obstructions, to comply with Codes, to facilitate the work of other trades, to conform to the details of the installation supplied by the manufacturer of the equipment to be installed, and thereby to provide an integrated satisfactory operating installation.

D. Final placement of serviceable equipment shall be carefully coordinated with all other trades to ensure sufficient clearance for maintenance according to manufacturer's recommendations. Lubricating orifices and adjustable components shall be easily accessible. Piping, conduit, valve stems, cabling and other building systems shall not interfere with service space.

E. Location of Exposed Devices

1. All exposed devices (sprinkler heads, fire risers, pumps, etcetera) shall be referenced to fixed data points that are coordinated with all trades; shall be located to present symmetrical arrangements with respect to the fixed data point; and shall facilitate the proper arrangements of acoustical ceiling tiles. Fixed data points shall include such features as wall and ceiling lines, soffits, balanced border widths, masonry joints, etc. Devices located in acoustical ceiling tiles shall occur symmetrically in tile joints or in the centers of whole tiles. The final determination of the exact location of each outlet and the arrangements to be followed shall be acceptable to the Owner's Representative.

1.4 QUALIFICATIONS

A. Contractor must have minimum of five years experience installing fire suppression systems similar to those described in these Contract Documents.

B. Contractor must be licensed and hold a current contracting license that has been valid for a minimum of five years in the State of Texas.

C. Contractor must be able to bond work for payment and performance of work being bid. Contractor's bonding agency shall have a Best's insurance rating of A or A+.

1.5 MATERIAL AND EQUIPMENT REQUIREMENTS

A. Manufacturer's Instructions: The manufacturer's published instructions shall be followed for preparing, assembling, installing, erecting, and cleaning manufacturer materials or equipment, unless otherwise indicated. The Contractor shall promptly notify the Owner's Representative in writing of any conflict between the requirements of the Contract Documents and the manufacturer's direction and shall obtain the clarification of the Owner's Representative before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturer's directions or such clarification by the Owner's Representative, he shall bear all costs arising in connection with the correction of the deficiencies.

B. Storage at Site: The Contractor shall not receive material or equipment at the jobsite until there is suitable space provided to properly protect equipment from rust, drip, humidity, and dust damage and from surrounding work.

C. Capacities shall be not less than those indicated and shall be such that no component or system becomes inoperative or is damaged because of startup or other overload conditions.

D. Conformance to Agency Requirements: Where materials or equipment are specified to be approved, listed, tested, or labeled by the Underwriters Laboratories, Inc., or constructed and/or tested in accordance with the standards of the American Society of Mechanical Engineers, the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of Underwriters Laboratories, Inc. applied to the item will be acceptable as sufficient evidence that the items conform to such requirements. The ASME stamp or the AMCA label will be acceptable as sufficient evidence that the items conform to the respective requirements.

E. Nameplates: Each major component of equipment shall have the manufacturer's name, address, and model-identification number on a plate securely attached to the item of equipment. All data on nameplates shall be legible at the time of Final Inspection.

F. Prevention of Rust: Standard factory finish will be acceptable on equipment specified by model number; otherwise surfaces of ferrous metal shall be given a rust-inhibiting coating. The treatment shall withstand 200 hours in salt-spray fog test, in accordance with Method 6061 of Federal Standard No. 141. Immediately after completion of the test, the specimen shall show no signs of wrinkling or cracking and no signs of rust creepage beyond 1/8 inch on either side of the scratch mark. Where rust inhibitor coating is specified hereinafter, any treatment that will pass the above test is acceptable unless a specific coating is specified, except that coal tar or asphalt-type coatings will not be acceptable unless so stated for a

specific item. Where steel is specified to be hot-dip galvanized, mill-galvanized sheet steel may be used provided all raw edges are painted with a zinc-pigmented paint conforming to Military Specification MIL-P-26915.

G. Protection from Moving Parts: Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts located so that any person can come in close proximity thereto, shall be fully enclosed or properly guarded.

H. Drive Guards: For machinery and equipment, provide guards as shown in AMCA 410 for belts, chains, couplings, pulleys, sheaves, shafts, gears, and other moving parts regardless of height above the floor. Drive guards may be excluded where motors and drives are inside factory-fabricated air handling units casings. Guards shall be constructed of sheet steel, cast iron, expanded metal, or wire mesh rigidly secured so as to be removable without disassembling pipe duct or electrical connection to equipment. Provide a 1-inch diameter hole in each drive guard at each shaft center to allow access for speed measurement.

I. Verifications of Dimensions: The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Owner's Representative of any discrepancy before performing any work. Adjustments to the work required in order to facilitate a coordinated installation shall be made at no additional cost to the Owner, Architect, or Engineer.

J. Standard Products: Materials and equipment to be provided shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications, and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

1.6 INSPECTION OF THE SITE

A. The Contractor shall visit the site, verifying all existing items indicated on drawings and/or specified, and familiarize himself with the existing work conditions, hazards, grades, actual formations, soil conditions, structures, utilities, equipment, systems, facilities, and local requirements. The submission of bids shall be deemed evidence of such visits. All proposals shall take these existing conditions into consideration, and the lack of specific information shall not relieve the Contractor of any responsibility.

1.7 UTILITY LOCATIONS AND ELEVATIONS

A. Locations and elevations of the various utilities included within the scope of this work have been obtained from substantially reliable sources and are offered separately from the Contract Documents, as a general guide only, without guarantee as to accuracy. Examine the site, the locations, and availability of all utilities and services required for their relation to the work. Verify the location of all existing site utilities with each responsible utility company or applicable party. The Contractor shall repair all damage to existing utilities, whether indicated on the drawings or not, at his sole expense.

1.8 PERMITS, UTILITY CONNECTIONS, AND INSPECTIONS

A. Permitting Fees: Contractor shall pay for all fees associated with permits required by municipal authorities having jurisdiction.

B. Tapping and Impact Fees: Contractor shall pay for all fees associated with tapping into municipal utility mains, including domestic water. Impact fees will be paid for by the Owner.

C. Compliance: The Contractor shall comply in every respect with all requirements of local authorities having jurisdiction, including building inspections, fire marshal, local ordinances and codes, and utility company requirements. In no case does this relieve the Contractor of the responsibility of complying with these specifications and drawings where specified conditions are of a higher quality than the requirements of the above-specified authorities. Where requirements of the specifications and drawings

are below the requirements of the above offices having jurisdiction, the Contractor shall make installations in compliance with the requirements of the above authorities.

D. Utilities: The Contractor shall coordinate with the various utility companies involved in this project and shall provide required utility relocations, extensions, modifications, and/or changes (complete in all respects) as described in the Contract Documents. Contractor shall verify the location of all existing utilities with the applicable Utility Company. The Contractor shall be responsible for all damages to existing utilities, whether indicated on drawings or not, and repair all damage to existing utilities as acceptable to the affected Utility Company.

E. Certification: Prior to final acceptance, the Contractor shall furnish a certificate of acceptance from the inspection departments having jurisdiction over the work for any and all work installed under this Contract. Any additional labor costs incurred as a result of a substitution shall be the Contractor's responsibility.

1.9 EXISTING FACILITIES

A. The Contractor shall be responsible for loss or damage to the existing facilities caused by him and his workmen, and shall be responsible for repairing or replacing such loss or damage. The Contractor shall send proper notices, make necessary arrangements, and perform other services required for the care, protection, and in-service maintenance of all plumbing, heating, air conditioning, and ventilating services for the new and existing facilities. The Contractor shall erect temporary barricades, with necessary safety devices, as required to protect personnel from injury, removing all such temporary protection upon completion of the work.

B. The Contractor shall provide temporary or new services to all existing facilities as required to maintain their proper operation when normal services are disrupted as a result of the work being performed under this project.

C. Outages of services as required by the new installation will be permitted but only at a time approved by the Owner. The Contractor shall allow the Owner two weeks in order to schedule required outages. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the contract amount.

1.10 DEMOLITION AND RELOCATION

A. The Contractor shall modify, remove, and/or relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Salvage materials shall remain the property of the Owner, and shall be delivered to such destination or otherwise disposed of as directed by the Owner. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The Contractor may, at his discretion, and upon the approval of the Owner, substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.

B. All items which are to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean and repair and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.

C. When items scheduled for relocation and/or reuse are found to be in damaged condition before work has been started on dismantling, the Contractor shall call the attention of the Owner to such items and receive further instructions before removal. Items damaged in repositioning operations are the Contractor's responsibility and shall be repaired or replaced by the Contractor as approved by the Owner, at no additional cost to the Owner.

D. Service lines and wiring to items to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner. Service lines and wiring not scheduled

for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied off or disconnected in a safe manner acceptable to the Owner. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities which must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner as hereinbefore specified.

1.11 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. No substitution of materials or equipment herein specified or called for on the drawings will be permitted, except by written permission of the Owner's Representative. Where several makes of equipment or material are mentioned, any item named may be bid upon provided it meets space, capacity specifications, and other requirements.

1.12 SUBMITTALS

A. Submittals for Review:
   1. As soon as practical or within 30 days after the date of contract award or notice to proceed, and before purchasing or starting installation of any materials or equipment, the Contractor shall submit for review sufficient material and equipment data to indicate that all requirements of the specifications have been met and samples shall be furnished when requested. All manufacturer's data used as part of the submittal shall have all non-applicable features crossed out or deleted in a manner that will clearly indicate exactly what is to be furnished.
   2. Digital copies of the submittal list and detailed submittals (for the Owner's and A/E's use) shall be submitted to the Owner's Representative. The Contractor is requested to include three hard copies for insertion in the project's Owner's Manuals at the completion of the project, and the number of additional copies the Contractor requires for his and his subcontractor's use during the project's construction. The detailed submittals shall be accompanied by the same number of sets of pictorial and descriptive data derived from the manufacturer's catalogs and sales literature, or incorporated in the shop drawings. The Contractor may provide a detailed submittal on any item even though not required by the Owner's Representative.

B. Format
   1. Submittals shall in pdf format. The front sleeve shall have a cover sheet with the title "FIRE SUPPRESSION SUBMITTALS" centered in large print. Below the title shall be the name of the project, the date, the project location, the name and address of the contractor, the name and address of the subcontractor and the name and address of the engineer(s) in smaller print.
   2. Provide a Table of Contents that summarizes the information being submitted according to specification section.
   3. Submittals shall be tab divided by specification section; **all sections** identified in the project specifications shall have a tab. When no information is being provided concerning a particular specification section, insert a single dated sheet that explains the circumstances.

C. Content:
   1. The Contractor shall prepare or cause to be prepared shop drawings, product data, materials and equipment lists, diagrams, data, samples, and other submittals as required by the contract documents, hereinafter referred to as "Submittal Data." The Contractor shall review and approve all submittal data for compliance with the contract documents, manufacturer's recommendations, adequacy, clearances, code compliance, safety, and coordination with associated work.
   2. The Contractor shall submit approved submittal data to the Owner's Representative for review and comment as to general conformance with the design concept and general compliance with information given in the contract documents. Owner's Representative's review shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with other trades or work, or construction safety and precautions, all of which are the sole responsibility of the Contractor.

3. The Contractor shall clearly and specifically identify and call to the attention of the Owner's Representative any deviation from the contract documents for which Owner acceptance is desired. The responsibility for such a deviation accepted by the Owner shall remain with the Contractor.
4. Timeliness: The burden of timeliness in the complete cycle of submittal data is on the Contractor. The Contractor shall allow a minimum of two (2) weeks' time frame for review of each submission by the Owner's Representative. The Contractor is responsible for allowing sufficient time in the construction schedule to cover the a forementioned cycles of data processing, including time for all re-submission cycles on nonconforming materials, equipment, etc. covered by the data submitted. Construction delays and/or lack of timeliness in the above regard are the responsibility of the Contractor and will not justify any request for scheduled construction time extensions or extra compensation.
5. Work performed in accordance with approved submittal data that is not in accordance with the Contract Documents and did not have the specific acceptance of the Owner's Representative shall be replaced at Contractor's cost.

D. Re-submittals
1. Re-submit entire submittal in accordance with afore mentioned format and content requirements. **Loose-leaf or piecemeal re-submittals are not acceptable.** New and/or revised data for each section shall be prefaced with a colored (yellow, pink, orange, etc) cover sheet that identifies (in a word or two) the materials and/or equipment being re-submitted. Typeset the words "REVISED SUBMITTAL NO. 1 (or 2, 3 as applicable)" centered at the bottom of the cover sheet.
2. Subsequent re-submittals (second and third, if necessary) shall have different colored cover sheets to distinguish between the various re-submittals.
3. Include a cover letter at front of binder that specifically responds to each "REVISE AND RE-SUBMIT COMMENT" or "REJECTED" comment by number. Example responses would include the following:
   a. RESPONSE: "Please see attached re-submittal."
   b. RESPONSE: "Will be re-submitted at a later date."
   c. RESPONSE: "Requirement for (xxxxxx) was deleted in Addendum No. 2."
   d. RESPONSE: "Exception requested based on Section xx, Paragraph x.x.x.

E. These paragraphs related to Fire Suppression submittal data supersede any conflicting requirements contained in Division 01 sections.

1.13 ACCEPTANCE OF MATERIALS AND EQUIPMENT

A. All equipment installed on this project shall have **local (within 125 miles)** representation, local factory-authorized service, and a local stock of repair parts. This requirement is essential and will be strictly reviewed by the Owner's Representative prior to concurrence with the Contractor's approval for all submittals covered by Fire Suppression sections of this Specification.

B. NOTICE: The Contractor is responsible for providing materials and equipment that conform to the requirements of the project manual in every respect unless a deviation has been "accepted" in writing. Removal of any nonconforming materials and equipment and the replacement with conforming materials and equipment shall be at the Contractor's sole expense, regardless of when nonconformance was discovered.

C. Approval of materials and equipment shall be based on manufacturer's published data and shall be tentatively subject to the submission of complete shop drawings which comply with the contract documents. Approval is also dependent upon the existence of adequate and acceptable clearances for entry, servicing, and maintenance.

D. Approval of materials and equipment under this provision shall not be construed as authorizing any deviations from the specifications, unless the attention of the Owner's Representative has been directed in writing to the specific deviations. Data submitted shall not contain unrelated information unless all pertinent information is properly identified.

E. Physical Size of Equipment: Space is critical; therefore, equipment of larger sizes than shown, even though of approved manufacturer, will not be acceptable unless it can be demonstrated that ample space exists for proper installation, operation, and maintenance.

1.14 SHOP DRAWINGS

A. As soon as practicable after the award of contract and approval of materials and equipment, but prior to installation, complete and detailed shop drawings of the Fire Suppression System shall be submitted for review and comment. The following systems are to be coordinated on the Shop Drawings:
   1. Equipment arrangements.
   2. Duct layouts.
   3. Piping layouts.
   4. Cable Tray.
   5. Sprinkler locations.
   6. Other details as directed by the Owner's Representative. Composite drawings of areas requiring coordination between trades shall be provided and expedited to eliminate conflicts and to ensure maximum cooperation and work progress.

B. Work performed without benefit of reviewed and approved shop drawings **will not be recommended for payment by the Engineer** until such time as the shop drawings are submitted, reviewed, and approved. Any work performed without the benefit of reviewed and approved shop drawings may require removal, relocation, and/or replacement at the Contractor's sole expense in order to resolve conflicts between the various systems and provide the performance specified.

C. All installation of equipment, fixtures, terminal devices, etc. shall be made in accordance with approved composite shop drawings. The Contractor shall modify installation and relocate installed work to provide code clearances, service access, and eliminate conflict with other systems.

D. Submit approved shop drawings in pdf format.

1.15 SITE OBSERVATION

A. Site observation by the Architect, Engineer, and/or Owner's Representative is for the express purpose of verifying compliance by the Contractor with the contract documents, and shall not be construed as construction supervision nor indication of approval of the manner or location in which the work is being performed as being a safe practice or place.

1.16 SUPERVISION

A. In addition to the Superintendent required under the conditions of the contract, each subcontractor shall keep a competent superintendent or foreman on the job at all times.

B. It shall be the responsibility of each superintendent to study all plans and familiarize himself with the work to be done by other trades. He shall coordinate his work with other trades and, before material is fabricated or installed, make sure that his work will not cause an interference with another trade. Where interferences are encountered, they shall be resolved at the jobsite by the superintendents involved. Where interferences cannot be resolved without major changes to the plans, the matter shall be referred to the Owner's Representative for comments.

1.17 OPERATION PRIOR TO COMPLETION

A. When any piece of mechanical equipment is operable and it is to the advantage of the Contractor to operate the equipment, he may do so, providing that he properly supervises the operation and has the written permission of the Owner's Representative to do so. The warranty period shall not commence, however, until such time as the equipment is operated for the beneficial use of the Owner or date of substantial completion, whichever occurs first.

B. Regardless of whether the equipment has or has not been operated, the Contractor shall properly clean the equipment, properly adjust, and complete all deficiency list items before final acceptance by the Owner. The date of acceptance and the start of the warranty may not be the same date.

1.18 MANUFACTURER'S RECOMMENDATIONS

A. The manufacturer's published directions shall be followed in the delivery, storage, protection, installation, piping, and wiring of all equipment and material. The Contractor shall promptly notify the Owner's Representative, in writing, of any conflict between the requirements of the contract documents and the manufacturer's directions and shall obtain the Owner's Representative's comments before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturer's directions or applicable comments from the Owner's Representative, he shall bear all costs arising in connection with the correction of such deficiencies.

1.19 CHECKING AND TESTING MATERIALS AND/OR EQUIPMENT

A. Before final acceptance of the work, an authorized representative of the manufacturer of the installed materials and/or equipment shall personally inspect the installation and operation of his materials and/or equipment to determine that it is properly installed and in proper operating order. Testing and checking shall be accomplished during the scope of the work where required by work being concealed, and at the completion of the work otherwise. In addition, the Contractor shall submit to the Owner's Representative a signed statement from each representative certifying as follows:
   1. "I certify that the materials and/or equipment listed below have been personally inspected by the undersigned authorized manufacturer's representative and is properly installed and operating in accordance with the manufacturer's recommendations and are asbestos free."

1.20 OPERATING AND MAINTENANCE INSTRUCTION

A. The Contractor shall prepare for the owner's manual hereinafter specified complete sets of operating and maintenance instructions, system piping, valving, control and interlock diagrams, manuals, parts lists, etc. for each item of equipment. These are to be assembled as hereinafter specified for owner's manual.

B. In addition, the Contractor shall provide the service of a competent engineer or a technician acceptable to the Owner's Representative to instruct a representative of the Owner in the complete and detailed operation of all equipment and systems. These instructions shall be provided for a period of sufficient duration to fully accomplish the desired results. Upon completion of these instructions, a letter of release will be required, acknowledged by the Owner, stating the dates of instruction and personnel to whom instructions were given.

C. Additional diagrams, operating instructions, etc. shall be provided as specified hereinafter in the other sections of these specifications.

1.21 MATERIAL AND EQUIPMENT SCHEDULES

A. Contractor shall refer to both drawings and specification for schedules. Where reference is made to items "scheduled on drawings" or "scheduled in specifications," same shall include schedules contained in both the drawings and the specifications. The Contractor's attention is directed to the various specification sections and drawings for schedules.

1.22 APPLICABLE CODES AND STANDARDS

A. The installation shall meet the minimum standards prescribed in the latest editions of the following listed codes and standards, which are made a part of these specifications, except as may be hereinafter specifically modified in these specifications and associated drawings.
   1. National Fire Protection Association Standards (NFPA):
      NFPA 10 - Portable Fire Extinguishers

NFPA 13 – Standard for the installation of sprinkler systems.
NFPA 14 – Standard for the installation of standpipe and hose systems.
NFPA 20 – Standard for installation of stationary pumps
NFPA 54 - National Fuel and Gas Code
NFPA 70 - National Electrical Code
NFPA 90A - Air Conditioning Systems
NFPA 101 - Life Safety Code
NFPA 255 - Method of Test of Surface Burning Characteristics of Building Materials

2. American National Standards Institute (ANSI):
   15-78 - Safety Code for Mechanical Refrigeration
   C.2 - 1984 National Electrical Safety Code
   A117.1 - Handicapped Code
3. American Society of Mechanical Engineers (ASME): Section IV, V, CSD-1
4. American Water Works Association (AWWA): All applicable manuals and standards.
5. American Society of Testing Materials (ASTM): All applicable manuals and standards.
6. National Electrical Manufacturers' Association (NEMA): All applicable manuals and standards.
7. Occupational Safety and Health ACT (OSHA):
   National Sanitation Foundation - Standard No. 2
8. American Society of Heating, Refrigeration, and Air conditioning Engineers (ASHRAE):
   90-80 Energy Conservation in New Building Design
   2001 ASHRAE Handbook of Fundamentals
9. Americans with Disabilities Act, 1990
10. American Gas Association (AGA)
11. Underwriters Laboratories, Inc. (UL)
12. Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS)
13. Applicable State Building Codes (International Building Codes, as amended):
14. Applicable State Mechanical Code (International Mechanical Code, as amended).
15. Applicable State Plumbing Code (International Plumbing Code, as amended).
16. Applicable State Energy Code (International Energy Conservation Code, as amended).

B. All materials and workmanship shall comply with all applicable city, state, and national codes, specifications, and industry standards. All materials shall be listed by Underwriters Laboratories, Inc. as conforming to its standards and so labeled in every case where such a standard has been established for the particular type of material in question.

C. The contract documents are intended to comply with the aforementioned rules and regulations; however, some discrepancies may occur. Where such discrepancies occur, the Contractor shall immediately notify the Owner's Representative in writing of said discrepancies and apply for an interpretation. Should the discovery and notification occur after the execution of a contract, any additional work required for compliance with said regulations shall be paid for as covered by Division 1 of these contract documents, providing no work or fabrication of materials has been accomplished in a manner of noncompliance. Should the Contractor fabricate and/or install materials and/or workmanship in such a manner that does not comply with the applicable codes, rules, and regulations, the Contractor who performed such work shall bear all costs arising in correcting these deficiencies to comply with said rules and regulations.

1.23 DEFINITIONS

A. Refer to the condition of the contract for Division 1 for additional requirements regarding definitions.

B. Where "as required" or "as necessary" is used in these specifications or on the drawings, it shall mean "that situations exist that are not necessarily described in detail or indicated that may cause the Contractor certain complications in performing the work described or indicated. These complications entail the normal coordination activities expected of the Contractor where multiple trades are involved and new or existing construction causes deviations to otherwise simplistic approaches to the work to be performed. The term shall not be interpreted to permit an option on the part of the Contractor to achieve the end result."

C. Where “and/or” is used in these specifications or on the drawings, it shall mean “that situations exist where either one or both conditions occur or are required and shall not be interpreted to permit an option on the part of the Contractor.

1.24 FINAL INSPECTION

A. Refer to Division 1 for additional requirements for final inspection.

B. It shall be the responsibility of the Contractor to personally conduct a careful inspection, assuring himself that the work on the project is ready for final acceptance and developing his own “punch lists,” before calling upon the Owner’s Representative to make a final inspection. Failure of the Contractor to conduct such inspections and provide the Owner’s Representative with a copy of his “punch lists” prior to the final inspection shall be adequate cause for the Owner’s Representative to cancel any Contractor-requested final inspection.

C. In order not to delay final acceptance of the work, the Contractor shall conduct his own “final inspections” prior to requesting the Owner’s Representative to “final” the project; will have all necessary bonds, guarantees, receipts, affidavits, etc. called for in the various articles of this specification prepared and signed in advance; and together with a letter of transmittal listing each paper included, shall deliver the same to the Owner’s Representative at or before the time of said final inspection. The Contractor is cautioned to check over each bond, receipt, etc. before preparing same for submission to see that the terms check with the requirements of the specifications.

D. The final inspection will be made jointly by the Owner’s Representative and the Owner.

1.25 REQUIREMENTS FOR FINAL ACCEPTANCE

A. Requirements for final acceptance shall include but not be limited to the Contractor accomplishing the following:
   1. Construction: Complete all construction.
   2. Deficiency Lists: Correct all deficiencies listed at time of Substantial Completion.
   3. Owner’s Manual: Submit at least 30 days prior to final acceptance on (1) copy of the owner’s manual for the Owner’s Representative’s review and comments. Following acceptance, prepare three (3) copies of bound and indexed owner’s manual, to be delivered at the time of final acceptance, which shall include but not be limited to the following:
      a. System operating instructions.
      b. System control drawings.
      c. System interlock drawings.
      d. System maintenance instructions.
      e. Manufacturers’, suppliers’, and subcontractors’ names, addresses, and telephone numbers, both local representatives and manufacturers’ service headquarters.
      f. Equipment operating and maintenance instructions and parts lists.
      g. Manufacturer’s certifications (see Checking and Testing Materials and/or Equipment, this section).
      h. Contractor’s warranty.
      i. Acceptance certificates of authorities having jurisdiction.
      j. Log of all tests made during course of work.
      k. Owner’s acknowledgment of receipt of instruction, enumerating items in owner’s manual.
      l. List of manufacturers’ guarantees executed by the Contractor.
      m. Certified performance curves.
      n. Owner’s acknowledgment of items of equipment or accessories indicated or specified to be turned over to Owner.
   4. Instructions:
      a. Verbal, as herein specified.
      b. Posted, framed under glass or plastic laminated:
         1) System operating instructions.
         2) System control drawings.
         3) System interlock drawings.

5. Record Drawings: Deliver the specified record drawings to the Owner's Representative.

1.26 RECORD DRAWINGS

A. The Contractor shall maintain a set of contract drawings (black-line prints) at the jobsite on which he shall indicate the installed (as-built) locations.

B. Drawings shall be used for construction reference and shall not leave the field office of the jobsite.

C. Drawings shall include all addenda, ASI's, Change Orders, and existing conditions and equipment that are not reflected in the original contract drawings.

D. Upon completion of work, the Contractor shall obtain CAD files of the contract drawings from the Owner's Representative and transfer the above as-built information into these files. The as-built files shall be permanently marked "RECORD DRAWINGS" and printed on full-size Mylar sheets. Upon completion, the CAD files shall be transferred to CD in AutoCAD 2010 format. Both the CAD files CD and Mylar drawings shall be submitted to the Owner's Representative as part of the Close-out Submittals.

E. Refer to Division 1 paragraph entitled "Record Documents" for additional requirements.

1.27 ALTERNATE PROPOSALS

A. Alternate proposals are summarized in Division 1 and on the bid proposal form. Refer to all sections of the specifications and the drawings to determine the exact extent and scope of the various alternate proposals as each pertains to the work of the various trades.

1.28 WARRANTY

A. General: All work performed (including equipment and materials furnished) under the various sections of these specifications shall be 100% warranted, for a period of one (1) year from the date of final acceptance thereof, against defective materials, design, and unauthorized substitution. Upon receipt of note of failure of any part of the guaranteed equipment and/or facilities during the guaranty period, the affected part(s) or facilities shall be replaced promptly with new parts, etc. by and at the expense of the Contractor. Further, the Contractor shall properly obtain, execute, and forward any and all manufacturer's warranties on equipment furnished under the Contract. Refer to Division 1 for additional requirements.

B. Extended Period: The Contractor shall provide all extended time warranties available from the manufacturer of the equipment provided as standard at no additional cost. This includes all extended warranties where specified with certain equipment as directed in other sections of this Specification.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. All materials, unless otherwise specified, shall be current United States manufacture, new, free from all defects, and of the best quality. Foreign goods specifically approved for use by the Owner's Representative prior to bidding may be furnished.

B. Materials and equipment shall be installed in accordance with the manufacturer's recommendations and the best standard practice for the type of work involved. All work shall be executed by mechanics skilled in their respective trades, and the installations shall present a neat, precise appearance.

C. The responsibility for the furnishing and installation of the proper fire suppression equipment and/or material as intended rests entirely upon the Contractor. The Contractor shall request advice and supervisory assistance from the representative of specific manufacturers during the installation.

2.2 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS

A. All materials in concealed locations, including any above-ceiling area, shall have a flame spread rating not over 25 without evidence of continued progressive combustion and a smoke developed rating no higher than 50. Flame spread and smoke developed ratings shall be in accordance with NFPA Standard No. 255.

2.3 FIRE AND SMOKE PARTITION, WALL, AND/OR FLOOR PENETRATIONS

A. Pipe, conduit, etc. shall pass through fire- or smoke-rated floors, partitions, walls, or other barriers within a UL-listed assembly which shall maintain the rating of the applicable wall, floor, partition, or barrier.

B. The Contractor shall review the architectural and structural drawings and determine the location of the fire-rated building elements. Where these elements are penetrated, UL-listed fire-rated penetration assemblies approved by the local authority shall be provided in accordance with the manufacturer's instructions to obtain the required rating.

2.4 FOUNDATIONS / HOUSEKEEPING PADS

A. General: All special foundations and supports required for the proper installation of equipment and pipe shall be provided as hereinafter specified and under the section of the specifications covering the equipment, unless otherwise indicated on the drawings.

B. All equipment shall receive concrete housekeeping pads unless otherwise noted. Equipment to be receive pads are to include (but not limited to): air compressors, fire pumps, etc.

C. Concrete foundations for the support of equipment such as floor-mounted pumps, equipment, etc. shall be not less than 5 1/2 inches high and not less than 4 inches larger (in both directions) than supported unit, unless otherwise noted and shall be poured in forms built of new dressed lumber. All corners of the foundations shall be neatly chaffered by means of sheet metal or triangular wood strips nailed to the form. Pads shall not be laid out directly against walls or structures. 2 inches shall be left available for pad form work. Foundation bolts shall be placed in the forms when the concrete is poured, the bolts being correctly located by means of templates. Allow 1 inch below the equipment bases for alignment and grouting (where applicable). Foundations for equipment located on the exterior of the building shall be provided as indicated. Foundations shall be constructed in accordance with approved shop drawings and shall be reinforced with #4 bars at 12 inches on center both ways (minimum).

2.5 FLOOR AND CEILING PLATES

A. Except as otherwise noted, provide one-piece chrome-plated brass floor and ceiling plates (or escutcheons) around all pipes, conduits, etc. passing through walls, floors, or ceilings in any spaces, except underfloor and attic spaces. Plates shall be sized to fit snugly against the outside of the pipe or against the outside of insulation on lines which are insulated, and positively secured to such pipe or insulation. Plates will not be required for piping where pipe sleeves extend ¾ of an inch above finish floor and are concealed. Plates shall be one piece.

PART 3 - EXECUTION

3.1 SPACE AND EQUIPMENT ARRANGEMENT

A. The size of equipment indicated on the drawings is based on the dimensions of a particular manufacturer. While other manufacturers will be acceptable, it is the responsibility of the Contractor to determine whether the equipment he proposes to furnish will fit in the space. Shop drawings shall be prepared when required by the Owner's Representative to indicate a suitable arrangement.

B. All equipment shall be installed in a manner to permit access to all surfaces.

3.2 PROTECTION

A. The Contractor shall take such precautions as may be necessary to properly protect all materials and equipment from damage from the time of delivery until the completion of work. This shall include the erection of all required temporary shelters and supports to adequately protect any items stored in the open on the site from the weather, the ground and surrounding work; the cribbing of any items above the floor of the construction; and the covering of items in the uncompleted building with tarpaulins or other protective covering. Failure on the part of the Contractor to comply with the above will be sufficient cause for the rejection of the items in question.

B. The Contractor shall protect existing facilities, the work of others, and the premises from any and all damages that may be made possible by the execution of work.

C. Equipment and materials shall be protected from rust both before and after installation. Any equipment or materials found in a rusty condition at the time of final inspection must be cleaned of rust and repainted as specified elsewhere in these specifications.

3.3 COOPERATION BETWEEN TRADES AND WITH OTHER CONTRACTORS

A. Each trade, subcontractor, and/or Contractor must work in harmony with the various trades, subcontractors, and/or Contractors on the job as may be required to facilitate the progress to the best advantage of the job as a whole. Each trade, subcontractor, and/or Contractor must pursue its work promptly and carefully so as not to delay the general progress of the job. This Contractor shall work in harmony with Contractors working under other contracts on the premises.

B. It shall be the responsibility of each trade to cooperate fully with the other trades on the job to help keep the jobsite in a clean and safe condition. At the end of each day's work, each trade shall properly store all of its tools, equipment, and materials and shall clean its debris from the job. Upon the completion of the job, each trade shall immediately remove all of its tools, equipment, any surplus materials, and all debris caused by its portion of the work.

3.4 PRECEDENCE OF MATERIALS AND COORDINATION OF WORK

A. These specifications and the accompanying drawings are intended to cover systems which will not interfere with the structural design of the building, which will fit into the several available spaces, and which will ensure complete and satisfactory systems. Each subcontractor and/or trade shall be responsible for the proper fitting of his material and apparatus into the building.

B. The work of the various trades shall be performed in the most direct and workmanlike manner without hindering or handicapping the work of other trades. Piping interferences shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. Where space requirements conflict, the following order or precedence shall, in general, be observed:
1. Building lines.
2. Structural members.
3. Light fixtures.
4. Soil and drain piping.
5. Condensate drains.
6. Vent piping.
7. Supply, return, and outside air ductwork.
8. Exhaust ductwork.
9. HVAC water and steam piping.
10. Steam condensate piping.
11. Fire protection piping.
12. Natural gas piping.
13. Domestic water (cold and hot).
14. Refrigerant piping.
15. Electrical conduit.

C. The light fixture grid layout as indicated on the drawings must be maintained. This Contractor shall refer to all light fixture plans and details indicated on the drawings and shall coordinate the location of dampers, supply grilles, return air grilles, sprinkler heads, etc. with the location of the light fixtures to assure proper access to all items in a manner acceptable to the Owner's Representative.

3.5 CONNECTIONS FOR OTHERS

A. After the equipment is set in place, this Contractor shall make all final connections and shall provide all required pipe, fittings, valves, traps, connectors, etc.

B. Provide all air gap fittings required, using materials hereinbefore specified. In each water line serving an item of equipment or piece of machinery, provide a shutoff valve.

C. Provide all transition pieces, etc. required for a complete installation of equipment provided by others.

3.6 INSTALLATION METHODS

A. Where to Conceal: All pipes and conduits shall be concealed in pipe chases, walls, furred spaces, below suspended floors, or above the ceilings of the building unless otherwise indicated.

B. Where to Expose: In mechanical rooms, janitor's closets tight against pan soffits in exposed Tee structures, or storage spaces, but only where necessary, piping and conduit may be run exposed. All exposed piping and conduit shall be run in the neatest, most inconspicuous manner, and parallel or perpendicular to the building lines. All exposed piping to be coordinated with Architect.

C. Support: All piping and conduit shall be adequately and properly supported from the building structure by means of hanger rods or clamps to walls as herein specified.

D. Maintaining Clearance: Where limited space is available above the ceilings and below concrete beams or other deep projections, pipe and conduit shall be sleeved through the projection where it crosses, rather than hung below them, in a manner to provide maximum above-floor clearance. Sleeves shall be as herein specified. Approval shall be obtained from the Owner's Representative for each penetration.

E. All pipe, conduits, etc. shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. All pipes, and conduits run exposed in machinery and equipment rooms shall be installed parallel to the building lines, except that they shall be sloped to obtain the proper pitch. Piping run in furred ceilings, etc. shall be similarly installed, except as otherwise shown. Conduits in furred ceilings and in other concealed spaces may be run at angles to the construction but shall be neatly grouped and racked indicating good workmanship. All conduit and pipe openings shall be kept closed until the systems are closed with final connections.

F. Special Requirements:
   1. There shall be no pipe joints nearer than 12 inches to a wall, ceiling, or floor penetration unless pipe joint is a welded or mechanically-coupled-type joint.
   2. The Contractor shall study all construction documents and carefully lay out all work in advance of fabrication and erection in order to meet the requirements of the extremely limited spaces. Where conflicts occur the Contractor shall meet with all involved trades and the Owner's Representative and resolve the conflict prior to erection of any work in the area involved.
   3. Prior to the installation of any ceiling material, gypsum, plaster, or acoustical board, the Contractor shall notify the Owner's Representative so that arrangements can be made for an inspection of the above-ceiling area about to be "sealed off." The Contractor shall give as much advance notice as possible up to five (5) working days, but in no case less than three (3) working days.
   4. The purpose of this inspection is to verify the completeness and quality of the installation of the air conditioning systems, the plumbing systems, and any other special above-ceiling systems such as pneumatic tube. The ceiling supports (tee bar or lath) should be in place so that access panel and light fixture locations are identifiable and so that clearances and access provisions may be evaluated.

5. No ceiling material shall be installed until the deficiencies listed from this inspection have been corrected to the satisfaction of the Owner's Representative.

3.7 TESTS AND INSPECTIONS

A. General: The Contractor shall make all tests deemed necessary by the inspection departments of the authority having jurisdiction, Board of Underwriters, etc. He shall provide all equipment, materials, and labor for making such tests. Fuel and electrical energy for system operational tests following beneficial occupancy by the Owner will be paid for by the Owner.

B. Other: Additional tests specified hereinafter under the various specifications sections shall be made.

C. Notification: The Owner's Representative shall be notified at his office 36 hours prior to each test and other specifications requirements requiring action on the part of the Owner, Architect, Engineer, and/or Owner's Representative.

D. Test Logs: All tests which the Contractor conducts shall have pertinent data logged by the Contractor at the time of testing. Data shall include date, time, personnel, description and extent of system tested, test conditions, test results, specified results, and any other pertinent data. Data shall be delivered to the Owner's Representative as specified under "Requirements for Final Acceptance.

E. Inspections: In general, an inspection by the Owner's Representative shall be required prior to closing up any work and prior to beneficial occupancy or final project completion. The closing up of work includes, but is not limited to, pipe and conduit installations prior to backfilling; mechanical, electrical, and fire protection work prior to placement of concrete; or closing up walls and overhead mechanical, electrical, and fire protection work prior to installation of the ceiling.

3.8 DISCHARGE OF WASTES FROM CONSTRUCTION SITE

A. The Contractor shall comply with all applicable provisions of local, state, and federal laws regarding the discharge of wastes into sewer and waterways. Special caution shall be exercised to prevent the discharge of wastes which contain oil, tar, asphalt, roofing compound, kerosene, gasoline, paint, mud, cement, lime, or other materials which would degrade the water quality of the receiving water course. The Contractor shall construct and maintain oil interceptors, settling basins, acid neutralization tanks, and/or other effective pollution countermeasures, as required by the Texas Water Quality Board.

END OF SECTION 210100

SECTION 210513

COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Piping materials and installation instructions.
2. Mechanical sleeve seals.
3. Sleeves.
4. Escutcheons.
5. Grout.
6. Fire-suppression equipment and piping demolition.
7. Equipment installation requirements common to equipment sections.
8. Painting and finishing.
9. Concrete bases.
10. Supports and anchorages.

1.3 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in chases.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:

1. CPVC: Chlorinated polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Mechanical sleeve seals.
2. Escutcheons.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."

B. Steel Pipe Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

1. Comply with provisions in ASME B31 Series, "Code for Pressure Piping."
2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

C. Electrical Characteristics for Fire-Suppression Equipment: Equipment of higher electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified. If minimum energy ratings or efficiencies are specified, equipment shall comply with requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture.

1.7 COORDINATION

A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for fire-suppression installations.

B. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.

C. Coordinate requirements for access panels and doors for fire-suppression items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 08 Section "Access Doors and Frames."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.

2.2 PIPE, TUBE, AND FITTINGS

A. Refer to individual Fire Suppression Sections for pipe, tube, and fitting materials and joining methods.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Fire Suppression Sections for joining materials not listed below.

2.4 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
   1. Manufacturers:
      a. Advance Products & Systems, Inc.
      b. Calpico, Inc.
      c. Metraflex Co.
      d. Pipeline Seal and Insulator, Inc.
   2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
   3. Pressure Plates: Carbon steel. Include two for each sealing element.
   4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.

2.5 SLEEVES

A. Galvanized-Steel Sheet: 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint.

B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

C. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.

D. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
   1. Underdeck Clamp: Clamping ring with set screws.

E. Molded PVC: Permanent, with nailing flange for attaching to wooden forms.

F. PVC Pipe: ASTM D 1785, Schedule 40.

G. Molded PE: Reusable, PE, tapered-cup shaped and smooth-outer surface with nailing flange for attaching to wooden forms.

2.6 ESCUTCHEONS

A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.

C. One-Piece, Cast-Brass Type: With set screw.
   1. Finish: Polished chrome-plated.

D. Split-Casting, Cast-Brass Type: With concealed hinge and set screw.
   1. Finish: Polished chrome-plated.

E. One-Piece, Stamped-Steel Type: With set screw and chrome-plated finish.

F. Split-Plate, Stamped-Steel Type: With concealed hinge, spring clips, and chrome-plated finish.

G. One-Piece, Floor-Plate Type: Cast-iron floor plate.

H. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.7 GROUT

A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
   1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
   2. Design Mix: 5000-psi, 28-day compressive strength.
   3. Packaging: Premixed and factory packaged.

PART 3 - EXECUTION

3.1 FIRE-SUPPRESSION DEMOLITION

A. Refer to Specification Section "Cutting and Patching" and Specification Section "Selective Structure Demolition" for general demolition requirements and procedures.

B. Disconnect, demolish, and remove fire-suppression systems, equipment, and components indicated to be removed.
   1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
   2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
   3. Equipment to Be Removed: Disconnect and cap services and remove equipment.
   4. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
   5. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.

C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.2 PIPING SYSTEMS - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 21 Sections specifying piping systems.

B. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

H. Install piping free of sags and bends.

I. Install fittings for changes in direction and branch connections.

J. Install piping to allow application of insulation.

K. Select system components with pressure rating equal to or greater than system operating pressure.

L. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:

1. New Piping:
    a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
    b. Chrome-Plated Piping: One-piece, cast-brass type with polished chrome-plated finish.
    c. Insulated Piping: One-piece, stamped-steel type with spring clips.
    d. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    e. Bare Piping at Wall and Floor Penetrations in Finished Spaces: One-piece, stamped-steel type.
    f. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    g. Bare Piping at Ceiling Penetrations in Finished Spaces: One-piece, stamped-steel type and set screw.
    h. Bare Piping in Unfinished Service Spaces: One-piece, cast-brass type with polished chrome-plated finish.
    i. Bare Piping in Unfinished Service Spaces: One-piece, stamped-steel type with concealed.
    j. Bare Piping in Equipment Rooms: One-piece, cast-brass type.
    k. Bare Piping in Equipment Rooms: One-piece, stamped-steel type with set screw.
    l. Bare Piping at Floor Penetrations in Equipment Rooms: One-piece, floor-plate type.

M. Sleeves are not required for core-drilled holes.

N. Permanent sleeves are not required for holes formed by removable PE sleeves.

O. Install sleeves for pipes passing through concrete and masonry walls and concrete floor and roof slabs.

P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.

1. Cut sleeves to length for mounting flush with both surfaces.
    a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified.
2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
3. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
    a. Steel Pipe Sleeves: For pipes smaller than NPS 6.
    b. Steel Sheet Sleeves: For pipes NPS 6 and larger, penetrating gypsum-board partitions.
    c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level. Refer to Specification Section "Sheet Metal Flashing and Trim" for flashing.

1) Seal space outside of sleeve fittings with grout.

4. Except for underground wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Specification Section "Joint Sealants" for materials and installation.

Q. Aboveground, Exterior-Wall Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Install steel pipe for sleeves smaller than 6 inches in diameter.
2. Install cast-iron "wall pipes" for sleeves 6 inches and larger in diameter.
3. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

R. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.

1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

S. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Specification Section "Penetration Firestopping" for materials.

T. Verify final equipment locations for roughing-in.

U. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

3.3 PAINTING

A. Painting of fire-suppression systems, equipment, and components is specified in Specification Sections "Interior Painting" and "Exterior Painting."

B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

C. Sprinkler heads are **not** to be painted.

3.4 CONCRETE BASES

A. Concrete Bases: Anchor equipment to concrete base according to equipment manufacturer's written instructions and according to seismic codes at Project.

1. Construct concrete bases of dimensions indicated, but not less than 4 inches larger in both directions than supported unit.
2. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of the base.
3. Install epoxy-coated anchor bolts for supported equipment that extend through concrete base, and anchor into structural concrete floor.
4. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

5. Install anchor bolts to elevations required for proper attachment to supported equipment.
6. Install anchor bolts according to anchor-bolt manufacturer's written instructions.
7. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Division 03.

3.5 ERECTION OF METAL SUPPORTS AND ANCHORAGES

A. Refer to Specification Section "Metal Fabrications" for structural steel.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor fire-suppression materials and equipment.

C. Field Welding: Comply with AWS D1.1.

3.6 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor fire-suppression materials and equipment.

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.7 GROUTING

A. Mix and install grout for fire-suppression equipment base bearing surfaces, pump and other equipment base plates, and anchors.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placement of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases and provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout.

END OF SECTION 210513

SECTION 211313

FIRE SUPPRESSION PIPING WET-PIPE SPRINKLER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provision of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following fire-suppression piping system(s) inside the building. See other specification sections for additional systems requirements.
   1. Wet-pipe sprinkler systems.

B. Related Sections include the following:
   1. Specification Section “Fire Alarm” for alarm devices not specified in this Section.
   2. Specification Section “Basic Fire Protection Materials and Methods.”
   3. Specification Section “Special Conditions for all Fire Suppression Work.”

C. Scope of Work: Install a complete wet-pipe fire sprinkler system **Per NFPA**.

1.3 DEFINITIONS

A. High-Pressure Piping System: Fire-suppression piping system designed to operate at working pressure high than standard 175 psig.

B. Underground Service-Entrance Piping: Underground service piping below the building.

1.4 SYSTEM DESCRIPTION

A. Wet-Pipe Sprinkler System: Automatic sprinklers are attached to piping containing water and that is connected to water supply. Water discharges immediately from sprinklers when they are opened. Sprinklers open when heat melts fusible link or destroys frangible device. Hose connections are included if indicated.

1.5 PERFORMANCE REQUIREMENTS

A. Standard Piping System Component Working Pressure: Listed for at least 175 psig.

B. Fire-suppression sprinkler system design shall be approved for authorities having jurisdiction.
   1. Margin of Safety for Available Water Flow and Pressure: 10 percent, including losses through water-service piping; valves, and backflow preventers.
   2. Sprinkler Occupancy Hazard Classifications:
      a. Building Service Areas: Ordinary Hazard, Group 1.
      b. Electrical Equipment Rooms: Ordinary Hazard, Group 1.
      c. General Storage Areas: Ordinary Hazard, Group 1.
      d. Mechanical Equipment Rooms: Ordinary Hazard, Group 1.
      e. Office and Public Areas: Light Hazard.
   3. Minimum Density for Automatic-Sprinkler Piping Design:
      a. Light-Hazard Occupancy: 0.10 gpm over 1500-sq.ft. (6.3 mL/s over 139-sq. m) area.
      b. Ordinary-hazard, Group 1 Occupancy: 0.15 gpm over 1500-sq. ft. (9.5 mL/s over 139-sq. m) area.

4. Total Combined Hose-Stream Demand Requirement: According to NFPA 13, unless otherwise indicated:
   a. Light-Hazard Occupancies: 100 gpm (6.3 L/s) for 30 minutes.
   b. Ordinary-Hazard Occupancies: 250 gpm (15.75 L/s) for 60 to 90 minutes.

1.6 SUBMITTALS

A. Product Data: For the following: **All products must be UL and/or FMG**
   1. Piping materials, including dielectric fittings and sprinkler specialty fittings.
   2. Pipe hangers and supports.
   3. Valves, including listed fire-protection valves, unlisted general-duty valves, and specialty valves and trim.
   4. Sprinklers, escutcheons, and guards. Include sprinkler flow characteristics, mounting, finish, and other pertinent data.
   5. Hose connections, including size, type, and finish.
   6. Hose stations, including size, type, and finish of hose connections; type and length of fire hoses; finish of fire hose couplings; type, material, and finish of nozzles; and finish of rack.
   7. Alarm devices, including electrical data.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Fire-hydrant flow test report.

D. Approved Sprinkler Piping Drawings: Working Plans, prepared according to NFPA 13, that have been approved by authorities having jurisdiction, including hydraulic calculations.

E. Field Test Reports and Certificates: Indicate and interpret test results for compliance with performance requirements and as described in NFPA 13. Include “Contractor’s Material and Test Certificate for Aboveground Piping” and “contractor’s Material and Test Certificate for Underground Piping.”

F. Welding certificates.

G. Field quality-control test reports.

H. Operation and Maintenance Data: For sprinkler specialties to include in emergency, operation and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Installer’s responsibilities include designing, fabricating, and installing fire-suppression systems and providing design services needed to assume engineering responsibility. Base calculations on results of fire-hydrant flow test. All work is to be executed by an RME employed by the installing contractor.

B. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

C. Steel Pipe Welding: Quality processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, “Welding and Brazing Qualifications.”
   1. Comply with provisions in ASME B31 Series, “Code for Pressure Piping.”
   2. Certify that each welder has passed AWS qualification tests for welding processes involved and that certification is current.

D. NFPA Standards: Fire-suppression-system equipment, specialties, accessories, installation, and testing shall comply with the following:

1. NFPA 13, “Installation of Sprinkler Systems.”
2. NFPA 230, “Fire Protection of Storage.”
3. NFPA 231, “Standard for General Storage.”

1.8 COORDINATION

A. Coordinate layout and installation of sprinklers with other construction that penetrates ceilings, including light fixtures, HVAC equipment, and partition assemblies.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Sprinkler Cabinets: Finished, wall-mounting, steel cabinet with hinged cover, with space for minimum of six spare sprinklers plus sprinkler wrench. Include number of sprinklers required by NFPA 13 and sprinkler wrench. Include separate cabinet with sprinklers and wrench for each type of sprinkler on Project.

1.10 STORAGE OF MATERIALS

A. Store all piping on site in a clean, dry, clear area on the jobsite – covered and protected from the elements. Pipe is not to be directly on the ground, support pipe off of ground by wood blocking or other material. All pipe ends are to be capped and protected from the elements until piping is ready for installation. Any piping not covered or protected will be required to be removed from the jobsite and replaced at no cost to the owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Provide products from one of the following manufacturers:
   1. Viking Corp.
   2. Anvil International, Inc.
   3. VGS by Viking
   4. Flex head
   5. ARGCO (Allied Rubber & Gasket Co.)
   6. Tyco
   7. Victaulic Co. of America
   8. Ward Manufacturing
   9. Milwaukee Valve Company
   10. Sigma Valve Co.
   11. Mueller Company
   12. NIBCO
   13. Reliable Automatic Sprinkler Co., Inc.
   14. Watts Industries, Inc.; Water Products Div.
   15. Guardian Fire Equipment Incorporated

2.2 DUCTILE-IRON PIPE AND FITTINGS

A. Mechanical-Joint, Ductile-Iron Pipe: AWWA C151, with mechanical-joint bell end and plain end.
   1. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern.
   2. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron gland, rubber gasket, and steel bolts and nuts.

B. Push-on-Joint, Ductile-Iron Fittings: AWWA C151, with push-on-joint bell end and plain end.
   1. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern.
   2. Gaskets: AWWA C111, rubber.

C. Corrosion-Protective Encasement for Piping
   1. Encasement for Underground Metal Piping: ASTM A674 or AWWA C105, PE film, 0.008-inch minimum thickness, tube or sheet.

2.3 STEEL PIPE AND FITTINGS

A. All steel pipe to be threaded end, grooved end or weld-thread/grooved-end only. Hex/ reducing bushing, locking lug or saddle fittings are NOT acceptable.

B. Threaded-End, Standard-Weight Schedule 40 Steel Pipe: ASTM 135 and with factory- or field-formed threaded ends.
   1. Cast-Iron Threaded: ASME B16.1, Class 125.
   2. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150.
   3. Steel Threaded Pipe Nipples: ASME A733, made of ASTM A 53/A 53M or ASTM A106, Schedule 40. Include ends matching joining method.

C. Grooved-End, Standard-Weight Schedule 10 Steel Pipe: ASTM A 135 and with factory- or field-formed, square-cut- or roll-grooved ends.
   1. Grooved-End Fittings: UL-listed, ASTM A 536, ductile-iron casting with OD matching steel-pipe OD.
   2. Grooved-End-Pipe Couplings: UL 213 and AWWA C606, rigid pattern, unless otherwise indicated; gasketed fitting matching steel-pipe OD. Include ductile-iron housing with keys matching steel-pipe and fitting grooves, pre-lubricated rubber gasket listed for use with housing, and steel bolts and nuts.

D. Welded-Threaded-End/Grooved-End, Schedule 40 Steel Fittings: ASTM A 53, Grade A (Weld-o-let).
   1. UL/FM approved.

2.4 SPRINKLER SPECIALTY FITTINGS

A. Sprinkler specialty fittings shall be UL listed or FMG approved, with 175-psig minimum working-pressure rating and made of materials compatible with piping.

B. Sprinkler Drain and Alarm Test Fittings: Cast- or ductile-iron body; with threaded inlet and outlet, test valve and orifice and sight glass.

C. Sprinkler Branch-Line Test Fittings: Brass body with threaded inlet, capped drain outlet, and threaded outlet for sprinkler.

D. Sprinkler Inspector’s Test Fitting: Cast- or ductile-iron housing with threaded inlet and drain outlet and sight glass.

E. Drop-Nipple Fittings: UL 1474, adjustable with threaded inlet and outlet and seals.

F. Flexible Drops: FMG approved Viking or equal.

2.5 LISTED FIRE-PROTECTION VALVES

A. Valves shall be UL listed or FMG approved, with 175-psig minimum pressure rating.

B. Ball Valves: Comply with UL 1091, except with ball instead of disc.
   1. NPS 1-1/2 and Smaller: Bronze body with threaded ends.

2. NPS 2 and NPS 2-1/2: Bronze body with threaded ends or ductile-iron body with grooved ends.
3. NPS 3: Ductile-iron body with grooved ends.

C. Butterfly Valves: UL 1091.
1. NPS 2 and Smaller: Bronze body with threaded ends.
2. NPS 2-1/2 and Larger: Bronze, cast-iron, or ductile-iron body; wafer type or with flanged or grooved ends.

D. Check Valves NPS 2 and Larger: UL 312, swing type, cast-iron body with flanged or grooved ends.

E. Gate Valves: UL 262, OS&Y type.
1. NPS 2 and Smaller: Bronze body with threaded ends.
2. NPS 2-1/2 and Larger: Cast-iron body with flanged ends.

2.6 UNLISTED GENERAL-DUTY VALVES

A. Ball Valves NPS 2 and Smaller: 2-piece copper-alloy body with stainless steel trim, 600-psig minimum CWP rating, blowout-proof stem, and threaded ends.

B. Check Valves NPS 2 and Smaller: Type 4, Class 125 minimum, swing type with bronze body, nonmetallic disc, and threaded ends.

C. Gate Valves NPS 2 and Smaller: Type 2, Class 125 minimum, with bronze body, solid wedge, and threaded ends.

D. Globe Valves NPS 2 and Smaller: Type 2, Class 125 minimum, with bronze body, nonmetallic disc, and threaded ends.

2.7 SPECIALTY VALVES

A. Sprinkler System Control Valves: UL listed or FMG approved, cast- or ductile-iron body with flanged or grooved ends, and 175-psig minimum pressure rating.
1. Alarm Check Valves: UL 193, designed for horizontal or vertical installation, with bronze grooved seat with O-ring seals, single-hinge pin, and latch design. Include trim sets for bypass, drain, electrical sprinkler alarm switch, pressure gages, retarding chamber and fill-line attachment with strainer.
a. Drip Cup Assembly: Pipe drain without valves and separate from main drain piping.
b. Drip Cup Assembly: Pipe drain with check valve to main drain piping.

B. Automatic Drain Valves: UL 1726, NPS 3/4, ball-check device with threaded ends.

2.8 SPRINKLERS

A. Sprinklers shall be UL listed or FMG approved, Viking or equal with 175-psig minimum pressure rating.

B. Automatic Sprinklers: With heat-responsive element complying with the following:
1. UL 199, for nonresidential applications.
2. UL 1767, for early-suppression, fast-response applications.

C. Sprinkler Types and Categories: Nominal 1/2-inch orifice for “Ordinary” temperature classification rating, unless otherwise indicated or required by application.
1. Open Sprinklers: UL 199, without heat-responsive element.
a. Orifice: 1/2 inch with discharge coefficient K between 5.3 and 5.8.
b. Orifice: 17/32 inch with discharge coefficient K between 7.4 and 8.2

D. Sprinkler types, features and options as follows: Viking or equal
   1. Concealed ceiling sprinklers, including cover plate.
   2. Extended-coverage sprinklers.
   3. Flow-control sprinklers, with automatic open and shutoff feature.
   4. Flush ceiling sprinklers, including escutcheon.
   5. High-pressure sprinklers.
   6. Institution sprinklers, made with a small, breakaway projection.
   7. Open sprinklers.
   8. Pendent sprinklers.
   9. Pendent, dry-type sprinklers.
   10. Quick-response sprinklers.
   11. Recessed sprinklers, including escutcheon.
   12. Sidewall sprinklers.
   13. Sidewall, dry-type sprinklers.
   14. Upright sprinklers.

E. Sprinkler Finishes: Chrome plated, bronze, and painted.

F. Special Coatings: Wax, lead, ENT and corrosion-resistant paint.

G. Sprinkler Escutcheons: Materials, types and finishes for the following sprinkler mounting applications. Escutcheons for concealed, flush, and recessed-type sprinklers are specified with sprinklers.
   1. Ceiling Mounting: Chrome-plated steel, one piece, flat.
   2. Sidewall Mounting: Chrome-plated steel, one piece, flat.

H. Sprinkler Guards: Viking or equal Wire-cage type, including fastening device for attaching to sprinkler.

2.9 HOSE CONNECTIONS

A. Description: UL 668, brass or bronze, 300-psig minimum pressure rating, hose valve for connecting fire hose. Include angle or gate pattern design, as indicated; female NPS inlet and male hose outlet; and lugged cap, gasket, and chain. Include NPS 1-1/2 or NPS 2-1/2 as indicated, and hose valve threaded according to NFPA 1963 and matching local fire department threads.
   1. Valve Operation: Nonadjustable type.
   2. Finish: Rough metal or chrome-plated, as indicated.

2.10 FIRE DEPARTMENT CONNECTIONS

A. Exposed, Freestanding-Type, Fire Department Connections: UL 405, 175-psig minimum pressure rating; with corrosion-resistant-metal body, brass inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, and bottom outlet with pipe threads. Include brass lugged caps, gaskets, and brass chains; brass lugged swivel connection and drop clapper for each hose-connection inlet; 18-inch-high, brass sleeve; and round, floor, brass escutcheon plate with marking “AUTO SPKR & STANDPIPE.”
   1. Finish Including Sleeve: Polished brass.

B. Wall-Type, Fire Department Connection: UL 405, 175-psig minimum pressure rating, with corrosion-resistant-metal body with brass inlets, brass wall escutcheon plate, brass lugged caps with gaskets and brass chains, and brass lugged swivel connections. Include inlets with threads according to NFPA 1963 and matching local fire department sizes and threads, outlet with pipe threads, extension pipe nipples, check devices or clappers for inlets, and escutcheon plate with marking similar to “AUTO SPKR & STANDPIPE.”
   1. Type: Flush, with multiple inlets and square or rectangular escutcheon plate.
   2. Type: Exposed, projecting, with two inlets and round escutcheon plate.
   3. Finish: Polished brass.

2.11 ALARM DEVICES

A. Alarm-device types shall match piping and equipment connections.

B. Water-Motor-Operated Alarm: UL 753, mechanical-operation type with pelton-wheel operator with shaft length, bearings, and sleeve to suit wall construction and 10-inch diameter, cast-aluminum alarm gong with red-enamel factory finish. Include NPS 3/4 inlet and NPS 1 drain connections.

C. Water-Flow Indicator: UL 346, electrical-supervision, paddle-operated-type, water-flow detector with 250-psig pressure rating and designed for horizontal or vertical installation. Include two single pole, double-throw circuit switches for isolated alarm and auxiliary contacts, 7A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal if removed.

D. Pressure Switch: UL 753, electrical-supervision-type, water-flow switch with retard feature. Include single-pole, double-throw, normally closed contacts and design that operates on rising pressure and signals water flow.

E. Valve Supervisory Switch: UL 753, electrical, single-pole, double-throw switch with normally closed contacts. Include design that signals controlled valve is in other than fully open position.

2.12 PRESSURE GAGES

A. Description: UL 393, 3-1/2 to 4-1/2-inch diameter, dial pressure gage with range of 0 to 250 psig minimum.
   1. Water System Piping: Include caption “WATER” or “AIR/WATER” on dial face.
   2. Air System Piping: Include retard feature and caption “AIR” or “AIR/WATER” on dial face.

PART 3 - EXECUTION

3.1 PREPARATION

A. Perform fire-hydrant flow test according to NFPA 13, FMG and NFPA 291. Use results for system design calculations required in Part 1 “Quality Assurance” Article.

B. Report test results promptly and in writing.

3.2 EXAMINATION

A. Examine roughing-in for hose connections and stations to verify actual locations of piping connections before installation.

B. Examine walls and partitions for suitable thicknesses, fire- and smoke-rated construction, framing for hose-station cabinets, and other conditions where hose connections and stations are to be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 PIPING APPLICATIONS, GENERAL

A. Shop weld pipe joints welded piping as indicated.

B. Flanges, flanged fittings, unions, nipples, and transition and special fittings with finish and pressure ratings same as or higher than system’s pressure rating may be used in aboveground applications, unless otherwise indicated.

C. Piping between Fire Department Connections and Check Valves: Galvanized, standard-weight Schedule 40 steel pipe with threaded ends; cast- or malleable-iron threaded fittings; and threaded joints.

D. Underground Service-Entrance Piping: Ductile-iron, mechanical-joint pipe and fittings and restrained joints. Include corrosion-protective encasement.

3.4 SPRINKLER SYSTEM PIPING APPLICATIONS

A. Standard-pressure, Wet-Pipe Sprinkler System, 175-psig Maximum Working Pressure;
   1. All piping NPS 2 and smaller shall be the following: Standard weight Schedule 40 threaded steel pipe, cast or malleable iron threaded fittings.
   2. All piping NPS 2-1/2 and larger shall be the following: Schedule 10 steel pipe, grooved fittings and welded fittings.

B. Water Service Pipe (up to Alarm Riser)
   1. Mechanical-Joint, Ductile Iron and fittings (above ground).
   2. Push-on-joint, Ductile Iron (underground).

3.5 VALVE APPLICATIONS

A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
   1. Listed Fire-Protection Valves: UL listed and FMG approved for applications where required by NFPA 13.
      a. Shutoff Duty: Use ball, butterfly, or gate valves.
   2. Unlisted General-Duty Valves: For applications where UL-listed and FMG-approved valves are not required by NFPA 13.
      a. Shutoff Duty: Use ball, butterfly, or gate valves.

3.6 JOINT CONSTRUCTION

A. Refer to Specification Section “Basic Fire Suppression Materials and Methods” for basic piping joint construction.

B. Threaded Joints: Comply with NFPA 13 for pipe thickness and threads. Do not thread nipples shorter than 8 inches with wall thickness less than Schedule 40 unless approved by authorities having jurisdiction and threads are checked by a ring gage and comply with ASME B1.20.1.

C. Grooved Joints: Assemble joints with listed Viking or equal coupling and gasket, lubricant, and bolts.
   1. Steel Pipe: Square-cut or roll-groove piping. Use grooved-end fittings and rigid, grooved-end-pipe couplings, unless otherwise indicated.

D. Ductile Iron Joints:
   1. Locking-lug fittings UL 213, ductile iron body with retainer lugs that require one quarter turn to secure pipe in fitting.

3.7 SERVICE-ENTRANCE PIPING

A. Connect fire-suppression piping to water-service piping of size and in location indicated for service entrance to building. Refer to Specification Section “Water Distribution” for exterior piping.

B. Install shutoff valve, check valve, pressure gage and drain at connection to water service.

3.8 PIPING INSTALLATION

A. Refer to Specification Section “Basic Fire Suppression Materials and Methods” for basic piping installation.

B. Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping. Install piping as indicated, as far as practical.
   1. Deviations from approved working plans for piping require written approval from authorities having jurisdiction. File written approval with Architect before deviating from approved working plans.

C. Install underground ductile-iron service-entrance piping according to NFPA 24 and with restrained joints. Encase piping in corrosion-protective encasement.

D. Use approved fittings to make changes in direction, branch takeoffs from mains, and reductions in pipe sizes. Saddle fittings or saddle couplings are NOT approved.

E. Install unions adjacent to each valve in pipes NPS 2 and smaller. Unions are not required on flanged devices or in piping installations using grooved joints.

F. Install flanges or flange adapters on valves, apparatus, and equipment having NPS 2-1/2 and larger connections.

G. Install “Inspector’s Test Connections” in sprinkler system piping, complete with shutoff valve, sized and located according to NFPA 13.

H. Install sprinkler piping with drains for complete system drainage.

I. Install sprinkler zone control valves, test assemblies and drain risers adjacent to standpipes when sprinkler piping is connected to standpipes.

J. Install drain valves on standpipes.

K. Install ball drip valves to drain piping between fire department connections and check valves. Drain to floor drain or outside building.

L. Install alarm devices in piping systems.

M. Hangers and Supports: Comply with NFPA 13 for hanger materials.
   1. Install sprinkler system piping according to NFPA 13.
   2. All hangers and supports to be galvanized.
   3. All supports to be secured to building structure.
   4. All supports to be listed as a support system (pipe not acceptable as supports).
   5. Pipe Support: All pipes throughout the building, both horizontal and vertical, shall be adequately supported from the construction to line of grade, with proper provision for expansion, contraction, vibration elimination, and anchorage. Vertical pipe shall be supported from floor lines with riser clamps sized to fit the lines and to adequately support their weight. At the bases of lines, where required for proper support, provide anchor base fittings or other approved supports.

N. Install pressure gages on riser or feed main, at each sprinkler test connection, and at top of each standpipe. Include pressure gages with connection not less than NPS 1/4 and with soft metal seated globe valve, arranged for draining pipe between gage and valve. Install gages to permit removal, and install where they will not be subject to freezing.

O. Fill wet-pipe sprinkler system piping with water.

3.9 VALVE INSTALLATION

A. Install listed fire-protection valves, unlisted general-duty valves, specialty valves and trim, controls, and specialties according to NFPA 13 and authorities having jurisdiction.

B. Install listed fire-protection shutoff valves supervised-open, located to control sources of water supply except from fire department connections. Install permanent identification signs indicating portion of system controlled by each valve.

C. Install check valve in each water-supply connection. Install backflow preventers instead of check valves in potable-water supply sources.

D. Specialty Valves:
   1. Alarm Check Valves: Install in vertical position for proper direction of flow, including bypass check valve and retarding chamber drain-line connection.

3.10 SPRINKLER APPLICATIONS

A. Drawings indicate sprinkler types to be used. Where specific types are not indicated, use the following sprinkler types:
   1. Rooms without Ceilings: Upright sprinklers.
   2. Rooms with Suspended Ceilings: Recessed sprinklers.
   3. Platforms: Concealed sprinklers.
   4. Wall Mounting: Sidewall sprinklers.
   5. Spaces Subject to Freezing: Pendent, dry sprinklers; and sidewall, dry sprinklers as indicated.
   6. Special Applications: Quick-response sprinklers where indicated.
   7. Sprinkler Finishes:
      a. Upright, Pendent, and Sidewall Sprinklers: Chrome plated in finished spaces exposed to view; rough bronze in unfinished spaces not exposed to view; wax coated where exposed to acids, chemicals, or other corrosive fumes.
      b. Concealed Sprinklers: Rough brass, with factory-painted white cover plate.
      c. Recessed Sprinklers: Bright chrome, with bright chrome escutcheon.

3.11 SPRINKLER INSTALLATION

A. Install sprinklers in suspended ceilings in center of narrow dimension and at 1/4, 1/2, or 3/4 points of long dimension of acoustical ceiling panels and tiles.

B. Do not install pendent or sidewall, wet-type sprinklers in areas subject to freezing. Use dry-type sprinklers with water supply from heated space.

C. Install sprinklers in storage rooms and/or closets to provide coverage without locating the deflectors directly above any wall shelving.

3.12 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install freestanding-type, fire department connection in level surface.
   1. Install protective pipe bollards on three sides of each fire department connection. Refer to Specification Section “Metal Fabrications” for pipe bollards.

B. Install wall-type, Fire Department connection in vertical wall (reference details).

C. Install ball drip valve at each check valve for fire department connection.

3.13 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment to allow service and maintenance.

C. Connect water-supply piping to fire-suppression piping. Include backflow preventer between potable-water piping and fire-suppression piping. Refer to Specification Section “Plumbing Specialties” for backflow preventers.

D. Install ball drip valves at each check valve for fire department connection. Drain to floor drain or outside building.

E. Connect piping to specialty valves, hose valves, specialties, fire department connections, and accessories.

F. Electrical Connections: Power wiring is specified in Electrical Specifications.

G. Connect alarm devices to fire alarm.

H. Ground equipment according to Specification Section “Grounding and Bonding.”

I. Connect wiring according to Specification Section “Conductors and Cables.”

J. Tighten electrical connectors and terminals according to manufacturer’s published torque-tightening values. If manufacturer’s torque valves are not indicated, use those specified in UL 486A and UL 486B.

3.14 LABELING AND IDENTIFICATION

A. Install labeling and pipe markers on equipment and piping according to requirements in NFPA 13.

B. All pipe shall be clearly identified in mechanical rooms and congested areas.

3.15 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
   3. Energize circuits to electrical equipment and devices.
   4. Start and run excess-pressure pumps.
   5. Flush, test, and inspect sprinkler systems according to NFPA 13, “Systems Acceptance” Chapter.
   6. Coordinate with fire alarm tests. Operate as required.
   7. Verify that equipment hose threads are same as local fire department equipment.

B. Report test results promptly and in writing to Architect and authorities having jurisdiction.

3.16 CLEANING AND PROTECTION

A. Clean dirt and debris from sprinklers.

B. Remove and replace sprinklers with paint or corrosion other than factory finish.

C. Protect sprinklers from damage until Substantial Completion.

D. All material to be protected from weather and shall not be installed rusted or weathered.

3.17 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain specialty valves. Refer to Specification Section "Demonstration and Testing."

END OF SECTION 211313

SECTION 220100

SPECIAL CONDITIONS FOR ALL PLUMBING WORK

PART 1- GENERAL

1.1 DESCRIPTION OF WORK

A. This section covers the general provisions of the plumbing specifications applicable to the following systems:
   1. Plumbing.

B. The use of the word plumbing in the body of the various specifications sections shall be interpreted to include all the aspects of all of the systems referenced in the Plumbing Specifications.

1.2 DRAWINGS

A. These specifications are accompanied by drawings of the building and details of the installations showing the locations of equipment, piping, etc. The drawings and these specifications are complementary to each other; requirements described in one or the other shall be considered binding as if described in both.

B. If any departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted to the Owner's Representative for approval. No departures shall be made without prior written approval by the Owner's Representative.

C. There are intricacies of construction which are impractical to specify or indicate in detail; means and methods for performing such work shall adhere to commonly accepted industry standards.

D. It is the Contractor's responsibility to properly use all information found on the Architectural, Structural, Mechanical, Plumbing and Electrical drawings and applicable shop drawings where such information affects his work.

E. For new buildings, all final dimensions shall be scaled from the drawings, unless otherwise noted. For work associated with existing buildings (renovations and additions), all final dimensions shall be field verified.

1.3 CONSTRUCTION REQUIREMENTS

A. The architectural, civil, structural, mechanical, electrical, plumbing, and fire protection drawings, and specifications are all part of the Contract Documents. In many instances there are details described in another trade's drawings that are not necessarily included or referenced in the plumbing drawings. It is the Contractor's responsibility to review in detail all parts of the Contract Documents prior to submitting a bid. Failure to comply with this requirement shall not relieve the Contractor of responsibility or be used as cause for additional compensation because architectural, structural, or electrical details were not included in the plumbing drawings.

B. It is the intent of the Contract Documents to provide complete and fully functional installation in every respect. Material and/or construction details not specifically described in the Contract Documents, but commonly considered incidental to the industry, are required by the Contractor.

C. The Contractor shall be responsible for fitting his material and apparatus into the building and shall carefully lay out his work at the site to conform to the structural conditions, to avoid all obstructions, to comply with Codes, to facilitate the work of other trades, to conform to the details of the installation supplied by the manufacturer of the equipment to be installed, and thereby to provide an integrated satisfactory operating installation.

D. The plumbing, electrical and mechanical drawings are schematic in nature and do not show every connection in detail or every pipe or conduit in its exact location. These details are subject to the requirements of ordinances and structural and architectural conditions.

E. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases and above suspended ceilings, etc. in finished portions of the building, unless specifically noted to be exposed. Work shall be installed to avoid compromising structural members; therefore, inserts to accommodate hangers shall be set before concrete is poured, and proper openings through floor, walls, beams, etc. shall be provided as hereinafter specified or as otherwise indicated or required. All work shall be installed parallel or perpendicular to building lines unless otherwise noted.

F. When the plumbing drawings do not give exact details as to the elevation of pipe or equipment, physically arrange the systems to fit in the space available at the elevations intended with the proper grades for the functioning of the system involved. Piping and exposed conduit, are generally intended to be installed true and square to the building construction, and located as high as possible against the structure in a neat and workmanlike manner. The plans do not show all required offsets, control lines, pilot lines, and other location details. Work shall be concealed in all finished areas. Piping specified to be insulated shall be supported in a manner that will allow the insulation to be installed without gaps. Insulated piping in concealed areas shall be offset with fittings as necessary to permit installation of insulation. Bending of pipes or installing pipes in a strain to insulate will not be permitted.

G. Final placement of serviceable equipment shall be carefully coordinated with all other trades to ensure sufficient clearance for maintenance according to manufacturer's recommendations. Lubricating orifices and adjustable components shall be easily accessible. Piping, conduit, valve stems, cabling and other building systems shall not interfere with service space.

H. Location of Exposed Devices
   1. All exposed devices (sprinkler heads, medical gas outlets, plumbing rough-ins, lights, outlets, communication devices, etcetera) shall be referenced to fixed data points that are coordinated with all trades; shall be located to present symmetrical arrangements with respect to the fixed data point; and shall facilitate the proper arrangements of acoustical ceiling tiles. Fixed data points shall include such features as wall and ceiling lines, soffits, balanced border widths, masonry joints, etc. Devices located in acoustical ceiling tiles shall occur symmetrically in tile joints or in the centers of whole tiles. The final determination of the exact location of each outlet and the arrangements to be followed shall be acceptable to the Owner's Representative.
   2. The drawings schematically indicate locations of the exposed devices. Final locations shall be determined by carefully coordinating the drawings pertaining to each trade. Where conflicts are identified, Owner's Representative shall determine final location. The Owner reserves the right to make any reasonable change in location of any device before installation, without additional cost to the Owner or the Architect.

1.4 QUALIFICATIONS

A. Contractor must have minimum of five years experience installing commercial, plumbing and piping systems similar to those described in these Contract Documents.

B. Contractor must be licensed and hold a current contracting license that has been valid for a minimum of five years in the State of Texas.

C. Contractor must be able to bond work for payment and performance of work being bid. Contractor's bonding agency shall have a Best's insurance rating of A or A+.

1.5 MATERIAL AND EQUIPMENT REQUIREMENTS

A. Manufacturer's Instructions: The manufacturer's published instructions shall be followed for preparing, assembling, installing, erecting, and cleaning manufacturer materials or equipment, unless otherwise

indicated. The Contractor shall promptly notify the Owner's Representative in writing of any conflict between the requirements of the Contract Documents and the manufacturer's direction and shall obtain the clarification of the Owner's Representative before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturer's directions or such clarification by the Owner's Representative, he shall bear all costs arising in connection with the correction of the deficiencies.

B. Storage at Site: The Contractor shall not receive material or equipment at the jobsite until there is suitable space provided to properly protect equipment from rust, drip, humidity, and dust damage and from surrounding work.

C. Capacities shall be not less than those indicated and shall be such that no component or system becomes inoperative or is damaged because of startup or other overload conditions.

D. Conformance to Agency Requirements: Where materials or equipment are specified to be approved, listed, tested, or labeled by the Underwriters Laboratories, Inc., or constructed and/or tested in accordance with the standards of the American Society of Mechanical Engineers, the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of Underwriters Laboratories, Inc. applied to the item will be acceptable as sufficient evidence that the items conform to such requirements. The ASME stamp or the AMCA label will be acceptable as sufficient evidence that the items conform to the respective requirements.

E. Nameplates: Each major component of equipment shall have the manufacturer's name, address, and model-identification number on a plate securely attached to the item of equipment. All data on nameplates shall be legible at the time of Final Inspection.

F. Prevention of Rust: Standard factory finish will be acceptable on equipment specified by model number; otherwise surfaces of ferrous metal shall be given a rust-inhibiting coating. The treatment shall withstand 200 hours in salt-spray fog test, in accordance with Method 6061 of Federal Standard No. 141. Immediately after completion of the test, the specimen shall show no signs of wrinkling or cracking and no signs of rust creepage beyond 1/8 inch on either side of the scratch mark. Where rust inhibitor coating is specified hereinafter, any treatment that will pass the above test is acceptable unless a specific coating is specified, except that coal tar or asphalt-type coatings will not be acceptable unless so stated for a specific item. Where steel is specified to be hot-dip galvanized, mill-galvanized sheet steel may be used provided all raw edges are painted with a zinc-pigmented paint conforming to Military Specification MIL-P-26915.

G. Protection from Moving Parts: Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts located so that any person can come in close proximity thereto, shall be fully enclosed or properly guarded.

H. Drive Guards: For machinery and equipment, provide guards as shown in AMCA 410 for belts, chains, couplings, pulleys, sheaves, shafts, gears, and other moving parts regardless of height above the floor. Drive guards may be excluded where motors and drives are inside factory-fabricated air handling units casings. Guards shall be constructed of sheet steel, cast iron, expanded metal, or wire mesh rigidly secured so as to be removable without disassembling pipe duct or electrical connection to equipment. Provide a 1-inch diameter hole in each drive guard at each shaft center to allow access for speed measurement.

I. Verifications of Dimensions: The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Owner's Representative of any discrepancy before performing any work. Adjustments to the work required in order to facilitate a coordinated installation shall be made at no additional cost to the Owner, Architect, or Engineer.

J. Standard Products: Materials and equipment to be provided shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

K. Spare Parts Data: As soon as practicable after approval of materials and equipment and, if possible, not later than four months prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies with current unit prices and sources of supply, a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment or specified hereinafter to be furnished as part of the Contract, and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 120 days at the particular installation. The foregoing shall not relieve the Contractor of any responsibilities under the warranty specified.

1.6 INSPECTION OF THE SITE

A. The Contractor shall visit the site, verifying all existing items indicated on drawings and/or specified, and familiarize himself with the existing work conditions, hazards, grades, actual formations, soil conditions, structures, utilities, equipment, systems, facilities, and local requirements. The submission of bids shall be deemed evidence of such visits. All proposals shall take these existing conditions into consideration, and the lack of specific information shall not relieve the Contractor of any responsibility.

1.7 UTILITY LOCATIONS AND ELEVATIONS

A. Locations and elevations of the various utilities included within the scope of this work have been obtained from substantially reliable sources and are offered separately from the Contract Documents, as a general guide only, without guarantee as to accuracy. Examine the site, the locations, and availability of all utilities and services required for their relation to the work. Verify the location of all existing site utilities with each responsible utility company or applicable party. The Contractor shall repair all damage to existing utilities, whether indicated on the drawings or not, at his sole expense.

1.8 PERMITS, UTILITY CONNECTIONS, AND INSPECTIONS

A. Permitting Fees: Contractor shall pay for all fees associated with permits required by municipal authorities having jurisdiction.

B. Tapping and Impact Fees: Contractor shall pay for all fees associated with tapping into municipal utility mains, including sanitary sewer, natural gas and domestic water. Impact fees will be paid for by the Owner.

C. Compliance: The Contractor shall comply in every respect with all requirements of local authorities having jurisdiction, including building inspections, fire marshal, local ordinances and codes, and utility company requirements. In no case does this relieve the Contractor of the responsibility of complying with these specifications and drawings where specified conditions are of a higher quality than the requirements of the above-specified authorities. Where requirements of the specifications and drawings are below the requirements of the above offices having jurisdiction, the Contractor shall make installations in compliance with the requirements of the above authorities.

D. Utilities: The Contractor shall coordinate with the various utility companies involved in this project and shall provide required utility relocations, extensions, modifications, and/or changes (complete in all respects) as described in the Contract Documents. Contractor shall verify the location of all existing utilities with the applicable Utility Company. The Contractor shall be responsible for all damages to existing utilities, whether indicated on drawings or not, and repair all damage to existing utilities as acceptable to the affected Utility Company.

E. Certification: Prior to final acceptance, the Contractor shall furnish a certificate of acceptance from the inspection departments having jurisdiction over the work for any and all work installed under this Contract. Any additional labor costs incurred as a result of a substitution shall be the Contractor’s responsibility.

1.9 EXISTING FACILITIES

A. The Contractor shall be responsible for loss or damage to the existing facilities caused by him and his workmen and shall be responsible for repairing or replacing such loss or damage. The Contractor shall send proper notices, make necessary arrangements, and perform other services required for the care, protection, and in-service maintenance of all plumbing, heating, air conditioning, and ventilating services for the new and existing facilities. The Contractor shall erect temporary barricades, with necessary safety devices, as required to protect personnel from injury, removing all such temporary protection upon completion of the work.

B. The Contractor shall provide temporary or new services to all existing facilities as required to maintain their proper operation when normal services are disrupted as a result of the work being performed under this project.

C. Where existing construction is removed to provide working and extension access to existing utilities, Contractor shall remove doors, piping, conduit, outlet boxes, wiring, light fixtures, air conditioning ductwork and equipment, etc. to provide this access and shall reinstall same upon completion of work in the areas affected.

D. Where partitions, walls, floors, or ceilings of existing construction are indicated to be removed, all Contractors shall remove and reinstall in locations approved by the Architect/Engineer all devices required for the operation of the various systems installed in the existing construction. This is to include but is not limited to temperature controls system devices, electrical switches, relays, fixtures, piping, conduit, etc.

E. Outages of services as required by the new installation will be permitted but only at a time approved by the Owner. The Contractor shall allow the Owner two weeks in order to schedule required outages. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the contract amount.

1.10 DEMOLITION AND RELOCATION

A. The Contractor shall modify, remove, and/or relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Salvage materials shall remain the property of the Owner and shall be delivered to such destination or otherwise disposed of as directed by the Owner. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The Contractor may, at his discretion, and upon the approval of the Owner, substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.

B. All items which are to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean and repair and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.

C. When items scheduled for relocation and/or reuse are found to be in damaged condition before work has been started on dismantling, the Contractor shall call the attention of the Owner to such items and receive further instructions before removal. Items damaged in repositioning operations are the Contractor's responsibility and shall be repaired or replaced by the Contractor as approved by the Owner, at no additional cost to the Owner.

D. Service lines and wiring to items to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner. Service lines and wiring not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied off or disconnected in a safe manner acceptable to the Owner. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities which must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner as hereinbefore specified.

1.11 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. No substitution of materials or equipment herein specified or called for on the drawings will be permitted, except by written permission of the Owner's Representative. Where several makes of equipment or material are mentioned, any item named may be bid upon provided it meets space, capacity specifications, and other requirements.

1.12 SUBMITTALS

A. Submittals for Review:
   1. As soon as practical or within 30 days after the date of contract award or notice to proceed, and before purchasing or starting installation of any materials or equipment, the Contractor shall submit for review sufficient material and equipment data to indicate that all requirements of the specifications have been met and samples shall be furnished when requested. All manufacturer's data used as part of the submittal shall have all non-applicable features crossed out or deleted in a manner that will clearly indicate exactly what is to be furnished.
   2. Four (4) copies of the submittal list and detailed submittals (for the Owner's and A/E's use) shall be submitted to the Owner's Representative. The Contractor is requested to include a minimum of three (3) additional copies for insertion in the project's Owner's Manuals at the completion of the project, and the number of additional copies the Contractor requires for his and his subcontractor's use during the project's construction. The detailed submittals shall be accompanied by the same number of sets of pictorial and descriptive data derived from the manufacturer's catalogs and sales literature or incorporated in the shop drawings. The Contractor may provide a detailed submittal on any item even though not required by the Owner's Representative.

B. Format
   1. Submittals shall be in pdf format. The first page shall have a cover sheet inserted with the title "PLUMBING SUBMITTALS" centered in large print. Below the title shall be printed the name of the project, the date, the project location, the name and address of the contractor, the name and address of the subcontractor and the name and address of the engineer(s) in smaller print.
   2. Provide a Table of Contents at the beginning of the binder that summarizes the information being submitted according to specification section.
   3. Submittals shall be tab divided by specification section; all sections identified in the project specifications shall have a tab. When no information is being provided concerning a particular specification section, insert a single dated sheet that explains the circumstances.
   4. Loose-leaf or piecemeal submittals are not acceptable and subject to rejection unless prior approval has been granted by the Engineer.

C. Content:
   1. The Contractor shall prepare or cause to be prepared shop drawings, product data, materials and equipment lists, diagrams, data, samples, and other submittals as required by the contract documents, hereinafter referred to as "Submittal Data." The Contractor shall review and approve all submittal data for compliance with the contract documents, manufacturer's recommendations, adequacy, clearances, code compliance, safety, and coordination with associated work.
   2. The Contractor shall submit approved submittal data to the Owner's Representative for review and comment as to general conformance with the design concept and general compliance with information given in the contract documents. Owner's Representative's review shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with other trades or work, or construction safety and precautions, all of which are the sole responsibility of the Contractor.
   3. The Contractor shall clearly and specifically identify and call to the attention of the Owner's Representative any deviation from the contract documents for which Owner acceptance is desired. The responsibility for such a deviation accepted by the Owner shall remain with the Contractor.
   4. Timeliness: The burden of timeliness in the complete cycle of submittal data is on the Contractor. The Contractor shall allow a minimum of two (2) weeks' time frame for review of each submission by the Owner's Representative. The Contractor is responsible for allowing sufficient time in the construction schedule to cover the aforementioned cycles of data processing, including time for all re-submission cycles on nonconforming materials, equipment, etc. covered by the data submitted. Construction delays and/or lack of timeliness in the above regard are the responsibility of the

Contractor and will not justify any request for scheduled construction time extensions or extra compensation.

5. Work performed in accordance with approved submittal date that is not in accordance with the Contract Documents and did not have the specific acceptance of the Owner's Representative shall be replaced at Contractor's cost.

D. Re-submittals
   1. Re-submit entire submittal in accordance with afore mentioned format and content requirements. Loose-leaf or piecemeal re-submittals are not acceptable. New and/or revised data for each section shall be prefaced with a colored (yellow, pink, orange, etc) cover sheet that identifies (in a word or two) the materials and/or equipment being re-submitted. Typeset the words "REVISED SUBMITTAL NO. 1 (or 2, 3 as applicable)" centered at the bottom of the cover sheet.
   2. Subsequent re-submittals (second and third, if necessary) shall have different colored cover sheets to distinguish between the various re-submittals.
   3. Include a cover letter at front of binder that specifically responds to each "REVISE AND RE-SUBMIT COMMENT" or "REJECTED" comment by number. Example responses would include the following:
      a. RESPONSE: "Please see attached re-submittal."
      b. RESPONSE: "Will be re-submitted at a later date."
      c. RESPONSE: "Requirement for (xxxxxx) was deleted in Addendum No. 2."
      d. RESPONSE: "Exception requested based on Section xx, Paragraph x.x.x.

E. These paragraphs related to Plumbing submittal data supersede any conflicting requirements contained in Division 01 sections.

1.13 CONTRACTOR CERTIFICATION OF SUBMITTAL DATA

A. The Contractor shall provide the following certification with all submittal data furnished to the Owner's Representative for review and comment.

Project Title:

Description of Submittal Data:

This is to certify that the above-described submittal data has been reviewed and is approved for compliance with the Contract Documents, manufacturer's recommendation, adequacy, clearances, code compliance, safety, and coordination with other trades and/or work except as follows: (list "none" or itemize and explain). In addition, the Contractor shall submit to the Owner's Representative a signed statement from each representative certifying as follows:

"I certify that the materials and/or equipment listed below have been personally inspected by the undersigned authorized manufacturer's representative and is properly installed and operating in accordance with the manufacturer's recommendations and are asbestos free."

_____

Name and Company

1.14 ACCEPTANCE OF MATERIALS AND EQUIPMENT

A. All equipment installed on this project shall have local (within 125 miles) representation, local factory-authorized service, and a local stock of repair parts. This requirement is essential and will be strictly reviewed by the Owner's Representative prior to concurrence with the Contractor's approval for all submittals covered by Plumbing Division of this Specification.

B. NOTICE: The Contractor is responsible for providing materials and equipment that conform to the requirements of the project manual in every respect unless a deviation has been "accepted" in writing. Removal of any nonconforming materials and equipment and the replacement with conforming materials

and equipment shall be at the Contractor's sole expense, regardless of when nonconformance was discovered.

C. Approval of materials and equipment shall be based on manufacturer's published data and shall be tentatively subject to the submission of complete shop drawings which comply with the contract documents. Approval is also dependent upon the existence of adequate and acceptable clearances for entry, servicing, and maintenance.

D. Approval of materials and equipment under this provision shall not be construed as authorizing any deviations from the specifications, unless the attention of the Owner's Representative has been directed in writing to the specific deviations. Data submitted shall not contain unrelated information unless all pertinent information is properly identified.

E. Physical Size of Equipment: Space is critical; therefore, equipment of larger sizes than shown, even though of approved manufacturer, will not be acceptable unless it can be demonstrated that ample space exists for proper installation, operation, and maintenance.

1.15 SITE OBSERVATION

A. Site observation by the Architect, Engineer, and/or Owner's Representative is for the express purpose of verifying compliance by the Contractor with the contract documents, and shall not be construed as construction supervision nor indication of approval of the manner or location in which the work is being performed as being a safe practice or place.

1.16 SUPERVISION

A. In addition to the Superintendent required under the conditions of the contract, each subcontractor shall keep a competent superintendent or foreman on the job at all times.

B. It shall be the responsibility of each superintendent to study all plans and familiarize himself with the work to be done by other trades. He shall coordinate his work with other trades and, before material is fabricated or installed, make sure that his work will not cause an interference with another trade. Where interferences are encountered, they shall be resolved at the jobsite by the superintendents involved. Where interferences cannot be resolved without major changes to the plans, the matter shall be referred to the Owner's Representative for comments.

1.17 OPERATION PRIOR TO COMPLETION

A. When any piece of equipment is operable and it is to the advantage of the Contractor to operate the equipment, he may do so, providing that he properly supervises the operation and has the written permission of the Owner's Representative to do so. The warranty period shall not commence, however, until such time as the equipment is operated for the beneficial use of the Owner or date of substantial completion, whichever occurs first.

B. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, install clean filter media, properly adjust, and complete all deficiency list items before final acceptance by the Owner. The date of acceptance and the start of the warranty may not be the same date.

1.18 MANUFACTURER'S RECOMMENDATIONS

A. The manufacturer's published directions shall be followed in the delivery, storage, protection, installation, piping, and wiring of all equipment and material. The Contractor shall promptly notify the Owner's Representative, in writing, of any conflict between the requirements of the contract documents and the manufacturer's directions and shall obtain the Owner's Representative's comments before proceeding with the work. Should the Contractor perform any such work that does not comply with the

manufacturer's directions or applicable comments from the Owner's Representative, he shall bear all costs arising in connection with the correction of such deficiencies.

1.19 CHECKING AND TESTING MATERIALS AND/OR EQUIPMENT

A. Before final acceptance of the work, an authorized representative of the manufacturer of the installed materials and/or equipment shall personally inspect the installation and operation of his materials and/or equipment to determine that it is properly installed and in proper operating order. Testing and checking shall be accomplished during the course of the work where required by work being concealed, and at the completion of the work otherwise. In addition, the Contractor shall submit to the Owner's Representative a signed statement from each representative certifying as follows:

> *"I certify that the materials and/or equipment listed below have been personally inspected by the undersigned authorized manufacturer's representative and is properly installed and operating in accordance with the manufacturer's recommendations and are asbestos free."*

B. Check inspections shall include plumbing, heating, air conditioning, ventilating, mechanical control and electrical equipment, and such other items hereinafter specified or specifically designated by the Owner's Representative.

1.20 OPERATING AND MAINTENANCE INSTRUCTION

A. The Contractor shall prepare for the owner's manual hereinafter specified complete sets of operating and maintenance instructions, system piping, valving, control and interlock diagrams, manuals, parts lists, etc. for each item of equipment. These are to be assembled as hereinafter specified for owner's manual.

B. In addition, the Contractor shall provide the service of a competent engineer or a technician acceptable to the Owner's Representative to instruct a representative of the Owner in the complete and detailed operation of all equipment and systems. These instructions shall be provided for a period of sufficient duration to fully accomplish the desired results. Upon completion of these instructions, a letter of release will be required, acknowledged by the Owner, stating the dates of instruction and personnel to whom instructions were given.

C. Additional diagrams, operating instructions, etc. shall be provided as specified hereinafter in the other sections of these specifications.

1.21 MATERIAL AND EQUIPMENT SCHEDULES

A. Contractor shall refer to both drawings and specification for schedules. Where reference is made to items "scheduled on drawings" or "scheduled in specifications," same shall include schedules contained in both the drawings and the specifications. The Contractor's attention is directed to the various specification sections and drawings for schedules.

1.22 APPLICABLE CODES AND STANDARDS

A. The installation shall meet the minimum standards prescribed in the latest editions of the following listed codes and standards, which are made a part of these specifications, except as may be hereinafter specifically modified in these specifications and associated drawings.

1. National Fire Protection Association Standards (NFPA):
   NFPA 10 - Portable Fire Extinguishers
   NFPA 54 - National Fuel and Gas Code
   NFPA 70 - National Electrical Code
   NFPA 90A - Air Conditioning Systems
   NFPA 101 - Life Safety Code
   NFPA 255 - Method of Test of Surface Burning Characteristics of Building Materials
   Local and State Health Code (TDSH)
2. American National Standards Institute (ANSI):

15-78 - Safety Code for Mechanical Refrigeration
C.2 - 1984 National Electrical Safety Code
A117.1 - Handicapped Code

3. American Society of Mechanical Engineers (ASME): Section IV, V, CSD-1
4. Air Conditioning and Refrigeration Institute Standards (ARI): All standards related to refrigeration and air conditioning equipment and piping furnished under these specifications.
5. American Water Works Association (AWWA): All applicable manuals and standards.
6. Sheet Metal and Air Conditioning Contractors National Associate, Inc, (SMACNA): All applicable manuals and standards.
7. Air Moving and Conditioning Association (AMCA): All applicable manuals and standards.
8. American Society of Testing Materials (ASTM): All applicable manuals and standards.
9. National Electrical Manufacturers' Association (NEMA): All applicable manuals and standards.
10. Occupational Safety and Health ACT (OSHA):
    National Sanitation Foundation - Standard No. 2
11. American Society of Heating, Refrigeration, and Air conditioning Engineers (ASHRAE):
    90-80 Energy Conservation in New Building Design
    2001 ASHRAE Handbook of Fundamentals
12. Americans with Disabilities Act, 1990
13. American Gas Association (AGA)
14. Underwriters Laboratories, Inc. (UL)
15. Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS)
16. Applicable State Building Codes (International Building Codes, as amended):
17. Applicable State Mechanical Code (International Mechanical Code, as amended).
18. Applicable State Plumbing Code (International Plumbing Code, as amended).
19. Applicable State Energy Code (International Energy Conservation Code, as amended).

B. All materials and workmanship shall comply with all applicable city, state, and national codes, specifications, and industry standards. All materials shall be listed by the Underwriters Laboratories, Inc. as conforming to its standards and so labeled in every case where such a standard has been established for the particular type of material in question.

C. The contract documents are intended to comply with the aforementioned rules and regulations; however, some discrepancies may occur. Where such discrepancies occur, the Contractor shall immediately notify the Owner's Representative in writing of said discrepancies and apply for an interpretation. Should the discovery and notification occur after the execution of a contract, any additional work required for compliance with said regulations shall be paid for as covered by Division 1 of these contract documents, providing no work or fabrication of materials has been accomplished in a manner of noncompliance. Should the Contractor fabricate and/or install materials and/or workmanship in such a manner that does not comply with the applicable codes, rules, and regulations, the Contractor who performed such work shall bear all costs arising in correcting these deficiencies to comply with said rules and regulations.

1.23 DEFINITIONS

A. Refer to the condition of the contract for Division 1 for additional requirements regarding definitions.

B. Where "as required" or "as necessary" is used in these specifications or on the drawings, it shall mean "that situations exist that are not necessarily described in detail or indicated that may cause the Contractor certain complications in performing the work described or indicated. These complications entail the normal coordination activities expected of the Contractor where multiple trades are involved and new or existing construction causes deviations to otherwise simplistic approaches to the work to be performed. The term shall not be interpreted to permit an option on the part of the Contractor to achieve the end result."

C. Where "and/or" is used in these specifications or on the drawings, it shall mean "that situations exist where either one or both conditions occur or are required and shall not be interpreted to permit an option on the part of the Contractor.

1.24 FINAL INSPECTION

A. Refer to Division 1 for additional requirements for final inspection.

B. It shall be the responsibility of the Contractor to personally conduct a careful inspection, assuring himself that the work on the project is ready for final acceptance and developing his own “punchlists,” before calling upon the Owner’s Representative to make a final inspection. Failure of the Contractor to conduct such inspections and provide the Owner’s Representative with a copy of his “punchlists” prior to the final inspection shall be adequate cause for the Owner’s Representative to cancel any Contractor-requested final inspection.

C. In order not to delay final acceptance of the work, the Contractor shall conduct his own “final inspections” prior to requesting the Owner’s Representative to “final” the project; will have all necessary bonds, guarantees, receipts, affidavits, etc. called for in the various articles of this specification prepared and signed in advance; and together with a letter of transmittal listing each paper included, shall deliver the same to the Owner’s Representative at or before the time of said final inspection. The Contractor is cautioned to check over each bond, receipt, etc. before preparing same for submission to see that the terms check with the requirements of the specifications.

D. The final inspection will be made jointly by the Owner’s Representative and the Owner.

1.25 REQUIREMENTS FOR FINAL ACCEPTANCE

A. Requirements for final acceptance shall include but not be limited to the Contractor accomplishing the following:
   1. Construction: Complete all construction.
   2. Deficiency Lists: Correct all deficiencies listed at time of Substantial Completion.
      a. Owner’s Manual: Submit at least 30 days prior to final acceptance on (1) copy of the owner’s manual for the Owner’s Representative’s review and comments. Following acceptance, prepare three (3) copies of bound and indexed owner’s manual, to be delivered System operating instructions.
      b. System control drawings.
      c. System interlock drawings.
      d. System maintenance instructions.
      e. Manufacturers’, suppliers’, and subcontractors’ names, addresses, and telephone numbers, both local representatives and manufacturers’ service headquarters.
      f. Equipment operating and maintenance instructions and parts lists.
      g. Manufacturer’s’ certifications (see Checking and Testing Materials and/or Equipment, this section).
      h. Contractor’s warranty.
      i. Acceptance certificates of authorities having jurisdiction.
      j. Log of all tests made during course of work.
      k. Owner’s acknowledgment of receipt of instruction, enumerating items in owner’s manual.
      l. List of manufacturers’ guarantees executed by the Contractor.
      m. Certified performance curves.
      n. Balance and performance test reports.
      o. Owner’s acknowledgment of items of equipment or accessories indicated or specified to be turned over to Owner.
      p. Verbal, as herein specified.
      q. Posted, framed under glass or plastic laminated:
   3. At the time of final acceptance, which shall include but not be limited to the following:
   4. Instructions:
      a. System operating instructions.
      b. System control drawings.
      c. System interlock drawings.
   5. Record Drawings: Deliver the specified record drawings to the Owner’s Representative.

1.26 RECORD DRAWINGS

A. The Contractor shall maintain a set of contract drawings (black-line prints) at the jobsite on which he shall indicate the installed (as-built) locations of the following:
   1. Equipment
   2. Main lines of piping and ductwork.
   3. Dimensional locations (including depth) of all underground piping, valves and conduits.

B. Drawings shall be used for construction reference and shall not leave the field office of the jobsite.

C. Drawings shall include all addenda, ASI's, Change Orders, and existing conditions and equipment that are not reflected in the original contract drawings.

D. Upon completion of work, the Contractor shall obtain CAD files of the contract drawings from the Owner's Representative and transfer the above as-built information into these files. The as-built files shall be permanently marked "RECORD DRAWINGS" and printed on full-size Mylar sheets. Upon completion, the CAD files shall be transferred to CD in AutoCAD 2007 format. Both the CAD files CD and Mylar drawings shall be submitted to the Owner's Representative as part of the Close-out Submittals.

E. Refer to Division 1 paragraph entitled "Record Documents" for additional requirements.

1.27 ALLOWANCES

A. Refer to Division 1 for allowances.

1.28 ALTERNATE PROPOSALS

A. Alternate proposals are summarized in Division 1 and on the bid proposal form. Refer to all sections of the specifications and the drawings to determine the exact extent and scope of the various alternate proposals as each pertains to the work of the various trades.

1.29 WARRANTY

A. General: All work performed (including equipment and materials furnished) under the various sections of these specifications shall be 100% warranted, for a period of one (1) year from the date of final acceptance thereof, against defective materials, design, and unauthorized substitution. Upon receipt of note of failure of any part of the guaranteed equipment and/or facilities during the guaranty period, the affected part(s) or facilities shall be replaced promptly with new parts, etc. by and at the expense of the Contractor. Further, the Contractor shall properly obtain, execute, and forward any and all manufacturer's warranties on equipment furnished under the Contract. Refer to Division 1 for additional requirements.

B. Extended Period: The Contractor shall provide all extended time warranties available from the manufacturer of the equipment provided as standard at no additional cost. This includes all extended warranties where specified with certain equipment as directed in other sections of this Specification.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. All materials, unless otherwise specified, shall be 51% manufactured in the United States, new, free from all defects, and of the best quality. Foreign goods specifically approved for use by the Owner's Representative prior to bidding may be furnished.

B. Materials and equipment shall be installed in accordance with the manufacturer's recommendations and the best standard practice for the type of work involved. All work shall be executed by mechanics skilled in their respective trades, and the installations shall present a neat, precise appearance.

C. The responsibility for the furnishing and installation of the proper plumbing equipment and/or material as intended rests entirely upon the Contractor. The Contractor shall request advice and supervisory assistance from the representative of specific manufacturers during the installation.

2.2 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS

A. Duct coverings, duct linings, vapor barrier facings, tapes, adhesives, core materials, insulation, jackets, piping (of any sort), and other materials in concealed locations, including any above-ceiling area, shall have a flame spread rating not over 25 without evidence of continued progressive combustion and a smoke developed rating no higher than 50. Flame spread and smoke developed ratings shall be in accordance with NFPA Standard No. 255.

2.3 BEARINGS

A. All ball bearings shall be of radial and/or thrust type and enclosed in a dust and moisture-proof housing.

2.4 MOTORS

A. The Contractor shall provide all motors required for equipment supplied under each portion of the work. Motors shall be built in accordance with the latest ANSI, IEE, and NEMA standards, shall be fully coordinated with the equipment served, shall be of sizes and electrical characteristics scheduled.

2.5 STARTING EQUIPMENT

A. Each motor shall be provided with proper starting equipment. This equipment, unless hereinafter specified or scheduled to the contrary, shall be provided by the trade furnishing the motor. All motor starting equipment provided by any one trade shall be of the same manufacture unless such starting equipment is an integral part of the equipment on which the motor is mounted.

2.6 FIRE AND SMOKE PARTITION, WALL, AND/OR FLOOR PENETRATIONS

A. Pipe, ductwork, conduit, etc. shall pass through fire- or smoke-rated floors, partitions, walls, or other barriers within a UL-listed assembly which shall maintain the rating of the applicable wall, floor, partition, or barrier.

B. The Contractor shall review the architectural and structural drawings and determine the location of the fire-rated building elements. Where these elements are penetrated, UL-listed fire-rated penetration assemblies approved by the local authority shall be provided in accordance with the manufacturer's instructions to obtain the required rating.

2.7 FOUNDATIONS / HOUSEKEEPING PADS

A. General: All special foundations and supports required for the proper installation of equipment and pipe shall be provided as hereinafter specified and under the section of the specifications covering the equipment, unless otherwise indicated on the drawings.

B. All equipment shall receive concrete housekeeping pads unless otherwise noted. Equipment to be receive pads are to include (but not limited to): boilers, water heaters, water softeners, expansion / compression tanks, filter feeders, water treatment equipment, air compressors, pumps (in addition to inertia bases where required), surge tanks, deareators, etc.

C. Concrete foundations for the support of equipment such as floor-mounted pumps, equipment, etc. shall be not less than 3 inches high and not less than 4 inches larger (in both directions) than supported unit, unless otherwise noted and shall be poured in forms built of new dressed lumber. All corners of the foundations shall be neatly chaffered by means of sheet metal or triangular wood strips nailed to the form. Pads shall not be laid out directly against walls or structures. 2 inches shall be left available for pad form

work. Foundation bolts shall be placed in the forms when the concrete is poured, the bolts being correctly located by means of templates. Allow 1 inch below the equipment bases for alignment and grouting (where applicable). Foundations for equipment located on the exterior of the building shall be provided as indicated. Foundations shall be constructed in accordance with approved shop drawings and shall be reinforced with #4 bars at 12 inches on center both ways (minimum).

D. Pipe and Conduit Support: All pipes and conduits throughout the building, both horizontal and vertical, shall be adequately supported from the construction to line of grade, with proper provision for expansion, contraction, vibration elimination, and anchorage. Vertical pipes and conduits shall be supported from floor lines with riser clamps sized to fit the lines and to adequately support their weight. At the bases of lines, where required for proper support, provide anchor base fittings or other approved supports.

PART 3 - EXECUTION

3.1 SPACE AND EQUIPMENT ARRANGEMENT

A. The size of equipment indicated on the drawings is based on the dimensions of a particular manufacturer. While other manufacturers will be acceptable, it is the responsibility of the Contractor to determine whether the equipment he proposes to furnish will fit in the space. Shop drawings shall be prepared when required by the Owner's Representative to indicate a suitable arrangement.

B. All equipment shall be installed in a manner to permit access to all surfaces. All valves, motors, drives, filters, and other accessory items shall be installed in a position to allow removal for service without disassembly of another part.

3.2 LARGE APPARATUS

A. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through stairways, doorways, or shafts shall be brought to the job and placed in the space before the enclosing structure is completed. Following placement in the space, such apparatus shall be thoroughly, completely protected from damage as hereinafter specified.

3.3 PROTECTION

A. The Contractor shall take such precautions as may be necessary to properly protect all materials and equipment from damage from the time of delivery until the completion of work. This shall include the erection of all required temporary shelters and supports to adequately protect any items stored in the open on the site from the weather, the ground and surrounding work; the cribbing of any items above the floor of the construction; and the covering of items in the uncompleted building with tarpaulins or other protective covering. Failure on the part of the Contractor to comply with the above will be sufficient cause for the rejection of the items in question.

B. The Contractor shall protect existing facilities, the work of others, and the premises from any and all damages that may be made possible by the execution of work.

C. Equipment and materials shall be protected from rust both before and after installation. Any equipment or materials found in a rusty condition at the time of final inspection must be cleaned of rust and repainted as specified elsewhere in these specifications.

3.4 COOPERATION BETWEEN TRADES AND WITH OTHER CONTRACTORS

A. Each trade, subcontractor, and/or Contractor must work in harmony with the various trades, subcontractors, and/or Contractors on the job as may be required to facilitate the progress to the best advantage of the job as a whole. Each trade, subcontractor, and/or Contractor must pursue its work promptly and carefully so as not to delay the general progress of the job. This Contractor shall work in harmony with Contractors working under other contracts on the premises.

B. It shall be the responsibility of each trade to cooperate fully with the other trades on the job to help keep the jobsite in a clean and safe condition. At the end of each day's work, each trade shall properly store all of its tools, equipment, and materials and shall clean its debris from the job. Upon the completion of the job, each trade shall immediately remove all of its tools, equipment, any surplus materials, and all debris caused by its portion of the work.

3.5 PRECEDENCE OF MATERIALS AND COORINATION OF WORK

A. These specifications and the accompanying drawings are intended to cover systems which will not interfere with the structural design of the building, which will fit into the several available spaces, and which will ensure complete and satisfactory systems. Each subcontractor and/or trade shall be responsible for the proper fitting of his material and apparatus into the building.

B. The work of the various trades shall be performed in the most direct and workmanlike manner without hindering or handicapping the work of other trades. Piping interferences shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. Where space requirements conflict, the following order or precedence shall, in general, be observed:
   1. Building lines.
   2. Structural members.
   3. Light fixtures.
   4. Soil and drain piping.
   5. Condensate drains.
   6. Vent piping.
   7. Supply, return, and outside air ductwork.
   8. Exhaust ductwork.
   9. HVAC water and steam piping.
   10. Steam condensate piping.
   11. Fire protection piping.
   12. Natural gas piping.
   13. Domestic water (cold and hot).
   14. Refrigerant piping.
   15. Electrical conduit.

C. Coordinate all major elements, components, and systems of plumbing equipment and materials in relationship with other systems, installations, and building components. Coordinate space requirements for installation and access. Verify the following:
   1. Clearance for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
   2. Equipment and accessory service connections and support details.
   3. Fire-rated wall and floor penetrations.
   4. Scheduling, sequencing, movement and positioning of large equipment into building during construction.
   5. Access panel and door locations.
   6. Clearances between building openings and VTR's/Flues.

D. The light fixture grid layout as indicated on the drawings must be maintained. This Contractor shall refer to all light fixture plans and details indicated on the drawings and shall coordinate the location of dampers, supply grilles, return air grilles, sprinkler heads, etc. with the location of the light fixtures to assure proper access to all items in a manner acceptable to the Owner's Representative.

E. The electrical trades shall locate all junction boxes, pull boxes, conduits, etc. to avoid interference with the diffusers, dampers, grilles, etc. hereinbefore mentioned. The mechanical trades shall furnish to all other trades copies of approved ductwork shop drawings to assist in the coordination of the rough-in and installation of all items of work.

3.6 CONNECTIONS FOR OTHERS

A. This Contractor shall rough-in for and make all water, sewer, electrical, etc. connections to all fixtures, equipment, machinery, etc. provided by others in accordance with detailed roughing-in drawings provided by the equipment suppliers, by actual measurements of the equipment connections, or as detailed.

B. After the equipment is set in place, this Contractor shall make all final connections and shall provide all required pipe, fittings, valves, traps, connectors, etc.

C. Provide all air gap fittings required, using materials hereinbefore specified. In each water line serving an item of equipment or piece of machinery, provide a shutoff valve. On each drain without integral trap provide a suitable trap.

D. All pipe fittings, valves, traps, etc. exposed in finished areas and connected to chrome-plated lines provided by others shall be chrome-plated to match.

E. Provide all transition pieces, etc. required for a complete installation of equipment provided by others.

3.7 INSTALLATION METHODS

A. Where to Conceal: All pipes and conduits shall be concealed in pipe chases, walls, furred spaces, below suspended floors, or above the ceilings of the building unless otherwise indicated.

B. Where to Expose: In mechanical rooms, janitor's' closets tight against pan soffits in exposed Tee structures, or storage spaces, but only where necessary, piping and conduit may be run exposed. All exposed piping and conduit shall be run in the neatest, most inconspicuous manner, and parallel or perpendicular to the building lines.

C. Support: All piping and conduit shall be adequately and properly supported from the building structure by means of hanger rods or clamps to walls as herein specified.

D. Maintaining Clearance: Where limited space is available above the ceilings and below concrete beams or other deep projections, pipe and conduit shall be sleeved through the projection where it crosses, rather than hung below them, in a manner to provide maximum above-floor clearance. Sleeves shall be as herein specified. Approval shall be obtained from the Owner's Representative for each penetration.

E. All pipe, conduits, etc. shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. All ducts, pipes, and conduits run exposed in machinery and equipment rooms shall be installed parallel to the building lines, except that they shall be sloped to obtain the proper pitch. Piping and ducts run in furred ceilings, etc. shall be similarly installed, except as otherwise shown. Conduits in furred ceilings and in other concealed spaces may be run at angles to the construction but shall be neatly grouped and racked indicating good workmanship. All conduit and pipe openings shall be kept closed until the systems are closed with final connections.

F. Special Requirements:
   1. There shall be no pipe joints nearer than 12 inches to a wall, ceiling, or floor penetration unless pipe joint is a welded or mechanically-coupled-type joint.
   2. The Contractor shall study all construction documents and carefully lay out all work in advance of fabrication and erection in order to meet the requirements of the extremely limited spaces. Where conflicts occur, the Contractor shall meet with all involved trades and the Owner's Representative and resolve the conflict prior to erection of any work in the area involved.
   3. Prior to the installation of any ceiling material, gypsum, plaster, or acoustical board, the Contractor shall notify the Owner's Representative so that arrangements can be made for an inspection of the above-ceiling area about to be "sealed off." The Contractor shall give as much advance notice as possible up to ten (10) working days, but in no case less than five (5) working days.
   4. The purpose of this inspection is to verify the completeness and quality of the installation of the air conditioning systems, the plumbing systems, and any other special above-ceiling systems such as pneumatic tube. The ceiling supports (tee bar or lath) should be in place so that access panel and light fixture locations are identifiable and so that clearances and access provisions may be evaluated.

5. No ceiling material shall be installed until the deficiencies listed from this inspection have been corrected to the satisfaction of the Owner's Representative.

3.8 CUTTING AND PATCHING

A. General: Cut and patch walls, floors, etc. resulting from work in existing construction or where made necessary by failure to provide proper openings or recesses in new construction.

B. Methods of Cutting: Openings cut through concrete and masonry shall be made with masonry saws and/or core drills and at such locations acceptable to the Owner's Representative. Impact-type equipment will not be used except where specifically acceptable to the Owner's Representative. Openings in concrete for pipes, conduits, outlet boxes, etc. shall be core drilled to exact size. Determine location of embedded conduit and reinforcing bars prior to cutting.

C. Restoration: All openings shall be restored to "as-new" condition under the appropriate specification section for the materials involved, and shall match remaining surrounding materials and/or finishes.

D. Masonry: Where openings are cut through masonry walls, provide and install lintels or other structural supports to protect the remaining masonry. Adequate supports shall be provided during the cutting operation to prevent any damage to the masonry occasioned by the operation. All structural members, supports, etc. shall be of the proper size and shape, and shall be installed in a manner acceptable to the Owner's Representative.

E. Plaster: All plumbing work in area containing plaster shall be completed prior to the application of the finish plaster coat. Cutting of finish plaster coat will not be permitted.

F. Weakening: No cutting, boring, or excavating which will weaken the structure shall be undertaken.

3.9 ROOF PENETRATIONS AND FLASHING

A. Pipe and conduit ducts, pitch pockets, curb bases, and flashing compatible with the roofing installation shall be provided for roof penetrations. Provide framing or other support around all openings through roof as required to preserve the structural integrity of the roof system and make the penetration weathertight.

3.10 EXCAVATING AND BACKFILLING

A. Perform trenching, excavating, backfilling for plumbing work as set forth below.

B. Depth of excavation varies with invert of pipe. Excavation to be carried to a depth of at least 6 inches below bottom of pipe elevation. Fill below pipe (6 inches), around pipe, and a minimum of 12 inches above pipe with crushed stone tamped firm and even. Separate topsoil during excavation. Final layer of dirt for exterior installations to be (6 inches minimum) to be topsoil. Backfilling shall be done to exclude use of rock or stone above crushed stone.

3.11 TESTS AND INSPECTIONS

A. General: The Contractor shall make all tests deemed necessary by the inspection departments of the engineer and the authority having jurisdiction, Board of Underwriters, etc. He shall provide all equipment, materials, and labor for making such tests. Fuel and electrical energy for system operational tests following beneficial occupancy by the Owner will be paid for by the Owner.

B. Other: Additional tests specified hereinafter under the various specification sections shall be made.

C. Notification: The Owner's Representative shall be notified at his office 36 hours prior to each test and other specifications requirements requiring action on the part of the Owner, Architect, Engineer, and/or Owner's Representative.

D. Test Logs: All tests which the Contractor conducts shall have pertinent data logged by the Contractor at the time of testing. Data shall include date, time, personnel, description and extent of system tested, test conditions, test results, specified results, and any other pertinent data. Data shall be delivered to the Owner's Representative as specified under "Requirements for Final Acceptance.

E. Inspections: In general, an inspection by the Owner's Representative shall be required prior to closing up any work and prior to beneficial occupancy or final project completion. The closing up of work includes, but is not limited to, pipe and conduit installations prior to backfilling; mechanical, plumbing electrical, and fire protection work prior to placement of concrete; or closing up walls and overhead mechanical, plumbing, electrical and fire protection work prior to installation of the ceiling.

3.12 CLEANING AND PAINTING

A. Thoroughly clean and touch up the finish on all parts of the materials and equipment. Exposed parts in equipment rooms, and all other spaces except sealed chases and attics shall be thoroughly cleaned of cement, plaster, and other materials, and all oil and grease spots shall be removed. Such surfaces shall be carefully wiped and all cracks and corners scraped out.

B. All other painting shall be accomplished under the Painting Section of Division 9 of the specifications.

3.13 DISCHARGE OF WASTES FROM CONSTRUCTION SITE

A. The Contractor shall comply with all applicable provisions of local, state, and federal laws regarding the discharge of wastes into sewer and waterways. Special caution shall be exercised to prevent the discharge of wastes which contain oil, tar, asphalt, roofing compound, kerosene, gasoline, paint, mud, cement, lime, or other materials which would degrade the water quality of the receiving water course. The Contractor shall construct and maintain oil interceptors, settling basins, acid neutralization tanks, and/or other effective pollution countermeasures, as required by the Texas Water Quality Board.

B. On LEED and CHPS projects, contractor is responsible for tracking waste leaving the jobsite. All waste on these projects to be sorted and processed during construction.

END OF SECTION 220100

SECTION 220500

BASIC PLUMBING MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following basic plumbing materials and methods to complement other Plumbing Sections.
   1. Piping materials and installation instructions common to most piping systems.
   2. Concrete base construction requirements.
   3. Escutcheons.
   4. Dielectric fittings.
   5. Dielectric isolation tape
   6. Flexible connectors.
   7. Mechanical sleeve seals.
   8. Nonshrink grout for equipment installations.
   9. Field-fabricated metal and wood equipment supports.
   10. Installation requirements common to equipment specification sections.
   11. Mechanical demolition.
   12. Cutting and patching.
   13. Touchup painting and finishing.
   14. Access Doors

B. Pipe and pipe fitting materials are specified in Plumbing piping system Sections, if applicable.

1.2 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
   1. ABS: Acrylonitrile-butadiene-styrene plastic.
   2. CPVC: Chlorinated polyvinyl chloride plastic.
   3. NP: Nylon plastic.
   4. PE: Polyethylene plastic.
   5. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
   1. CR: Chlorosulfonated polyethylene synthetic rubber.
   2. EPDM: Ethylene propylene diene terpolymer rubber.

1.3 SUBMITTALS

A. Product Data: For dielectric fittings, flexible connectors, access doors, solder/brazing material and mechanical sleeve seals.

B. Shop Drawings: Detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

C. Coordination Drawings: Detail major elements, components, and systems of plumbing equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following:
   1. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
   2. Equipment and accessory service connections and support details.
   3. Fire-rated wall and floor penetrations.
   4. Scheduling, sequencing, movement, and positioning of large equipment into building during construction.
   5. Access panel and door locations

1.4 QUALITY ASSURANCE

A. All materials, unless otherwise specified, shall be 51% manufactured in the United States, new, free from all defects, and of the best quality. Foreign goods specifically approved for use by the Owner's Representative prior to bidding may be furnished.

B. Materials and equipment shall be installed in accordance with the manufacturer's recommendations and the best standard practice for the type of work involved. All work shall be executed by mechanics skilled in their respective trades, and the installations shall present a neat, precise appearance.

C. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

D. Equipment Selection: Equipment of higher electrical characteristics, physical dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. Additional costs shall be approved in advance by appropriate Contract Modification for these increases. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate plumbing equipment installation with other building components.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for plumbing installations.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of plumbing materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

E. Coordinate connection of plumbing systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate requirements for access panels and doors if plumbing items requiring access are concealed behind finished surfaces.

G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2- PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Dielectric Tape:
      a. Holdrite (#272-4).
   2. Metal, Flexible Connectors:
      a. Flexicraft Industries.
      b. Flex-Weld, Inc.
      c. Grinnell Corp.; Grinnell Supply Sales Co.
      d. Mercer Rubber Co.
      e. Metraflex Co.
      f. Uniflex, Inc.
   3. Rubber, Flexible Connectors:
      a. General Rubber Corp.
      b. Mercer Rubber Co.
      c. Metraflex Co.
      d. Red Valve Co., Inc.
      e. Uniflex, Inc.
   4. Mechanical Sleeve Seals:
      a. Calpico, Inc.
      b. Metraflex Co.
      c. Thunderline/Link-Seal.

2.2 PIPE AND PIPE FITTINGS

A. Refer to individual Specification piping Sections for pipe and fitting materials and joining methods, if applicable.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Specification piping Sections for special joining materials not listed below, if applicable.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.

1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, unless thickness or specific material is indicated.
   a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
   b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32.
1. ASTM B 32, 95/5 lead-free alloys. Include water –flushable and soluble flux according to ASTM B 813.

F. Brazing Filler Metals: AWS A5.8.
1. BCuP Series: Copper-phosphorus alloys.
2. BAg1: Silver alloy.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements: Manufacturer's standard solvent cements for the following:
1. CPVC Piping: ASTM F 493.
2. PVC Piping: ASTM D 2564, medium bodied (bond). Include purple primer according to ASTM F 656.

I. Plastic Pipe Seals: ASTM F 477, elastomeric gasket.

J. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon-steel bolts and nuts.

K. Couplings: Iron-body sleeve assembly, fabricated to match OD of plain-end, pressure pipes.
1. Sleeve: ASTM A 126, Class B, gray iron.
2. Followers: ASTM A 47 malleable iron or ASTM A 536 ductile iron.
3. Gaskets: Rubber.
4. Bolts and Nuts: AWWA C111.
5. Finish: Enamel paint.

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature, to prevent galvanic action and stop corrosion. Unions in first paragraph below are available in at least NPS 1/2 to NPS 2.

B. Dielectric Unions:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Capitol Manufacturing Company.
   b. Central Plastics Company.
   c. EPCO Sales, Inc.
   d. Hart Industries International, Inc.
   e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
   f. Zurn Plumbing Products Group; Wilkins Water Control Products.
2. Description:
   a. Pressure Rating: 250 psig at 180 deg F.
   b. End Connections: Solder-joint copper alloy and threaded ferrous.

c. Flanges in first paragraph below are available in at least NPS 1-1/2 to NPS 4.

C. Dielectric Flanges:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Capitol Manufacturing Company.
b. Central Plastics Company.
c. EPCO Sales, Inc.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
a. Factory-fabricated, bolted, companion-flange assembly.
b. Pressure Rating: 175 psig minimum.
c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Advance Products & Systems, Inc.
b. Calico, Inc.
c. Central Plastics Company.
d. Pipeline Seal and Insulator, Inc.
2. Description:
a. Nonconducting materials for field assembly of companion flanges.
b. Pressure Rating: 150 psig.
c. Gasket: Neoprene or phenolic.
d. Bolt Sleeves: Phenolic or polyethylene.
e. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Calpico, Inc.
b. Lochinvar Corporation.
2. Description:
a. Galvanized-steel coupling.
b. Pressure Rating: 300 psig at 225 deg F.
c. End Connections: Female threaded.
d. Lining: Inert and noncorrosive, thermoplastic.

F. Dielectric Nipples:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Perfection Corporation; a subsidiary of American Meter Company.
b. Precision Plumbing Products, Inc.
c. Victaulic Company.
2. Description:
a. Electroplated steel nipple complying with ASTM F 1545.
b. Pressure Rating: 300 psig at 225 deg F.
c. End Connections: Male threaded or grooved.
d. Lining: Inert and noncorrosive, propylene.

2.5 DIELECTRIC ISOLATION TAPE

A. Tape to eliminate dissimilar metal contact: (equal to Holdrite #272-4)
1. White Polyester Felt. Pressure sensitive adhesive rubber base (one side only).
2. 4” width.

2.6 FLEXIBLE CONNECTORS

A. General: Fabricated from materials suitable for system fluid and that will provide flexible pipe connections. Include 125-psig minimum working-pressure rating, unless higher working pressure is indicated, and ends according to the following:
   1. 2-Inch NPS and Smaller: Threaded.
   2. 2-1/2-Inch NPS and Larger: Flanged.
   3. Option for 2-1/2-Inch NPS and Larger: Grooved for use with keyed couplings.

B. Bronze-Hose, Flexible Connectors: Corrugated, bronze, inner tubing covered with bronze wire braid. Include copper-tube ends or bronze flanged ends, braze welded to hose.

C. Rubber, Flexible Connectors: CR or EPDM elastomer rubber construction, with multiple plies of NP fabric, molded and cured in hydraulic presses. Include 125-psig minimum working-pressure rating at 220 deg F. Units may be straight or elbow type, unless otherwise indicated.

2.7 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.
   1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe materials and size of pipe.
   2. Pressure Plates: Stainless steel.
   3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.8 PIPING SPECIALTIES

A. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:
   1. Steel Sheet Metal: 0.0239-inch minimum thickness, galvanized, round tube closed with welded longitudinal joint.
   2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.
   3. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
   4. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
      a. Underdeck Clamp: Clamping ring with set screws.
   5. Sleeve Fasteners: Manufactured, steel clips for securement during pour. Equal to B-line, BD40, BE-5-8 or BE-9-12.

B. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type if required to conceal protruding fittings and sleeves.
   1. ID: Closely fit around pipe, tube, and insulation of insulated piping.
   2. OD: Completely cover opening.
   3. Cast Brass: One piece, with set screw. (split face acceptable for existing piping)
      a. Finish: Polished chrome-plate.

2.9 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C 1107, Grade B.
   1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
   2. Design Mix: 5000-psig, 28-day compressive strength.
   3. Packaging: Premixed and factory packaged.

2.10 ACCESS DOORS

A. General: Provide access doors for all serviceable mechanical appurtenances (valves, trap primers, shock arresters, actuators, sensors, etcetera) in inaccessible locations. Such locations include gypsum, brick and CMU ceilings and walls.

B. Location of panels shall be carefully coordinated with other Exposed Devices as described in earlier paragraphs.

C. Manufacturers shall be Milcor, Mifab, or approved equal. Unless indicated otherwise, use panels equal to Milcor Style M for masonry and drywall construction, equal to Milcor Style K for plastered masonry walls and ceilings. Stainless steel panels shall be used in ceramic tile or glazed structural tile.

D. Minimum construction features include 16-gage frame and door, continuous hinges, cam-style latch and 10”x10" unobstructed opening size.

E. UL labeled when in fire-rated construction, one and one-half hour rating.

F. Access doors located outside, in restrooms or in a moisture-laden environment (dressing area, shower area, lockers, etcetera) shall be stainless steel construction.

G. Equipment access doors shall be of sufficient size to remove/replace equipment and provide routine maintenance as necessary, unless otherwise noted. Doors shall be set flush with adjacent finish surfaces. All access doors shall be provided with cylinder locks. All access doors (MEP) shall have one (1) common key.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS AND APPLICATIONS

A. General: Install piping as described below, unless piping Sections specify otherwise. Individual piping Sections specify unique piping installation requirements.

B. General Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.

C. All piping to be installed in compliance with current NEC required clearances.

D. Install manufactured isolation clamps at all dissimilar metal pipe supports. Install dielectric isolation tape (engineer approved) only when a manufactured isolation clamp is not available.

E. Install piping at indicated slope.

F. Install components with pressure rating equal to or greater than system operating pressure.

G. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

H. Install piping free of sags and bends.

I. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.

J. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

K. Install piping to allow application of insulation plus 1-inch clearance around insulation.

L. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

M. Install fittings for changes in direction and branch connections.

N. Install couplings according to manufacturer's written instructions.

O. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Division 07 Section "Penetration Firestopping" for firestop materials and installations.
   1. Fire-stop all sleeves at floor penetrations of multistory buildings including underfloor penetrations.

P. Verify final equipment locations for roughing-in.

Q. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

R. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping specification Sections:
   1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
   2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
   3. Soldered Joints: Construct joints according to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube"; or CDA's "Copper Tube Handbook."
   4. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
   5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
      a. Note internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
      b. Apply appropriate tape or thread compound to external pipe threads, unless dry seal threading is specified.
      c. Align threads at point of assembly.
      d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
      e. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
   6. Welded Joints: Construct joints according to AWS D10.12, "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe," using qualified processes and welding operators according to "Quality Assurance" Article.
   7. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.
   8. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following:
      a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
      b. CPVC Piping: ASTM D 2846 and ASTM F 493.
      c. PVC Pressure Piping: ASTM D 2672.
      d. PVC Nonpressure Piping: ASTM D 2855.
   9. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657 procedures and manufacturer's written instructions.
      a. Plain-End Pipe and Fittings: Use butt fusion.
      b. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.2 ESCUTCHEON REQUIREMENTS

A. Install escutcheons at pipe penetrations of walls, ceilings, and floors in finished areas.
   1. Escutcheons for New Piping:
      a. Piping exposed through floors and walls in finished areas: One piece, cast brass with polished chrome-plated finish with set screw. Deep escutcheons to be provided where standard depth will not fit.
      b. Escutcheons shall cover entire hole penetration.
      c. Escutcheon to be appropriately sized for pipe.
   2. Escutcheons for Existing piping:
      a. Piping exposed through floors and walls in finished areas: Split plate, cast brass with polished chrome-plated finish with set screw. Deep escutcheons to be provided where standard depth will not fit.
      b. Escutcheons shall cover entire hole penetration.
      c. Escutcheon to be appropriately sized for pipe.
   3. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.3 PIPE SLEEVE INSTALLATION REQUIREMENTS

A. Pipe sleeves are required at all through wall and floor penetrations.
   1. Sleeves are to be of the following material:
      a. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.
   2. Sleeves are required for all through floor and wall penetrations. Sleeves to be set and poured in place (in slab applications), secure all sleeves with fasteners.
   3. Sleeves to extend 2 inches past face of floor or wall. Pipe sleeve in finished areas to be flush with wall or floor for installation of escutcheon.
   4. Install sleeves in new partitions, slabs, and walls as they are built.
   5. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.
   6. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Division 07 Section "Joint Sealants" for joint sealants.
   7. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals specified in this Section.
   8. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated. Seal annular space with water tight sealant. (equal to NP-1). All sleeves and penetrations to maintain rating of wall / floor. Seal pipe penetrations with fire-stopping materials.
   9. Install sleeve materials according to the following applications:
      a. Sleeves for Piping Passing through Concrete Floor Slabs: galvanized steel pipe.
      b. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Galvanized-steel pipe sleeves.
         1) Extend sleeves 2 inches above finished floor level.
         2) For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Comply with requirements in Division 07 Section "Sheet Metal Flashing and Trim" for flashing.
   10. Sleeves for Piping Passing through Gypsum-Board Partitions:
      a. Galvanized-steel pipe sleeves.
      b. Exception: Sleeves are not required for water supply tubes and waste pipes for individual plumbing fixtures if escutcheons will cover openings.
   11. Sleeves for Piping Passing through Concrete Roof Slabs: Reference details.
   12. Sleeves for Piping Passing through Exterior Concrete Walls:

a. Galvanized-steel pipe sleeves.
b. Install sleeves that are large enough to provide 1-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.

13. Sleeves for Piping Passing through Interior Concrete Walls:
    a. Galvanized-steel pipe sleeves.
14. Mechanical sleeve seals
    a. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building. Sleeves must be poured in place. Installation of sleeves after wall is constructed is not acceptable.
    b. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

B. Piping Connections: Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.
2. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 DIELECTRIC FITTING INSTALLATION

A. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.

B. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.

3.5 EQUIPMENT INSTALLATION – COMMON REQUIREMENTS

A. Install equipment to provide maximum possible headroom, if mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

E. Install equipment giving right of way to piping installed at required slope.

3.6 PAINTING AND FINISHING

A. Apply paint to exposed piping according to the following, unless otherwise indicated:
1. Interior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
2. Interior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
3. Interior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.

4. Exterior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.
5. Exterior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
6. Exterior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.

B. Do not paint piping specialties with factory-applied finish.

C. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1, "Structural Welding Code--Steel."

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment (not to be used at pipe supports).

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.9 DEMOLITION

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.10 CUTTING AND PATCHING

A. Disconnect, demolish, and remove Work specified in Plumbing Sections.

B. If pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Work Abandoned in Place: Cut and remove underground pipe a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from Project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

3.11 GROUTING

A. Install nonmetallic, nonshrink, grout for plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's written instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placing of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases to provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout according to manufacturer's written instructions.

END OF SECTION 220500

SECTION 220519

METERS AND GAGES FOR PLUMBING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following meters and gages for plumbing systems:
   1. Thermometers.
   2. Gages.
   3. Test plugs
   4. Flow indicators.
   5. Temperature and Pressure Test Kit

B. Related Sections include the following:
   1. Specification Section "Domestic Water Piping" for domestic water appurtenances.

1.2 SUBMITTALS

A. Product Data: For each type of product to be installed.

B. Operation and Maintenance Data: For all products to be installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 METAL-CASE, LIQUID-IN-GLASS THERMOMETERS

A. Manufacturers:
   1. Palmer - Wahl Instruments Inc.
   2. Trerice, H. O. Co.
   3. Weiss Instruments, Inc.
   4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.

B. Case: Black-finished Aluminum, 9 inches long.

C. Tube: Red or blue reading, organic-liquid filled, with magnifying lens.

D. Tube Background: Satin-faced, nonreflective aluminum with permanently baked on scale markings on lens (U.V. protected).

E. Window: Glass.

F. Connector: Adjustable type, 180 degrees in vertical plane, 360 degrees in horizontal plane, with locking device.

G. Stem: Brass for thermowell installation and of length to suit installation.

H. Accuracy: Plus or minus 1 percent of range or plus or minus 1 scale division to maximum of 1.5 percent of range.

2.3 THERMOWELLS

A. Manufacturers:
   1. Palmer – Wahl Instruments Inc.
   2. Trerice, H. O. Co.
   3. Weiss Instruments, Inc.
   4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.

B. Manufacturers: Same as manufacturer of thermometer being used.

C. Description: Pressure-tight, socket-type metal fitting made for insertion into piping and of type, diameter, and length required to hold thermometer. Provide extended neck to accommodate insulation thickness.

2.4 PRESSURE GAGES

A. Manufacturers:
   1. Palmer – Wahl Instruments, Inc.
   2. Trerice, H. O. Co.
   3. Weiss Instruments, Inc.
   4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.

B. Direct Mounting, Dial-type Dry or Liquid Filled Pressure Gages: Indicating-dial type complying with ASME B40.100.
   1. Case: Dry or Liquid-filled type, stainless steel, 4-inch diameter. Weatherproof.
   2. Pressure-Element Assembly: Bourdon tube, unless otherwise indicated.
   3. Pressure Connection: Brass, NPS 1/4, bottom-outlet type unless back-outlet type is indicated.
   4. Movement: Mechanical, with link to pressure element and connection to pointer.
   5. Dial: Satin-faced, nonreflective aluminum with baked on scale markings.
   6. Pointer: Red or other dark-color metal.
   7. Window: Glass
   8. Ring: Stainless
   9. Accuracy: Grade B, plus or minus 2 percent of middle half scale.
   10. Vacuum-Pressure Range: 30-in. Hg of vacuum to 15 psig of pressure.
   11. Range of Fluids under Pressure: Two times operating pressure.

C. Pressure-Gage Fittings:
   1. Valves: NPS ¼ brass or stainless-steel needle type.
   2. Syphons: NPS ¼ coil of brass tubing with threaded ends.
   3. Snubbers: ASME B40.5,NPS ¼ brass bushing with corrosion-resistant, porous-metal disc of material suitable for system fluid and working pressure.

2.5 TEST PLUGS (PT PORTS)

A. Manufacturers:
   1. Palmer – Wahl Instruments, Inc.
   2. Trerice, H. O. Co.
   3. Weiss Instruments, Inc.
   4. Weksler Instruments Operating Unit; Dresser Industries; Instrument Div.

B. Description: Corrosion-resistant brass or stainless-steel body with core inserts and gasketed and threaded cap, with extended stem for units to be installed in insulated piping.

C. Minimum Pressure and Temperature Rating: 500 psig at 200 deg F

D. Core Inserts: One or two self-sealing rubber valves.
   1. Insert material for air, water, oil, or gas service at 20 to 200 deg F shall be CR.
   2. Insert material for air or water service at minus 30 to plus 275 deg F shall be EPDM.

2.6 FLOW INDICATORS

A. Manufacturers:
   1. Dwyer Instruments, Inc. (Series SFI-800 ONLY)

B. Description: Instrument for installation in piping systems for visual verification of flow. Rated for potable water applications.

C. Construction: Polysulfone body; with polysulfone sight glass and white polysulfone paddle-wheel indicator, and threaded ends.

D. Pressure Rating: 150 psig.

E. Temperature Rating: 212 deg F.

F. End Connections for NPS 3/4 and Smaller: Threaded.

2.7 TEMPERATURE AND PRESSURE TEST KIT

A. Test Kit: Furnish (1) test kit containing one pressure gage and adaptor, two (2) thermometers, and carrying case. Pressure gage, adapter probes, and thermometer sensing elements shall be of diameter to fit test plugs and of length to project into piping.
   1. Pressure Gage: Small bourdon-tube insertion type with 2- to 3-inch diameter dial and probe. Dial range shall be 0 to 200 psig.
   2. Low-Range Thermometer: Small bimetallic insertion type with 1- to 2-inch diameter dial and tapered-end sensing element. Dial ranges shall be 25 to 125 deg F.
   3. High-Range Thermometer: Small bimetallic insertion type with 1- to 2-inch diameter dial and tapered-end sensing element. Dial ranges shall be 0 to 220 deg F.
   4. Carrying case shall have formed instrument padding.

PART 3 - EXECUTION

3.1 THERMOMETER APPLICATIONS

A. Install liquid-in-glass thermometers in the following locations:
   1. Inlet and outlet of each storage tank.
   2. Outlet of all domestic water heaters or boilers.
   3. On hot water return line after circulation pump.
   4. At the following locations for mixing valves:
      a. HW (inlet to valve).
      b. HWR (inlet to valve).
      c. Tempered (outlet of valve).

B. Provide the following temperature ranges for thermometers:
   1. Domestic Hot Water: 30 to 180 deg F, with 2-degree scale divisions.
   2. Domestic Cold Water: 0 to 100 deg F, with 2-degree scale divisions.

3.2 PRESSURE GAGE APPLICATIONS

A. Install dry-case-type pressure gages for discharge of each pressure-reducing valve and inlet and outlet of all backflow preventers (Domestic water).

B. Dry type pressure gages to be used on domestic water systems (inlet and outlets of heaters mixing valves, booster pumps and water softeners).

3.3 FLOW INDICATOR APPLICATION

A. Install wheel type indicator on outlet side of each domestic pump (recirculation or booster).

3.4 INSTALLATIONS

A. Install direct-mounting thermometers and adjust vertical and tilted positions.

B. Install thermowells with socket extending to center of pipe and in vertical position in piping tees where thermometers are indicated.

C. Install direct-mounting pressure gages in piping tees with pressure gage located on pipe at most readable position.

D. Install ¼" NPT, ¼ turn ball-valve and snubber fitting in piping for each pressure gage for fluids.

E. Install test plugs in tees in piping.

F. Install flow indicators, in accessible positions for easy viewing, in piping systems.

3.5 CONNECTIONS

A. Install meters and gages adjacent to machines and equipment to allow service and maintenance for meters, gages, machines, and equipment.

3.6 ADJUSTING

A. Calibrate meters according to manufacturer's written instructions, after installation.

B. Adjust faces of meters and gages to proper angle for best visibility.

END OF SECTION 220519

SECTION 220523

GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Bronze ball valves.
2. Ductile iron Butterfly valves.
3. Bronze swing check valves.
4. Iron swing check valves.
5. Bronze globe valves.
6. Ductile iron globe valves.

1.3 DEFINITIONS

A. CWP: Cold working pressure.

B. EPDM: Ethylene propylene copolymer rubber.

C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.

D. NRS: Nonrising stem.

E. OS&Y: Outside screw and yoke.

F. RS: Rising stem.

G. SWP: Steam working pressure.

1.4 SUBMITTALS

A. Product Data: For each type of valve indicated and required accessories (chains, extensions, etc.).

1.5 QUALITY ASSURANCE

A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.

B. ASME Compliance:
1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
2. ASME B31.1 for power piping valves.
3. ASME B31.9 for building services piping valves.

C. NSF Compliance: NSF 61 for valve materials for potable-water service.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Prepare valves for shipping as follows:
   1. Protect internal parts against rust and corrosion.
   2. Protect threads, flange faces, grooves, and weld ends.
   3. Set globe valves closed to prevent rattling.
   4. Set ball and plug valves open to minimize exposure of functional surfaces.
   5. Set butterfly valves closed or slightly open.
   6. Block check valves in either closed or open position.

B. Use the following precautions during storage:
   1. Maintain valve end protection.
   2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.

C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR VALVES

A. Refer to valve schedule articles for applications of valves.

B. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.

C. Valve Sizes: Same as upstream piping unless otherwise indicated.

D. Valve Actuator Types:
   1. Gear Actuator: For quarter-turn valves NPS 8 and larger.
   2. Handwheel: For valves other than quarter-turn types.
   3. Handlever: For quarter-turn valves NPS 6 and smaller.
   4. Chainwheel: Device for attachment to valve handwheel, stem, or other actuator; of size and with chain for mounting height, as indicated in the "Valve Installation" Article.

E. Valve Action: Close rotation shall be clockwise.

F. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
   1. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation. Extension to be provided by valve manufacturer to match specific product.
   2. Butterfly Valves: With extended neck.

G. Valve-End Connections:
   1. Flanged: With flanges according to ASME B16.1 for iron valves (with 316 stainless steel bolts).
   2. Threaded: With threads according to ASME B1.20.1.

2.2 BRONZE BALL VALVES

A. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Conbraco Industries, Inc.; Apollo Valves.
      b. Milwaukee Valve Company.
      c. Mueller Steam Specialty; a division of SPX Corporation.
      d. NIBCO INC.

e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:
   a. Standard: MSS SP-110.
   b. SWP Rating: 150 psig.
   c. CWP Rating: 600 psig.
   d. Body Design: Two piece.
   e. Body Material: Bronze.
   f. Ends: Threaded.
   g. Seats: PTFE or TFE.
   h. Stem: Stainless steel, blowout-proof.
   i. Ball: Stainless steel, vented.
   j. Port: Full.

2.3 BUTTERFLY VALVES

A. 200 CWP, Ductile Iron, Lug Style-Flanged Butterfly Valves, potable rated:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Conbraco Industries, Inc.; Apollo Valves.
      b. Milwaukee Valve Company.
      c. Mueller Steam Specialty; a division of SPX Corporation.
      d. NIBCO INC.
      e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
   2. Description:
      a. Standard: MSS SP-67, Type I.
      b. CWP Rating: 200 psig.
      c. Body Design: Lug type; suitable for bidirectional dead-end service at rated pressure without use of downstream flange.
      d. Body Material: ASTM A 536, ductile iron.
      e. Seat: EPDM.
      f. Stem: One- or two-piece stainless steel.
      g. Disc: Aluminum Bronze
      h. Flange bolts to be 316 stainless steel.

2.4 BRONZE SWING CHECK VALVES

A. Class 150, Bronze Swing Check Valves with Bronze Disc:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Conbraco Industries, Inc.; Apollo Valves.
      b. Milwaukee Valve Company.
      c. Mueller Steam Specialty; a division of SPX Corporation.
      d. NIBCO INC.
      e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
   2. Description:
      a. Standard: MSS SP-80, Type 3.
      b. CWP Rating: 300 psig.
      c. Body Design: Horizontal flow.
      d. Body Material: ASTM B 62, bronze.
      e. Ends: Threaded.
      f. Disc: Bronze.

2.5 IRON SWING CHECK VALVES

A. Class 250, Iron Swing Check Valves with Metal Seats, potable rated:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Conbraco Industries, Inc.; Apollo Valves.
b. Milwaukee Valve Company.
c. Mueller Steam Specialty; a division of SPX Corporation.
d. NIBCO INC.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:
a. Standard: MSS SP-71, Type I.
b. CWP Rating: 500 psig.
c. Body Design: Clear or full waterway.
d. Body Material: ASTM A 126, gray iron with bolted bonnet.
e. Ends: Flanged.
f. Trim: Bronze.
g. Gasket: Asbestos free.
h. Flange bolts to be 316 stainless steel.

2.6 BRONZE GLOBE VALVES

A. Class 150, Bronze Globe Valves with Nonmetallic Disc:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Conbraco Industries, Inc.; Apollo Valves.
b. Milwaukee Valve Company.
c. Mueller Steam Specialty; a division of SPX Corporation.
d. NIBCO INC.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
a. Standard: MSS SP-80, Type 2.
b. CWP Rating: 300 psig.
c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
d. Ends: Threaded.
e. Stem: Bronze.
f. Disc: PTFE or TFE.
g. Packing: Asbestos free.
h. Handwheel: Malleable iron, bronze, or aluminum.

2.7 DUCTILE IRON GLOBE VALVES

A. Class 150, Ductile Iron Globe Valves, potable rated:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Conbraco Industries, Inc.; Apollo Valves.
b. Milwaukee Valve Company.
c. Mueller Steam Specialty; a division of SPX Corporation.
d. NIBCO INC.
e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
a. Standard: MSS SP-85, Type I.
b. CWP Rating: 200 psig.
c. Body Material: ASTM A395, ductile iron.
d. Ends: Flanged.
e. Trim: Bronze.
f. Packing and Gasket: PTFE.
g. Flange bolts to be 316 stainless steel.

2.8 CHAINWHEELS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Babbitt Steam Specialty Co.
2. Roto Hammer Industries.
3. Trumbull Industries.

B. Description: Valve actuation assembly with sprocket rim, brackets, and chain.
   1. Brackets: Type, number, size, and fasteners required to mount actuator on valve.
   2. Attachment: For connection to butterfly valve stems.
   3. Sprocket Rim with Chain Guides: Ductile iron, of type and size required for valve.
   4. Chain: Hot-dip, galvanized steel, of size required to fit sprocket rim.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.

B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.

C. Examine threads on valve and mating pipe for form and cleanliness.

D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.

E. Do not attempt to repair defective valves; replace with new valves.

3.2 VALVE INSTALLATION

A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.

B. Install valves with brass short nipples and brass unions at downstream side (outlet) of ball and globe valves (NPS 2 and smaller).

C. Locate valves for easy access and provide separate support where necessary.

D. Install valves in horizontal piping with stem at or above center of pipe.

E. Install valves in position to allow full stem and handle movement. Valve handle to have ample clearance to be fully exercised without interference (full open and full closed) with no modifications to handle.

F. Install chainwheels on operators for butterfly valves NPS 4 and larger and more than 120 inches above finished floor. Extend chains to 96 inches above finished floor.

G. All valves NPS 3 and smaller shall be installed within 120 inches above finished floor.

H. Install check valves for proper direction of flow and as follows:
   1. Swing Check Valves: In horizontal position with hinge pin level.

I. For all valves on insulated piping, provide insulated stem extension.

J. Install shutoff valves immediately upstream of each dielectric fitting.

K. Provide and install shutoff valve close to water main on each branch and riser serving plumbing fixtures or equipment, on each water supply to equipment, and on each water supply to plumbing fixtures that do not have supply stops.

L. Provide and install drain valves for equipment at base of each water riser, at low points in horizontal piping, and where required to drain water piping.
   1. Drain Valves (At low points in water mains, risers, and branches): Ball valves

3.3 ADJUSTING

A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

B. Perform the following adjustments before operation:
   1. Open shutoff valves to fully open position.
   2. Remove and clean strainer screens. Close drain valves and replace drain plugs.

3.4 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS

A. Valve applications, use the following:
   1. Shutoff Service: Ball, butterfly valves.
   2. Butterfly Valve Dead-End Service: Flange (lug) type.
   3. Throttling Service: Globe valves.
   4. Pump-Discharge Check Valves:
      a. NPS 2 and Smaller: Bronze swing check valves with bronze disc.

B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.

C. Select valves, except wafer types, with the following end connections:
   1. For Copper Tubing, NPS 2 and Smaller: Threaded ends.
   2. For Copper Tubing, NPS 2-1/2 and larger: Flanged ends except where threaded valve-end option is indicated in valve schedules below.
   3. For Steel Piping, NPS 2 and Smaller: Threaded ends.
   4. For Steel Piping, NPS 2-1/2 and larger: Flanged ends.

3.5 VALVE SCHEDULE

A. Pipe NPS 2 and Smaller:
   1. Ball Valves: Two piece, full port, bronze with stainless-steel trim; with brass short nipple and brass union connection at downstream side (outlet).
   2. Bronze Swing Check Valves.
   3. Bronze Globe Valves: With brass short nipple and brass union connection at downstream side (outlet).

B. Pipe NPS 2-1/2 and Larger:
   1. Ductile Iron, Butterfly Valves.
   2. Iron Swing Check Valves.
   3. Ductile Iron Globe Valves.

END OF SECTION 220523

SECTION 220529

HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following hangers and supports for plumbing system piping and equipment.
   1. Steel pipe hangers, supports and riser clamps
   2. Thermal-hanger shield inserts and saddles.
   3. Fastener systems.
   4. Pipe positioning systems.
   5. Equipment supports.

B. Related Sections include the following:
   1. All plumbing specification sections.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.

B. Terminology: As defined in MSS SP-90, “Guidelines on Terminology for Pipe Hangers and Supports.”

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents and test water.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

C. Weight loading for supports and hangers shall not exceed manufacturers recommended tolerances and limits.

1.5 SUBMITTALS

A. Product Data: For the following:
   1. Steel pipe hangers and supports.
   2. Thermal-hanger shield inserts and saddles.
   3. Fastener systems.
   4. Pipe positioning systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
   1. Trapeze pipe hangers. Include Product Data for components.
   2. Metal framing systems. Include Product Data for components.
   3. Equipment supports.

C. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, “Structural Welding Code-steel.”

B. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1. “Structural Welding Code-Steel”.

PART 2 – PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. All materials, unless otherwise specified, shall be 51% manufactured in the United States, new, free from all defects, and of the best quality. Foreign goods specifically approved for use by the Owner’s Representative prior to bidding may be furnished.

B. Materials and equipment shall be installed in accordance with the manufacturer’s recommendations and the best standard practice for the type of work involved. All work shall be executed by mechanics skilled in their respective trades, and the installations shall present a neat, precise appearance.

2.2 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.3 METAL COATING REQUIREMENTS:

A. All metal products shall have the following coatings:
   1. Wet/damp areas: hot dipped galvanized.
   2. Dry or conditioned areas: pre-galvanized.

2.4 STEEL PIPE HANGERS, SUPPORTS AND RISER CLAMPS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 “Hangers and Support Applications” Article for where to use specific hanger and support types.

B. Manufacturers:
   1. B-Line Systems, Inc.; a division of Cooper Industries.
   2. ERICO/Michigan Hanger Co.
   3. Grinnell Corp.

C. Galvanized, Metallic Coatings: Pre-galvanized (minimum thickness of 0.5 mils) or hot dipped (1.4 to 3.9 thickness).

D. Nonmetallic Coatings: Plastic coating, jacket or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

F. Epoxy Coatings: Copper colored epoxy coating on carbon steel hangers and supports for use on noninsulated copper piping only.

G. Channel, rod and securement hardware:
   1. Channel: 12-ga.
   2. Rod: Sized as scheduled.

3. Hardware (clamps, bolts, washers, etc): coating per area indication.

2.5 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig minimum, compressive-strength insulation insert with a sheet metal shield.

B. Manufactures:
   1. B-line
   2. ERICO / Michigan Hanger CO
   3. Grinnell Corp
   4. Buckaroos

C. Insulation –Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier. Wood inserts are not acceptable.

D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type 1 calcium silicate or ASTM C 552, Type II cellular glass.

E. Insulation-Insert Material for Cold and Hot Piping, up to 3" diameter: Molded fiberglass block, 20 lbs/ft^3 density, thermal conductivity of 0.30.

2.6 FASTENER SYSTEMS

A. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened Portland cement concrete with pull-out, tension and shear capacities appropriate for supported loads and building materials where used.
   1. Manufacturers:
      a. B-Line Systems, Inc.; a division of Cooper Industries.
      b. Hilti, Inc.
      c. Powers Fasteners.

B. Concrete Insert: electroplated steel finish, for embedding in concrete. Steel insert nut for rod attachment.
   1. Manufacturers:
      a. B-Line Systems, Inc.; a division of Cooper Industries.
      b. Hilti, Inc.
      c. Powers Fasteners.

2.7 PIPE POSITIONING SYSTEMS

A. Description: IAPMO PS 42, system of metal brackets, clips and straps for positioning piping in pipe spaces for plumbing fixtures for commercial applications.

B. Manufacturers:
   1. C&S Mfg. Corp.
   2. HOLDRITE Corp.; Hubbard Enterprises.
   3. Samco Stamping Inc.

2.8 EQUIPMENT SUPPORTS

A. Description: Welded, shop or field-fabricated equipment support made from structural-steel shapes.

2.9 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes and bars. Galvanized only. Painted steel not acceptable.

PART 3 - EXECUTION

3.1 HANGERS AND SUPPORTS APPLICATIONS AND INSTALLATION

A. Specific hanger and support requirements are specified in Hanger Application Schedule below.

B. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps and attachments as required to properly support piping form building structure; attaching to metal roof decks is not permissible.

C. Use hangers and supports with galvanized, metallic coatings for piping. Field applied finish is not acceptable.

D. Use nonmetallic plastic or epoxy coating, jacket or liner coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use padded hangers for piping that is subject to scratching.

F. Rod to be installed plumb. Bending rod is not acceptable. Provide and install required attachments.

G. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Adjustable, Heavy Duty Steel Clevis Hangers: For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30.
   2. Strut System Clamps: For attachment of piping to channel. NPS ½ to NPS 2.
      a. Noninsulated copper piping to have dielectric insert. (dielectric tape not acceptable).
   3. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
      a. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
      b. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.
   4. Install hangers for piping with the following maximum horizontal spacing and minimum rod diameters (hangers shall be spaced to prevent sagging):
      a. NPS 2 and Smaller: 60 inches with 3/8-inch rod.
      b. NPS 2-1/2 to 5: 60 inches with 1/2-inch rod.
      c. NPS 6 to 8: 60 inches with 3/4-inch rod.

H. Vertical-Piping Riser Clamps: Unless otherwise indicated and except as specified in piping system Section, install the following types:
   1. Required at all risers from under-floor or through floors from floor below. Risers clamps to be installed every 10 ft max. Coordinate installation with sleeves.

I. Building and Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Wide Jaw C-Clamps: For structural shapes, with retaining clip.
   2. NPS 2 and smaller: mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
   3. NPS 2 ½ and larger: Concrete spot insert. Install building attachments within concrete slabs. Install additional attachments at concentrate loads, including valves, flanges and strainers, NPS 2-1/2 and larger and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

J. Insulation Piping Installation:
   1. Provide manufacture galvanized metal shield with locking tabs or securement band.
   2. For Trapeze or Clamped Systems: Thermal insert and shield shall cover entire circumference of pipe.

3. For Clevis or Band Hangers: Thermal insert and shield shall cover lower 180 degrees of pipe.
4. Thermal Insert Length: Extend 4 inches beyond sheet metal shield for piping operating below ambient air temperature.

K. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures; minimum three (3) for vertical pipe sections.

L. Pipe Positioning System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture. Refer Specification Section “Plumbing Fixtures” for plumbing fixtures.

M. Install hangers and supports complete with necessary inserts, bolts, rods, nuts washers and other accessories.

N. Load Distribution: Install hangers and supports so piping live and dead loads and stressed from movement will not be transmitted to connected equipment.

O. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.

3.2 EQUIPMENT SUPPORTS

A. Manufacturer’s structural-steel system to suspend equipment from structure overhead or to support equipment above floor.

3.3 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger and support rods to 1 inch.

3.4 PAINTING

A. Repair Galvanized Surfaces: Clean welds, bolted connections and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 220529

SECTION 220553

IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Equipment labels.
   2. Warning signs and labels
   3. Pipe labels.
   4. Valve tags.
   5. Warning tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For color, letter style and graphic representation required for each identification material and device.

C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.

D. Valve numbering scheme.

E. Valve Schedules: For each piping system to include in maintenance manuals.

1.4 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with locations of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 EQUIPMENT LABELS

A. Plastic Labels for Equipment:
   1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
   2. Letter Color: White.
   3. Background Color: Black.
   4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
   5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.

6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
7. Fasteners: Stainless-steel rivets or self-tapping screws.

B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details and schedules), plus the Specification Section number and title where equipment is specified.

C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2 by 11 inch (A4) bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

2.2 WARNING SIGNS AND LABELS

A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.

B. Letter Color: White.

C. Background Color: Red.

D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.

E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3 inch.

F. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

G. Fasteners: Stainless-Steel self-tapping screws.

H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.

I. Label Content: Include caution and warning information, plus emergency notification instructions.

2.3 PIPE LABELS

A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.

B. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.

C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.

D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size and an arrow indicating flow direction.
1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

2.4 VALVE TAGS

A. Valve Tags: Stamped or engrave with ¼ inch letters piping system abbreviation and ½ inch numbers.

B. Valve Schedules: For each piping system, on 8-1/2 by 11-inch (A4) bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of a valve (room or space), normal-operating position (open, closed or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
   1. Valve-tag schedule shall be included in operation and maintenance date.

2.5 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, or plasticized card stock with matte finish suitable for writing.
   1. Size: Approximately 4 by 7 inches.
   2. Fasteners: Brass grommet and wire.
   3. Nomenclature: Large-size primary caption such as “DANGER”, “CAUTION”, OR “DO NOT OPERATE”.
   4. Color: yellow background with black lettering.

PART 3 - EXECUTION

3.1 PREPARATION

A. Clean piping and equipment surfaces or substances that could impair band of identification devices, including dirt, oil, grease, release agents and incompatible primers, paints and encapsulants.

3.2 EQUIPMENT LABEL INSTALLATION

A. Install or permanently fasten labels on each major item of mechanical equipment.

B. Locate equipment labels where accessible and visible.

3.3 PIPE LABEL INSTALLATION

A. Piping Color-Coding: Painting of piping is specified in Specification Section “Interior Painting”.

B. Locate pipe labels where piping is exposed or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels and plenums; and exterior exposed locations as follows:
   1. Near each valve and control device.
   2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
   3. Near penetrations through walls, floors, ceilings and inaccessible enclosures.
   4. At access doors, manholes and similar access points that permit view of concealed piping.
   5. Near major equipment items and other points of origination and termination.
   6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
   7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.

C. Pipe Label Color Schedule:
   1. Domestic Water Piping:
      a. Background Color: Blue.
      b. Letter Color: White.
   2. Domestic Hot Water Piping:
      a. Background Color: Red.
      b. Letter Color: White.
   3. Sanitary Waste and Vent and Storm Drainage Piping:
      a. Background Color: Green.
      b. Letter Color: White

3.4 VALVE-TAG INSTALLATION

A. Install tags on valves and controls devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
   1. Valve-Tag Size and Shape:
      a. Cold Water: 1-1/2 inches round.
      b. Hot Water: 1-1/2 inches square.
   2. Valve-Tag Color:
      a. Cold Water: Blue.
      b. Hot Water: Orange.
   3. Letter Color:
      a. Cold Water: Black.
      b. Hot Water: Black

3.5 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

END OF SECTION 220553

SECTION 220716

PLUMBING INSULATION

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes plumbing insulation for equipment and pipe, including the following:
   1. Insulation Materials:
      a. Cellular glass.
      b. Flexible Elastomeric.
      c. Mineral fiber.
      d. Phenolic
   2. Adhesives.
   3. Mastics.
   4. Sealants.
   5. Factory-applied jackets.
   6. Field-applied tape.
   7. Field-applied jackets.
   8. Securements.

B. Related Sections include the following:
   1. Specification Section “Hangers and Supports” for high-density inserts at hangers; wood inserts at hangers are not acceptable.
   2. Specification Section “Special Conditions for All Plumbing Work”.
   3. Specification Section “Basic Plumbing Materials and Methods”.

C. Not all items listed within this specification are used. Use only items applicable per application schedule.

1.3 DEFINITIONS

A. ASJ: All-service jacket.

B. CONCEALED: Covered or concealed by a ceiling (gypsum or lay-in acoustical tile) or wall.

C. EXPOSED: Open to view; not concealed by a ceiling or wall of any sort.

D. FSK: Foil, scrim, kraft paper.

E. UNDERFLOOR: Accessible crawl space beneath lowest floor level (considered “outdoors”).

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, identify thermal conductivity, thickness, and jackets (both factory and field applied, if any). Provide submittal data on all products to be used.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
   1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

B. All products to be stored in a dry location, protected from the elements. All damaged insulation to be replaced.

1.7 COORDINATION

A. Coordinate size and location of supports, hangers, and high-density insulation inserts and shields specified in Specification Section "Hangers and Supports." Coordinate with drawing details where applicable; wood inserts at hangers are not acceptable.

B. Coordinate clearance requirements with piping Installer for piping insulation application, and equipment Installer for equipment insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

C. Insulation not to be installed until building is dried in.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 INSULATION MATERIALS

A. Refer to Part 3 schedule articles for requirements about where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Phenolic:
   1. Products
      a. Insul-phen
   2. 100% CFC-free, HCFC-free, and halogen-free, closed cell rigid phenolic foam insulation.
   3. Minimal thermal conductivity @ 75˚ F.
      a. Green, 2.5 lb/ft³. 0.15 (Btu.in/hr.ft².F)
      b. Pink, 5.0 lb/ft³. 0.21 (Btu.in/hr.ft². F)

G. Cellular Glass:
   1. Products:
      a. Pittsburgh Corning Corporation; Foamglas Super K.
   2. Block Insulation: ASTM C 552, Type I.
   3. Special-Shaped Insulation: ASTM C 552, Type III.
   4. Board Insulation: ASTM C 552, Type IV.
   5. Preformed Pipe Insulation with Factory-Applied ASJ: Comply with ASTM C 552, Type II, Class 2.
   6. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
   7. Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Minimal thermal conductivity at 75˚ F of 0.29 (Btu.in/hr.ft². F) (R-value of 10.34@ 3 inches thickness). Factory-applied jacket requirements are specified in Part 2 “Factory-Applied Jackets” Article.

H. Flexible Elastomeric:
   1. Products:
      a. Aeroflex USA Inc.; Aerocel.
      b. Armacel LLC; AP Armaflex.
   2. Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
   3. Minimal thermal conductivity at 75˚ F of 0.25 (Btu.in/hr.ft². F.)

I. Mineral-Fiber Blanket Insulation:
   1. Products:
      a. Johns Manville; Microlite.
      b. Knauf Insulation; Duct Wrap
      c. Owens-Corning; All-Service Duct Wrap.
   2. Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in Part 2 “Factory-Applied jackets” Article.

J. Mineral-Fiber, Preformed Pipe Insulation:
   1. Products:
      a. Johns Manville; Micro-Lok.
      b. Knauf Insulation; 1000° Pipe Insulation.
      c. Owens Corning; Fiberglas Pipe Insulation.
   2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

K. Fire Rated Wrap
   1. Manufacturers:
      a. 3M
      b. Specialty Products and Insulation Co.
   2. Insulation Materials: Fire rated fiber wrap insulation: 1-1/2 inch thick low bio-persistent Alka-line Earth Silicate fiber with melting point at 2200 degrees F. jacket shall be foil faced (one side)

Kraft fiber paper with a concealed reinforcing scrim. (FSK) One hour rating with 1-layer of wrap, 3 inches to combustibles. Two hour rating with 2 layers of wrap, 0 inch to combustibles.

3. Accessories and Attachments:
   a. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, presized a minimum of 8 oz./sq.yd.
      1) Tape Width: 4 inches.
   b. Bands: 3/4 inch wide, in one of the following materials compatible with jacket.
      1) Stainless Steel: ASTM A 666, Type 304; 0.020 inch thick.
   c. Insulation Anchor Pings and Speed Washers: Galvanized steel plate, pin and washer manufactured for attachment to duct by weld. Pin length sufficient for insulation thickness indicated.
   d. Vapor Retarders: Mastics: Materials recommended by insulation material manufacturers that are compatible with insulation materials, jackets, and substrates.
4. Secured per manufacturer's requirements and AHJ.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated. All products are to contain low V.O.C. as defined/governed by LEED IEQ 4.1 and 4.2 (Regardless of project type).

B. Cellular-Glass, Solvent-based resin adhesive, with a service temperature range of minus 75 to plus 300 deg F.
   1. Products:
      a. Foamglas: Pittseal 444N or equal

C. Flexible Elastomeric: Comply with MIL-A-24179A, Type II, Class I.
   1. Products:
      a. K-Flex: 720 LVOC or equal

D. Phenolic: Water based adhesive with a service temp of minus 20°F to 700°F.
   1. Products:
      a. Foster 97-15

E. Metal Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
   1. Products:
      a. Design Polymerics, DP2502 (or approved equal).

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II. All products are to contain low V.O.C. as defined/governed by LEED IEQ 4.1 and 4.2 (Regardless of project type).

B. Vapor-Barrier Mastic: Water based; suitable for outdoor use on below ambient services, or indoor vapor barrier use.
   1. Products:
      a. Childers Products, Division of ITW; CP-35.
   2. Water-Vapor Permeance: ASTM F 1249, 0.09 perm at 55-mils film thickness.
   3. Service Temperature Range: Minus 20 to plus 190 deg F.
   4. Solids Content: ASTM D 1644, 60 percent by volume and 73 percent by weight.
   5. Color: White.
   6. VOC: 36 g/l.

2.5 SEALANTS

A. Joint Sealants:
   1. Joint Sealants for Cellular-Glass Products:

a. Pittsburgh Corning Corporation; Pittseal 444N.
2. Joint Sealant for Phenolic Products
a. Foster 95-50

B. Metal Jacket:
1. Products:
a. Foster 95-44 or equal.
b. Childers Products, Division of ITW; CP-76.

C. Mineral Fiber:
1. Design Polymerics DP 2502.
2. Childers Products, Division of ITW; CP-35.

D. PVC Jacket:
1. Childers Products, Division of ITW; CP-35.

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.7 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, 25/50 ASTM-F 84, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
1. Products:
a. Johns Manville; Zeston.
b. Proto PVC Corporation; LoSmoke.
2. Adhesive: As recommended by jacket material manufacturer.
3. Color: White:
4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
5. Factory-fabricated tank heads and tank side panels.

C. Metal Jacket:
1. Products:
a. Childers Products, Division of ITW; Metal Jacketing Systems.
b. PABCO Metals Corporation; Surefit.
c. RPR Products, Inc.; Insul-Mate.
2. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005, Temper H-14.
a. Factory cut and rolled to size.
b. Finish and thickness are indicated in field-applied jacket schedules.

2.8 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136 and UL listed.
   1. Width: 3 inches.
   2. Thickness: 14.0 mils.
   3. Adhesion: 73 ounces force/inch in width.
   4. Elongation: 2 percent.
   5. Tensile Strength: 55 lbf/inch in width.
   6. Color: White

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136 and UL listed.
   1. Width: 3 inches.
   2. Thickness: 13 mils.
   3. Adhesion: 73 ounces force/inch in width.
   4. Elongation: 2 percent.
   5. Tensile Strength: 40 lbf/inch in width.
   6. Color: Silver

2.9 SECUREMENTS

A. Bands:
   1. Products:
      a. Childers Products; Bands.
   2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 316; 0.015 inch thick, 3/4 inch wide with wing or closed seal.
   3. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch with wing or closed seal.
   4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
   1. Verify that systems and equipment to be insulated have been tested and are free of defects.
   2. Verify that surfaces to be insulated are clean and dry.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application. For Stainless Steel; apply a corrosion coating to insulated surfaces with an epoxy primer and an epoxy finish 5 mils thick.

B. Verify and coordinate insulation installation with the systems and trades installing heat tracing. Comply with requirements for heat tracing that applies to insulation.

3.3 COMMON INSTALLATION REQUIREMENTS

A. Requirements in this Article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties

C. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, and pipe system as specified in insulation system schedules.

D. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

E. Install high-density inserts at hanger locations prior to insulating; wood or block inserts are not acceptable

F. Do not weld brackets, clips, pins or other attachment devices to piping, fittings, tanks, coils, equipment, vessel, and specialties.

G. Keep insulation materials clean and dry before, during application, and finishing.

H. Install insulation with tight longitudinal seams and end joints, with least number of joints practical.

I. Install insulation so that material is not over compressed.

J. Seal all joints, and seams, including penetrations in insulation, at supports, and other projections with insulation of same material overlapped by 2”. Secure strips with outward clinching staples along both edges of strip, (spaced 1 inch on center) and seal entire joint or seam with mastic.

K. Do not insulate, conceal, or enclose pipe hangers, channel and steel supports, etc. not directly fasten to duct.

L. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

M. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses. Do not water down products unless directed by manufacture. Use clean potable demineralized water when required.

N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

O. Repair all damage insulation prior to concealment as noted above.

P. Do not insulation or conceal vibration-control devices, labels, stamps, nameplates, data plates, manholes, cleanouts, etc. require for maintenances.

Q. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarded integrity, unless otherwise indicated.

R. Insulate pipe elbows, tees, valves, strainers, flanges, etc., using preformed fitting insulation, mitered fittings or oversized preformed pipe insulation made from same material thickness and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, voids, and irregular surfaces with insulating mastic finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation. Provide a removable reusable insulation cover; design that maintains vapor barrier. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts.

S. Cover segmented insulated surfaces with a layer of finishing mastic prior to jacket installation.

T. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions.

Terminate ends with PVC end caps. Secure PVC covers to adjoining insulation facing using staples and ASJ tape. Seal PVC fitting covers with mastic.

U. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating adhesive and finish with finishing mastic. All connections are to be accessible.

V. Install removable insulation segment and covers at flanges, valves, controls, unions, equipment access doors, manholes, hand holes, and other elements that require frequent removal for service and inspection. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.4 PENETRATIONS

A. Install insulation continuously through all walls, floors, and partitions penetrations and sleeves.

B. Extend jacket of outdoor installation into wall and roof jacks by 2 inches. Seal jacket to roof flashing with approved flashing sealant.

C. Insulation Installation at Below-Grade Exterior Wall Penetrations: Terminate insulation flush with sleeve seal. Seal terminations with approved flashing sealant.

3.5 GENERAL PIPE INSULATION INSTALLATION

A. Preformed Pipe Insulation Installation on Pipe, Fittings, Valves, Flanges, Tanks, Elbows, and Appurtenances for Cellular- Glass, Mineral- Fiber, Flexible Elastomeric, and Phenolic insulations:
   1. Install insulation in a manner that secures material to system being insulated with staples, tape and mastic.
   2. When insulation with preformed pipe insulation, seal all longitudinal seams, end joints, and protrusions with manufacturers recommended tape matching jacket, vapor-barrier mastic, joint sealant, and adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
   3. Secure fittings, jacket, cover, etc. with tape matching jacket and secure with outward clinched staples 1 inch on center. Apply vapor-barrier mastic over staples.
   4. Arrange insulation to permit access to valves packing, flanges, unions, etc. and valve operation for maintenance without disturbing insulation. Install insulation so that it can be removed without damage to surrounding insulation or access enclosure.
   5. Pipe hangers are not to be concealed in insulation.
   6. Seal all exposed insulation ends with mastic.
   7. Seal all mitered joints prior to installing covers with vapor-barrier mastic.
   8. Install preformed pipe insulation to outer diameter of pipe flange.
   9. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
   10. Fill voids between inner circumference of valves, flange, elbows, and bolts insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
   11. Install preformed sections of same material insulation when available. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Install PVC cover over fitting or mitered section.
   12. Arrange insulation to permit access to valves packing, flanges, unions, etc. and valve operation for maintenance without disturbing insulation. Install insulation so that it can be removed without damage to surrounding insulation or access enclosure.

3.6 GENERAL BLANKET INSULATION INSTALLATION (IN ADDITION TO COMMON REQUIREMENTS)

A. Blanket Insulation Installation on Pipes, Drains, Tanks, Vessels, Elbows, and Appurtenances:
   1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for a minimum of 50 percent coverage of insulated surface and 100 percent coverage of equipment, tanks, etc.; to secure insulation to surfaces. Apply adhesive to entire circumference of all surfaces; including fittings and transitions.
   2. Install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 3/4-inch outward-clinching staples, 1 inch on center. Coat all seams/joints with mastic.
   3. Repair punctures, tears, penetrations and protrusions with 6-inch-wide strips of same material used to insulate duct. Seal all seams with staples, cover with mastic and cover with embedded fiberglass reinforced mesh, cover mesh with finish coat of mastic.
   4. Do not conceal hangers beneath/under insulation.
   5. Insulation termination: Butt insulation up to termination point. Apply mastic no less than 3" overlap on insulation, and 3" on metal surface.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Apply two continuous beads of sealant to seams and joints, one bead under lap and the finish bead along seam and joint edge. Secure metal jacket with stainless-steel bands 12 inches on center and at end joints.

3.8 FINISHES

A. Equipment, and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in painting Sections (if applicable).
   1. Flat Acrylic Finish: Two (2) finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
      a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

C. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. Inspect insulated pipe, and equipment, randomly selected by Engineer, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to two (3) location(s) for each system.
   2. All insulation applications will be considered defective work if sample inspection reveals noncompliance with requirements.
   3. Remove all defective work and install new insulation and jackets to replace insulation and jackets removed for inspection. Repeat inspection procedures as needed.

3.10 PIPING INSULATION SCHEDULE, GENERAL

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor’s option.

B. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
   1. Fire-suppression piping.
   2. Drainage piping located in crawl spaces.

3. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

3.11 INDOOR PIPING INSULATION SCHEDULE

A. Domestic Hot and Recirculated Hot Water:
   1. Concealed Locations:
      a. 0 through 1-1/4" Pipe Size: Insulation shall be any of the following:
         1) Mineral Fiber Preformed: Type 1: 1-inch thick.
         2) Phenolic (2.5 lb/ft³), 1-inch thick.
         3) Cellular Glass: 1-1/2 inches thick.
      b. 1-1/2" and Larger Pipe Size: Insulation shall be any of the following:
         4) Mineral Fiber Preformed: Type 1: 1-1/2"-inch thick.
         5) Phenolic (2.5 lb/ft³), 1-1/2"-inch thick.
         6) Cellular Glass: 1-1/2 inches thick.

   2. Exposed Locations: (including inside mechanical rooms):
      a. 0 through 1-1/4" Pipe Size: Insulation shall be any of the following:
         1) Phenolic (3.5 lb/ft³), 1-inch thick.
         2) Cellular Glass: 1-1/2 inches thick.
         3) Mineral Fiber Preformed: Type 1: 1-inch thick.
      b. 1-1/2" and Larger Pipe Size: Insulation shall be any of the following:
         4) Phenolic (3.5 lb/ft³), 1-1/2-inch thick.
         5) Cellular Glass: 1-1/2 inches thick.
         6) Mineral Fiber Preformed: Type 1: 1-1/2"-inch thick.

B. Condensate, Equipment Drain, Floor Drains, Traps and Waste Water below 60 Deg F:
   1. All PVC Piping exposed to and in a Return Air Plenum: Insulation shall be any of the following:
      a. Fire rated wrap.
   2. All Other Pipe: Insulation shall be any of the following:
      a. Cellular Glass: 1-1/2 inches thick.
      b. Phenolic (2.5 lb/ft³): 1-1/2 inches thick.

C. Horizontal Storm Water Piping (continuous from roof drain body to first vertical drop):
   1. All PVC Piping exposed to and in a Return Air Plenum: Insulation shall be any of the following:
      a. Fire rated wrap.
   2. All Other Pipe: Insulation shall be any of the following:
      a. Cellular Glass: 1-1/2 inches thick.
      b. Phenolic (2.5 lb/ft³): 1-1/2 inches thick.
      c. Mineral Fiber, Preformed, Type 1: 1-inch thick.

D. Roof Drain Body:
   1. PVC Roof Drain Body exposed to and in a Return Air Plenum: Insulation shall be any of the following:
      a. Fire rated wrap.
   2. All Other Roof Drain Bodies: Insulation shall be any of the following:
      a. Mineral-Fiber Blanket Insulation: 1-1/2 inch thick.

E. Sanitary Waste & Vent; Domestic Water piping:
   1. All PVC Piping exposed to and in a Return Air Plenum: Insulation shall be any of the following:
      a. Fire rated wrap.

3.12 OUTDOOR, ABOVEGROUND PIPING INSULATION SCHEDULE (ATTIC AND CRAWL SPACE INCLUDED)

A. Domestic Cold, Hot and Recirculated Hot Water:
   1. All Pipe Sizes: Insulation shall be any of the following:
      a. Pre-insulated Pipe: 1-1/2" thick (underfloor, outdoors and buried)
      b. Cellular Glass: 2 inches thick (outdoors, not acceptable indoors)

c. Phenolic (5 lb/ft³): 2 inches thick (outdoors, not acceptable indoors)
d. Mineral Fiber Preformed, Type 1: 1-1/2 inch thick (uninsulated Attic space)

B. Condensate, Equipment Drain, Floor Drains, Traps and Waste Water below 60 Deg. F:
1. All Pipe Sizes: Insulation shall be any of the following:
a. Cellular Glass: 1-1/2 inches thick
b. Phenolic (5 lb/ft³): 1-1/2 inches thick
2. Insulation shall be continuous until the connection to the sanitary system.

C. Fire Protection:
1. All Pipe Sizes: Insulation shall be any of the following:
a. Cellular Glass: 1-1/2 inches thick
b. Phenolic (5 lb/ft³): 1-1/2 inches thick

3.13 INSIDE EXTERIOR WALL PIPING INSULATION SCHEDULE

A. Domestic Cold, Hot and Recirculated Hot Water:
1. All Pipe Sizes: Insulation shall be any of the following:
a. Cellular Glass: 1-1/2 inches thick
b. Phenolic (2.5 lb/ft³): 1 inch thick
c. Mineral Fiber Preformed, Type 1: 1 inch thick, coat entire ASJ jacket with vapor mastic

B. Condensate, Equipment Drain, Floor Drains, Traps and Waste Water below 60 Deg. F:
1. All Pipe Sizes: Insulation shall be any of the following:
a. Cellular Glass: 1-1/2 inches thick
b. Phenolic (2.5 lb/ft³): 1-1/2 inches thick

C. Fire Protection:
1. All Pipe Sizes: Insulation shall be any of the following:
a. Cellular Glass: 1-1/2 inches thick
b. Phenolic (2.5 lb/ft³): 1-1/2 inches thick

3.14 FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. Piping exposed in finish interior areas, outdoors, in underfloor, mechanical rooms:
1. Aluminum, Stucco Embossed: 0.016 inch thick.

C. Indoor piping fitting or elbows:
1. PVC: (0.015 inch thick).

END OF SECTION 220716

SECTION 221116

DOMESTIC WATER PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Under-building slab and aboveground domestic water pipes, tubes, fittings, and specialties inside the building.
   2. Encasement for piping.

1.3 SUBMITTALS

A. Product Data: For the following products:
   1. Piping and fittings.

B. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Piping materials shall bear label, stamp, or other markings of specified testing agency. Origin of product to be domestic. No imported product will be acceptable.

B. Comply with NSF 14 for plastic, potable domestic water piping and components. Include marking "NSF-pw" on piping.

C. Comply with NSF 61 for potable domestic water piping and components.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
   1. Notify Owner no fewer than two days in advance of proposed interruption of water service.
   2. Do not proceed with interruption of water service without Owner's written permission.

PART 2 - PRODUCTS

2.1 PIPING MATERIALS

A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

2.2 COPPER TUBE AND FITTINGS

A. Hard Copper Tube: ASTM B 88, Type L or K water tube, drawn temper.

1. Copper Pressure Fittings: ASME B16.18, cast copper-alloy or ASME B16.22, wrought-copper, solder fittings.

B. Soft Copper Tube: ASTM B 88, Type L or K water tube, annealed temper.
1. Copper Pressure Fittings: ASME B16.18, cast copper-alloy or ASME B16.22, wrought-copper, solder fittings.

C. Copper Pipe, Pre-insulated:
1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Insul-Pipe Systems, Inc.
b. Insul-tek
c. Thermal Pipe Systems, Inc.
d. Thermacor Process L.P.
2. Description: Factory pre-insulated double-wall pipe system.
3. Carrier Pipe: Drawn-Temper Copper Tubing: ASTM B 88, Type L (ASTM B 88M, Type B).
4. Wrought-Copper Fittings: ASME B16.22.
5. Pipe Insulation: Foamed-in-place polyurethane, 90% closed cell, poured in place, "K" = 0.14 per inch @ 75 degrees F, with a density of not less than 2.5 lbs. per cubic foot. Insulation shall be completely encased within a seamless jacket.
a. Insulation at each end of each length of pipe shall be protected with an end seal bonded both to the carrier pipe and the outer jacket. Piping cuts made in the field must be provided with end-seals equal to factory type.
b. Insulation thickness, minimum: 1.12-inches for NPS 2 and smaller; 1.67-inches for NPS 2-1/2; 1.42-inches for NPS 3; 1.93-inches for NPS 4; and 1.93-inches for NPS 6.
6. Jacket: PVC; ASTM D-1784, Class 12454-B, of not less than .060 inches thick and able to withstand H-20 highway loading.
7. Fitting insulation: Coupling joints on straight runs shall be field wrapped with a mold/jacket of roll PVC, sealed with self seal tape and filled with field mixed pour poly-urethane foam. Fittings shall be field insulated using a field mixed polyurethane poured between the fitting and a PVC fitting cover supplied by the manufacturer that is sealed with self seal tape. Vapor barrier jacketing material for fittings and joints shall be of the same material as the pipe jacketing. Installation shall be as per manufacturer's instructions.

2.3 NIPPLES

A. Brass Nipple: ASTM B687-88
1. Threads: NPT (Federal Services Handbook H-28)
2. Potable use.

2.4 UNIONS

A. Factory-fabricated, brass or bronze union assembly, for 150-psig minimum working pressure at 180 deg F, ASTM B687-88

B. End Connections: Solder-joint copper alloy and / or threaded ferrous.

C. Potable use.

2.5 FLANGES

A. Factory-fabricated, bronze union assembly, for 150-psig minimum working pressure at 180 deg F, ASME B16.24, Class 150.

B. End Connections: Solder-joint copper alloy and / or threaded ferrous.

C. Potable use.

D. All bolts to be 316 stainless steel (Class 150).

2.6 PIPING JOINING MATERIALS

A. Pipe-Flange Gasket Materials: AWWA C110, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free, unless otherwise indicated; full-face or ring type unless otherwise indicated.

B. Solder Filler Metals: ASTM B 32, 95/5 lead-free alloys. Include water-flushable and soluble flux according to ASTM B 813.

C. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

2.7 ENCASEMENT FOR PIPING

A. Standard: ASTM A 674 or AWWA C105.

B. Form: Tube.

C. Material: LLDPE film of 0.008-inch minimum thickness or high-density, cross-laminated PE film of 0.004-inch minimum thickness.

D. Color: Black or blue.

2.8 TRANSITION FITTINGS

A. General Requirements:
   1. Same size as pipes to be joined.
   2. Pressure rating at least equal to pipes to be joined.
   3. End connections compatible with pipes to be joined.

B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.

C. Sleeve-Type Transition Coupling: AWWA C219.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Cascade Waterworks Manufacturing.
      b. Dresser, Inc.; Dresser Piping Specialties.
      c. Ford Meter Box Company, Inc. (The).
      d. JCM Industries.
      e. Romac Industries, Inc.
      f. Smith-Blair, Inc; a Sensus company.
      g. Viking Johnson; c/o Mueller Co.

D. Plastic-to-Metal Transition Fittings:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Charlotte Pipe and Foundry Company.
      b. Harvel Plastics, Inc.
      c. Spears Manufacturing Company.
   2. Description: CPVC one-piece fitting with manufacturer's Schedule 80 equivalent dimensions; one end with threaded brass insert and one solvent-cement-socket end.

E. Plastic-to-Metal Transition Unions:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Colonial Engineering, Inc.

b. NIBCO INC.
c. Spears Manufacturing Company.

2. Description: CPVC four-part union. Include brass threaded end, solvent-cement-joint plastic end, rubber O-ring, and union nut.

PART 3 - EXECUTION

3.1 PIPING INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on Coordination Drawings.

B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."

C. Install underground copper tube in PE encasement according to ASTM A 674 or AWWA C105.

D. Provide and install shutoff valve, strainer, pressure reducing valve, hose-end drain valve, pressure gage, and test tee with valve, inside the building at each domestic water service entrance. Comply with requirements in Section "Meters and Gages" for pressure gages and Section "Domestic Water Piping Specialties" for drain valves and strainers.

E. Install domestic water piping level and plumb.

F. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.

G. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

H. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.

I. Install piping adjacent to equipment and specialties to allow service and maintenance.

J. Install piping to permit valve servicing.

K. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than system pressure rating used in applications below unless otherwise indicated.

L. Install piping free of sags and bends.

M. Install fittings for changes in direction and branch connections.

N. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty valves.

O. All pipe nipples to be brass.

3.2 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.

B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, and fittings before assembly.

C. Brazed Joints: Join copper tube and fittings according to CDA's "Copper Tube Handbook," "Brazed Joints" Chapter.

D. Soldered Joints: Apply ASTM B 813, water-flushable flux to end of tube. Join and prepare/clean copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."

E. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.

F. Dissimilar-Material Piping Joints: Make joints using adapters compatible with materials of both piping systems.

G. All piping is to be cleaned prior to concealment.

3.3 TRANSITION FITTING INSTALLATION

A. Install transition couplings at joints of dissimilar piping.

B. Transition Fittings in Underground Domestic Water Piping:
   1. NPS 2 and Smaller: Fitting-type coupling.
   2. NPS 2-1/2 and Larger: mechanical joint-type coupling.

C. Transition Fittings in Aboveground Domestic Water Piping NPS 2 and Smaller: Plastic-to-metal transition unions.

3.4 CONNECTIONS

A. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment and machines to allow service and maintenance.

C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to all equipment.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Piping Inspections:
   1. Do not enclose, cover, or put piping into operation until it has been inspected and approved by engineer and authorities having jurisdiction
   2. During installation, notify engineer and authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of engineer and authority having jurisdiction:
      a. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
      b. Final Inspection: Arrange final inspection for engineer and authority having jurisdiction to observe tests specified below and to ensure compliance with requirements.
   3. Reinspection: If the engineer or authority having jurisdiction finds that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
   4. Reports: Prepare inspection reports and have them signed by engineer and authority having jurisdiction.

C. Piping Tests:

1. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
2. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
3. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
4. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
5. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
6. Prepare reports for tests and for corrective action required.

D. Domestic water piping will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.6 CLEANING

A. Clean and disinfect potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
b. Fill and isolate system according to either of the following:
1) Fill system or part thereof with water/chlorine solution with at least 50 ppm (50 mg/L) of chlorine. Isolate with valves and allow to stand for 24 hours.
2) Fill system or part thereof with water/chlorine solution with at least 200 ppm (200 mg/L) of chlorine. Isolate and allow to stand for three hours.
c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.

B. Clean non-potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
2. Use purging procedures prescribed by authorities having jurisdiction or; if methods are not prescribed, follow procedures described below:
a. Flush piping system with clean, potable water until dirty water does not appear at outlets.

C. Prepare and submit reports of purging and disinfecting activities.

D. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.

3.7 PIPING SCHEDULE

A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

B. Flanges and unions to be provided and installed at all equipment connections and appurtenances.

C. Under-building-slab, domestic water, building service and distribution piping, NPS 2 and smaller, shall be the following:
1. Soft copper tube, ASTM B 88, Type K; (continuous, no joints under slab.)

D. Under-building-slab, domestic water, building-service piping, NPS 2-1/2 and larger, shall be the following (see detail for additional requirements):
   1. Hard copper tube, ASTM B 88, Type K; wrought- copper brazed-joint fittings and joints.
   2. Mechanical-joint, ductile iron pipe; standard-pattern mechanical-joint fittings; and mechanical joints.

E. Aboveground domestic water piping, all sizes, shall be the following:
   1. Hard copper tube, ASTM B 88, Type L; cast- or wrought- copper solder-joint fittings; and soldered joints.

F. Underfloor domestic water piping shall be the following:
   1. Hard copper tube, ASTM B 88, Type L; cast- or wrought- copper solder-joint fittings; and soldered joints.
   2. Pre-insulated copper pipe. (Hot and Recirculated water only)

END OF SECTION 221116

SECTION 224100

PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following conventional plumbing fixtures and related components:
   1. Faucets for lavatories.
   2. Flushometers.
   3. Toilet seats.
   4. Protective shielding guards.
   5. Fixture supports.
   6. Dishwasher air-gap fittings.
   7. Disposers.
   8. Water closets.
   9. Urinals.
   10. Lavatories.
   11. Commercial sinks.
   12. Kitchen sinks.
   13. Service basins.
   14. Utility Boxes

B. Related Sections include the following:
   1. Specification Section "Water Distribution" for exterior plumbing fixtures and hydrants.
   2. Specification Section "Toilet and Bath Accessories."
   3. Specification Section "Emergency Plumbing Fixtures."
   4. Specification Section "Security Plumbing Fixtures."
   5. Specification Section "Drinking Fountains and Water Coolers."
   6. Specification Section "Plumbing Specialties" for backflow preventers, floor drains, and specialty fixtures not included in this Section.

1.3 DEFINITIONS

A. Accessible Fixture: Plumbing fixture that can be approached, entered, and used by people with disabilities; and is compliant with the Texas Accessibility Standards (TAS), Article 9102, Texas Civil Statutes.

B. Fitting: Device that controls the flow of water into or out of the plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, shower heads and tub spouts, drains and tailpieces, and traps and waste pipes. Piping and general-duty valves are included where indicated.

1.4 SUBMITTALS

A. Product Data: For each type of plumbing fixture indicated. Include selected fixture and trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

B. Shop Drawings: Diagram power, signal, and control wiring.

C. Operation and Maintenance Data: For plumbing fixtures to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category through one source from a single manufacturer.
   1. Exception: If fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for that category.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Regulatory Requirements: Comply with requirements in ICC A117.1, "Accessible and Usable Buildings and Facilities" Public Law 90-480, "Architectural Barriers Act"; and Public Law 101-336, "Americans with Disabilities Act" for plumbing fixtures for people with disabilities.

D. Regulatory Requirements: Comply with requirements in the Texas Accessibility Standards (TAS), Architectural Barriers Act, Article 9102, Texas Civil Statutes.

E. Regulatory Requirements: Comply with requirements in Public Law 102-486, "Energy Policy Act," about water flow and consumption rates for plumbing fixtures.

F. NSF Standard: Comply with NSF 61, "Drinking Water System Components--Health Effects," for fixture materials that will be in contact with potable water.

G. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

H. Comply with the following applicable standards and other requirements specified for plumbing fixtures:
   1. Enameled, Cast-Iron Fixtures: ASME A112.19.1M.
   2. Water-Closet, Flushometer Tank Trim: ASSE 1037.

I. Comply with the following applicable standards and other requirements specified for lavatory and sink faucets:
   1. Backflow Protection Devices for Faucets with Hose-Thread Outlet: ASME A112.18.3M.
   2. Faucets: ASME A112.18.1.
   3. Hose-Connection Vacuum Breakers: ASSE 1011.
   4. Hose-Coupling Threads: ASME B1.20.7.
   5. Integral, Atmospheric Vacuum Breakers: ASSE 1001.
   6. NSF Potable-Water Materials: NSF 61.
   7. Pipe Threads: ASME B1.20.1.
   8. Supply Fittings: ASME A112.18.1.
   9. Brass Waste Fittings: ASME A112.18.2.

J. Comply with the following applicable standards and other requirements specified for miscellaneous fittings:
   1. Atmospheric Vacuum Breakers: ASSE 1001.
   2. Brass and Copper Supplies: ASME A112.18.1.
   3. Dishwasher Air-Gap Fittings: ASSE 1021.
   4. Manual-Operation Flushometers: ASSE 1037.
   5. Plastic Tubular Fittings: ASTM F 409.
   6. Brass Waste Fittings: ASME A112.18.2.

K. Comply with the following applicable standards and other requirements specified for miscellaneous components:
   1. Disposers: ASSE 1008 and UL 430.
   2. Dishwasher Air-Gap Fittings: ASSE 1021.

3. Flexible Water Connectors: ASME A112.18.6.
4. Hose-Coupling Threads: ASME B1.20.7.
5. Off-Floor Fixture Supports: ASME A112.6.1M.
6. Pipe Threads: ASME B1.20.1.
7. Plastic Toilet Seats: ANSI Z124.5.
8. Supply and Drain Protective Shielding Guards: ICC A117.1.

1.6 WARRANTY

A. Warranty Period: Two (2) years from dated of Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Faucet Cartridge, Assembly and Associated O-Rings: Equal to 2 or 5 percent of amount of each type and size installed (whichever is greater).
   2. Flushometer Valve, Repair Kits: Equal to 10 percent of amount of each type installed, but no fewer than 12 of each type.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Product descriptions hereinafter represent minimum requirements for each fixture; refer to Basis-of-Design manufacturer and model number listed on the drawing “Plumbing Fixture Schedule” for additional features, construction details, accessories and/or options.

2.2 MATERIALS AND WORKMANSHIP

A. All materials, unless otherwise specified, shall be 51% manufactured in the United States, new, free from all defects, and of the best quality. Foreign goods specifically approved for use by the Owner’s Representative prior to bidding may be furnished.

B. Materials and equipment shall be installed in accordance with the manufacturer’s recommendations and the best standard practice for the type of work involved. All work shall be executed by mechanics skilled in their respective trades, and the installations shall present a neat, precise appearance.

2.3 STOPS

A. Angle Stops:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following: (unless noted otherwise on drawings or on schedule).
      a. Chicago Faucets.
      b. McGuire Manufacturing Co., Inc.
      c. T & S Brass and Bronze Works, Inc.
   2. Description: Heavy duty cast brass with compression cartridge.
      a. Finish: Chrome plated.
      b. Stem: Brass, full turn.
      c. Operation: Loose Key, unless otherwise indicated.
      d. Outlet: NPS 3/8, compression
      e. Inlet Size: NPS 1/2, female thread.

2.4 LAVATORY FAUCETS

A. Lavatory Faucets, Manual:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing “Plumbing Fixture Schedule” or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule)
      a. Chicago Faucets.
      b. T & S Brass and Bronze Works, Inc.
   2. Description: Two-handle mixing valve. Include hot- and cold-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
      a. Body Material: Commercial, solid brass.
      b. Finish: Polished chrome plate.
      c. Maximum Flow Rate: 0.5 gpm. (unless noted otherwise on drawings or within Schedule)
      d. Valve Handle(s): Wrist blade, 4 inches.
      e. Spout Outlet: Aerator.
      f. Operation/Cartridge: Ceramic disk, manual.

2.5 SINK FAUCETS

A. Sink Faucets, Manual, Single Hole:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing “Plumbing Fixture Schedule” or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule)
      a. Chicago Faucets.
      b. T & S Brass and Bronze Works, Inc.
   2. Description: One or two-handle valve. Include cold and hot-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
      a. Body Material: Commercial, solid brass.
      b. Finish: Polished chrome plate.
      c. Maximum Flow Rate: 2.2 gpm, (unless noted otherwise on drawings or within Scheduled)
      d. Mixing Valve: None.
      e. Handle: Wrist blade, 4 inches; coordinate single handle (CW only) units with floor plans such that lever is always located on front side of counter/sink.
      f. Spout Outlet: Aerator.
      g. Operation: Compression, manual.

B. Sink Faucets, Manual:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing “Plumbing Fixture Schedule” or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule).
      a. Chicago Faucets.
      b. T & S Brass and Bronze Works, Inc.
   2. Description: Two-handle mixing. Include cold and hot-water indicators; coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
      a. Body Material: Commercial, solid brass.
      b. Finish: Polished chrome plate.
      c. Maximum Flow Rate: 2.2 gpm, (unless noted otherwise on drawings or within Schedule)
      d. Mixing Valve: None.
      e. Handles: Wrist blade, 4 inches.
      f. Spout Outlet: Aerator.
      g. Operation: Compression, manual.

C. Sink Faucets, Kitchen:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing “Plumbing Fixture Schedule” or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule)
      a. Chicago Faucets.

b. T & S Brass and Bronze Works, Inc.

2. Description: Kitchen faucet without spray, single-handle mixing. Coordinate faucet inlets with supplies and fixture holes; coordinate outlet with spout and fixture receptor.
   a. Body Material: Commercial, solid brass.
   b. Finish: Polished chrome plate.
   c. Maximum Flow Rate: 2.2 gpm, (unless noted otherwise on drawings or within Schedule).
   d. Mixing Valve: Integral to cartridge.
   e. Handle: Lever, minimum 4 inches;
   f. Spout Outlet: Aerator.
   g. Operation/Cartridge: Manual, ceramic disk mixing.

2.6 TOILET SEATS

A. Toilet Seats:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. American Standard Companies, Inc.
      b. Bemis Manufacturing Company.
      c. Church Seats.
      d. Kohler Co.
   2. Description: Toilet seat for water-closet-type fixture.
      a. Material: Molded, solid plastic.
      b. Configuration: Open front without cover.
      c. Size: Elongated.
      d. Hinge Type: SC, self-sustaining, check.
      e. Class: Heavy-duty commercial.
      f. Color: White.

2.7 PROTECTIVE SHIELDING GUARDS

A. Protective Shielding Pipe Covers:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following: (unless noted otherwise on drawings or within Schedule)
      a. McGuire Manufacturing Co., Inc.
      b. TRUEBRO, Inc.
   2. Description: Manufactured plastic wraps for covering plumbing fixture hot- and cold-water supplies and trap and drain piping. Comply with Americans with Disabilities Act (ADA) requirements.

2.8 FIXTURE SUPPORTS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Josam Company.
   2. MIFAB Manufacturing Inc.
   3. Smith, Jay R. Mfg. Co.
   4. Tyler Pipe; Wade Div.
   5. Zurn Plumbing Products Group; Specification Drainage Operation.

B. Water-Closet Supports:
   1. Description: Combination carrier designed for mounting height of wall-mounting, water-closet-type fixture. Include single or double, vertical or horizontal, hub-and-spigot or hubless waste fitting as required for piping arrangement; faceplates; couplings with gaskets; feet; and fixture bolts and hardware matching fixture. Include additional extension coupling, faceplate, and feet for installation in wide pipe space. Factory painted.

C. Urinal Supports:

1. Description: Type I, manufactured urinal carrier with fixture support plates and coupling with seal and fixture bolts and hardware matching fixture for wall-mounting, urinal-type fixture. Include steel uprights with feet. Factory painted.
2. Accessible-Fixture Support: Include rectangular steel uprights.

D. Lavatory Supports:
1. Description: Type II, manufactured lavatory carrier with concealed arms and tie rod for wall-mounting, lavatory-type fixture. Include steel uprights with feet. Factory painted.
2. Accessible-Fixture Support: Include rectangular steel uprights.

E. Securements
1. Stainless Steel drop in anchors with heavy-duty class stainless steel bolts. All-threaded is not acceptable.

2.9 DISHWASHER AIR-GAP FITTINGS

A. Dishwasher Air-Gap Fittings:
1. Manufacturers: Subject to compliance with requirements, provide product (or provide Dishwasher loop where local jurisdiction allows):
a. Watts Brass & Tubular; a division of Watts Regulator Co.
2. Description: Fitting suitable for use with domestic dishwashers and for deck mounting; with plastic body chrome-plated brass cover; and capacity of at least 5 gpm; and inlet pressure of at least 5 psig at a temperature of at least 140 deg F. Include 5/8-inch ID inlet and 7/8-inch ID outlet hose connections.
3. Hoses: Rubber and suitable for temperature of at least 140 deg F.
a. Inlet Hose: 5/8-inch ID and 48 inches long.
b. Outlet Hose: 7/8-inch ID and 48 inches long.

2.10 DISPOSERS

A. Disposers:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following: (unless noted otherwise on drawings or within Schedule).
a. In-Sink-Erator; a div. of Emerson Electric Co.
b. KitchenAid.
2. Description: Batch-feed household, food-waste disposer. Include reset button; switch; corrosion-resistant chamber with jam-resistant, cutlery- or stainless-steel grinder or shredder; NPS 1-1/2 outlet; quick-mounting, stainless-steel sink flange; antisplash guard; and combination cover/stopper.
a. Type: Batch-feed household.
b. Model: Sound-insulated chamber.
c. Motor: 115-V ac.
d. Minimum 1/2 HP motor

2.11 WATER CLOSETS

A. Water Closets, Floor Mounted, ADA-Compliant:
1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing “Plumbing Fixture Schedule” or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule)
a. American Standard Companies, Inc.
b. Kohler Co.
c. Sloan (Water Closets/Flush Valve combo)
2. Description: Accessible, floor-mounting, floor-outlet, vitreous-china fixture designed for flush tank operation.
a. Style: two piece.
1) Bowl Type: Elongated with siphon-jet design; include bolt caps matching fixture.

2) Design Consumption: 1.28 gal./flush (unless noted otherwise on drawings or within Schedule).
3) Color: White.
4) Toilet Seat: Required; see other paragraph.
5) Flush tank: Required; see other paragraph.

3. Description: Accessible, floor-mounting, floor-outlet, vitreous-china fixture designed for flushometer valve operation.
   a. Style: Flush tank valve.
      1) Bowl Type: Elongated with siphon-jet design; include bolt caps matching fixture.
      2) Height: Accessible, 16-3/4".
      3) Design Consumption: 1.28 gal./flush (unless noted otherwise or within Schedule).
      4) Color: White.
      5) Toilet Seat: Required; see other paragraph.
      6) Flush tank: Required; see other paragraph.

2.12 URINALS

A. Urinals:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing "Plumbing Fixture Schedule" or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule).
      a. American Standard Companies, Inc.
      b. Kohler Co.
      c. Sloan (Urinals/Flush Valve combo)
   2. Description: Accessible, wall-mounting, back-outlet, vitreous-china fixture designed for flushometer valve operation.
      a. Type: Siphon jet.
      b. Design Consumption: 0.5 gal./flush (unless noted otherwise on drawings or within Schedule).
      c. Color: White.
      d. Supply Spud Size: NPS 3/4.
      e. Outlet Size: NPS 2.

2.13 LAVATORIES

A. Lavatories:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing "Plumbing Fixture Schedule" or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule).
      a. American Standard Companies, Inc.
      b. Kohler Co.
   2. Description: Accessible, wall-mounting, vitreous-china fixture.
      a. Type: With back Ledge back Shelf back Slab Pedestal.
      b. Faucet Hole Punching: Coordinate with faucet.
      c. Color: White.
      d. Supplies: NPS 3/8 chrome-plated copper with stops.
      e. Drain: Grid.
      f. Drain Piping: NPS 1-1/4 chrome-plated, cast-brass 17-ga. P-trap; NPS 1-1/4 0.045-inch thick tubular brass waste to wall (trap arm); and wall escutcheon.

2.14 COMMERCIAL SINKS

A. Commercial Sinks:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing "Plumbing Fixture Schedule" or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule).
      a. Elkay Manufacturing Co.

b. Just Manufacturing Company.

2. Description: Counter-mounting, seamless commercial sink, self-rimming, fully undercoated for sound attenuation, with 1-3/4" radius coved corners.
   a. Metal: 304 stainless steel, 18 gauge.
   b. Finish: Satin.
   c. Drain: 3" Grid, chrome-plated brass, with vandal resistant strainer and NPS 1-1/2 tailpiece; unless otherwise indicated.
   d. Supplies: NPS 1/2 chrome-plated copper with stops.
   e. Drain Piping: NPS 1-1/2 chrome-plated, cast-brass P-trap; 0.045-inch- thick tubular brass waste to wall (trap arm); and wall escutcheon(s).

2.15 KITCHEN SINKS

A. Kitchen Sinks, Barrier Free:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing "Plumbing Fixture Schedule" or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule).
      a. Kohler Co.
      b. American Standard Companies, Inc.
   2. Description: Two-compartment (high/low), accessible, built into counter, enameled, cast-iron kitchen sink.
      a. Overall Dimensions:
      b. Metal Thickness: 0.038 inch 0.050 inch.
      c. Left Compartment:
         1) Dimensions: 7 x 9-inches.
         2) Drain: 3-1/2-inch outlet for disposer.
            a) Location: Near back of compartment.
      d. Right Compartment:
         1) Dimensions: 21 x 16-inches.
         2) Drain: 3-1/2-inch crumb cup.
            a) Location: Near back of compartment on left side.
      e. Supplies: NPS 1/2 chrome-plated copper with stops.
      f. Drain Piping: Drain Piping: NPS 1-1/2 chrome-plated, cast-brass P-trap; 0.045-inch thick tubular brass waste to wall (trap arm); and wall escutcheon(s).
      g. Color: White.
      h. Barrier-free Shroud: Required.
      i. Disposer: Required for left compartment.
      j. Dishwasher Air-Gap Fitting: Required.

2.16 SERVICE BASINS

A. Service Basins:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing "Plumbing Fixture Schedule" or a comparable product by one of the following: (unless noted otherwise on drawings or within Schedule).
      a. Crane Plumbing, L.L.C./Fiat Products.
      b. Stern-Williams Co., Inc.
   2. Description: Flush-to-wall, floor-mounting, pre-cast terrazzo fixture with rim guard.
      a. Rim Guard: On front surfaces, stainless steel.
      b. Faucet: As indicated on drawing "Plumbing Fixture Schedule."
      c. Color: Not applicable.
      d. Drain: Cast-brass with nickel-bronze grid and NPS 3 (DN 80) outlet; extra heavy-duty, cast iron, deep seal trap.

2.17 UTILITY BOXES

A. Utility Boxes, Clothes Washer:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing “Plumbing Fixture Schedule.”
2. Description: Flush mounted in wall cavity with shutoff valves.
   a. Material: Galvanized Steel.
   b. Finish: Unpainted.
   c. Valves: Bronze, brass stem, compression.
   d. Outlets: 3/4" Hose Thread.
   e. Inlet Size: NPS 1/2, female thread.
   f. Supplies: 60-inch Heavy-duty CW and HW clothes washer hoses, manufactured by Floodcheck (no exceptions). Provide with shock arrestors equal to Precision Plumbing Products #WHA-500L.

B. Utility Boxes, Ice Maker:
1. Basis-of-Design Product: Subject to compliance with requirements, provide the product listed on the drawing “Plumbing Fixture Schedule.”
2. Description: Flush mounted in wall cavity with angle stop.
   a. Material: Galvanized Steel.
   b. Finish: Unpainted.
   c. Supply: Annealed copper tube, minimum 48-inch length (coiled) to permit pulling out appliance for rear service.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine roughing-in of water supply and sanitary drainage and vent piping systems to verify actual locations of piping connections before plumbing fixture installation.

B. Examine cabinets, counters, floors, and walls for suitable conditions where fixtures will be installed.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Assemble plumbing fixtures, trim, fittings, and other components according to manufacturers' written instructions.

B. Install off-floor supports, affixed to building substrate, for wall-mounting fixtures.
1. Use carrier supports with waste fitting and seal for back-outlet fixtures.
2. Use carrier supports without waste fitting for fixtures with tubular waste piping.
3. Use chair-type carrier supports with rectangular steel uprights for accessible fixtures.

C. All wall mounted fixtures and equipment shall be installed with floor mounted carriers (provided by Manufacturer).

D. Install wall-mounted fixtures AT ELEVATIONS INDICATED ON ARCHITECTURAL DRAWINGS.

E. Install back-outlet, wall-mounting fixtures onto waste fitting seals and attach to supports.

F. Install floor-mounting fixtures on closet flanges or other attachments to piping or building substrate.

G. Install wall-mounting fixtures with tubular waste piping attached to supports.

H. Install floor-mounting, back-outlet water closets attached to building floor substrate and wall bracket and onto waste fitting seals.

I. Install counter-mounting fixtures in and attached to casework.

J. Install fixtures level and plumb according to roughing-in drawings.

K. Install water-supply piping with stop on each supply to each fixture to be connected to water distribution piping. Attach supplies to supports or substrate within pipe spaces behind fixtures. Install stops in locations where they can be easily reached for operation.
   1. Exception: Use ball valve, if supply stops are not specified with fixture. Valves are specified in Specification Section "Valves."

L. All appurtenances supporting fixtures to be chrome plated in exposed areas (including but not limited to under-cabinet areas).

M. Install trap and tubular waste piping on drain outlet of each fixture to be directly connected to sanitary drainage system.

N. Install tubular waste piping on drain outlet of each fixture to be indirectly connected to drainage system.

O. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for people with disabilities to reach.

P. Install toilet seats on water closets.

Q. Install faucet-spout fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

R. Install water-supply flow-control fittings with specified flow rates in fixture supplies at stop valves.

S. Install faucet flow-control fittings with specified flow rates and patterns in faucet spouts if faucets are not available with required rates and patterns. Include adapters if required.

T. Install shower flow-control fittings with specified maximum flow rates in shower arms.

U. Install traps on fixture outlets.
   1. Exception: Omit trap on fixtures with integral traps.
   2. Exception: Omit trap on indirect wastes, unless otherwise indicated.

V. Install disposer in outlet of each sink indicated to have disposer. Install a labeled switch where indicated or in wall adjacent to sink if location is not indicated.

W. Install dishwasher air-gap fitting at each sink indicated to have air-gap fitting. Install on countertop at sink. Connect inlet hose to dishwasher and outlet hose to disposer.

X. Install escutcheons at piping wall ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding fittings. Escutcheons are specified in Specification Section "Basic Mechanical Materials and Methods."

Y. Seal joints between fixtures and walls, floors, and countertops using sanitary-type, one-part, mildew-resistant silicone sealant. Match sealant color to fixture color. Sealants are specified in Specification Section "Joint Sealants."

3.3 CONNECTIONS

A. Piping installation requirements are specified in other plumbing specification sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Connect fixtures and appliances with water supplies, stops, and risers, and with traps, soil, waste, and vent piping. Use size fittings required to match fixtures.

C. Ground equipment according to Specification Section "Grounding and Bonding."

D. Connect wiring according to Specification Section "Conductors and Cables."

E. Arrange for electric-power connections to fixtures, transformers and devices that require power. Electric power is specified in Electrical Specification Sections.

3.4 FIELD QUALITY CONTROL

A. Verify that installed plumbing fixtures are categories and types specified for locations where installed.

B. Check that plumbing fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed plumbing fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized for proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

3.5 ADJUSTING

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Operate and adjust disposers and controls. Replace damaged and malfunctioning units and controls.

C. Adjust water pressure at faucets and flushometer valves to produce proper flow and stream.

D. Replace washers and seals of leaking and dripping faucets and stops.

E. Install fresh batteries in sensor-operated mechanisms.

F. Run hot water (full flow) at each faucet until temperature is stable (-2 degree deviation from water heater set point); balance manual (y-type, etcetera) mixing valve at each faucet to 110 F spout-discharge temperature.

G. After compression cartridges are well-seated (50-60 cycles), adjust faucet wrist-blade handles to position parallel to back-splash (or wall that lavatory is mounted to) when fully closed (tight).

3.6 CLEANING

A. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Do the following:
   1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
   2. Remove sediment and debris from drains.

B. After completing installation of exposed, factory-finished fixtures, faucets, and fittings, inspect exposed finishes and repair damaged finishes.

3.7 PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of plumbing fixtures for temporary facilities unless approved in writing by Owner.

END OF SECTION 224100

SECTION 230005

MECHANICAL DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of building or structure.
   2. Demolition and removal of selected site elements.
   3. Salvage of existing items to be reused or recycled.

1.2 DEFINITIONS

A. Remove or Demolish: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner cleaned, packaged, and ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
   1. Coordinate with Owner's representative, who will establish special procedures for removal and salvage.

1.4 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shutoff, capping, and continuation of utility services (including but not limited to: Gas, Water, Fire Suppression, Chilled Water, Hot Water, Air Conditioning, etc).
   4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
   5. Means of protection for items to remain and items in path of waste removal from building.

B. Inventory: After selective demolition is complete, submit a list of items that have been salvaged.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

C. Pre-demolition Conference: Conduct conference at Project site to comply with requirements in Section “Project Management and Coordination.” Review methods and procedures related to selective demolition including, but not limited to, the following:
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.6 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

1.7 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.

B. Service/ Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
      a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   2. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
   3. Maintain adequate ventilation when using cutting torches.
   4. Dispose of demolished items and materials promptly.

B. Removed and Salvaged Items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner's storage area designated by Owner.
   5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

E. Contractor shall terminate demolished pipe and/or ductwork. System shall be capped and insulated per new work specification.

F. Contractor shall remove any abandoned piping and/or ductwork in area of construction during the demolition process.

G. Unforeseen Conditions
   1. Any unforeseen utilities found during construction that directly affect any trade must be brought to the engineer's attention via RFI.
   2. All existing conditions must be clearly annotated on the As-Built drawings.

H. Repair any walls, floors or roofs that piping, ducts or equipment have been removed from (or through). Patch with similar materials to match finish and color (paint to match). If paint cannot be matched, repaint entire wall or surface.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

END OF SECTION 230005

SECTION 230100

SPECIAL CONDITIONS FOR ALL MECHANICAL WORK

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. This section covers the general provisions of the mechanical specifications applicable to the following systems:
   1. Heating, air conditioning, and ventilation.

B. The use of the word mechanical in the body of the various specifications sections shall be interpreted to include all the aspects of all of the systems referenced in Mechanical Specifications.

1.2 DRAWINGS

A. These specifications are accompanied by drawings of the building and details of the installations showing the locations of equipment, piping, ductwork, etc. The drawings and these specifications are complementary to each other; requirements described in one or the other shall be considered binding as if described in both.

B. If any departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted to the Owner's Representative for approval. No departures shall be made without prior written approval by the Owner's Representative.

C. There are intricacies of construction which are impractical to specify or indicate in detail; means and methods for performing such work shall adhere to commonly accepted industry standards.

D. It is the Contractor's responsibility to properly use all information found on the Architectural, Structural, Mechanical, and Electrical drawings and applicable shop drawings where such information affects his work.

E. For new buildings, all final dimensions shall be scaled from the Architectural drawings, unless otherwise noted. For work associated with existing buildings (renovations and additions), all final dimensions shall be field verified.

1.3 CONSTRUCTION REQUIREMENTS

A. The architectural, civil, structural, electrical, plumbing, fire protection and mechanical drawings, and specifications are all part of the Contract Documents. In many instances there are details described on another trade's drawings that are not necessarily included or referenced in the mechanical drawings. It is the Contractor's responsibility to review in detail all parts of the Contract Documents prior to submitting a bid. Failure to comply with this requirement shall not relieve the Contractor of responsibility or be used as cause for additional compensation because architectural, structural, or electrical details were not included in the mechanical drawings.

B. It is the intent of the Contract Documents to provide complete and fully functional installation in every respect. Material and/or construction details not specifically described in the Contract Documents, but commonly considered incidental to the industry, are required by the Contractor.

C. The Contractor shall be responsible for fitting his material and apparatus into the building and shall carefully lay out his work at the site to conform to the structural conditions, to avoid all obstructions, to comply with Codes, to facilitate the work of other trades, to conform to the details of the installation supplied by the manufacturer of the equipment to be installed, and thereby to provide an integrated satisfactory operating installation.

D. The mechanical, electrical and plumbing drawings are schematic in nature and do not show every connection in detail or every pipe or conduit in its exact location. These details are subject to the requirements of ordinances and structural and architectural conditions.

E. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases and above suspended ceilings, etc. in finished portions of the building, unless specifically noted to be exposed. Work shall be installed to avoid compromising structural members; therefore, inserts to accommodate hangers shall be set before concrete is poured, and proper openings through floor, walls, beams, etc. shall be provided as hereinafter specified or as otherwise indicated or required. All work shall be installed parallel or perpendicular to building lines unless otherwise noted.

F. When the mechanical drawings do not give exact details as to the elevation of pipe or ducts, physically arrange the systems to fit in the space available at the elevations intended with the proper grades for the functioning of the system involved. Piping, exposed conduit, and duct systems are generally intended to be installed true and square to the building construction and located as high as possible against the structure in a neat and workmanlike manner. The plans do not show all required offsets, control lines, pilot lines, and other location details. Work shall be concealed in all finished areas. Piping specified to be insulated shall be supported in a manner that will allow the insulation to be installed without gaps. Insulated piping in concealed areas shall be offset with fittings as necessary to permit installation of insulation. Bending of pipes or installing pipes in a strain to insulate will not be permitted.

G. Final placement of serviceable equipment shall be carefully coordinated with all other trades to ensure sufficient clearance for maintenance according to manufacturer's recommendations. Lubricating orifices and adjustable components shall be easily accessible. Piping, conduit, valve stems, cabling and other building systems shall not interfere with service space.

H. Location of Exposed Devices
   1. All exposed devices (grills, registers, diffusers, sprinkler heads, medical gas outlets, plumbing rough-ins, lights, outlets, communication devices, etcetera) shall be referenced to fixed data points that are coordinated with all trades; shall be located to present symmetrical arrangements with respect to the fixed data point; and shall facilitate the proper arrangements of acoustical ceiling tiles. Fixed data points shall include such features as wall and ceiling lines, soffits, balanced border widths, masonry joints, etc. Devices located in acoustical ceiling tiles shall occur symmetrically in tile joints or in the centers of whole tiles. The final determination of the exact location of each outlet and the arrangements to be followed shall be acceptable to the Owner's Representative.
   2. The drawings schematically indicate locations of the exposed devices. Final locations shall be determined by carefully coordinating the drawings pertaining to each trade. Where conflicts are identified, Owner's Representative shall determine final location. The Owner reserves the right to make any reasonable change in location of any device before installation, without additional cost.

1.4 QUALIFICATIONS

A. Contractor must have minimum of five years experience installing commercial heating, ventilation and air conditioning systems, plumbing and piping systems similar to those described in these Contract Documents.

B. Contractor must be licensed and hold a current contracting license that has been valid for a minimum of five years in the State of Texas.

C. Contractor must be able to bond work for payment and performance of work being bid. Contractor's bonding agency shall have a Best's insurance rating of A or A+.

1.5 MATERIAL AND EQUIPMENT REQUIREMENTS

A. Manufacturer's Instructions: The manufacturer's published instructions shall be followed for preparing, assembling, installing, erecting, and cleaning manufacturer materials or equipment, unless otherwise indicated. The Contractor shall promptly notify the Owner's Representative in writing of any conflict between the requirements of the Contract Documents and the manufacturer's direction and shall obtain the clarification of the Owner's Representative before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturer's directions or such clarification by the Owner's Representative, he shall bear all costs arising in connection with the correction of the deficiencies.

B. Storage at Site: The Contractor shall not receive material or equipment at the jobsite until there is suitable space provided to properly protect equipment from rust, drip, humidity, and dust damage and from surrounding work.

C. Capacities shall be not less than those indicated and shall be such that no component or system becomes inoperative or is damaged because of startup or other overload conditions.

D. Conformance to Agency Requirements: Where materials or equipment are specified to be approved, listed, tested, or labeled by the Underwriters Laboratories, Inc., ETL listed or constructed and/or tested in accordance with the standards of the American Society of Mechanical Engineers or the Air Moving and Conditioning Association, the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of the Underwriters Laboratories, Inc. or ETL applied to the item will be acceptable as sufficient evidence that the items conform to such requirements. The ASME stamp or the AMCA label will be acceptable as sufficient evidence that the items conform to the respective requirements.

E. Nameplates: Each major component of equipment shall have the manufacturer's name, address, and model-identification number on a plate securely attached to the item of equipment. All data on nameplates shall be legible at the time of Final Inspection.

F. Prevention of Rust: Standard factory finish will be acceptable on equipment specified by model number otherwise surfaces of ferrous metal shall be given a rust-inhibiting coating. The treatment shall withstand 200 hours in salt-spray fog test, in accordance with Method 6061 of Federal Standard No. 141. Immediately after completion of the test, the specimen shall show no signs of wrinkling or cracking and no signs of rust creepage beyond 1/8 inch on either side of the scratch mark. Where rust inhibitor coating is specified hereinafter, any treatment that will pass the above test is acceptable unless a specific coating is specified, except that coal tar or asphalt-type coatings will not be acceptable unless so stated for a specific item. Where steel is specified to be hot-dip galvanized, mill-galvanized sheet steel may be used provided all raw edges are painted with a zinc-pigmented paint conforming to Military Specification MIL-P-26915.

G. Protection from Moving Parts: Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts located so that any person can come in close proximity thereto, shall be fully enclosed or properly guarded.

H. Drive Guards: For machinery and equipment, provide guards as shown in AMCA 410 for belts, chains, couplings, pulleys, sheaves, shafts, gears, and other moving parts regardless of height above the floor. Drive guards may be excluded where motors and drives are inside factory-fabricated air handling units casings. Guards shall be constructed of sheet steel, cast iron, expanded metal, or wire mesh rigidly secured so as to be removable without disassembling pipe duct or electrical connection to equipment. Provide a 1-inch diameter hole in each drive guard at each shaft center to allow access for speed measurement.

I. Verifications of Dimensions: The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Owner's Representative of any discrepancy before performing any work. Adjustments to the work required in order to facilitate a coordinated installation shall be made at no additional cost to the Owner, Architect, or Engineer.

J. Standard Products: Materials and equipment to be provided shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications, and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

K. Spare Parts Data: As soon as practicable after approval of materials and equipment and, if possible, not later than four months prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies with current unit prices and sources of supply, a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment or specified hereinafter to be furnished as part of the Contract, and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 120 days at the particular installation. The foregoing shall not relieve the Contractor of any responsibilities under the warranty specified.

1.6 INSPECTION OF THE SITE

A. The Contractor shall visit the site, verifying all existing items indicated on drawings and/or specified, and familiarize himself with the existing work conditions, hazards, grades, actual formations, soil conditions, structures, utilities, equipment, systems, facilities, and local requirements. The submission of bids shall be deemed evidence of such visits. All proposals shall take these existing conditions into consideration, and the lack of specific information shall not relieve the Contractor of any responsibility.

1.7 UTILITY LOCATIONS AND ELEVATIONS

A. Locations and elevations of the various utilities included within the scope of this work have been obtained from substantially reliable sources and are offered separately from the Contract Documents, as a general guide only, without guarantee as to accuracy. Examine the site, the locations, and availability of all utilities and services required for their relation to the work. Verify the location of all existing site utilities with each responsible utility company or applicable party. The Contractor shall repair all damage to existing utilities, whether indicated on the drawings or not, at his sole expense.

1.8 PERMITS, UTILITY CONNECTIONS, AND INSPECTIONS

A. Permitting Fees: Contractor shall pay for all fees associated with permits required by municipal authorities having jurisdiction.

B. Tapping and Impact Fees: Contractor shall pay for all fees associated with tapping into municipal utility mains, including sanitary sewer, natural gas and domestic water. Impact fees will be paid for by the Owner.

C. Compliance: The Contractor shall comply in every respect with all requirements of local authorities having jurisdiction, including building inspections, fire marshal, local ordinances and codes, and utility company requirements. In no case does this relieve the Contractor of the responsibility of complying with these specifications and drawings where specified conditions are of a higher quality than the requirements of the above-specified authorities. Where requirements of the specifications and drawings are below the requirements of the above offices having jurisdiction, the Contractor shall make installations in compliance with the requirements of the above authorities.

D. Utilities: The Contractor shall coordinate with the various utility companies involved in this project and shall provide required utility relocations, extensions, modifications, and/or changes (complete in all respects) as described in the Contract Documents. Contractor shall verify the location of all existing utilities with the applicable Utility Company. The Contractor shall be responsible for all damages to existing utilities, whether indicated on drawings or not, and repair all damage to existing utilities as acceptable to the affected Utility Company.

E. Certification: Prior to final acceptance, the Contractor shall furnish a certificate of acceptance from the inspection departments having jurisdiction over the work for any and all work installed under this Contract. Any additional labor costs incurred as a result of a substitution shall be the Contractor’s responsibility.

1.9 EXISTING FACILITIES

A. The Contractor shall be responsible for loss or damage to the existing facilities caused by him and his workmen and shall be responsible for repairing or replacing such loss or damage. The Contractor shall send proper notices, make necessary arrangements, and perform other services required for the care, protection, and in-service maintenance of all plumbing, heating, air conditioning, and ventilating services for the new and existing facilities. The Contractor shall erect temporary barricades, with necessary safety devices, as required to protect personnel from injury, removing all such temporary protection upon completion of the work.

B. The Contractor shall provide temporary or new services to all existing facilities as required to maintain their proper operation when normal services are disrupted as a result of the work being performed under this project.

C. Where existing construction is removed to provide working and extension access to existing utilities, Contractor shall remove doors, piping, conduit, outlet boxes, wiring, light fixtures, air conditioning ductwork and equipment, etc. to provide this access and shall reinstall same upon completion of work in the areas affected.

D. Where partitions, walls, floors, or ceilings of existing construction are indicated to be removed, all Contractors shall remove and reinstall in locations approved by the Architect/Engineer all devices required for the operation of the various systems installed in the existing construction. This is to include but is not limited to temperature controls system devices, electrical switches, relays, fixtures, piping, conduit, etc.

E. Outages of services as required by the new installation will be permitted but only at a time approved by the Owner. The Contractor shall allow the Owner two weeks in order to schedule required outages. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the contract amount.

1.10 DEMOLITION AND RELOCATION

A. The Contractor shall modify, remove, and/or relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Salvage materials shall remain the property of the Owner and shall be delivered to such destination or otherwise disposed of as directed by the Owner. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The Contractor may, at his discretion, and upon the approval of the Owner, substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.

B. All items which are to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean and repair and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.

C. When items scheduled for relocation and/or reuse are found to be in damaged condition before work has been started on dismantling, the Contractor shall call the attention of the Owner to such items and receive further instructions before removal. Items damaged in repositioning operations are the Contractor’s responsibility and shall be repaired or replaced by the Contractor as approved by the Owner, at no additional cost to the Owner.

D. Service lines and wiring to items to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner. Service lines and wiring not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied off or disconnected in a safe manner acceptable to the Owner. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or

facilities which must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner as hereinbefore specified.

1.11 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. No substitution of materials or equipment herein specified or called for on the drawings will be permitted, except by written permission of the Owner's Representative. Where several makes of equipment or material are mentioned, any item named may be bid upon provided it meets space, capacity specifications, and other requirements.

1.12 SUBMITTALS

A. Submittals for Review:
   1. As soon as practical or within 30 days after the date of contract award or notice to proceed, and before purchasing or starting installation of any materials or equipment, the Contractor shall submit for review sufficient material and equipment data to indicate that all requirements of the specifications have been met and samples shall be furnished when requested. All manufacturer's data used as part of the submittal shall have all non-applicable features crossed out or deleted in a manner that will clearly indicate exactly what is to be furnished.
   2. Four (4) copies of the submittal list and detailed submittals (for the Owner's and A/E's use) shall be submitted to the Owner's Representative. The Contractor is requested to include a minimum of three (3) additional copies for insertion in the project's Owner's Manuals at the completion of the project, and the number of additional copies the Contractor requires for his and his subcontractor's use during the project's construction. The detailed submittals shall be accompanied by the same number of sets of pictorial and descriptive data derived from the manufacturer's catalogs and sales literature or incorporated in the shop drawings. The Contractor may provide a detailed submittal on any item even though not required by the Owner's Representative.

B. Format
   1. Submittals shall be in pdf format. The first page shall have a cover sheet inserted with the title "MECHANICAL SUBMITTALS" centered in large print. Below the title shall be printed the name of the project, the date, the project location, the name and address of the contractor, the name and address of the subcontractor and the name and address of the engineer(s) in smaller print.
   2. Provide a Table of Contents at the beginning of the binder that summarizes the information being submitted according to specification section.
   3. Submittals shall be tab divided by specification section; all sections identified in the project specifications shall have a tab. When no information is being provided concerning a particular specification section, insert a single dated sheet that explains the circumstances.
   4. Loose-leaf or piecemeal submittals are not acceptable and subject to rejection unless prior approval has been granted by the Engineer.

C. Content:
   1. The Contractor shall prepare or cause to be prepared shop drawings, product data, materials and equipment lists, diagrams, data, samples, and other submittals as required by the contract documents, hereinafter referred to as "Submittal Data." The Contractor shall review and approve all submittal data for compliance with the contract documents, manufacturer's recommendations, adequacy, clearances, code compliance, safety, and coordination with associated work.
   2. The Contractor shall submit approved submittal data to the Owner's Representative for review and comment as to general conformance with the design concept and general compliance with information given in the contract documents. Owner's Representative's review shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with other trades or work, or construction safety and precautions, all of which are the sole responsibility of the Contractor.
   3. The Contractor shall clearly and specifically identify and call to the attention of the Owner's Representative any deviation from the contract documents for which Owner acceptance is desired. The responsibility for such a deviation accepted by the Owner shall remain with the Contractor.

4. Timeliness: The burden of timeliness in the complete cycle of submittal data is on the Contractor. The Contractor shall allow a minimum of four (4) weeks' time frame for review of each submission by the Owner's Representative. The Contractor is responsible for allowing sufficient time in the construction schedule to cover the aforementioned cycles of data processing, including time for all re-submission cycles on nonconforming materials, equipment, etc. covered by the data submitted. Construction delays and/or lack of timeliness in the above regard are the responsibility of the Contractor and will not justify any request for scheduled construction time extensions or extra compensation.
5. Work performed in accordance with approved submittal date that is not in accordance with the Contract Documents and did not have the specific acceptance of the Owner's Representative shall be replaced at Contractor's cost.

D. Re-submittals
1. Re-submit entire submittal in accordance with afore mentioned format and content requirements. Loose-leaf or piecemeal re-submittals are not acceptable. New and/or revised data for each section shall be prefaced with a colored (yellow, pink, orange, etc) cover sheet that identifies (in a word or two) the materials and/or equipment being re-submitted. Typeset the words "REVISED SUBMITTAL NO. 1 (or 2, 3 as applicable)" centered at the bottom of the cover sheet.
2. Subsequent re-submittals (second and third, if necessary) shall have different colored cover sheets to distinguish between the various re-submittals.
3. Include a cover letter at front of binder that specifically responds to each "REVISE AND RE-SUBMIT COMMENT" or "REJECTED" comment by number. Example responses would include the following:
   a. RESPONSE: "Please see attached re-submittal."
   b. RESPONSE: "Will be re-submitted at a later date."
   c. RESPONSE: "Requirement for (xxxxxx) was deleted in Addendum No. 2."
   d. RESPONSE: "Exception requested based on Section xx, Paragraph x.x.x.

E. These paragraphs related to Mechanical submittal data supersede any conflicting requirements contained in Division 01 sections.

1.13 CONTRACTOR CERTIFICATION OF SUBMITTAL DATA

A. The Contractor shall provide the following certification with all submittal data furnished to the Owner's Representative for review and comment.

Project Title:

Description of Submittal Data:

This is to certify that the above-described submittal data has been reviewed and is approved for compliance with the Contract Documents, manufacturer's recommendation, adequacy, clearances, code compliance, safety, and coordination with other trades and/or work except as follows: (list "none" or itemize and explain). In addition, the Contractor shall submit to the Owner's Representative a signed statement from each representative certifying as follows:

"I certify that the materials and/or equipment listed below have been personally inspected by the undersigned authorized manufacturer's representative and is properly installed and operating in accordance with the manufacturer's recommendations and are asbestos free."

_____

Name and Company

1.14 ACCEPTANCE OF MATERIALS AND EQUIPMENT

A. All equipment installed on this project shall have local (within 125 miles) representation, local factory-authorized service, and a local stock of repair parts. This requirement is essential and will be strictly

reviewed by the Owner's Representative prior to concurrence with the Contractor's approval for all submittals covered by Mechanical sections of this Specification.

B. NOTICE: The Contractor is responsible for providing materials and equipment that conform to the requirements of the project manual in every respect unless a deviation has been "accepted" in writing. Removal of any nonconforming materials and equipment and the replacement with conforming materials and equipment shall be at the Contractor's sole expense, regardless of when nonconformance was discovered.

C. Approval of materials and equipment shall be based on manufacturer's published data and shall be tentatively subject to the submission of complete shop drawings which comply with the contract documents. Approval is also dependent upon the existence of adequate and acceptable clearances for entry, servicing, and maintenance.

D. Approval of materials and equipment under this provision shall not be construed as authorizing any deviations from the specifications, unless the attention of the Owner's Representative has been directed in writing to the specific deviations. Data submitted shall not contain unrelated information unless all pertinent information is properly identified.

E. Physical Size of Equipment: Space is critical; therefore, equipment of larger sizes than shown, even though of approved manufacturer, will not be acceptable unless it can be demonstrated that ample space exists for proper installation, operation, and maintenance.

1.15 SHOP DRAWINGS

A. As soon as practicable after the award of contract and approval of materials and equipment, but prior to installation, complete and detailed shop drawings of the following shall be submitted for review and comment:
   1. Equipment arrangements.
   2. Duct layouts.
   3. Piping layouts.
   4. Layouts of equipment spaces indicating ductwork and piping larger than 2 inches.
   5. Typical fittings and connections.
   6. Equipment foundations.
   7. Factory-fabricated equipment and materials.
   8. Anchors.
   9. Control.
   10. Interlock.
   11. Sprinkler locations.
   12. Other details as directed by the Owner's Representative. Composite drawings of areas requiring coordination between trades shall be provided and expedited to eliminate conflicts and to ensure maximum cooperation and work progress.

B. Work performed without benefit of reviewed and approved shop drawings will not be recommended for payment by the Engineer until such time as the shop drawings are submitted, reviewed, and approved. Any work performed without the benefit of reviewed and approved shop drawings may require removal, relocation, and/or replacement at the Contractor's sole expense in order to resolve conflicts between the various systems and provide the performance specified.

C. All installation of equipment, fixtures, terminal devices, etc. shall be made in accordance with approved composite shop drawings. The Contractor shall modify installation and relocate installed work to provide code clearances, service access, and eliminate conflict with other systems.

D. Submit one print of shop drawings for each area, floor, system, etc. The print will be marked with the A/E's comments and returned to the Contractor. Contractor shall revise shop drawings, incorporate revisions in field and submit revised shop drawings at project close out.

1.16 SITE OBSERVATION

A. Site observation by the Architect, Engineer, and/or Owner's Representative is for the express purpose of verifying compliance by the Contractor with the contract documents, and shall not be construed as construction supervision nor indication of approval of the manner or location in which the work is being performed as being a safe practice or place.

1.17 SUPERVISION

A. In addition to the Superintendent required under the conditions of the contract, each subcontractor shall keep a competent superintendent or foreman on the job at all times.

B. It shall be the responsibility of each superintendent to study all plans and familiarize himself with the work to be done by other trades. He shall coordinate his work with other trades and, before material is fabricated or installed, make sure that his work will not cause an interference with another trade. Where interferences are encountered, they shall be resolved at the jobsite by the superintendents involved. Where interferences cannot be resolved without major changes to the plans, the matter shall be referred to the Owner's Representative for comments.

1.18 OPERATION PRIOR TO COMPLETION

A. When any piece of mechanical equipment is operable and it is to the advantage of the Contractor to operate the equipment, he may do so, providing that he properly supervises the operation and has the written permission of the Owner's Representative to do so. The warranty period shall not commence, however, until such time as the equipment is operated for the beneficial use of the Owner or date of substantial completion, whichever occurs first.

B. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, install clean filter media, properly adjust, and complete all deficiency list items before final acceptance by the Owner. The date of acceptance and the start of the warranty may not be the same date.

1.19 MANUFACTURER'S RECOMMENDATIONS

A. The manufacturer's published directions shall be followed in the delivery, storage, protection, installation, piping, and wiring of all equipment and material. The Contractor shall promptly notify the Owner's Representative, in writing, of any conflict between the requirements of the contract documents and the manufacturer's directions, and shall obtain the Owner's Representative's comments before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturer's directions or applicable comments from the Owner's Representative, he shall bear all costs arising in connection with the correction of such deficiencies.

1.20 CHECKING AND TESTING MATERIALS AND/OR EQUIPMENT

A. Before final acceptance of the work, an authorized representative of the manufacturer of the installed materials and/or equipment shall personally inspect the installation and operation of his materials and/or equipment to determine that it is properly installed and in proper operating order. Testing and checking shall be accomplished during the course of the work where required by work being concealed, and at the completion of the work otherwise. In addition, the Contractor shall submit to the Owner's Representative a signed statement from each representative certifying as follows:

"I certify that the materials and/or equipment listed below have been personally inspected by the undersigned authorized manufacturer's representative and is properly installed and operating in accordance with the manufacturer's recommendations and are asbestos free."

B. Check inspections shall include plumbing, heating, air conditioning, ventilating, mechanical control and electrical equipment, and such other items hereinafter specified or specifically designated by the Owner's Representative.

1.21 OPERATING AND MAINTENANCE INSTRUCTION

A. The Contractor shall prepare for the owner's manual hereinafter specified complete sets of operating and maintenance instructions, system piping, valving, control and interlock diagrams, manuals, parts lists, etc. for each item of equipment. These are to be assembled as hereinafter specified for owner's manual.

B. In addition, the Contractor shall provide the service of a competent engineer or a technician acceptable to the Owner's Representative to instruct a representative of the Owner in the complete and detailed operation of all equipment and systems. These instructions shall be provided for a period of sufficient duration to fully accomplish the desired results. Upon completion of these instructions, a letter of release will be required, acknowledged by the Owner, stating the dates of instruction and personnel to whom instructions were given.

C. Additional diagrams, operating instructions, etc. shall be provided as specified hereinafter in the other sections of these specifications.

1.22 MATERIAL AND EQUIPMENT SCHEDULES

A. Contractor shall refer to both drawings and specification for schedules. Where reference is made to items "scheduled on drawings" or "scheduled in specifications," same shall include schedules contained in both the drawings and the specifications. The Contractor's attention is directed to the various specification sections and drawings for schedules.

1.23 APPLICABLE CODES AND STANDARDS

A. The installation shall meet the minimum standards prescribed in the latest editions of the following listed codes and standards, which are made a part of these specifications, except as may be hereinafter specifically modified in these specifications and associated drawings.

1. National Fire Protection Association Standards (NFPA):
   NFPA 10 - Portable Fire Extinguishers
   NFPA 54 - National Fuel and Gas Code
   NFPA 70 - National Electrical Code
   NFPA 90A - Air Conditioning Systems
   NFPA 101 - Life Safety Code
   NFPA 255 - Method of Test of Surface Burning Characteristics of Building Materials
2. American National Standards Institute (ANSI):
   15-78 - Safety Code for Mechanical Refrigeration
   C.2 - 1984 National Electrical Safety Code
   A117.1 - Handicapped Code
3. American Society of Mechanical Engineers (ASME): Section IV, V, CSD-1
4. Air Conditioning and Refrigeration Institute Standards (ARI): All standards related to refrigeration and air conditioning equipment and piping furnished under these specifications.
5. American Water Works Association (AWWA): All applicable manuals and standards.
6. Sheet Metal and Air Conditioning Contractors National Associate, Inc, (SMACNA): All applicable manuals and standards.
7. Air Moving and Conditioning Association (AMCA): All applicable manuals and standards.
8. American Society of Testing Materials (ASTM): All applicable manuals and standards.
9. National Electrical Manufacturers' Association (NEMA): All applicable manuals and standards.
10. Occupational Safety and Health ACT (OSHA):
    National Sanitation Foundation - Standard No. 2
11. American Society of Heating, Refrigeration, and Air conditioning Engineers (ASHRAE):
    ASHRAE 90.1
12. Americans with Disabilities Act, 1990
13. American Gas Association (AGA)
14. Underwriters Laboratories, Inc. (UL)
15. Manufacturer's Standardization Society of the Valve and Fitting Industry (MSS)
16. Applicable Local and State Building Codes (International Building Codes, as amended):
17. Applicable Local and State Mechanical Code (International Mechanical Code, as amended).

18. Applicable Local and State Plumbing Code (International Plumbing Code, as amended).
19. Applicable Local and State Energy Code (International Energy Conservation Code, as amended).
20. Applicable State Gas Code (International Fuel and Gas Code, as amended).

B. All materials and workmanship shall comply with all applicable city, state, and national codes, specifications, and industry standards. All materials shall be listed by the Underwriters Laboratories, Inc. as conforming to its standards and so labeled in every case where such a standard has been established for the particular type of material in question.

C. The contract documents are intended to comply with the aforementioned rules and regulations; however, some discrepancies may occur. Where such discrepancies occur, the Contractor shall immediately notify the Owner's Representative in writing of said discrepancies and apply for an interpretation. Should the discovery and notification occur after the execution of a contract, any additional work required for compliance with said regulations shall be paid for as covered by Division 1 of these contract documents, providing no work or fabrication of materials has been accomplished in a manner of noncompliance. Should the Contractor fabricate and/or install materials and/or workmanship in such a manner that does not comply with the applicable codes, rules, and regulations, the Contractor who performed such work shall bear all costs arising in correcting these deficiencies to comply with said rules and regulations.

1.24 DEFINITIONS

A. Refer to the condition of the contract for Division 1 for additional requirements regarding definitions.

B. Where "as required" or "as necessary" is used in these specifications or on the drawings, it shall mean "that situations exist that are not necessarily described in detail or indicated that may cause the Contractor certain coordination requirements in performing the work described or indicated. These coordination requirements entail the normal coordination activities expected of the Contractor where multiple trades are involved and new or existing construction causes deviations to otherwise simplistic approaches to the work to be performed. The term shall not be interpreted to permit an option on the part of the Contractor to achieve the end result."

C. Where "and/or" is used in these specifications or on the drawings, it shall mean "that situations exist where either one or both conditions occur or are required and shall not be interpreted to permit an option on the part of the Contractor.

1.25 FINAL INSPECTION

A. Refer to Division 1 for additional requirements for final inspection.

B. It shall be the responsibility of the Contractor to personally conduct a careful inspection, assuring himself that the work on the project is ready for final acceptance and developing his own "punchlists," before calling upon the Owner's Representative to make a final inspection. Failure of the Contractor to conduct such inspections and provide the Owner's Representative with a copy of his "punchlists" prior to the final inspection shall be adequate cause for the Owner's Representative to cancel any Contractor-requested final inspection.

C. In order not to delay final acceptance of the work, the Contractor shall conduct his own "final inspections" prior to requesting the Owner's Representative to "final" the project; will have all necessary bonds, guarantees, receipts, affidavits, etc. called for in the various articles of this specification prepared and signed in advance; and together with a letter of transmittal listing each paper included, shall deliver the same to the Owner's Representative at or before the time of said final inspection. The Contractor is cautioned to check over each bond, receipt, etc. before preparing same for submission to see that the terms check with the requirements of the specifications.

D. The final inspection will be made jointly by the Owner's Representative and the Owner.

1.26 REQUIREMENTS FOR FINAL ACCEPTANCE

A. Requirements for final acceptance shall include but not be limited to the Contractor accomplishing the following:
   1. Construction: Complete all construction.
   2. Deficiency Lists: Correct all deficiencies listed at time of Substantial Completion.
   3. Owner's Manual: Submit at least 30 days prior to final acceptance on (1) copy of the owner's manual for the Owner's Representative's review and comments. Following acceptance, prepare three (3) copies of bound and indexed owner's manual, to be delivered at the time of final acceptance, which shall include but not be limited to the following:
      a. System operating instructions.
      b. System control drawings.
      c. System interlock drawings.
      d. System maintenance instructions.
      e. Manufacturers', suppliers', and subcontractors' names, addresses, and telephone numbers, both local representatives and manufacturers' service headquarters.
      f. Equipment operating and maintenance instructions and parts lists.
      g. Manufacturer's certifications (see Checking and Testing Materials and/or Equipment, this section).
      h. Contractor's warranty.
      i. Acceptance certificates of authorities having jurisdiction.
      j. Log of all tests made during course of work.
      k. Owner's acknowledgment of receipt of instruction, enumerating items in owner's manual.
      l. List of manufacturers' guarantees executed by the Contractor.
      m. Certified performance curves.
      n. Balance and performance test reports.
      o. Owner's acknowledgment of items of equipment or accessories indicated or specified to be turned over to Owner.
   4. Instructions:
      a. Verbal, as herein specified.
      b. Posted, framed under glass or plastic laminated:
         1) System operating instructions.
         2) System control drawings.
         3) System interlock drawings.
   5. Record Drawings: Deliver the specified record drawings to the Owner's Representative.

1.27 RECORD DRAWINGS

A. The Contractor shall maintain a set of contract drawings (black-line prints) at the jobsite on which he shall indicate the installed (as-built) locations of the following:
   1. Equipment
   2. Main lines of piping and ductwork.
   3. Dimensional locations (including depth) of all underground piping, valves and conduits.

B. Drawings shall be used for construction reference and shall not leave the field office of the jobsite.

C. Drawings shall include all addenda, ASI's, Change Orders, and existing conditions and equipment that are not reflected in the original contract drawings.

D. Upon completion of work, the Contractor shall obtain CAD files of the contract drawings from the Owner's Representative and transfer the above as-built information into these files. The as-built files shall be permanently marked "RECORD DRAWINGS" and printed on full-size Mylar sheets. Upon completion, the CAD files shall be transferred to CD in AutoCAD 2007 format. Both the CAD files CD and Mylar drawings shall be submitted to the Owner's Representative as part of the Close-out Submittals.

E. Refer to Division 1 paragraph entitled "Record Documents" for additional requirements.

1.28 ALLOWANCES

A. Refer to Division 1 for allowances.

1.29 ALTERNATE PROPOSALS

A. Alternate proposals are summarized in Division 1 and on the bid proposal form. Refer to all sections of the specifications and the drawings to determine the exact extent and scope of the various alternate proposals as each pertains to the work of the various trades.

1.30 WARRANTY

A. General: All work performed (including equipment and materials furnished) under the various sections of these specifications shall be 100% warranted, for a period of one (1) year from the date of final acceptance thereof, against defective materials, design, and unauthorized substitution. Upon receipt of note of failure of any part of the guaranteed equipment and/or facilities during the guaranty period, the affected part(s) or facilities shall be replaced promptly with new parts, etc. by and at the expense of the Contractor. Further, the Contractor shall properly obtain, execute, and forward any and all manufacturer's warranties on equipment furnished under the Contract. Refer to Division 1 for additional requirements.

B. Extended Period: The Contractor shall provide all extended time warranties available from the manufacturer of the equipment provided as standard at no additional cost. This includes all extended warranties where specified with certain equipment as directed in other sections of this Specification.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. All materials, unless otherwise specified, shall be current United States manufacture, new, free from all defects, and of the best quality. Foreign goods specifically approved for use by the Owner's Representative prior to bidding may be furnished.

B. Materials and equipment shall be installed in accordance with the manufacturer's recommendations and the best standard practice for the type of work involved. All work shall be executed by mechanics skilled in their respective trades, and the installations shall present a neat, precise appearance.

C. The responsibility for the furnishing and installation of the proper mechanical equipment and/or material as intended rests entirely upon the Contractor. The Contractor shall request advice and supervisory assistance from the representative of specific manufacturers during the installation.

2.2 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS

A. Duct coverings, duct linings, vapor barrier facings, tapes, adhesives, core materials, insulation, jackets, piping (of any sort), and other materials in concealed locations, including any above-ceiling area, shall have a flame spread rating not over 25 without evidence of continued progressive combustion and a smoke developed rating no higher than 50. Flame spread and smoke developed ratings shall be in accordance with NFPA Standard No. 255.

2.3 BEARINGS

A. All ball bearings shall be of radial and/or thrust type and enclosed in a dust and moisture-proof housing.

2.4 MOTORS

A. The Contractor shall provide all motors required for equipment supplied under each portion of the work. Motors shall be premium efficiency and be built in accordance with the latest ANSI, IEE, and NEMA standards, shall be fully coordinated with the equipment served, shall be of sizes and electrical characteristics scheduled.

2.5 STARTING EQUIPMENT

A. Each motor shall be provided with proper starting equipment. This equipment, unless hereinafter specified or scheduled to the contrary, shall be provided by the trade furnishing the motor. All motor starting equipment provided by any one trade shall be of the same manufacture unless such starting equipment is an integral part of the equipment on which the motor is mounted.

2.6 LOW VOLTAGE (CONTROLS/THERMOSTAT) WIRING

A. All low voltage wiring installed by the Mechanical Contractor, Electrical Contractor or Controls Vendor shall be run in a neat and workmen like manner, parallel and perpendicular to building lines on J-Hooks (above ceiling grid only). Plenum rated cable shall be installed above ceilings. All other locations (exposed, Mechanical Rooms, outdoors or above hard lid ceiling) should be installed in conduit.

2.7 SLEEVES, INSERTS, AND FASTENINGS

A. General: Proper openings through floors, walls, roofs, etc. for the passage of piping, ductwork, conduits, etc. shall be provided. All piping and conduit through floors and piping through walls must pass through sleeves except soil pipe installed under concrete slabs-on-fill, and pipe and conduit that is cast-in-place. Sleeves shall be set in new construction before concrete is poured, as cutting holes through any part of the concrete will not be permitted unless acceptable to the Owner's Representative.

B. Aboveground, Exterior-Wall, Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
   1. Install steel pipe for sleeves smaller than 6 inches in diameter.
   2. Install cast-iron "wall pipes" for sleeves 6 inches in diameter and larger.
   3. Assemble and install mechanical sleeve seals according to manufacturer's written instructions. Tighten bolts that cause rubber sealing elements to expand and make watertight seal.

C. Underground, Exterior-Wall, Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
   1. Assemble and install mechanical sleeve seals according to manufacturer's written instructions. Tighten bolts that cause rubber sealing elements to expand and make watertight seal.

D. Sleeves: The minimum clearance between horizontal pipe, including insulation where applicable, and sleeve shall be 1/4 inch, except that the minimum clearance shall be 2 inches where piping contacts the ground. Sleeves through floors shall extend 3/4 inch above the floor; sleeves through walls and partitions shall be installed flush with exposed surfaces.

E. Materials: Install sleeves large enough to provide ¼" annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
   1. Steel Pipe Sleeves: For pipes smaller than 6-inch NPS.
   2. Steel, Sheet-Metal Sleeves: For pipes 6-inch NPS and larger, penetrating gypsum-board partitions.
   3. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
      a) Seal space outside of sleeve fittings with non-shrink, nonmetallic grout.

F. Inserts: Suitable concrete inserts for pipe, conduit, and equipment hangers shall be set and properly located for all piping, conduit, and equipment to be suspended from concrete construction.

G. Fasteners: Fastening of pipes, conduits, etc. in the building shall be as follows:
   1. To wood members: by wood screws.
   2. To masonry and concrete: by threaded metal inserts, metal expansion screws, or toggle bolts, whichever is appropriate for the particular type of masonry or concrete.

3. To steel: machine screws or welding (when specifically permitted or directed), or bolts.
NOTE: Under no circumstances will the use of plastic anchors or plastic expansion shields be permitted for any purpose whatsoever.

H. Ratproofing: The open space around all piping, ductwork, etc. passing through the ground floor and/or exterior walls shall be ratproofed in a manner acceptable to the Owner's Representative.

I. Weatherproofing: The annular space between a pipe and its sleeve in exterior walls or through floor to below grade shall be filled with polyurethane foam rods 50% greater in diameter than the space as backing and fill material and made watertight with a permanent elastic polysulfide compound. Seal both surfaces of wall or floor with a fire-resistant sealant.

J. Air Plenums: The space around piping, ductwork, etc. passing through an air plenum shall be made airtight in a manner acceptable to the Owner's Representative. The sealant used must be fire resistant.

2.8 FIRE AND SMOKE PARTITION, WALL, AND/OR FLOOR PENETRATIONS

A. Pipe, ductwork, conduit, etc. shall pass through fire- or smoke-rated floors, partitions, walls, or other barriers within a UL-listed assembly which shall maintain the rating of the applicable wall, floor, partition, or barrier.

B. The Contractor shall review the architectural and structural drawings and determine the location of the fire-rated building elements. Where these elements are penetrated, UL-listed fire-rated penetration assemblies approved by the local authority shall be provided in accordance with the manufacturer's instructions to obtain the required rating.

2.9 METAL BUILDING SYSTEMS/MECHANICAL-ELECTRICAL SUPPORTS

A. Metal building systems are required to be designed by the manufacturer to accommodate and support the mechanical systems indicated on the mechanical drawings and specified in Mechanical specifications.

B. The metal building systems manufacturer is required to provide the following:
1. Framed openings through the roofs with supports, roof curbs, and flashings for roof-mounted equipment, fans, vents, and air intakes.
2. Structural support for piping, conduits, and suspended equipment consisting of beam, joists, purlins, and/or blocking above and perpendicular to pipe routes and equipment hangers at intervals not to exceed 8 feet.
3. Structural support for suspended ceilings, diffusers, grilles, light fixtures including associated raceways and ductwork.

C. The mechanical trade shall:
1. Provide all routes, weights, installation heights, opening locations, etc. for all equipment, piping, vents, etc. to the metal building system manufacturer and coordinate requirements for structural supports, hangers, attachments, etc. with the metal building systems manufacturer.
2. Provide all supporting devices (hangers, attachments, brackets, cross beams, etc.) to attach to the metal building structural system.

2.10 FOUNDATIONS / HOUSEKEEPING PADS

A. General: All special foundations and supports required for the proper installation of equipment and pipe shall be provided as hereinafter specified and under the section of the specifications covering the equipment, unless otherwise indicated on the drawings.

B. All mechanical equipment shall receive concrete housekeeping pads unless otherwise noted. Equipment to receive pads are to include (but not limited to): air handlers, fan-coils, condensing units, boilers, water heaters, water softeners, expansion / compression tanks, filter feeders, water treatment equipment, air compressors, fans, pumps (in addition to inertia bases where required), chillers, surge tanks, deareators, etc.

C. Concrete foundations for the support of equipment such as floor-mounted pumps, fans, etc. shall be not less than 5½ inches high and not less than 4 inches larger (in both directions) than supported unit, unless otherwise noted and shall be poured in forms built of new dressed lumber. All corners of the foundations shall be neatly chamferred by means of sheet metal or triangular wood strips nailed to the form. Pads shall not be laid out directly against walls or structures. 2 inches shall be left available for pad form work. Foundation bolts shall be placed in the forms when the concrete is poured, the bolts being correctly located by means of templates. Allow 1 inch below the equipment bases for alignment and grouting (where applicable). Foundations for equipment located on the exterior of the building shall be provided as indicated. Foundations shall be constructed in accordance with approved shop drawings and shall be reinforced with #4 bars at 12 inches on center both ways (minimum).

D. Pipe and Conduit Support: All pipes and conduits throughout the building, both horizontal and vertical, shall be adequately supported from the construction to line of grade, with proper provision for expansion, contraction, vibration elimination, and anchorage. Vertical pipes and conduits shall be supported from floor lines with riser clamps sized to fit the lines and to adequately support their weight. At the bases of lines, where required for proper support, provide anchor base fittings or other approved supports.

2.11 ACCESS DOORS

A. General: Provide access doors for all serviceable mechanical appurtenances (valves, trap primers, shock arresters, volume dampers, fire/smoke dampers, actuators, sensors, etcetera) in inaccessible locations. Such locations include gypsum, brick and CMU ceilings and walls.

B. Location of panels shall be carefully coordinated with other Exposed Devices as described in earlier paragraphs.

C. Manufacturers shall be Inland-Milcor, Bilco, Miami Carey, or approved equal. Unless indicated otherwise, use panels equal to Milcor Style M for masonry and drywall construction, equal to Milcor Style K for plastered masonry walls and ceilings. Stainless steel panels shall be used in ceramic tile or glazed structural tile.

D. Minimum construction features include 14-gage frame and door, continuous hinges, cam-style latch and 10x10" unobstructed opening size.

E. UL labeled when in fire-rated construction, one and one-half hour rating.

F. Access doors located outside, in restrooms or in a moisture-laden environment (dressing area, shower area, lockers, etc.) shall be stainless steel construction.

G. Equipment access doors shall be of sufficient size to remove/replace equipment and provide routine maintenance as necessary, unless otherwise noted. Doors shall be set flush with adjacent finish surfaces. Exterior doors shall be provided with cylinder locks.

H. Access doors into ductwork shall be 14-gauge insulated galvanized steel with 16-gauge galvanized gasketed steel frame and cam-type locks. Ductwork access door shall be a minimum of 12" × 12" in size.

2.12 FLOOR AND CEILING PLATES

A. Except as otherwise noted, provide one-piece chrome-plated brass floor and ceiling plates (or escutcheons) around all pipes, conduits, etc. passing through walls, floors, or ceilings in any spaces, except underfloor and attic spaces. Plates shall be sized to fit snugly against the outside of the pipe or against the outside of insulation on lines which are insulated, and positively secured to such pipe or insulation. Plates will not be required for piping where pipe sleeves extend ¾ of an inch above finish floor and are concealed. Plates shall be one piece.

PART 3 - EXECUTION

3.1 SPACE AND EQUIPMENT ARRANGEMENT

A. The size of mechanical equipment indicated on the drawings is based on the dimensions of a particular manufacturer. While other manufacturers will be acceptable, it is the responsibility of the Contractor to determine whether the equipment he proposes to furnish will fit in the space. Shop drawings shall be prepared when required by the Owner's Representative to indicate a suitable arrangement.

B. All equipment shall be installed in a manner to permit access to all surfaces. All valves, motors, drives, filters, and other accessory items shall be installed in a position to allow removal for service without disassembly of another part.

3.2 LARGE APPARATUS

A. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through stairways, doorways, or shafts shall be brought to the job and placed in the space before the enclosing structure is completed. Following placement in the space, such apparatus shall be thoroughly, completely protected from damage as hereinafter specified.

3.3 PROTECTION

A. The Contractor shall take such precautions as may be necessary to properly protect all materials and equipment from damage from the time of delivery until the completion of work. This shall include the erection of all required temporary shelters and supports to adequately protect any items stored in the open on the site from the weather, the ground and surrounding work; the cribbing of any items above the floor of the construction; and the covering of items in the uncompleted building with tarpaulins or other protective covering. Failure on the part of the Contractor to comply with the above will be sufficient cause for the rejection of the items in question.

B. The Contractor shall protect existing facilities, the work of others, and the premises from any and all damages that may be made possible by the execution of work.

C. Equipment and materials shall be protected from rust both before and after installation. Any equipment or materials found in a rusty condition at the time of final inspection must be cleaned of rust and repainted as specified elsewhere in these specifications.

3.4 COOPERATION BETWEEN TRADES AND WITH OTHER CONTRACTORS

A. Each trade, subcontractor, and/or Contractor must work in harmony with the various trades, subcontractors, and/or Contractors on the job as may be required to facilitate the progress to the best advantage of the job as a whole. Each trade, subcontractor, and/or Contractor must pursue its work promptly and carefully so as not to delay the general progress of the job. This Contractor shall work in harmony with Contractors working under other contracts on the premises.

B. It shall be the responsibility of each trade to cooperate fully with the other trades on the job to help keep the jobsite in a clean and safe condition. At the end of each day's work, each trade shall properly store all of its tools, equipment, and materials and shall clean its debris from the job. Upon the completion of the job, each trade shall immediately remove all of its tools, equipment, any surplus materials, and all debris caused by its portion of the work.

3.5 PRECEDENCE OF MATERIALS AND COORINATION OF WORK

A. These specifications and the accompanying drawings are intended to cover systems which will not interfere with the structural design of the building, which will fit into the several available spaces, and which will ensure complete and satisfactory systems. Each subcontractor and/or trade shall be responsible for the proper fitting of his material and apparatus into the building.

B. The work of the various trades shall be performed in the most direct and workmanlike manner without hindering or handicapping the work of other trades. Piping interferences shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. Where space requirements conflict, the following order or precedence shall, in general, be observed:
   1. Building lines.
   2. Structural members.
   3. Light fixtures.
   4. Soil and drain piping.
   5. Condensate drains.
   6. Vent piping.
   7. Supply, return, and outside air ductwork.
   8. Exhaust ductwork.
   9. HVAC water and steam piping.
   10. Steam condensate piping.
   11. Fire protection piping.
   12. Natural gas piping.
   13. Domestic water (cold and hot).
   14. Refrigerant piping.
   15. Electrical conduit.

C. The light fixture grid layout as indicated on the drawings must be maintained. This Contractor shall refer to all light fixture plans and details indicated on the drawings and shall coordinate the location of dampers, supply grilles, return air grilles, sprinkler heads, etc. with the location of the light fixtures to assure proper access to all items in a manner acceptable to the Owner's Representative.

D. The electrical trades shall locate all junction boxes, pull boxes, conduits, etc. to avoid interference with the diffusers, dampers, grilles, etc. hereinbefore mentioned. The mechanical trades shall furnish to all other trades copies of approved ductwork shop drawings to assist in the coordination of the rough-in and installation of all items of work.

3.6 CONNECTIONS FOR OTHERS

A. This Contractor shall rough-in for and make all water, sewer, electrical, etc. connections to all fixtures, equipment, machinery, etc. provided by others in accordance with detailed roughing-in drawings provided by the equipment suppliers, by actual measurements of the equipment connections, or as detailed.

B. After the equipment is set in place, this Contractor shall make all final connections and shall provide all required pipe, fittings, valves, traps, connectors, etc.

C. Provide all air gap fittings required, using materials hereinbefore specified. In each water line serving an item of equipment or piece of machinery, provide a shutoff valve. On each drain without integral trap provide a suitable trap.

D. All pipe fittings, valves, traps, etc. exposed in finished areas and connected to chrome-plated lines provided by others shall be chrome-plated to match.

E. Provide all sheet metal ducts, transition pieces, etc. required for a complete installation of equipment provided by others.

3.7 INSTALLATION METHODS

A. Where to Conceal: All pipes and conduits shall be concealed in pipe chases, walls, furred spaces, below suspended floors, or above the ceilings of the building unless otherwise indicated.

B. Where to Expose: In mechanical rooms, janitor's closets tight against pan soffits in exposed Tee structures, or storage spaces, but only where necessary, piping and conduit may be run exposed. All exposed piping and conduit shall be run in the neatest, most inconspicuous manner, and parallel or perpendicular to the building lines.

C. Support: All piping and conduit shall be adequately and properly supported from the building structure by means of hanger rods or clamps to walls as herein specified.

D. Maintaining Clearance: Where limited space is available above the ceilings and below concrete beams or other deep projections, pipe and conduit shall be sleeved through the projection where it crosses, rather than hung below them, in a manner to provide maximum above-floor clearance. Sleeves shall be as herein specified. Approval shall be obtained from the Owner's Representative for each penetration.

E. All pipe, conduits, etc. shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. All ducts, pipes, and conduits run exposed in machinery and equipment rooms shall be installed parallel to the building lines, except that they shall be sloped to obtain the proper pitch. Piping and ducts run in furred ceilings, etc. shall be similarly installed, except as otherwise shown. Conduits in furred ceilings and in other concealed spaces may be run at angles to the construction but shall be neatly grouped and racked indicating good workmanship. All conduit and pipe openings shall be kept closed until the systems are closed with final connections.

F. Special Requirements:
1. There shall be no pipe joints nearer than 12 inches to a wall, ceiling, or floor penetration unless pipe joint is a welded or mechanically-coupled-type joint.
2. The Contractor shall study all construction documents and carefully lay out all work in advance of fabrication and erection in order to meet the requirements of the extremely limited spaces. Where conflicts occur, the Contractor shall meet with all involved trades and the Owner's Representative and resolve the conflict prior to erection of any work in the area involved.
3. All piping not directly buried in the ground shall be considered as "interior piping."
4. Prior to the installation of any ceiling material, gypsum, plaster, or acoustical board, the Contractor shall notify the Owner's Representative so that arrangements can be made for an inspection of the above-ceiling area about to be "sealed off." The Contractor shall give as much advance notice as possible up to ten (10) working days, but in no case less than five (5) working days.
5. The purpose of this inspection is to verify the completeness and quality of the installation of the air conditioning systems, the plumbing systems, and any other special above-ceiling systems such as pneumatic tube. The ceiling supports (tee bar or lath) should be in place so that access panel and light fixture locations are identifiable and so that clearances and access provisions may be evaluated.
6. No ceiling material shall be installed until the deficiencies listed from this inspection have been corrected to the satisfaction of the Owner's Representative.

3.8 CUTTING AND PATCHING

A. General: Cut and patch walls, floors, etc. resulting from work in existing construction or where made necessary by failure to provide proper openings or recesses in new construction.

B. Methods of Cutting: Openings cut through concrete and masonry shall be made with masonry saws and/or core drills and at such locations acceptable to the Owner's Representative. Impact-type equipment will not be used except where specifically acceptable to the Owner's Representative. Openings in concrete for pipes, conduits, outlet boxes, etc. shall be core drilled to exact size. Determine location of embedded conduit and reinforcing bars prior to cutting.

C. Restoration: All openings shall be restored to "as-new" condition under the appropriate specification section for the materials involved, and shall match remaining surrounding materials and/or finishes.

D. Masonry: Where openings are cut through masonry walls, provide and install lintels or other structural supports to protect the remaining masonry. Adequate supports shall be provided during the cutting operation to prevent any damage to the masonry occasioned by the operation. All structural members, supports, etc. shall be of the proper size and shape, and shall be installed in a manner acceptable to the Owner's Representative.

E. Plaster: All mechanical work in area containing plaster shall be completed prior to the application of the finish plaster coat. Cutting of finish plaster coat will not be permitted.

F. Weakening: No cutting, boring, or excavating which will weaken the structure shall be undertaken.

3.9 ROOF PENETRATIONS AND FLASHING

A. Pipe and conduit ducts, pitch pockets, curb bases, and flashing compatible with the roofing installation shall be provided for roof penetrations. Provide framing or other support around all openings through roof as required to preserve the structural integrity of the roof system and make the penetration weathertight.

B. Provide 30-inch round or square flashing acceptable to the roofing trades at all roof and deck drain and sleeve flashing locations.

C. Roof curbs for all roofs except standing seam metal roofs shall be provided by the equipment supplier supplying the roof-mounted equipment, etc., and such curbs shall be installed by the roofing trades. Contractor shall coordinate all roof curb requirements with all trades and the roofing trades at the earliest possible stage of the project.

D. Roof curbs for standing seam metal roofs shall be provided by the roofing trades. Curb base size, height, and type shall be coordinated with the roofing trades at the earliest possible stage of the project.

E. Flashing for pipe and conduit penetrations of standing seam metal roofs shall be provided and installed by the roofing trades.

3.10 EXCAVATING AND BACKFILLING

A. Perform trenching, excavating, backfilling for mechanical work as set forth below.

B. Depth of excavation to provide a minimum of 3 feet above top of pipe. Excavation to be carried to a depth of at least 6 inches below bottom of pipe elevation. Fill below pipe (6 inches), around pipe, and a minimum of 12 inches above pipe with sand of Class “B” crushed stone tamped firm and even. Separate topsoil during excavation. Final layer of dirt (12 inches minimum) to be topsoil. Trenches to be at least 18 inches wider than pipe with batter boards placed every 25 feet. Backfilling shall be done to exclude use of rock or stone above sand or Class “B” crushed stone.

3.11 TESTS AND INSPECTIONS

A. General: The Contractor shall make all tests deemed necessary by the inspection departments of the authority having jurisdiction, Board of Underwriters, etc. He shall provide all equipment, materials, and labor for making such tests. Fuel and electrical energy for system operational tests following beneficial occupancy by the Owner will be paid for by the Owner.

B. Other: Additional tests specified hereinafter under the various specification sections shall be made.

C. Notification: The Owner’s Representative shall be notified at his office 36 hours prior to each test and other specifications requirements requiring action on the part of the Owner, Architect, Engineer, and/or Owner’s Representative.

D. Test Logs: All tests which the Contractor conducts shall have pertinent data logged by the Contractor at the time of testing. Data shall include date, time, personnel, description and extent of system tested, test conditions, test results, specified results, and any other pertinent data. Data shall be delivered to the Owner’s Representative as specified under “Requirements for Final Acceptance.

E. Inspections: In general, an inspection by the Owner’s Representative shall be required prior to closing up any work and prior to beneficial occupancy or final project completion. The closing up of work includes, but is not limited to, pipe and conduit installations prior to backfilling; mechanical, electrical, and fire protection work prior to placement of concrete; or closing up walls and overhead mechanical, electrical, and fire protection work prior to installation of the ceiling.

3.12 CLEANING AND PAINTING

A. Thoroughly clean and touch up the finish on all parts of the materials and equipment. Exposed parts in equipment rooms, and all other spaces except sealed chases and attics shall be thoroughly cleaned of cement, plaster, and other materials, and all oil and grease spots shall be removed. Such surfaces shall be carefully wiped and all cracks and corners scraped out.

B. Exposed metal work which is not galvanized shall be carefully brushed down with steel brushes to remove rust and other spots and left smooth and clean and then painted with a suitable rust resistant primer. Exposed metal work includes work exterior to the building; exposed in mechanical or electrical equipment rooms and storage rooms; and other areas where occupants could see the work, whether normally occupied or not.

C. All other painting shall be accomplished under the Painting Section of Division 9 of the specifications.

3.13 DISCHARGE OF WASTES FROM CONSTRUCTION SITE

A. The Contractor shall comply with all applicable provisions of local, state, and federal laws regarding the discharge of wastes into sewer and waterways. Special caution shall be exercised to prevent the discharge of wastes which contain oil, tar, asphalt, roofing compound, kerosene, gasoline, paint, mud, cement, lime, or other materials which would degrade the water quality of the receiving water course. The Contractor shall construct and maintain oil interceptors, settling basins, acid neutralization tanks, and/or other effective pollution countermeasures, as required by the Texas Water Quality Board.

END OF SECTION 230100

SECTION 230513

BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following basic mechanical materials and methods to complement other Mechanical Sections.
   1. Piping materials and installation instructions common to most piping systems.
   2. Concrete base construction requirements.
   3. Escutcheons.
   4. Dielectric fittings.
   5. Dielectric isolation tape
   6. Flexible connectors.
   7. Mechanical sleeve seals.
   8. Nonshrink grout for equipment installations.
   9. Field-fabricated metal and wood equipment supports.
   10. Installation requirements common to equipment specification sections.
   11. Mechanical demolition.
   12. Cutting and patching.
   13. Touchup painting and finishing.
   14. Access Doors

B. Pipe and pipe fitting materials are specified in mechanical piping system Sections, if applicable.

1.2 DEFINITIONS

A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

C. Exposed, Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

F. The following are industry abbreviations for plastic materials:
   1. ABS: Acrylonitrile-butadiene-styrene plastic.
   2. CPVC: Chlorinated polyvinyl chloride plastic.
   3. NP: Nylon plastic.
   4. PE: Polyethylene plastic.
   5. PVC: Polyvinyl chloride plastic.

G. The following are industry abbreviations for rubber materials:
   1. CR: Chlorosulfonated polyethylene synthetic rubber.
   2. EPDM: Ethylene propylene diene terpolymer rubber.

1.3 SUBMITTALS

A. Product Data: For dielectric fittings, flexible connectors, access doors, solder/brazing material and mechanical sleeve seals.

B. Shop Drawings: Detail fabrication and installation for metal and wood supports and anchorage for mechanical materials and equipment.

C. Coordination Drawings: Detail major elements, components, and systems of mechanical equipment and materials in relationship with other systems, installations, and building components. Show space requirements for installation and access. Indicate if sequence and coordination of installations are important to efficient flow of the Work. Include the following:
   1. Clearances for servicing and maintaining equipment, accessories, and specialties, including space for disassembly required for periodic maintenance.
   2. Equipment and accessory service connections and support details.
   3. Fire-rated wall and floor penetrations.
   4. Scheduling, sequencing, movement, and positioning of large equipment into building during construction.
   5. Access panel and door locations

1.4 QUALITY ASSURANCE

A. Comply with ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.

B. Equipment Selection: Equipment of higher electrical characteristics, physical dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. Additional costs shall be approved in advance by appropriate Contract Modification for these increases. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.

B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.

C. Protect flanges, fittings, and piping specialties from moisture and dirt.

D. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate Mechanical equipment installation with other building components.

B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.

D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.

E. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.

F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces.

G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Dielectric Tape:
      a. Holdrite (#272-4).
   2. Metal, Flexible Connectors:
      a. Flexicraft Industries.
      b. Flex-Hose, Co., Inc.
      c. Grinnell Corp.; Grinnell Supply Sales Co.
      d. Mercer Rubber Co.
      e. Metraflex Co.
      f. Uniflex, Inc.
   3. Rubber, Flexible Connectors:
      a. General Rubber Corp.
      b. Mercer Rubber Co.
      c. Metraflex Co.
      d. Red Valve Co., Inc.
      e. Uniflex, Inc.
   4. Mechanical Sleeve Seals:
      a. Calpico, Inc.
      b. Metraflex Co.
      c. Thunderline/Link-Seal.

2.2 PIPE AND PIPE FITTINGS

A. Refer to individual Specification piping Sections for pipe and fitting materials and joining methods, if applicable.

B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.3 JOINING MATERIALS

A. Refer to individual Specification piping Sections for special joining materials not listed below, if applicable.

B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
   1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, unless thickness or specific material is indicated.
      a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
      b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
   2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.

D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.

E. Solder Filler Metals: ASTM B 32.
   1. ASTM B 32, 95/5 lead-free alloys. Include water –flushable and soluble flux according to ASTM B 813.

F. Brazing Filler Metals: AWS A5.8.
   1. BCuP Series: Copper-phosphorus alloys.
   2. BAg1: Silver alloy.

G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

H. Solvent Cements: Manufacturer's standard solvent cements for the following:
   1. CPVC Piping: ASTM F 493.
   2. PVC Piping: ASTM D 2564, medium bodied (bond). Include purple primer according to ASTM F 656.

I. Plastic Pipe Seals: ASTM F 477, elastomeric gasket.

J. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon-steel bolts and nuts.

K. Couplings: Iron-body sleeve assembly, fabricated to match OD of plain-end, pressure pipes.
   1. Sleeve: ASTM A 126, Class B, gray iron.
   2. Followers: ASTM A 47 malleable iron or ASTM A 536 ductile iron.
   3. Gaskets: Rubber.
   4. Bolts and Nuts: AWWA C111.
   5. Finish: Enamel paint.

2.4 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature, to prevent galvanic action and stop corrosion. Unions in first paragraph below are available in at least NPS 1/2 to NPS 2.

B. Dielectric Unions:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Capitol Manufacturing Company.
      b. Central Plastics Company.
      c. EPCO Sales, Inc.
      d. Hart Industries International, Inc.
      e. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
      f. Zurn Mechanical Products Group; Wilkins Water Control Products.
   2. Description:
      a. Pressure Rating: 250 psig at 180 deg F.
      b. End Connections: Solder-joint copper alloy and threaded ferrous.
      c. Flanges in first paragraph below are available in at least NPS 1-1/2 to NPS 4.

C. Dielectric Flanges:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Capitol Manufacturing Company.
      b. Central Plastics Company.

c. EPCO Sales, Inc.
d. Watts Regulator Co.; a division of Watts Water Technologies, Inc.

2. Description:
a. Factory-fabricated, bolted, companion-flange assembly.
b. Pressure Rating: 175 psig minimum.
c. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Kits:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Advance Products & Systems, Inc.
b. Calico, Inc.
c. Central Plastics Company.
d. Pipeline Seal and Insulator, Inc.
2. Description:
a. Nonconducting materials for field assembly of companion flanges.
b. Pressure Rating: 150 psig.
c. Gasket: Neoprene or phenolic.
d. Bolt Sleeves: Phenolic or polyethylene.
e. Washers: Phenolic with steel backing washers.

E. Dielectric Couplings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Calpico, Inc.
b. Lochinvar Corporation.
2. Description:
a. Galvanized-steel coupling.
b. Pressure Rating: 300 psig at 225 deg F.
c. End Connections: Female threaded.
d. Lining: Inert and noncorrosive, thermoplastic.

F. Dielectric Nipples:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
a. Perfection Corporation; a subsidiary of American Meter Company.
b. Precision Mechanical Products, Inc.
c. Victaulic Company.
2. Description:
a. Electroplated steel nipple complying with ASTM F 1545.
b. Pressure Rating: 300 psig at 225 deg F.
c. End Connections: Male threaded or grooved.
d. Lining: Inert and noncorrosive, propylene.

2.5 DIELECTRIC ISOLATION TAPE

A. Tape to eliminate dissimilar metal contact: (equal to Holdrite #272-4)
1. White Polyester Felt. Pressure sensitive adhesive rubber base (one side only).
2. 4” width.

2.6 FLEXIBLE CONNECTORS

A. General: Fabricated from materials suitable for system fluid and that will provide flexible pipe connections. Include 125-psig minimum working-pressure rating, unless higher working pressure is indicated, and ends according to the following:
1. 2-Inch NPS and Smaller: Threaded.
2. 2-1/2-Inch NPS and Larger: Flanged.

3. Option for 2-1/2-Inch NPS and Larger: Grooved for use with keyed couplings.

B. Bronze-Hose, Flexible Connectors: Corrugated, bronze, inner tubing covered with bronze wire braid. Include copper-tube ends or bronze flanged ends, braze welded to hose.

C. Rubber, Flexible Connectors: CR or EPDM elastomer rubber construction, with multiple plies of NP fabric, molded and cured in hydraulic presses. Include 125-psig minimum working-pressure rating at 220 deg F. Units may be straight or elbow type, unless otherwise indicated.

2.7 MECHANICAL SLEEVE SEALS

A. Description: Modular sealing element unit, designed for field assembly, used to fill annular space between pipe and sleeve.
   1. Sealing Elements: EPDM-rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe materials and size of pipe.
   2. Pressure Plates: Stainless steel.
   3. Connecting Bolts and Nuts: Stainless steel of length required to secure pressure plates to sealing elements.

2.8 PIPING SPECIALTIES

A. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:
   1. Steel Sheet Metal: 0.0239-inch minimum thickness, galvanized, round tube closed with welded longitudinal joint.
   2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.
   3. Cast Iron: Cast or fabricated "wall pipe" equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop, unless otherwise indicated.
   4. Stack Sleeve Fittings: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring and bolts and nuts for membrane flashing.
      a. Underdeck Clamp: Clamping ring with set screws.
   5. Sleeve Fasteners: Manufactured, steel clips for securement during pour. Equal to B-line, BD40, BE-5-8 or BE-9-12.

B. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type if required to conceal protruding fittings and sleeves.
   1. ID: Closely fit around pipe, tube, and insulation of insulated piping.
   2. OD: Completely cover opening.
   3. Cast Brass: One piece, with set screw. (split face acceptable for existing piping)
      a. Finish: Polished chrome-plate.

2.9 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C 1107, Grade B.
   1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
   2. Design Mix: 5000-psig, 28-day compressive strength.
   3. Packaging: Premixed and factory packaged.

2.10 ACCESS DOORS

A. General: Provide access doors for all serviceable mechanical appurtenances (valves, trap primers, shock arresters, actuators, sensors, etcetera) in inaccessible locations. Such locations include gypsum, brick and CMU ceilings and walls.

B. Location of panels shall be carefully coordinated with other Exposed Devices as described in earlier paragraphs.

C. Manufacturers shall be Milcor, Mifab, or approved equal. Unless indicated otherwise, use panels equal to Milcor Style M for masonry and drywall construction, equal to Milcor Style K for plastered masonry walls and ceilings. Stainless steel panels shall be used in ceramic tile or glazed structural tile.

D. Minimum construction features include 16-gage frame and door, continuous hinges, cam-style latch and 10x10" unobstructed opening size.

E. UL labeled when in fire-rated construction, one and one-half hour rating.

F. Access doors located outside, in restrooms or in a moisture-laden environment (dressing area, shower area, lockers, etcetera) shall be stainless steel construction.

G. Equipment access doors shall be of sufficient size to remove/replace equipment and provide routine maintenance as necessary, unless otherwise noted. Doors shall be set flush with adjacent finish surfaces. All access doors shall be provided with cylinder locks. All access doors (MEP) shall have one (1) common key.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS - COMMON REQUIREMENTS AND APPLICATIONS

A. General: Install piping as described below, unless piping Sections specify otherwise. Individual piping Sections specify unique piping installation requirements.

B. General Locations and Arrangements: Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, unless deviations to layout are approved on Coordination Drawings.

C. All piping to be installed in compliance with current NEC required clearances.

D. Install manufactured isolation clamps at all dissimilar metal pipe supports. Install dielectric isolation tape (engineer approved) only when a manufactured isolation clamp is not available.

E. Install piping at indicated slope.

F. Install components with pressure rating equal to or greater than system operating pressure.

G. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.

H. Install piping free of sags and bends.

I. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.

J. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.

K. Install piping to allow application of insulation plus 1-inch clearance around insulation.

L. Locate groups of pipes parallel to each other, spaced to permit valve servicing.

M. Install fittings for changes in direction and branch connections.

N. Install couplings according to manufacturer's written instructions.

O. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Comply with requirements in Section "Penetration Firestopping" for firestop materials and installations.
   1. Fire-stop all sleeves at floor penetrations of multistory buildings including underfloor penetrations.

P. Verify final equipment locations for roughing-in.

Q. Refer to equipment specifications in other Sections of these Specifications for roughing-in requirements.

R. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping specification Sections:
   1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
   2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
   3. Soldered Joints: Construct joints according to AWS's "Soldering Manual," Chapter "The Soldering of Pipe and Tube"; or CDA's "Copper Tube Handbook."
   4. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," Chapter "Pipe and Tube."
   5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
      a. Note internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
      b. Apply appropriate tape or thread compound to external pipe threads, unless dry seal threading is specified.
      c. Align threads at point of assembly.
      d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
      e. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
   6. Welded Joints: Construct joints according to AWS D10.12, "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe," using qualified processes and welding operators according to "Quality Assurance" Article.
   7. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.
   8. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join pipe and fittings according to the following:
      a. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
      b. CPVC Piping: ASTM D 2846 and ASTM F 493.
      c. PVC Pressure Piping: ASTM D 2672.
      d. PVC Nonpressure Piping: ASTM D 2855.
   9. Plastic Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657 procedures and manufacturer's written instructions.
      a. Plain-End Pipe and Fittings: Use butt fusion.
      b. Plain-End Pipe and Socket Fittings: Use socket fusion.

3.2 ESCUTCHEON REQUIREMENTS

A. Install escutcheons at pipe penetrations of walls, ceilings, and floors in finished areas.
   1. Escutcheons for New Piping:

a. Piping exposed through floors and walls in finished areas: One piece, cast brass with polished chrome-plated finish with set screw. Deep escutcheons to be provided where standard depth will not fit.
b. Escutcheons shall cover entire hole penetration.
c. Escutcheon to be appropriately sized for pipe.

2. Escutcheons for Existing piping:
   a. Piping exposed through floors and walls in finished areas: Split plate, cast brass with polished chrome-plated finish with set screw. Deep escutcheons to be provided where standard depth will not fit.
   b. Escutcheons shall cover entire hole penetration.
   c. Escutcheon to be appropriately sized for pipe.
3. Install escutcheons at wall, floor, and ceiling penetrations in exposed finished locations and within cabinets and millwork. Use deep-pattern escutcheons if required to conceal protruding pipe fittings.

3.3 PIPE SLEEVE INSTALLATION REQUIREMENTS

A. Pipe sleeves are required at all through wall and floor penetrations.
1. Sleeves are to be of the following material:
   a. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc-coated, with plain ends.
2. Sleeves are required for all through floor and wall penetrations. Sleeves to be set and poured in place (in slab applications), secure all sleeves with fasteners.
3. Sleeves to extend 2 inches past face of floor or wall. Pipe sleeve in finished areas to be flush with wall or floor for installation of escutcheon.
4. Install sleeves in new partitions, slabs, and walls as they are built.
5. For interior wall penetrations, seal annular space between sleeve and pipe or pipe insulation using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Section "Joint Sealants" for joint sealants.
6. For exterior wall penetrations above grade, seal annular space between sleeve and pipe using joint sealants appropriate for size, depth, and location of joint. Comply with requirements in Section "Joint Sealants" for joint sealants.
7. For exterior wall penetrations below grade, seal annular space between sleeve and pipe using sleeve seals specified in this Section.
8. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation unless otherwise indicated. Seal annular space with water tight sealant. (equal to NP-1). All sleeves and penetrations to maintain rating of wall / floor. Seal pipe penetrations with fire-stopping materials.
9. Install sleeve materials according to the following applications:
   a. Sleeves for Piping Passing through Concrete Floor Slabs: galvanized steel pipe.
   b. Sleeves for Piping Passing through Concrete Floor Slabs of Mechanical Equipment Areas or Other Wet Areas: Galvanized-steel pipe sleeves.
      1) Extend sleeves 2 inches above finished floor level.
      2) For pipes penetrating floors with membrane waterproofing, extend cast-iron sleeve fittings below floor slab as required to secure clamping ring if ring is specified. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Comply with requirements in Section "Sheet Metal Flashing and Trim" for flashing.
10. Sleeves for Piping Passing through Gypsum-Board Partitions:
    a. Galvanized-steel pipe sleeves.
    b. Exception: Sleeves are not required for water supply tubes and waste pipes for individual mechanical fixtures if escutcheons will cover openings.
11. Sleeves for Piping Passing through Concrete Roof Slabs: Reference details.
12. Sleeves for Piping Passing through Exterior Concrete Walls:
    a. Galvanized-steel pipe sleeves.
    b. Install sleeves that are large enough to provide 1-inch annular clear space between sleeve and pipe or pipe insulation when sleeve seals are used.
13. Sleeves for Piping Passing through Interior Concrete Walls:

a. Galvanized-steel pipe sleeves.

14. Mechanical sleeve seals
    a. Install sleeve seals in sleeves in exterior concrete walls at water-service piping entries into building. Sleeves must be poured in place. Installation of sleeves after wall is constructed is not acceptable.
    b. Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble sleeve seal components and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

B. Piping Connections: Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.
2. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.
3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.4 DIELECTRIC FITTING INSTALLATION

A. Install unions, in piping 2-inch NPS and smaller, adjacent to each valve and at final connection to each piece of equipment with 2-inch NPS or smaller threaded pipe connection.

B. Install flanges, in piping 2-1/2-inch NPS and larger, adjacent to flanged valves and at final connection to each piece of equipment with flanged pipe connection.

3.5 EQUIPMENT INSTALLATION – COMMON REQUIREMENTS

A. Install equipment to provide maximum possible headroom, if mounting heights are not indicated.

B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to Architect.

C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.

E. Install equipment giving right of way to piping installed at required slope.

3.6 PAINTING AND FINISHING

A. Apply paint to exposed piping according to the following, unless otherwise indicated:
1. Interior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
2. Interior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
3. Interior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include finish coat over enamel undercoat and primer.
4. Exterior, Ferrous Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.

5. Exterior, Galvanized-Steel Piping: Use semigloss, acrylic-enamel finish. Include two finish coats over galvanized metal primer.
6. Exterior, Ferrous Supports: Use semigloss, acrylic-enamel finish. Include two finish coats over rust-inhibitive metal primer.

B. Do not paint piping specialties with factory-applied finish.

C. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.7 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.

B. Field Welding: Comply with AWS D1.1, "Structural Welding Code--Steel."

3.8 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment (not to be used at pipe supports).

B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.

C. Attach to substrates as required to support applied loads.

3.9 DEMOLITION

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair cut surfaces to match adjacent surfaces.

3.10 CUTTING AND PATCHING

A. Disconnect, demolish, and remove Work specified in Mechanical Sections.

B. If pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.

C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.

D. Work Abandoned in Place: Cut and remove underground pipe a minimum of 2 inches beyond face of adjacent construction. Cap and patch surface to match existing finish.

E. Removal: Remove indicated equipment from Project site.

F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

3.11 GROUTING

A. Install nonmetallic, nonshrink, grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's written instructions.

B. Clean surfaces that will come into contact with grout.

C. Provide forms as required for placement of grout.

D. Avoid air entrapment during placing of grout.

E. Place grout, completely filling equipment bases.

F. Place grout on concrete bases to provide smooth bearing surface for equipment.

G. Place grout around anchors.

H. Cure placed grout according to manufacturer's written instructions.

END OF SECTION 230513

SECTION 230529

HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following hangers and supports for mechanical system piping and equipment:
   1. Steel pipe hangers and supports.
   2. Trapeze pipe hangers.
   3. Metal framing systems.
   4. Thermal-hanger shield inserts.
   5. Fastener systems.
   6. Equipment supports.

B. Related Sections include the following:
   1. Specification Section "Metal Fabrications" for structural-steel shapes and plates for trapeze hangers for pipe and equipment supports.
   2. Specification Section “Metal Ducts” for duct hangers and supports.

1.3 DEFINITIONS

A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.

B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 PERFORMANCE REQUIREMENTS

A. Design supports for multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 SUBMITTALS

A. Product Data: For the following:
   1. Steel pipe hangers and supports.
   2. Thermal-hanger shield inserts.
   3. Powder-actuated fastener systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
   1. Trapeze pipe hangers. Include Product Data for components.
   2. Metal framing systems. Include Product Data for components.
   3. Equipment supports.

C. Welding certificates.

1.6 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

B. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code--Steel."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 METAL COATING REQUIREMENTS:

A. All metal products shall have the following coatings:
   1. Wet/damp areas: hot dipped galvanized.
   2. Dry or conditioned areas: pre-galvanized.

2.3 STEEL PIPE HANGERS AND SUPPORTS

A. Description: MSS SP-58, Types 1 through 58, factory-fabricated components. Refer to Part 3 "Hanger and Support Applications" Article for where to use specific hanger and support types.

B. Manufacturers:
   1. AAA Technology & Specialties Co., Inc.
   2. Bergen-Power Pipe Supports.
   3. B-Line Systems, Inc.; a division of Cooper Industries.
   4. Carpenter & Paterson, Inc.
   5. Empire Industries, Inc.
   6. ERICO/Michigan Hanger Co.
   7. Globe Pipe Hanger Products, Inc.
   8. Grinnell Corp.
   9. GS Metals Corp.
   10. National Pipe Hanger Corporation.
   11. PHD Manufacturing, Inc.
   12. PHS Industries, Inc.
   13. Piping Technology & Products, Inc.
   14. Tolco Inc.

C. Galvanized, Metallic Coatings: Pre-galvanized (minimum thickness of 0.5 mils) or hot dipped (1.4 to 3.9 mil thickness).

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

E. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion for support of bearing surface of piping.

2.4 TRAPEZE PIPE HANGERS

A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural-steel shapes with MSS SP-58 hanger rods, nuts, saddles, and U-bolts.

2.5 METAL FRAMING SYSTEMS

A. Description: MFMA-3, shop- or field-fabricated pipe-support assembly made of steel channels and other components.

B. Manufacturers:
   1. B-Line Systems, Inc.; a division of Cooper Industries.
   2. ERICO/Michigan Hanger Co.; ERISTRUT Div.
   3. GS Metals Corp.
   4. Power-Strut Div.; Tyco International, Ltd.
   5. Thomas & Betts Corporation.
   6. Tolco Inc.
   7. Unistrut Corp.; Tyco International, Ltd.

C. Coatings: Manufacturer's standard finish unless bare metal surfaces are indicated.

D. Nonmetallic Coatings: Plastic coating, jacket, or liner.

2.6 THERMAL-HANGER SHIELD INSERTS

A. Description: 100-psig minimum, compressive-strength insulation insert with a sheet metal shield.

B. Manufacturers:
   1. Carpenter & Paterson, Inc.
   2. ERICO/Michigan Hanger Co.
   3. PHS Industries, Inc.
   4. Pipe Shields, Inc.
   5. Rilco Manufacturing Company, Inc.
   6. Buckaroos

C. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier. Wood inserts are not acceptable.

D. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C 533, Type I calcium silicate or ASTM C 552, Type II cellular glass.

E. Insulation-Insert Material for Hot Piping only, up to 3” diameter: Molded fiberglass block, 20 lbs/ft^3 density, thermal conductivity of 0.30.

F. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

G. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

H. Insert Length: Extend 4 inches beyond sheet metal shield for piping operating below ambient air temperature.

2.7 FASTENER SYSTEMS

A. Mechanical-Expansion Anchors: Insert-wedge-type stainless steel, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
   1. Manufacturers:
      a. B-Line Systems, Inc.; a division of Cooper Industries.
      b. Empire Industries, Inc.
      c. Hilti, Inc.
      d. ITW Ramset/Red Head.
      e. MKT Fastening, LLC.
      f. Powers Fasteners.

2.8 EQUIPMENT SUPPORTS

A. Description: Welded, shop- or field-fabricated equipment support made from structural-steel shapes.

2.9 MISCELLANEOUS MATERIALS

A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars.
   1. Exterior: Galvanized steel.
   2. Interior: Black steel.

B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, non-shrink and nonmetallic grout; suitable for interior and exterior applications.
   1. Properties: Nonstaining, noncorrosive, and nongaseous.
   2. Design Mix: 5000-psi, 28-day compressive strength.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

A. Specific hanger and support requirements are specified in Sections specifying piping systems and equipment.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Sections.

C. Use hangers and supports with galvanized, metallic coatings for piping and equipment that will not have field-applied finish.

D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.

E. Use padded hangers for piping that is subject to scratching.

F. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
   1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30.
   2. Yoke-Type Pipe Clamps (MSS Type 2): For suspension of 120 to 450 deg F pipes, NPS 4 to NPS 16, requiring up to 4 inches of insulation.
   3. Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24, requiring clamp flexibility and up to 4 inches of insulation.
   4. Steel Pipe Clamps (MSS Type 4): For suspension of cold and hot pipes, NPS 1/2 to NPS 24, if little or no insulation is required.
   5. Pipe Hangers (MSS Type 5): For suspension of pipes, NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
   6. Adjustable, Swivel Split- or Solid-Ring Hangers (MSS Type 6): For suspension of noninsulated stationary pipes, NPS 3/4 to NPS 8.
   7. Adjustable, Steel Band Hangers (MSS Type 7): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8.
   8. Adjustable Band Hangers (MSS Type 9): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8.
   9. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 2.
   10. Split Pipe-Ring with or without Turnbuckle-Adjustment Hangers (MSS Type 11): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 8.
   11. Extension Hinged or 2-Bolt Split Pipe Clamps (MSS Type 12): For suspension of noninsulated stationary pipes, NPS 3/8 to NPS 3.

12. U-Bolts (MSS Type 24): For support of heavy pipes, NPS 1/2 to NPS 30.
13. Clips (MSS Type 26): For support of insulated pipes not subject to expansion or contraction.
14. Pipe Saddle Supports (MSS Type 36): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange.
15. Pipe Stanchion Saddles (MSS Type 37): For support of pipes, NPS 4 to NPS 36, with steel pipe base stanchion support and cast-iron floor flange and with U-bolt to retain pipe.
16. Adjustable, Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes, NPS 2-1/2 to NPS 36, if vertical adjustment is required, with steel pipe base stanchion support and cast-iron floor flange.
17. Single Pipe Rolls (MSS Type 41): For suspension of pipes, NPS 1 to NPS 30, from 2 rods if longitudinal movement caused by expansion and contraction might occur.
18. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes, NPS 2-1/2 to NPS 20, from single rod if horizontal movement caused by expansion and contraction might occur.
19. Complete Pipe Rolls (MSS Type 44): For support of pipes, NPS 2 to NPS 42, if longitudinal movement caused by expansion and contraction might occur but vertical adjustment is not necessary.
20. Pipe Roll and Plate Units (MSS Type 45): For support of pipes, NPS 2 to NPS 24, if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
21. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes, NPS 2 to NPS 30, if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.

G. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20.
2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20, if longer ends are required for riser clamps.

H. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.

I. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
6. C-Clamps (MSS Type 23): For structural shapes.
7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.

11. Malleable Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
12. Welded-Steel Brackets: For support of pipes from below, or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    a. Light (MSS Type 31): 750 lb.
    b. Medium (MSS Type 32): 1500 lb.
    c. Heavy (MSS Type 33): 3000 lb.
13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.

J. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Thermal-Hanger Shield Inserts: For supporting insulated cold pipe. **Wood inserts are not acceptable.**

K. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41 roll hanger with springs.
4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from hanger.
6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from base support.
7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to absorb expansion and contraction of piping system from trapeze support.
8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
    a. Horizontal (MSS Type 54): Mounted horizontally.
    b. Vertical (MSS Type 55): Mounted vertically.
    c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.

L. Comply with MSS SP-69 for trapeze pipe hanger selections and applications that are not specified in piping system Sections.

M. Comply with MFMA-102 for metal framing system selections and applications that are not specified in piping system Sections.

N. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments in concrete construction only in locations approved by the structural engineer.

3.2 HANGER AND SUPPORT INSTALLATION

A. Steel Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure; attaching to metal roof decks is not permissible.

B. Trapeze Pipe Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping and support together on field-fabricated trapeze pipe hangers.
   1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified above for individual pipe hangers.
   2. Field fabricate from ASTM A 36/A 36M, steel shapes selected for loads being supported. Weld steel according to AWS D1.1.

C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping and support together on field-assembled metal framing systems.

D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.

E. Fastener System Installation:
   1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
   2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

F. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

G. Equipment Support Installation: Install suspended units on supports fabricated from welded-structural-steel shapes or from strut channels as applicable for the unit weight. Vertical support members must be appropriately sized threaded rods. Metal straps or cables are not allowed. Isolate units to prevent vibration or noise as specified in other sections.

H. Install hangers and supports to allow controlled thermal movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

I. Install lateral bracing with pipe hangers and supports to prevent swaying.

J. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads for NPS 2-1/2 and larger, including valves, flanges, and strainers, and at changes in direction of piping (24” maximum distance from elbow). Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.

K. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

L. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9 (for building services piping) are not exceeded.

M. Insulated Piping: Comply with the following:
   1. Attach clamps and spacers to piping.
      a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
      b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
      c. Do not exceed pipe stress limits according to ASME B31.9 for building services piping.
   2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
      a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
   3. Install thermal-hanger shield inserts on insulated piping with vapor barrier. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
   4. Shield Dimensions for Pipe: Not less than the following:
      a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.

b. NPS 4: 12 inches long and 0.06 inch thick.
c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.

5. Insert Material: Length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

N. Insulated Ducts (Mineral Fiber Blanket). Comply with the following:
1. At all unistrut supports provide mineral fiber board insert in between ductwork and unistrut. Insert to extend 12” on both sides of unistrut, full length of strut. Extend blanket between structural insert.

3.3 EQUIPMENT SUPPORTS

A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.

B. Grouting: Place grout under supports for floor-mounted equipment to make a smooth bearing surface.

C. Provide lateral bracing to prevent swaying for suspended equipment supports.

3.4 METAL FABRICATIONS

A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.

B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.

C. Field Welding: Comply with AWS D1.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and with the following:
1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

3.5 ADJUSTING

A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

B. Trim excess length of continuous-thread hanger support rods to 1-1/2 inches.

3.6 PAINTING

A. Touch Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.

B. Touch Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 09 painting Sections.

C. Galvanized Surfaces: Clean welds, bolted connections, field cuts, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 230529

SECTION 230553

MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following mechanical identification materials and their installation:
   1. Equipment nameplates.
   2. Equipment markers.
   3. Equipment signs.
   4. Access panel and door markers.
   5. Pipe markers.
   6. Duct markers.
   7. Stencils.
   8. Valve tags.
   9. Valve schedules.
   10. Warning tags.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Valve Schedules: For each piping system. Furnish extra copies (in addition to mounted copies) to include in maintenance manuals. Reproduce on 8½ × 11 bond. Tabulate valve number, piping system, system abbreviation as shown on tag, room or space location of valve, and variations for identification. Mark valves intended for emergency shutoff and similar special uses. Indicate normal operating positions (open, closed, modulating, or balance).

1.4 QUALITY ASSURANCE

A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.

1.5 COORDINATION

A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

B. Coordinate installation of identifying devices with location of access panels and doors.

C. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 GENERAL

A. Products specified are for applications referenced in other Mechanical sections. In addition to a factory installed equivalent nameplate, all equipment shall have an engraved equipment sign that matches the schedule tag name.

2.2 EQUIPMENT IDENTIFICATION DEVICES

A. Equipment Nameplates: Metal, with data engraved or stamped, for permanent attachment on equipment.
   1. Data:
      a. Manufacturer, product name, model number, and serial number.
      b. Capacity, operating and power characteristics, and essential data.
      c. Labels of tested compliances.
   2. Location: Accessible and visible.
   3. Fasteners: As required to mount on equipment.
   4. Material: Brass.

B. Equipment Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
   1. Data: Instructions for operation of equipment and for safety procedures.
   2. Engraving: Manufacturer's standard letter style, of sizes and with terms to match equipment identification.
   3. Thickness: 1/8 inch, unless otherwise indicated.
   4. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.

2.3 PIPING IDENTIFICATION DEVICES

A. Manufactured Pipe Markers, General: Manufacturers standard preprinted, semi-rigid, snap-on type.
   1. Colors: Comply with ASME A13.1, unless otherwise indicated.
   2. Pipes with OD, Including Insulation, Less Than 6 Inches: Full-band pipe markers extending 360 degrees around pipe at each location.
   3. Pipes with OD, Including Insulation, 6 Inches and Larger: Either full-band or strip-type pipe markers at least three times letter height and of length required for label.
   4. Arrows: Integral with piping system service lettering to accommodate both directions; or as separate unit on each pipe marker to indicate direction of flow.
   5. Lettering: Manufacturers standard preprinted.

2.4 DUCT IDENTIFICATION DEVICES

A. Duct Markers: Engraved, color-coded laminated plastic. Include direction and quantity of airflow and duct service (such as supply, return, and exhaust). Include contact-type, permanent adhesive. See Execution section for color scheme.

2.5 VALVE TAGS

A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch sequenced numbers. Provide 5/32-inch hole for fastener.
   1. Material: 0.032-inch thick aluminum.
   2. Valve-Tag Fasteners: Brass S-hook.
   3. Size: 1½ inches in diameter, unless otherwise indicated.

2.6 VALVE SCHEDULES

A. Valve-Schedule Frames: Glazed display frame for removable mounting on masonry walls for each page of valve schedule. Include mounting screws.

B. Frame: Extruded aluminum.

C. Glazing: ASTM C 1036, Type I, Class 1, Glazing Quality B, 2.5-mm, single-thickness glass.

2.7 WARNING TAGS

A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags; of plasticized card stock with matte finish suitable for writing.
   1. Size: 3 by 5-1/4 inches **minimum**.
   2. Fasteners: Brass grommet and wire.
   3. Nomenclature: Large-size primary caption such as DANGER, CAUTION, or DO NOT OPERATE.
   4. Color: Yellow background with black lettering.

PART 3 - EXECUTION

3.1 APPLICATIONS, GENERAL

A. Products specified are for applications referenced in other Mechanical Sections. If more than single-type material, device, or label is specified for listed applications, selection is Installer's option.

3.2 EQUIPMENT IDENTIFICATION

A. Install and permanently fasten equipment nameplates on each major item of mechanical equipment that does not have nameplate or has nameplate that is damaged or located where not easily visible. Locate nameplates where accessible and visible. Include nameplates for the following general categories of equipment:
   1. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
   2. Pumps, compressors, chillers, condensers, and similar motor-driven units.
   3. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
   4. Fans, blowers, primary balancing dampers, and mixing boxes.
   5. Packaged HVAC central-station and zone-type units.

B. Install equipment markers with permanent fasteners on or near each major item of mechanical equipment. Data required for markers may be included on signs, and markers may be omitted if both are indicated.
   1. Letter Size: Minimum 1/4 inch for name of units if viewing distance is less than 24 inches, ½ inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
   2. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
   3. Locate markers where accessible and visible. Include markers for the following general categories of equipment:
      a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
      b. Fire department hose valves and hose stations.
      c. Meters, gages, thermometers, and similar units.
      d. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
      e. Pumps, compressors, chillers, condensers, and similar motor-driven units.
      f. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
      g. Fans, blowers, primary balancing dampers, and mixing boxes.
      h. Packaged HVAC central-station and zone-type units.
      i. Tanks and pressure vessels.

j. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.

C. Install equipment signs with screws or permanent adhesive on or near each major item of mechanical equipment. Locate signs where accessible and visible.
   1. Identify mechanical equipment with equipment markers in the following color codes:
      a. Green: For cooling equipment and components.
      b. Yellow: For heating equipment and components.
      c. Green and Yellow, Orange: For combination cooling and heating equipment and components.
      d. Brown: For energy-reclamation equipment and components.
   2. Letter Size: Minimum 1/2 inch for name of units if viewing distance is less than 24 inches, 3/4 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
   3. Data: Distinguish among multiple units, indicate operational requirements, indicate safety and emergency precautions, warn of hazards and improper operations, and identify units.
   4. Include signs for the following general categories of equipment:
      a. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
      b. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
      c. Pumps, compressors, chillers, condensers, and similar motor-driven units.
      d. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.
      e. Fans, blowers, primary balancing dampers, and mixing boxes.
      f. Packaged HVAC central-station and zone-type units.
      g. Tanks and pressure vessels.
      h. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.

D. Install access panel markers with screws on equipment access panels.

3.3 PIPING IDENTIFICATION

A. Install manufactured pipe markers indicating service on each piping system. Install with flow indication arrows showing direction of flow.
   1. Pipes with OD, Including Insulation, Less Than 6 Inches: Snap-on application of pretensioned, semi-rigid plastic pipe marker.
   2. Pipes with OD, Including Insulation, 6 Inches and Larger: Shaped pipe markers. Use size to match pipe and secure with manufacturer's stainless steel bands.
   3. Fasten Option: Laminated or bonded application of pipe marker to pipe or insulation.

B. Locate pipe markers and color bands where piping is exposed in finished spaces; in machine rooms; in accessible maintenance spaces such as shafts, tunnels and plenums; and in exterior nonconcealed locations such as rooftops and chiller yards, as follows:
   1. Near each valve and control device.
   2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
   3. Near penetrations through walls, floors, ceilings, and nonaccessible enclosures.
   4. At access doors, manholes, and similar access points that permit view of concealed piping.
   5. Near major equipment items and other points of origination and termination.
   6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
   7. On piping above removable acoustical ceilings.

3.4 DUCT IDENTIFICATION

A. Install duct markers with permanent adhesive on air ducts in the following color codes:
   1. Green: For cold-air supply ducts.
   2. Yellow: For hot-air supply ducts.

3. Blue: For exhaust-, outside-, relief-, return-, and mixed-air ducts.
4. ASME A13.1 Colors and Designs: For hazardous material exhaust.
5. Letter Size: Minimum 1/2 inch for name of units if viewing distance is less than 24 inches, 3/4 inch for viewing distances up to 72 inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.

B. Locate markers near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system. Reduce intervals to 25 feet in areas of high duct congestion.

3.5 VALVE-SCHEDULE INSTALLATION

A. Mount valve schedule on wall in accessible location in each major equipment room.

3.6 WARNING-TAG INSTALLATION

A. Write required message on, and attach warning tags to, equipment and other items where required.

3.7 VALVE TAGS

A. Install on valves and control devices in piping systems, except check valves, valves within factory-fabricated equipment units, plumbing fixture supply stops, shutoff valves, and HVAC terminal devices and similar roughing-in connections of end-use fixtures and units. List tagged valves in valve schedule.

B. Valve Tag Application Schedule: Tag valves according to size, shape, color scheme, and with captions similar to those indicated in the following:

C. Tag Material: Aluminum.

D. Tag Size and Shape: 1-1/2 inches, round.

E. Tag Color: According to the following:
1. Chilled Water: Blue.
2. Cold Water: Black.
3. Hot Water: Red.
4. Fire Protection: Red.
5. Sprinkler: White.
6. Gas: Yellow.
7. Steam: Red.

F. Letter Color: White.

G. Install mounted valve schedule in each major equipment room.

3.8 EQUIPMENT SIGNS AND MARKERS

A. Install engraved plastic-laminate signs or equipment markers on or near each major item of mechanical equipment. Include signs for the following general categories of equipment:
1. Main control and operating valves, including safety devices and hazardous units such as gas outlets.
2. Meters, gages, thermometers, and similar units.
3. Fuel-burning units, including boilers, furnaces, heaters, stills, and absorption units.
4. Pumps, compressors, chillers, condensers, and similar motor-driven units.
5. Heat exchangers, coils, evaporators, cooling towers, heat recovery units, and similar equipment.

6. Fans, blowers, primary balancing dampers, and mixing boxes.
7. Packaged HVAC central-station and zone-type units.
8. Tanks and pressure vessels.
9. Strainers, filters, humidifiers, water-treatment systems, and similar equipment.
10. Any concealed appurtenances requiring access for maintenance shall be clearly identified by sign (to include but not be limited to unions, strainers, valves, etc.).

B. Duct Systems: Identify air supply, return, exhaust, intake, and relief ducts with duct markers; or provide stenciled signs and arrows showing service and direction of flow.
   1. Location: Locate signs near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

3.9 ADJUSTING AND CLEANING

A. Relocate mechanical identification materials and devices that have become visually blocked by work of this or other Divisions.

B. Clean faces of identification devices and glass frames of valve charts.

END OF SECTION 230553

SECTION 230593

TESTING, ADJUSTING AND BALANCING

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The work included in this section consists of the furnishing of all labor, instruments, tools, and services required in connection with the testing, adjusting and balancing (TAB) of the heating, ventilating, and air conditioning systems as described in the mechanical specifications and/or shown on the mechanical plans, or reasonable implied therefrom.

B. TAB of the HVAC systems will be performed by an impartial technical firm that is a member of NEBB and whose operations are limited to the field of professional testing and balancing.

C. Mechanical Contractor to obtain TAB services from an independent TAB contractor.

D. Qualified TAB firms shall submit cost, scope of work, qualifications, time line, and references.

E. The TAB firm is responsible to and shall submit five (5) copies of all reports directly to the Architect/Engineer and one copy to the Owner.

F. TAB services shall result in the optimum temperature, airflow, and noise levels in the conditioned space of the project.

G. The following basic components of the HVAC systems shall be tested, adjusted, and balanced:
   1. Air distribution systems.
   2. Air moving equipment.
   3. HVAC pumps (chilled water, hot water, condenser water, etc.).
   4. Heating systems (HVAC).
   5. Control systems verification.

1.2 SUMMARY

A. This Section includes testing, adjusting, and balancing HVAC systems to produce design objectives, including the following:
   1. Balancing airflow and water flow within distribution systems, including submains, branches, and terminals, to indicated quantities according to specified tolerances.
   2. Adjusting total HVAC systems to provide indicated quantities.
   3. Measuring electrical performance of HVAC equipment.
   4. Setting quantitative performance of HVAC equipment.
   5. Verifying that automatic control devices are functioning properly.
   6. Measuring sound and vibration.
   7. Reporting results of the activities and procedures specified in this Section.

B. Related sections include the following:
   1. Testing and adjusting requirements unique to particular systems and equipment are included in the Sections that specify those systems and equipment. See all related HVAC mechanical sections.
   2. Field quality-control testing to verify that workmanship quality for system and equipment installation is specified in system and equipment Sections.

1.3 DEFINITIONS

A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.

B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to design quantities.

C. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.

D. Procedure: An approach to and execution of a sequence of work operations to yield repeatable results.

E. Report Forms: Test data sheets for recording test data in logical order.

F. Static Head: The pressure due to the weight of the fluid above the point of measurement. In a closed system, static head is equal on both sides of the pump.

G. Suction Head: The height of fluid surface above the centerline of the pump on the suction side.

H. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.

I. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.

J. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.

K. Test: A procedure to determine quantitative performance of a system or equipment.

L. Testing, Adjusting, and Balancing Agent: The entity responsible for performing and reporting the testing, adjusting, and balancing procedures.

M. NEBB: National Environmental Balancing Bureau.

N. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.

1.4 SUBMITTALS

A. Quality-Assurance Submittals: Within 30 days from the Contractor's Notice to Proceed, submit 2 copies of evidence that the testing, adjusting, and balancing Agent and this Project's testing, adjusting, and balancing team members meet the qualifications specified in the "Quality Assurance" Article below.

B. Contract Documents Examination Report: Within 45 days from the Contractor’s Notice to Proceed, submit 2 copies of the Contract Documents review report as specified in Part 3 of this Section.

C. Strategies and Procedures Plan: Within 60 days from the Contractor’s Notice to Proceed, submit 2 copies of the testing, adjusting and balancing strategies and step-by-step procedures as specified in Part 3 “Preparation” Article below. Include a complete set of report forms intended for use on this Project.

D. Certified Testing, Adjusting and Balancing Reports: Submit 2 copies of reports prepared, as specified in this Section, on approved forms certified by the testing, adjusting and balancing Agent.

E. Sample Report Forms: Submit 2 sets of sample testing, adjusting and balancing report forms.

F. Warranty: Submit 2 copies of special warranty specified in the “Guarantee” Article below.

1.5 QUALITY ASSURANCE

A. Agent Qualifications: Engage a testing, adjusting, and balancing agent certified by NEBB.

B. Testing, Adjusting, and Balancing Conference: Meet with the Owner's and the Architect's representatives on approval of the testing, adjusting, and balancing strategies and procedures plan to develop a mutual

understanding of the details. Ensure the participation of testing, adjusting, and balancing team members, equipment manufacturers' authorized service representatives, HVAC controls Installer, and other support personnel. Provide 7 days' advance notice of scheduled meeting time and location.

1. Agenda Items: Include at least the following:
   a. Submittal distribution requirements.
   b. Contract Documents examination report.
   c. Testing, adjusting, and balancing plan.
   d. Work schedule and Project site access requirements.
   e. Coordination and cooperation of trades and subcontractors.
   f. Coordination of documentation and communication flow.

C. Certification of Testing, Adjusting, and Balancing Reports: Certify the testing, adjusting, and balancing field data reports. This certification includes the following:
   1. Review field data reports to validate accuracy of data and to prepare certified testing, adjusting, and balancing reports.
   2. Certify that the testing, adjusting, and balancing team complied with the approved testing, adjusting, and balancing plan and the procedures specified and referenced in this Specification.

D. Testing, Adjusting, and Balancing Reports: Use standard forms from NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems."

E. Instrumentation Type, Quantity, and Accuracy: As described in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."

F. Instrumentation Calibration: Calibrate instruments at least every 12 months or more frequently if required by the instrument manufacturer.

1.6 PROJECT CONDITIONS

A. Partial Owner Occupancy: The Owner may occupy completed areas of the building before Substantial Completion. Cooperate with the Owner during testing, adjusting, and balancing operations to minimize conflicts with the Owner's operations.

1.7 COORDINATION

A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist testing, adjusting, and balancing activities.

B. Notice: Provide 7 days' advance notice for each test. Include scheduled test dates and times.

C. Perform testing, adjusting, and balancing after leakage and pressure tests on air and water distribution systems have been satisfactorily completed.

1.8 GUARANTEE

A. General: The national project performance guarantee specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

PART 2- PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine Contract Documents to become familiar with project requirements and to discover conditions in systems' designs that may preclude proper testing, adjusting, and balancing of systems and equipment.
   1. Contract Documents are defined in the General and Supplementary Conditions of the Contract.
   2. Verify that balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are required by the Contract Documents. Verify that quantities and locations of these balancing devices are accessible and appropriate for effective balancing and for efficient system and equipment operation.

B. Examine approved submittal data of HVAC systems and equipment.

C. Examine Architect's and Engineer's design data, including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.

D. Examine equipment performance data, including fan and pump curves. Relate performance data to project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system. Calculate system effect factors to reduce the performance ratings of HVAC equipment when installed under conditions different from those presented when the equipment was performance tested at the factory. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," Sections 7 through 10; or in SMACNA's "HVAC Systems--Duct Design," Sections 5 and 6. Compare this data with the design data and installed conditions.

E. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Specification Sections have been performed.

F. Examine system and equipment test reports.

G. Examine HVAC system and equipment installations to verify that indicated balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, balancing valves and fittings, and manual volume dampers, are properly installed, and their locations are accessible and appropriate for effective balancing and for efficient system and equipment operation.

H. Examine systems for functional deficiencies that cannot be corrected by adjusting and balancing.

I. Examine air-handling equipment to ensure clean filters have been installed, bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.

J. Examine terminal units, such as variable-air-volume boxes and mixing boxes, to verify that they are accessible and their controls are connected and functioning.

K. Examine plenum ceilings, utilized for supply air, to verify that they are airtight. Verify that pipe penetrations and other holes are sealed.

L. Examine strainers for clean screens and proper perforations.

M. Examine 3-way valves for proper installation for their intended function of diverting or mixing fluid flows.

N. Examine heat-transfer coils for correct piping connections and for clean and straight fins.

O. Examine open-piping-system pumps to ensure absence of entrained air in the suction piping.

P. Examine equipment for installation and for properly operating safety interlocks and controls.

Q. Examine automatic temperature system components to verify the following:
   1. Dampers, valves, and other controlled devices operate by the intended controller.
   2. Dampers and valves are in the position indicated by the controller.

3. The Integrity of valves and dampers for free and full operation and for tightness of fully closed and fully open positions. This includes dampers in multizone units, mixing boxes, and variable-air-volume terminals.
4. Automatic modulating and shutoff valves, including 2-way valves and 3-way mixing and diverting valves, are properly connected.
5. Thermostats and humidistats are located to avoid adverse effects of sunlight, drafts, and cold walls.
6. Sensors are located to sense only the intended conditions.
7. Sequence of operation for control modes is according to the Contract Documents.
8. Controller set points are set at design values. Observe and record system reactions to changes in conditions. Record default set points if different from design values.
9. Interlocked systems are operating.
10. Changeover from heating to cooling mode occurs according to design values.

R. Report deficiencies discovered before and during performance of testing, adjusting, and balancing procedures.

3.2 PREPARATION

A. Prepare a testing, adjusting, and balancing plan that includes strategies and step-by-step procedures.

B. Complete system readiness checks and prepare system readiness reports. Verify the following:
1. Permanent electrical power wiring is complete.
2. Hydronic systems are filled, clean, and free of air.
3. Automatic temperature-control systems are operational.
4. Equipment and duct access doors are securely closed.
5. Balance, smoke, and fire dampers are open.
6. Isolating and balancing valves are open and control valves are operational.
7. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
8. Windows and doors can be closed so design conditions for system operations can be met.
9. Motors are wired properly with appropriate overloads and correct rotation.

3.3 GENERAL TESTING AND BALANCING PROCEDURES

A. Perform testing and balancing procedures on each system according to the procedures contained in NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.

B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. After testing and balancing, close probe holes and patch insulation with new materials identical to those removed. Restore vapor barrier and finish according to the insulation Specifications for this Project.

C. Mark equipment settings with paint or other suitable, permanent identification material, including damper-control positions, valve indicators, fan-speed-control levers, and similar controls and devices, to show final settings.

3.4 FUNDAMENTAL AIR SYSTEMS' BALANCING PROCEDURES

A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.

B. Prepare schematic diagrams of systems' "as-built" duct layouts.

C. For variable-air-volume systems, develop a plan to simulate diversity.

D. Determine the best locations in main and branch ducts for accurate duct airflow measurements.

E. Check the airflow patterns from the outside-air louvers and dampers and the return- and exhaust-air dampers, through the supply-fan discharge and mixing dampers.

F. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.

G. Verify that motor starters are equipped with properly sized thermal protection.

H. Check dampers for proper position to achieve desired airflow path.

I. Check for airflow blockages.

J. Check condensate drains for proper connections and functioning.

K. Check for proper sealing of air-handling unit components.

3.5 VARIABLE-AIR-VOLUME SYSTEMS' ADDITIONAL PROCEDURES

A. Pressure-Dependent, Variable-Air-Volume Systems without Diversity: After the fan systems have been adjusted, adjust the variable-air-volume systems as follows:
   1. Balance systems similar to constant-volume air systems.
   2. Set terminal units and supply fan at full-airflow condition.
   3. Adjust inlet dampers of each terminal unit to design airflow and verify operation of the static-pressure controller. When total airflow is correct, balance the air outlets downstream from terminal units as described for constant-volume air systems.
   4. Readjust fan airflow for final maximum readings.
   5. Measure operating static pressure at the sensor that controls the supply fan, if one is installed, and verify operation of the static-pressure controller.
   6. Set supply fan at minimum airflow if minimum airflow is indicated. Measure static pressure to verify that it is being maintained by the controller.
   7. Set terminal units at minimum airflow and adjust controller or regulator to deliver the designed minimum airflow. Check air outlets for a proportional reduction in airflow as described for constant-volume air systems.
      a. If air outlets are out of balance at minimum airflow, report the condition but leave the outlets balanced for maximum airflow.
   8. Measure the return airflow to the fan while operating at maximum return airflow and minimum outside airflow. Adjust the fan and balance the return-air ducts and inlets as described for constant-volume air systems.

3.6 FUNDAMENTAL PROCEDURES FOR HYDRONIC SYSTEMS

A. Prepare test reports with pertinent design data and number in sequence starting at pump to end of system. Check the sum of branch-circuit flows against approved pump flow rate. Correct variations that exceed plus or minus 5 percent.

B. Prepare schematic diagrams of systems' "as-built" piping layouts.

C. Prepare hydronic systems for testing and balancing according to the following, in addition to the general preparation procedures specified above:
   1. Open all manual valves for maximum flow.
   2. Check expansion tank liquid level.
   3. Check makeup-water-station pressure gage for adequate pressure for highest vent.
   4. Check flow-control valves for specified sequence of operation and set at design flow.
   5. Set differential-pressure control valves at the specified differential pressure. Do not set at fully closed position when pump is positive-displacement type, unless several terminal valves are kept open.
   6. Set system controls so automatic valves are wide open to heat exchangers.
   7. Check pump-motor load. If motor is overloaded, throttle main flow-balancing device so motor nameplate rating is not exceeded.

8. Check air vents for a forceful liquid flow exiting from vents when manually operated.

3.7 HYDRONIC SYSTEMS' BALANCING PROCEDURES

A. Determine water flow at pumps. Use the following procedures, except for positive-displacement pumps:
   1. Verify impeller size by operating the pump with the discharge valve closed. Verify with the pump manufacturer that this will not damage pump. Read pressure differential across the pump. Convert pressure to head and correct for differences in gage heights. Note the point on the manufacturer's pump curve at zero flow and confirm that the pump has the intended impeller size.
   2. Check system resistance. With all valves open, read pressure differential across the pump and mark the pump manufacturer's head-capacity curve. Adjust pump discharge valve until design water flow is achieved.
   3. Verify pump-motor brake horsepower. Calculate the intended brake horsepower for the system based on the pump manufacturer's performance data. Compare calculated brake horsepower with nameplate data on the pump motor. Report conditions where actual amperage exceeds motor nameplate amperage.
   4. Report flow rates that are not within plus or minus 5 percent of design.

B. Set calibrated balancing valves, if installed, at calculated presettings.

C. Measure flow at all stations and adjust, where necessary, to obtain first balance.
   1. System components that have Cv rating or an accurately cataloged flow-pressure-drop relationship may be used as a flow-indicating device.

D. Measure flow at main balancing station and set main balancing device to achieve flow that is 5 percent greater than design flow.

E. Adjust balancing stations to within specified tolerances of design flow rate as follows:
   1. Determine the balancing station with the highest percentage over design flow.
   2. Adjust each station in turn, beginning with the station with the highest percentage over design flow and proceeding to the station with the lowest percentage over design flow.
   3. Record settings and mark balancing devices.

F. Measure pump flow rate and make final measurements of pump amperage, voltage, rpm, pump heads, and systems' pressures and temperatures, including outdoor-air temperature.

G. Measure the differential-pressure control valve settings existing at the conclusions of balancing.

3.8 VARIABLE-FLOW HYDRONIC SYSTEMS' ADDITIONAL PROCEDURES

A. Balance systems with automatic 2- and 3-way control valves by setting systems at maximum flow through heat-exchange terminals and proceed as specified above for hydronic systems.

3.9 PRIMARY-SECONDARY-FLOW HYDRONIC SYSTEMS' ADDITIONAL PROCEDURES

A. Balance the primary system crossover flow first, then balance the secondary system.

3.10 MOTORS

A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
   1. Manufacturer, model, and serial numbers.
   2. Motor horsepower rating.
   3. Motor rpm.
   4. Efficiency rating if high-efficiency motor.
   5. Nameplate and measured voltage, each phase.
   6. Nameplate and measured amperage, each phase.
   7. Starter thermal-protection-element rating.

B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass for the controller to prove proper operation. Record observations, including controller manufacturer, model and serial numbers, and nameplate data.

3.11 BOILERS

A. Measure entering- and leaving-water temperatures and water flow.

3.12 HEAT-TRANSFER COILS

A. Water Coils: Measure the following data for each coil:
   1. Entering- and leaving-water temperatures.
   2. Water flow rate.
   3. Water pressure drop.
   4. Dry-bulb temperatures of entering and leaving air.
   5. Wet-bulb temperatures of entering and leaving air.
   6. Airflow.
   7. Air pressure drop.

B. Electric-Heating Coils: Measure the following data for each coil:
   1. Nameplate data.
   2. Airflow.
   3. Entering- and leaving-air temperatures at full load.
   4. Voltage and amperage input of each phase at full load and at each incremental stage.
   5. Calculated kW at full load.
   6. Fuse or circuit-breaker rating for overload protection.

3.13 TEMPERATURE TESTING

A. During testing, adjusting, and balancing, report need for adjustment in temperature regulation within the automatic temperature-control system.

B. Measure indoor wet- and dry-bulb temperatures every other hour for a period of 2 successive 8-hour days, in each separately controlled zone, to prove correctness of final temperature settings. Measure when the building or zone is occupied.

C. Measure outside-air, wet- and dry-bulb temperatures.

3.14 TEMPERATURE-CONTROL VERIFICATION

A. Verify that controllers are calibrated and commissioned.

B. Check transmitter and controller locations and note conditions that would adversely affect control functions.

C. Record controller settings and note variances between set points and actual measurements.

D. Verify operation of limiting controllers (i.e., high- and low-temperature controllers).

E. Verify free travel and proper operation of control devices such as damper and valve operators.

F. Verify sequence of operation of control devices. Note air pressures and device positions and correlate with airflow and water-flow measurements. Note the speed of response to input changes.

G. Confirm interaction of electrically operated switch transducers.

H. Confirm interaction of interlock and lockout systems.

I. Record voltages of power supply and controller output. Determine if the system operates on a grounded or nongrounded power supply.

J. Note operation of electric actuators using spring return for proper fail-safe operations.

3.15 TOLERANCES

A. Set HVAC system airflow and water flow rates within the following tolerances:
   1. Supply, Return, and Exhaust Fans: -5 to plus 10 percent.
   2. Air Outlets and Inlets: ± 10 percent.
   3. Heating-Water Flow Rate: ± 10 percent.
   4. Cooling-Water Flow Rate: ± 5 percent.

3.16 REPORTING

A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article above, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

B. Status Reports: As Work progresses, prepare reports to describe completed procedures, procedures in progress, and scheduled procedures. Include a list of deficiencies and problems found in systems being tested and balanced. Prepare a separate report for each system and each building floor for systems serving multiple floors.

C. Preliminary Report: Submit preliminary TAB reports to the design engineer for each floor, the central plant, and the chilled and hot water hydronic system.

3.17 FINAL REPORT

A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, in 3-ring binder, tabulated and divided into sections by tested and balanced systems.

B. Include a certification sheet in front of binder signed and sealed by the certified testing and balancing engineer.
   1. Include a list of the instruments used for procedures, along with proof of calibration.

C. Final Report Final Report Contents: In addition to the certified field report data, include the following:
   1. Pump Curves.
   2. Fan curves.
   3. Manufacturers' test data.
   4. Field test reports prepared by system and equipment installers.
   5. Other information relative to equipment performance, but not include approved Shop Drawings and Product Data.

D. General Report Data: In addition to the form titles and entries, include the following data in the final report, as applicable:
   1. Title page.
   2. Name and address of testing, adjusting and balancing Agent.
   3. Project name.
   4. Project location.
   5. Architect's name and address.
   6. Engineer's name and address.
   7. Contractor's name and address.
   8. Report date.
   9. Signature of testing, adjusting and balancing Agent who certifies the report.
   10. Summary of contents, including the following:

a. Design versus final performance.
b. Notable characteristics of systems.
c. Description of system operation sequence if it varies from the Contract Documents.

11. Nomenclature sheets for each item of equipment.
12. Data for terminal units, including manufacturer, type size and fittings.
13. Notes to explain why certain final data in the body of reports vary from design values.
14. Test conditions for fans and pump performance forms, including the following:
    a. Settings for outside-return-and exhaust-air dampers.
    b. Conditions of filters.
    c. Cooling coil, wet-and dry-bulb, conditions.
    d. Face and bypass damper settings at coils.
    e. Fan drive settings, including settings and percentage of maximum pitch diameter.
    f. Inlet vane settings for variable-air-volume, systems.
    g. Settings for supply-air, static-pressure, controller.
    h. Other system operating conditions that affect performance.

E. System Diagrams: Include schematic layouts of air and hydronic distribution systems. Present with single-line diagrams and include the following:
1. Quantities of outside, supply, return and exhaust airflows.
2. Water and steam flow rates.
3. Duct, outlet and inlet sizes.
4. Pipe and valve sizes and locations.
5. Terminal units.
6. Balancing stations.
7. Locations of duct traverse(s) of duct layout.

F. Air-Handling Unit Test Reports: For air-handling units with coils, include the following:
1. Unit Data: Include the following:
    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.
    f. Unit arrangement and class.
    g. Discharge arrangement.
    h. Sheave make, size in inches and bore.
    i. Sheave dimension, center-to-center and amount of adjustments in inches (mm).
    j. Number of belts, make and size.
    k. Number of filters, type and size.
2. Motor Data: Include the following:
    a. Make and frame type and size.
    b. Horsepower and rpm.
    c. Volts, phase and hertz.
    d. Full-load amperage and service factor.
    e. Sheave make, size in inches and bore.
    f. Sheave dimensions, center-to-center and amount of adjustments in inches.
3. Test Data: Include design and actual values for the following:
    a. Unit identification.
    b. Location.
    c. Make and type.
    d. Model number and unit size.
    e. Manufacturer's serial number.

G. Apparatus-Coil Test Reports: For apparatus coils, include the following:
1. Coil Data: Include the following:
    a. System Identification.
    b. Location.
    c. Coil type.

d. Number of rows.
e. Fin spacing in fins per inch.
f. Make and model number.
g. Face area in sq.ft.
h. Tube size in NPS.
i. Tube and fin materials.
j. Circuiting arrangement.

2. Test Data: Include design and actual values for the following:
a. Airflow rate in cfm.
b. Average face velocity in fpm.
c. Air pressure drop in inches wg.
d. Outside-air, wet and dry-bulb temperatures in deg F.
e. Return-air, wet and dry-bulb temperatures in deg F.
f. Entering-air, wet and dry-bulb temperatures in deg F.
g. Leaving-air, wet and dry bulb temperatures in deg F.
h. Return-air, wet and dry-bulb temperatures in deg F.
i. Entering water temperature in deg F.
j. Leaving water temperature in deg F
k. Water flow rate in gpm.
l. Water pressure differential in feet of head or psig.

H. Water Chiller Test Reports: For chillers (Air Cooled or Water Cooled)
1. Unit Data: Include the following:
a. Unit Identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer’s serial number.
f. Unit arrangement and class.
2. Motor Data:
a. Make and frame type and size.
b. Volts, phase and hertz.
c. Full-load amperage and service factor.
3. Test Data:
a. Total chilled water flow rate in gpm.
b. Total condenser water flow rate in gpm.
c. WPD in ft across chilled water.
d. WPD in ft across condenser water.
e. Chilled water supply and return temperatures ˚F.
f. Condenser water supply and return temperatures in ˚F.

I. Cooling Tower Test Reports: For condenser water cooling tower:
1. Unit Data: Include the following:
a. Unit identification.
b. Location.
c. Make and type.
d. Model number and unit size.
e. Manufacturer's serial number.
f. Unit arrangement and class.
g. Discharge arrangement.
2. Motor Data (Fan or Pump): Include the following:
a. Make and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
3. Test Data: Include design and actual values for the following:
a. Total condenser under flowrate in gpm.
b. Total wpd in ft across condenser water.

c. Condenser water supply and return temperatures in ˚F.
d. Fan rpm.

J. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
1. Unit Data: Include the following:
a. System identification.
b. Location.
c. Coil identification.
d. Capacity in Btuh (kW).
e. Number of stages.
f. Connected volts, phase, and hertz.
g. Rated amperage.
h. Airflow rate in cfm.
i. Face area in sq. ft.
j. Minimum face velocity in fpm.
2. Test Data: Include design and actual values for the following:
a. Heat output in Btuh.
b. Airflow rate in cfm.
c. Air velocity in fpm.
d. Entering-air temperature in deg F.
e. Leaving-air temperature in deg F.
f. Voltage at each connection.
g. Amperage for each phase.

K. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data: Include the following:
a. System identification.
b. Location.
c. Make and type.
d. Model number and size.
e. Manufacturer's serial number.
f. Arrangement and class.
g. Sheave make, size in inches, and bore.
h. Sheave dimensions, center-to-center and amount of adjustments in inches (mm).
2. Motor Data: Include the following:
a. Make and frame type and size.
b. Horsepower and rpm.
c. Volts, phase, and hertz.
d. Full-load amperage and service factor.
e. Sheave make, size in inches, and bore.
f. Sheave dimensions, center-to-center and amount of adjustments in inches.
g. Number of belts, make, and size.
3. Test Data: Include design and actual values for the following:
a. Total airflow rate in cfm.
b. Total system static pressure in inches wg.
c. Fan rpm.
d. Discharge static pressure in inches wg.
e. Suction static pressure in inches wg.

L. Round, Flat-Oval, and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
1. Report Data: Include the following:
a. System and air-handling unit number.
b. Location and zone.
c. Locate traverse location on duct work layout.
d. Traverse air temperature in deg F.
e. Duct static pressure in inches wg.

f. Duct size in inches.
g. Duct area in sq. ft.
h. Design airflow rate in cfm.
i. Design velocity in fpm.
j. Actual airflow rate in cfm.
k. Actual average velocity in fpm.
l. Barometric pressure in psig.

M. Air-Terminal-Device Reports: For terminal units, include the following:
1. Unit Data: Include the following:
a. System and air-handling unit identification.
b. Location and zone.
c. Test apparatus used.
d. Area served.
e. Air-terminal-device make.
f. Air-terminal-device number from system diagram.
g. Air-terminal-device type and model number.
h. Air-terminal-device size.
i. Air-terminal-device effective area in sq. ft.
2. Test Data: Include design and actual values for the following:
a. Airflow rate in cfm.
b. Air velocity in fpm.
c. Preliminary airflow rate as needed in cfm.
d. Preliminary velocity as needed in fpm.
e. Final airflow rate in cfm.
f. Final velocity in fpm.
g. Space temperature in deg F.

N. System-Coil Reports: For reheat coils and water coils of terminal units, include the following:
1. Unit Data: Include the following:
a. System and air-handling unit identification.
b. Location and zone.
c. Room or riser served.
d. Coil make and size.
e. Flowmeter type.
2. Test Data: Include design and actual values for the following:
a. Airflow rate in cfm.
b. Entering-water temperature in deg F.
c. Leaving-water temperature in deg F.
d. Water pressure drop in feet of head or psig.
e. Entering-air temperature in deg F.
f. Leaving-air temperature in deg F.

O. Instrument Calibration Reports: For instrument calibration, include the following:
1. Report Data: Include the following:
a. Instrument type and make.
b. Serial number.
c. Application.
d. Dates of use.
e. Dates of calibration.

END OF SECTION 230593

SECTION 230719

MECHANICAL INSULATION

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes mechanical insulation for duct, equipment, and pipe, including the following:
   1. Insulation Materials:
      a. Cellular glass.
      b. Flexible elastomeric.
      c. Mineral fiber.
      d. Phenolic
   2. Adhesives.
   3. Mastics.
   4. Sealants.
   5. Factory-applied jackets.
   6. Field-applied fabric-reinforcing mesh.
   7. Field-applied tape.
   8. Field-applied jackets.
   9. Securements.
   10. Corner angles.

B. Related Sections include the following:
   1. Specification Section "Metal Ducts" for duct liners.
   2. Specification Section “Hangers and Supports for HVAC Piping and Equipment” for high-density inserts at hangers; wood inserts at hangers are not acceptable.
   3. Specification Section “Special Conditions for All Mechanical Work”.
   4. Specification Section “Basic Mechanical Materials and Methods”.

C. Not all items listed within this specification are used. Use only items applicable per application schedule.

1.3 DEFINITIONS

A. ASJ: All-service jacket.

B. CONCEALED: Covered or concealed by a ceiling (gypsum or lay-in acoustical tile) or wall.

C. EXPOSED: Open to view; not concealed by a ceiling or wall of any sort.

D. FSK: Foil, scrim, kraft paper.

E. UNDERFLOOR: Accessible crawl space beneath lowest floor level. (considered “outdoors”)

1.4 SUBMITTALS

A. Product Data: For each type of product indicated, identify thermal conductivity, thickness, and jackets (both factory and field applied, if any). Provide submittal data on all products to be used.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.

B. Fire-Test-Response Characteristics: Insulation and related materials shall have fire-test-response characteristics indicated, as determined by testing identical products per ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, and cement material containers, with appropriate markings of applicable testing and inspecting agency.
   1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

B. All products to be stored in a dry location, protected from the elements. All damaged insulation to be replaced.

1.7 COORDINATION

A. Coordinate size and location of supports, hangers, and high-density insulation inserts and shields specified in Specification Section "Hangers and Supports for HVAC Piping and Equipment." Coordinate with drawing details where applicable; wood inserts at hangers are not acceptable.

B. Coordinate clearance requirements with piping Installer for piping insulation application, duct Installer for duct insulation application, and equipment Installer for equipment insulation application. Before preparing piping and ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

1.8 SCHEDULING

A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.

B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

C. Insulation not to be installed until building is dried in.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 INSULATION MATERIALS

A. Refer to Part 3 schedule articles for requirements about where insulating materials shall be applied.

B. Products shall not contain asbestos, lead, mercury, or mercury compounds.

C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.

D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.

E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

F. Phenolic:
   1. Manufacturers:
      a. Resolco
      b. Dyplast Products
      c. Polyguard
      d. Approved equal.
   2. 100% CFC-free, HCFC-free, and halogen-free, closed cell rigid phenolic foam insulation.
   3. Minimal thermal conductivity @ 75˚ F
      a. Green, 2.5 lb/ft³: 0.15 (Btu.in/hr.ft². F)
      b. Pink, 5.0 lb/ft³: 0.21 (Btu.in/hr.ft². F)

G. Cellular Glass:
   1. Manufacturers:
      a. Pittsburgh Corning Corporation; Foamglas Super K.
   2. Block Insulation: ASTM C 552, Type I.
   3. Special-Shaped Insulation: ASTM C 552, Type III.
   4. Board Insulation: ASTM C 552, Type IV.
   5. Preformed Pipe Insulation with Factory-Applied ASJ: Comply with ASTM C 552, Type II, Class 2.
   6. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
   7. Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Minimal thermal conductivity at 75˚ F of 0.27 (Btu.in/hr.ft². F) (R-value of 10.34@ 3 inches thickness). Factory-applied jacket requirements are specified in Part 2 “Factory-Applied Jackets” Article.

H. Flexible Elastomeric:
   1. Manufacturers:
      a. Aeroflex USA Inc.; Aerocel.
      b. Armacel LLC; AP Armaflex.
   2. Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
   3. Minimal thermal conductivity at 75˚ F of 0.25 (Btu.in/hr.ft². F).

I. Mineral-Fiber Blanket Insulation:
   1. Manufacturers:
      a. Johns Manville; Microlite.
      b. Knauf Insulation; Duct Wrap
      c. Owens-Corning; All-Service Duct Wrap.
   2. Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in Part 2 “Factory-Applied jackets” Article.
   3. Minimal density of 1.0 lb/ft³, installed R-value of 6.0 (at 2" thick).

J. Mineral-Fiber Board Insulation:
   1. Manufacturers:
      a. Johns Manville; 800 Series Spin-Glas.
      b. Knauf Insulation; Insulation Board.
      c. Owens Corning; Fiberglas 700 Series.
   2. Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied FSK

jacket. For equipment applications, provide insulation with factory-applied FSK jacket. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

3. Minimal density of 2.25 lb/ft³, with a R-value of 8.7 (at 2" thickness).

K. Mineral-Fiber, Preformed Pipe Insulation:
   1. Manufacturers:
      a. Johns Manville; Micro-Lok.
      b. Knauf Insulation; 1000° Pipe Insulation.
      c. Owens Corning; Fiberglas Pipe Insulation.
   2. Type I, 850 deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Minimum thermal conductivity at 75˚ F of 0.23 (Btu.in/hr.ft². F). Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ. Factory-applied jacket requirements are specified in Part 2 "Factory-Applied Jackets" Article.

2.3 ADHESIVES

A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated. All products are to contain low V.O.C. as defined/governed by LEED IEQ 4.1 and 4.2 (Regardless of project type).

B. Cellular-Glass, One part, acetoxy cure, silicone adhesive, with a service temperature range of minus 50 to plus 400 deg F.
   1. Products:
      a. Foamglas: PC RTV 450 Sillicone Adhesive

C. Flexible Elastomeric: Comply with MIL-A-24179A, Type II, Class I.
   1. Products:
      a. K-Flex: 720 LVOC or equal

D. Phenolic: Water based adhesive with a service temp of minus 20°F to 700°F.
   1. Products:
      a. Foster 97-15

E. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
   1. Products:
      a. Design Polymerics, DP2502 (or approved equal).

2.4 MASTICS

A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II. All products are to contain low V.O.C. as defined/governed by LEED IEQ 4.1 and 4.2 (Regardless of project type).

B. Vapor-Barrier Mastic: Water based; suitable for outdoor use on below ambient services, or indoor vapor barrier use.
   1. Products:
      a. Childers Products, Division of ITW; CP-35.
   2. Water-Vapor Permeance: ASTM F 1249, 0.09 perm at 55-mils film thickness.
   3. Service Temperature Range: Minus 20 to plus 190 deg F.
   4. Solids Content: ASTM D 1644, 60 percent by volume and 73 percent by weight.
   5. Color: White.
   6. VOC: 36 g/l

2.5 SEALANTS

A. Joint Sealants:
   1. Joint Sealants for Cellular-Glass Products:
      a. Pittsburgh Corning Corporation; Pittseal 444N.

2. Joint Sealant for Phenolic Products
   a. Foster 95-50

B. Metal Jacket:
   1. Products:
      a. Foster 95-44 or equal.
      b. Childers Products, Division of ITW; CP-76.

C. Mineral Fiber:
   1. Design Polymerics DP 2502.
   2. Childers Products, Division of ITW; CP-35.

D. PVC Jacket:
   1. Childers Products, Division of ITW; CP-35.

2.6 FACTORY-APPLIED JACKETS

A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:
   1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
   2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.
   3. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.7 FIELD-APPLIED FABRIC-REINFORCING MESH

A. Woven Glass-Fiber Fabric: Comply with MIL-C-20079H, Type I, plain weave, and presized a minimum of 2.2 oz./sq. yd. 10 x 10 strand count per square inch, minimum 4" wide band.
   1. Available Products:
      a. Chil-glas #10.
      b. Charles Harmon and Co. white weaveset.

2.8 FIELD-APPLIED JACKETS

A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.

B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, 25/50 ASTM-F 84, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
   1. Products:
      a. Johns Manville; Zeston.
      b. Proto PVC Corporation; LoSmoke.
   2. Color: White:
   3. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
      a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
   4. Factory-fabricated tank heads and tank side panels.

C. Metal Jacket:
   1. Products:
      a. Childers Products, Division of ITW; Metal Jacketing Systems.
   2. Aluminum Jacket: Comply with ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105 or 5005, Temper H-14.
      a. Factory cut and rolled to size.
      b. Finish and thickness are indicated in field-applied jacket schedules.

2.9 TAPES

A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136 and UL listed.
   1. Width: 4 inches.
   2. Thickness: 14.0 mils.
   3. Adhesion: 73 ounces force/inch in width.
   4. Elongation: 2 percent.
   5. Tensile Strength: 55 lbf/inch in width.
   6. Color: White

B. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136 and UL listed.
   1. Width: 4 inches.
   2. Thickness: 13 mils.
   3. Adhesion: 73 ounces force/inch in width.
   4. Elongation: 2 percent.
   5. Tensile Strength: 40 lbf/inch in width.
   6. Color: Silver

2.10 SECUREMENTS

A. Bands:
   1. Products:
      a. Childers Products; Bands.
   2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 316; 0.015 inch thick, 3/4 inch wide with wing or closed seal.
   3. Aluminum: ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch with wing or closed seal.
   4. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.

B. Insulation Pins and Hangers:
   1. Cupped-Head, Capacitor-Discharge-Insulated Weld Pins: Zinc-coated steel pin, fully annealed for capacitor-discharge welding, 12 Gauge shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer. Contractor to field verify, integrity of pin weld on ductwork with sheet metal thickness less than 22-gauge. Integrity to be verified prior to concealment with insulation.
      a. Products:
         1) GEMCO; Cupped Head Weld Pin or equal.
   2. Metal, “Peel and Press” Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
      a. Products:
         1) GEMCO; Peel and Press or equal.
      b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
      c. Spindle: Copper- or zinc-coated, low carbon steel, fully annealed, 12 Gauge diameter shank, length to suit depth of insulation indicated.
      d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
   3. Insulation-Retaining Washers and Cap: Self-locking cap washers formed from 12 Gauge, galvanized-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
      a. Products:
         1) AGM Industries, Inc.; RC-150.
         2) GEMCO; R-150.

b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.

C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.

2.11 CORNER ANGLES

A. PVC Corner Angles: 30 mils thick, minimum 1 by 1 inch, PVC according to ASTM D 1784, Class 16354-C. White or color-coded to match adjacent surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
   1. Verify that systems and equipment to be insulated have been tested and are free of defects.
   2. Verify that surfaces to be insulated are clean and dry.
   3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application. For Stainless Steel; apply a corrosion coating to insulated surfaces with an epoxy primer and an epoxy finish 5 mils thick.

B. Verify and coordinate insulation installation with the systems and trades installing heat tracing. Comply with requirements for heat tracing that applies to insulation.

3.3 COMMON INSTALLATION REQUIREMENTS

A. Requirements in this Article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.

B. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of equipment, ducts and fittings, and piping including fittings, valves, and specialties.

C. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of equipment, duct system, and pipe system as specified in insulation system schedules.

D. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.

E. Install high-density inserts at hanger locations prior to insulating (duct and pipe); wood or block inserts are not acceptable.

F. Install insulation with longitudinal seams at top and bottom of horizontal runs.

G. Where multiple layers of insulation are required, longitudinal and end seams are to be staggered.

H. Do not weld brackets, clips, pins or other attachment devices to piping, fittings, tanks, coils, equipment, vessel, and specialties.

I. Keep insulation materials clean and dry before, during application, and finishing.

J. Install insulation with tight longitudinal seams and end joints.

K. Install insulation with least number of joints practical.

L. Install insulation so that material is not over compressed. Install corner angles prior to insulating; to protect all insulation from damage.

M. Seal all joints, and seams, including penetrations in insulation, at supports, and other projections with insulation of same material overlapped by 2”. Secure strips with outward clinching staples along edge of overlap, (spaced 1 inch on center) and seal entire joint or seam with mastic and embedded fiberglass reinforcing mesh, minimum 4", cover mesh with finish coat of mastic.

N. Do not insulate, conceal, or enclose pipe hangers, channel and steel supports, etc. not directly fasten to duct.

O. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.

P. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses. Do not water down products unless directed by manufacture. Use clean potable demineralized water when required.

Q. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.

R. Repair all damage insulation prior to concealment as noted above.

S. Do not insulate or conceal vibration-control devices, labels, stamps, nameplates, data plates, manholes, cleanouts, etc. require for maintenances.

T. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarded integrity, unless otherwise indicated.

U. Insulate pipe elbows, tees, valves, strainers, flanges, etc., using preformed fitting insulation, mitered fittings or oversized preformed pipe insulation made from same material thickness and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, voids, and irregular surfaces with insulating mastic finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation. Provide a removable reusable insulation cover; design that maintains vapor barrier. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts.

V. Cover segmented insulated surfaces with a layer of finishing adhesive and coat with a vapor-barrier mastic. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.

W. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Secure PVC covers to adjoining insulation facing using staples and ASJ tape. Seal PVC fitting covers with mastic.

X. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes, vessels, and equipment. Shape insulation at these connections by tapering it to and around the connection with insulating adhesive and finish with mastic. All connections are to be accessible.

Y. Install removable insulation segment and covers at flanges, valves, controls, unions, equipment access doors, manholes, hand holes, and other elements that require frequent removal for service and inspection. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.

3.4 PENETRATIONS

A. Install insulation continuously through all walls, floors, and partitions penetrations and sleeves.

B. Extend jacket of outdoor installation into wall and roof jacks by 2 inches. Seal jacket to roof flashing with approved flashing sealant.

C. Insulation Installation at Fire-Rated Walls, floors and Partitions Penetrations for duct work where fire/smoke dampers are required: Terminate insulation at fire damper sleeves as require by damper manufacturer. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.

3.5 GENERAL PIPE INSULATION INSTALLATION (IN ADDITION TO COMMON REQUIREMENTS)

A. Preformed Pipe Insulation Installation on Pipe, Fittings, Valves, Flanges, Tanks, Elbows, and Appurtenances for Cellular- Glass, Mineral- Fiber, Flexible Elastomeric, and Phenolic insulations:
   1. Install insulation in a manner that secures material to system being insulated with staples, tape and mastic.
   2. When insulation with preformed pipe insulation, seal all longitudinal seams, end joints, and protrusions with manufacturers recommended tape matching jacket, vapor-barrier mastic, joint sealant, and adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
   3. Secure fittings, jacket, cover, etc. with tape matching jacket and secure with outward clinched staples 1 inch on center. Apply vapor-barrier mastic over staples.
   4. Arrange insulation to permit access to valves packing, flanges, unions, etc. and valve operation for maintenance without disturbing insulation. Install insulation so that it can be removed without damage to surrounding insulation or access enclosure.
   5. Pipe hangers are not to be concealed in insulation.
   6. Seal all exposed insulation ends with mastic.
   7. Seal all mitered joints prior to installing covers with vapor-barrier sealant and mastic.
   8. Install preformed pipe insulation to outer diameter of pipe flange.
   9. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
   10. Fill voids between inner circumference of valves, flange, elbows, and bolts insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
   11. Install preformed sections of same material insulation when available. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Install PVC cover over fitting or mitered section.
   12. Arrange insulation to permit access to valves packing, flanges, unions, etc. and valve operation for maintenance without disturbing insulation. Install insulation so that it can be removed without damage to surrounding insulation or access enclosure.

3.6 GENERAL BLANKET AND BOARD INSULATION INSTALLATION (IN ADDITION TO COMMON REQUIREMENTS)

A. Blanket and Board Insulation Installation on Duct, Tanks, Vessels, Elbows, and Appurtenances:
   1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for a minimum of 50 percent coverage of duct and plenum and 100 percent coverage of equipment, tanks, etc.; to secure insulation to surfaces. Apply adhesive to entire circumference of all surfaces; including fittings and transitions.
   2. Install cupped-head, capacitor-discharge-weld pins surfaces to secure insulation to ductwork. Install on sides and bottom of horizontal and vertical ducts having a width or height greater than 23 inches. Locate 16 inches center and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface as required by manufacturer recommendation. Use approved adhesive stick anchor pins with washers for all equipment, tanks, etc. Cut excess portion of stick anchor pins and install washer’s caps. Cover exposed pins and washers caps with tape and mastic matching insulation facing.

3. Install PVC corner angles prior to installing blanket insulation.
4. Do not over compress insulation during installation. Cover exposed pins and washers with tape matching insulation facing and mastic.
5. Install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from 1 edge and 1 end of insulation segment. Secure laps to adjacent insulation section with 3/4-inch outward-clinching staples, 1 inch on center. Coat all seams/joints with mastic and embed with fiberglass reinforced mesh, minimum 4", cover mesh with finish coat of mastic.
6. Repair punctures, tears, penetrations and protrusions with 6-inch-wide strips of same material used to insulate duct. Seal all seams with staples, cover with mastic and cover with embedded fiberglass reinforced mesh, cover mesh with finish coat of mastic.
7. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to 2 times the insulation thickness but not less than 3 inches.
8. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
9. Insulate hangers attached to duct work. Do not insulate or enclose channel, supports, etc. not directly fasten to duct.
10. Insulation termination: Butt insulation up to termination point. Apply mastic no less than 3" overlap on insulation, and 3" on metal surface. Embed fiberglass reinforced mesh overlapping full 3" of termination point, 6" strip. Cover mesh with finish coat of mastic.

3.7 FIELD-APPLIED JACKET INSTALLATION

A. Install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge. Secure metal jacket with stainless-steel bands 12 inches on center and at end joints.

3.8 FINISHES

A. Duct, Equipment, and Pipe Insulation with ASJ, Glass-Cloth, or Other Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Division 9 painting Sections.
   1. Flat Acrylic Finish: Two (2) finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
      a. Finish Coat Material: Interior, flat, latex-emulsion size.

B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer’s recommended protective coating.

C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.

D. Do not field paint aluminum or stainless-steel jackets.

3.9 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. Inspect insulated duct, pipe, and equipment, randomly selected by Engineer, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to two (3) location(s) for each system.
   2. All insulation applications will be considered defective work if sample inspection reveals noncompliance with requirements.

3. Remove all defective work and install new insulation and jackets to replace insulation and jackets removed for inspection. Repeat inspection procedures as needed.

3.10 INSULATION SCHEDULE, GENERAL

A. Plenums and Ducts Requiring Insulation:
   1. Indoor, concealed/exposed supply, return, relief and outdoor air.
   2. Outdoor, concealed/exposed supply, return and relief air.

B. Piping Requiring Insulation:
   1. Indoor and outdoor hydronics.
   2. All pipe and appurtenances that are susceptible to sweating.
   3. All pipe and appurtenances carrying water or refrigerant, for space conditioning.
   4. Any piping not specifically scheduled for insulation below to be insulated with the code minimum required insulation.

C. Items Not Insulated:
   1. Fibrous-glass ducts.
   2. Double-wall metal ducts or lined metal ducts, both with sufficient insulation thickness to comply with adopted edition of IECC and ASHRAE/ IESNA 90.1.
   3. Factory-insulated flexible ducts.
   4. Factory-insulated plenums and casings.
   5. Flexible connectors.
   6. Vibration-control devices.
   7. Factory-insulated access panels and doors.
   8. General building exhaust duct.

3.11 DUCT AND PLENUM INSULATION SCHEDULE

A. Indoor, concealed, all duct insulation shall be of the following (Including dishwasher exhaust):
   1. Mineral-Fiber Blanket: 2 inches thick and 1.00-lb/cu. ft. nominal density.

B. Indoor, exposed (including mechanical rooms and utility rooms), rectangular, all duct insulation shall be of the following:
   1. Mineral-Fiber Board: 2 inches thick and 2.25-lb/cu. ft. nominal density.

C. Indoor, exposed round or flat oval ductwork shall be double-wall construction.

D. Outdoor (including underfloor), all duct insulation shall be any of the following:
   1. Rectangular Duct: Cellular Glass, 3 inches thick and 7.5-lb/cu. ft. nominal density. (minimum R-value of 8)
   2. Round/Flat Oval: Double wall construction (reference Metal Ducts Specification).

3.12 AIR DEVICE INSULATION SCHEDULE

A. Supply-air devices (all styles/sizes): Field insulate backside of all devices that are not factory lined:
   1. Mineral-Fiber Blanket: 1-1/2 inches thick and 0.75-lb/cu. ft. nominal density. Secured to air device with FSK tape, all sides.

3.13 EQUIPMENT INSULATION SCHEDULE

A. Insulate indoor and outdoor equipment in paragraphs below that is not factory insulated.

B. Expansion/compression/buffer tanks, Air-separators, filter feeders, etc. insulation shall be any of the following:
   1. Cellular Glass: 3 inches. (chilled water service)
   2. Phenolic: 2 inches. (chilled water service)

3. Mineral Fiber Board: 3 inches. (hot water service)

C. Steam-to-hot water heat exchanger insulation:
1. Mineral-Fiber board: 3” thick, 3lb/cu. ft. density.
2. Cellular Glass: 3" thick, 7.5 lb/cu. ft density.

3.14 PIPING INSULATION SCHEDULE

A. Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range.

B. Condensate and Equipment Drains:
1. All Pipe Sizes: Insulation shall be any of the following:
a. Flexible Elastomeric: 1 inch thick.

C. Chilled Water Supply and Return:
1. All Pipe Sizes: Insulation shall be any of the following:
a. Pre-insulated Pipe: Reference Hydronic Piping Specification (for use underfloor, buried, and outdoors).
b. Cellular Glass: (for use indoors and outdoors, not accepted in underfloor or buried). Reference schedule below for thickness.
c. Phenolic: (for use indoors and outdoors, not accepted in underfloor or buried). Reference schedule below for thickness.

D. Hot Water Supply and Return:
1. All pipe sizes:
a. Mineral-Fiber (for use indoors) Reference table below for thickness.
b. Pre-insulated Pipe: Reference Hydronic Piping Specification (for use underfloor and outdoors). Reference table below for thickness.
c. Phenolic: (for use indoors and outdoors, not accepted in underfloor or buried) Reference Schedule below for thickness.
d. Cellular Glass: (for use indoors and outdoors, not accepted in underfloor or buried) Reference Schedule below for thickness.

E. Phenolic Density Schedule:
1. Indoors Concealed: 2.5 lb/ft.^{3} (Green)
2. Indoors Exposed: 5 lb/ft.^{3} (Pink)
3. Outdoors: 5 lb/ft.^{3} (Pink)

F. Steam and Steam Condensate, 350˚ F and below:
1. All pipe sizes:
a. Mineral-Fiber, Preformed pipe, Type I: 3" thick.

Insulation Thickness Schedule

Fluid	≤1.5” Pipe Size					>1.5” Pipe Size				
	Cellular Glass	Phenolic	Pre-Insulated	Mineral Fiber	Flex Elastomeric	Cellular Glass	Phenolic	Pre-Insulated	Mineral Fiber	Flex Elastomeric
Chilled Water	2”	1.5”	1.5”	N/A	N/A	2”	1.5”	1.5”	N/A	N/A
Hot Water	2”	1.5”	1.5”	1.5”	N/A	2.5”	2”	2”	2”	N/A
Steam/ Condensate	N/A	N/A	N/A	3”	N/A	N/A	N/A	N/A	3”	N/A
Condensate	N/A	N/A	N/A	N/A	1”	N/A	N/A	N/A	N/A	1”
Refrigerant Suction/Hot Gas Piping	N/A	N/A	N/A	N/A	1.5”	N/A	N/A	N/A	N/A	1.5”

G. Refrigerant Suction and Hot Gas Piping:
   1. All pipe sizes: Insulation shall be the following:
      a. Flexible elastomeric: 1-½ inch thick.

3.15 FIELD-APPLIED JACKET SCHEDULE

A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.

B. Ducts/Piping exposed in finished indoor areas, outdoors, underfloor and mechanical rooms.
   1. Aluminum, Stucco Embossed: 0.016 inch thick.

C. Indoor hydronic piping fitting or elbows.
   1. PVC: 0.015 inch thick.

END OF SECTION 230719

SECTION 233113

METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
1. Single-wall rectangular ducts and fittings.
2. Double-wall rectangular ducts and fittings.
3. Single-wall round and flat-oval ducts and fittings.
4. Double-wall round and flat-oval ducts and fittings.
5. Sheet metal materials.
6. Duct liner.
7. Sealants and gaskets.
8. Hangers and supports.
9. Ductwork Handling and Plenum Protection.
10. Ductwork Cleaning

B. Related Sections:
1. Mechanical Specification Section "Testing, Adjusting, and Balancing" for testing, adjusting, and balancing requirements for metal ducts.
2. Mechanical Specification Section "Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.
3. Mechanical Specification Section “Hangers & Supports for HVAC Piping and Equipment”.
4. Mechanical Specification Section “Basic Mechanical Materials and Methods”.
5. Mechanical Specification Section “Special Conditions for All Mechanical Work”.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated.
1. Static-Pressure Classes: Variable Volume Systems
   a. Supply Ducts: (Upstream from Air Terminal Units): 3-inch wg.
   b. Supply Ducts (Downstream from Air Terminal Units): 1-inch wg.
   c. Return Ducts (Negative Pressure): 1-inch wg.
   d. Outside Air Ducts (Negative Pressure): 1-inch wg.
2. Static-Pressure Classes: Constant Volume Systems
   a. Supply Ducts: 2-inch wg.
   b. Return Ducts (Negative Pressure): 1-inch wg.
   c. Outside Air Ducts (Negative Pressure): 1-inch wg.
3. Static-Pressure Classes: Other Systems
   a. Fume Hood Exhaust (negative Pressure): 3-inch wg.
   b. General Exhaust (Negative Pressure): 1-inch wg.
   c. Relief Air: 1-inch wg.
4. Leakage Class:
   a. Round Supply-Air Duct: 3 cfm/100 sq. ft. at static pressure class.
   b. Flat-Oval Supply-Air Duct: 3 cfm/100 sq. ft. at static pressure class.
   c. Rectangular Supply-Air Duct: 6 cfm/100 sq. ft. at static pressure class.

d. Flexible Supply-Air Duct: 6 cfm/100 sq. ft. at static pressure class.

B. Structural Performance: Duct hangers and supports shall withstand the effects of gravity loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

1.4 DEFINITIONS

A. Exposed: Open to view; not concealed by a ceiling.
1. Includes mechanical rooms.
2. Includes outdoors.
3. Includes crawlspace.

B. Concealed: Covered or Concealed by a ceiling, solid inaccessible or lay-in acoustical tile.

1.5 SUBMITTALS

A. Product Data: For each type of the following products:
1. Liners and adhesives.
2. Sealants and gaskets.
3. Insulation.
4. Metal.
5. Fasteners.
6. Hangers.
7. Double Wall Ductwork (Round or Flat Oval).
8. Single Wall (Round or Flat Oval).

B. Shop Drawings/Coordination Drawings: CADD generated, ¼" scale. Show fabrication and installation details for metal ducts.
1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Factory- and shop-fabricated ducts and fittings.
3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
4. Elevation of top of ducts.
5. Dimensions of main duct runs from building grid lines.
6. Fittings.
7. Reinforcement and spacing.
8. Seam and joint construction.
9. Penetrations through fire-rated and other partitions.
10. Equipment installation based on equipment being used on Project.
11. Locations for duct accessories, including dampers, turning vanes, and access doors and panels.
12. Hangers and supports, including methods for duct and building attachment, and vibration isolation (where applicable).
13. Ceiling suspension assembly members.
14. Other systems installed in same space as ducts, including fire sprinkler piping; electrical conduits; cable trays; hydronic, domestic, and sanitary piping; and structural members.
15. Ceiling-and-wall-mounting access doors and panels required to provide access to dampers and other operating devices.
16. Ceiling-mounting items, including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

C. Welding certificates.

D. Field quality-control reports.

E. Field pressure test reports.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel," for hangers and supports.
   2. AWS D9.1M/D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

PART 2 - PRODUCTS

2.1 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 2, "Fittings and Other Construction," for static-pressure class, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

E. Seal all duct transverse joints, longitudinal seams, flanges, and duct wall penetrations (SMACNA Seal Class-A regardless of static pressure construction class).

2.2 DOUBLE-WALL RECTANGULAR DUCTS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. McGill Airflow LLC.

B. Rectangular Ducts: Fabricate ducts with indicated dimensions for the inner duct.

C. Outer Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.

D. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Transverse (Girth) Joints," for static-pressure class, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

E. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-5, "Longitudinal Seams - Rectangular Ducts," for static-pressure class, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

F. Interstitial Insulation: Fibrous-glass liner complying with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
   1. Maximum Thermal Conductivity: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
   2. Thickness:

a. 1 inch, minimum for INDOOR, exposed ducts in conditioned spaces.
b. 1-1/2 inches, minimum for INDOOR ducts in unconditioned spaces, including, but not limited to return-air plenums and mechanical rooms.
c. 2-1/2 inches, minimum for OUTDOOR ducts.

3. Install spacers that position the inner duct at uniform distance from outer duct without compressing insulation.
4. Coat insulation with antimicrobial coating.

G. Formed-on Transverse Joints (Flanges): Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 1-4, "Traverse (Girth) Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

H. Seal all duct transverse joints, longitudinal seams, flanges and duct wall penetrations (SMACNA Seal Class-A regardless of static pressure construction class).

2.3 SINGLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS

A. General Fabrication Requirements: Spiral seams complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class. Longitudinal-seams (snap-lock) are not acceptable for any application.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
a. Lindab Inc.
b. McGill AirFlow LLC.
c. SEMCO Incorporated.
d. Spiral Pipe of Texas
e. Direct Duct

B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter (diameter of the round sides connecting the flat portions of the duct).

C. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.

D. Seams: Fabricate according to the spiral seam requirements of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Longitudinal-seams (snap-lock) are not acceptable for any application, except where indicated below.
1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.

E. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

F. Seal all duct transverse joints, longitudinal seams, flanges and duct wall penetrations (SMACNA Seal Class-A regardless of static pressure construction class).

2.4 DOUBLE-WALL ROUND AND FLAT-OVAL DUCTS AND FITTINGS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Lindab Inc.
   2. McGill AirFlow LLC.
   3. SEMCO Incorporated.
   4. Spiral Pipe of Texas
   5. Direct Duct

B. Flat-Oval Ducts: Indicated dimensions are the duct width (major dimension) and diameter (diameter of the round sides connecting the flat portions of the duct) of the inner duct.

C. Outer Duct Fabrication Requirements: Spiral seams complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class. Longitudinal-seams (snap-lock) are not acceptable for any application.
   1. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Transverse Joints - Round Duct," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
      a. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
   2. Seams: Fabricate according to the spiral seam requirements of SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Seams - Round Duct and Fittings," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible." Longitudinal-seams (snap-lock) are not acceptable for any application, except where indicated below.
      a. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
      b. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
   3. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

D. Inner Duct: Minimum 0.028-inch perforated galvanized sheet steel having 3/32-inch- diameter perforations, with overall open area of 23 percent.

E. Interstitial Insulation: Fibrous-glass liner complying with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
   1. Maximum Thermal Conductivity: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
   2. Thickness:
      a. 1 inch, minimum for INDOOR, exposed ducts in conditioned spaces.
      b. 1-1/2 inches, minimum for INDOOR ducts in unconditioned spaces, including, but not limited to return-air plenums and mechanical rooms.
      c. 2-1/2 inches, minimum for OUTDOOR ducts.
   3. Install spacers that position the inner duct at uniform distance from outer duct without compressing insulation.
   4. Coat insulation with antimicrobial coating.
   5. Cover insulation with polyester film complying with UL 181, Class 1.

2.5 SHEET METAL MATERIALS

A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, rust, stains, discolorations, and other imperfections. All ductwork shall be a minimum of 24 gage, with a minimum thickness of 0.023 inches. Where in the SMACNA “HVAC Duct Construction Standards-Metal Flexible” it indicates that a lighter gage may be utilized, a minimum of 24 gage shall be used.

B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   1. Galvanized Coating Designation: G60 (Z180).
   2. Finishes for Surfaces Exposed to View: Mill phosphatized.

C. PVC-Coated, Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
   1. Galvanized Coating Designation: G60 (Z180).
   2. Minimum Thickness for Factory-Applied PVC Coating: 4 mils thick on sheet metal surface of ducts and fittings exposed to corrosive conditions, and minimum 4 mils thick on opposite surface.
   3. Coating Materials: Acceptable to authorities having jurisdiction for use on ducts listed and labeled by an NRTL for compliance with UL 181, Class 1.

D. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.

E. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.

F. Aluminum Sheets: Comply with ASTM B 209 (ASTM B 209M) Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

G. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
   1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.

H. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

I. Plastic Connectors are not acceptable.

2.6 DUCT LINER

A. Fibrous-Glass Duct Liner: Comply with ASTM C 1071, NFPA 90A, or NFPA 90B; and with NAIMA AH124, "Fibrous Glass Duct Liner Standard."
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. CertainTeed Corporation; Insulation Group.
      b. Johns Manville.
      c. Knauf Insulation.
      d. Owens Corning.
      e. Maximum Thermal Conductivity:
         1) Type I, Flexible: 0.27 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
         2) Type II, Rigid: 0.23 Btu x in./h x sq. ft. x deg F at 75 deg F mean temperature.
   2. Antimicrobial Erosion-Resistant Coating: Apply to the surface of the liner that will form the interior surface of the duct to act as a moisture repellent and erosion-resistant coating. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.

3. Water-Based Liner Adhesive: Comply with NFPA 90A or NFPA 90B and with ASTM C 916. Equal to DP 2502.

B. Insulation Pins and Washers:
   1. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer. Equal to CS-10.

C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-19, "Flexible Duct Liner Installation."
   1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
   2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
   3. Butt transverse joints without gaps, and coat joint with adhesive.
   4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
   5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
   6. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
   7. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
      a. Fan discharges.
      b. Intervals of lined duct preceding unlined duct.
      c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
   8. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

2.7 SEALANT AND GASKETS

A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL. All products are to contain low V.O.C. as defined/governed by LEED IEQ 4.1 and 4.2 (Regardless of project type).

B. Water-Based Joint and Seam Sealant (for indoor installation):
   1. Application Method: Brush on.
   2. Solids Content: Minimum 68 percent.
   3. Water resistant.
   4. Mold and mildew resistant.
   5. VOC: less than 30 g/l (less water).
   6. Maximum Static-Pressure Class: 15-inch wg, positive and negative.
   7. Service: Indoor.
   8. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
   9. DP 1020 or approved equal.

C. Water-Based Joint and Seam Sealant (for outdoor installation):
   1. Application Method: Tube application or dry tooling.
   2. Service Temp Range (degrees F): -40 to 180.
   3. Water resistant.
   4. Mold and mildew resistant.
   5. Service: Indoor.

6. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
7. Sonolastic NP-1 or approved equal.

D. Flanged Joint Sealant: Comply with ASTM E-84.
1. General: Butyl gasket tape.
2. Type: Butyl Rubber.
3. Service Temperature: Minus 40°F to 245°F
4. Pressure Class: All
5. DP 1040

2.8 HANGERS AND SUPPORTS

A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.

B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct."

D. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

E. Trapeze and Riser Supports:
1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.
3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

PART 3 - EXECUTION

3.1 DUCT INSTALLATION

A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. All ductwork sizes indicted on drawings are internal, free area dimensions. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.

B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible".

C. Install round and flat-oval ducts in maximum practical lengths.

D. Install ducts with fewest possible joints.

E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.

F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.

G. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.

H. Coordinate layout with suspended ceiling, fire-and smoke-control dampers, lighting layouts, and similar finished work.

I. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws. Sealant of seems/joints to include (but not limited to): all joints (including gasketed joints) metal seams, taps, any connections, etc.

J. Paint interiors of metal ducts that do not have duct liner, for 24 inches (600 mm) upstream of return air registers and grilles. Apply one coat of flat, black, latex finish coat over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 9 painting Sections.

K. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

L. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness. Compression of insulation by other trades (pipe, conduit, etc) is not acceptable.

M. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.

N. Where ducts pass through non-fire-rated interior partitions and exterior walls, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.

O. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Mechanical Specification Section "Air Duct Accessories" for fire and smoke dampers.

P. Protect duct interiors from moisture, construction debris and dust, and other foreign materials. Comply with SMACNA's "Duct Cleanliness for New Construction Guidelines."

Q. Horizontal ductwork in mechanical rooms must be installed a minimum of 8’-0” AFF.

R. All duct floor penetrations must have a water-tight, continuous concrete curb surrounding them. Minimum curb size shall be 3-1/2” tall X 3-1/2” wide.

3.2 DUCTWORK HANDLING AND PLENUM PROTECTION

A. All ductwork shall be delivered to site and stored with all openings protected from the elements. Protection to include 2.5 mil thick polyethylene plastic film secured with tape or integral elastic band.

B. Each segment/section of ductwork installed is to be appropriately protected from elements.

C. Any ductwork damaged during delivery, installation, or at any time during construction will be removed from job and replaced.

D. Ductwork found onsite (installed or stored) without approved protection will be removed from job and replaced.

E. Ductwork installed exposed to the elements to be sealed (joints and seems) immediately after installation. Any ductwork not sealed is susceptible to rejection and removed from job.

F. Under no circumstances shall insulation be applied to ductwork prior to the building being fully dried in (i.e.: building sealed, windows and roof installed, etc). Any ductwork being insulated prior to building dry-in is susceptible to rejections and removed from job.

G. If ductwork is found onsite not protected or the newly installed ductwork is deemed as dirty, engineer can elect for the contractor to clean all duct at no cost to the owner per NADCA 1992.

3.3 SEAM AND JOINT SEALINGS

A. Seal all duct transverse joints, longitudinal seams, flanges and duct wall penetrations (SMACNA Seal Class-A regardless of static pressure construction class).

3.4 HANGERS AND SUPPORT INSTALLATION

A. Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Chapter 4 "Hangers and Supports," unless otherwise indicated.
   1. Support rectangular ducts greater than 36 inches with width with trapeze threaded rod and angle or channel supports. Straps not acceptable.
   2. Rectangular Duct Hangers Exposed to View: Threaded rod and channel supports (do not use steel angles).

B. Building Attachments: Concrete inserts or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
   1. Where practical, install concrete inserts before placing concrete.

C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards-Metal and Flexible," Table4-1 (Table 4-1M), "Rectangular Duct Hangers Minimum Size," and Table 4-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection. Elbows 36" and larger to be individually supported.

D. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16' feet. Support vertical ducts in a manner that introduces minimal weight onto the roof curb flange.

E. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
   1. Do not attach hangers to metal deck roof assemblies with built-up insulation only (no concrete). Attach only to structural steel members.

3.5 CONNECTIONS

A. Make all connections to all fan-bearing equipment with flexible connectors complying with Specification Section "Duct Accessories".

B. Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible" for branch, outlet and inlet, and terminal unit connections. Reference detail for specific additional items required.

3.6 PAINTING

A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Division 09 painting Sections.

3.7 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Leakage Tests:
   1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Leakage Class defined in previous sections of specification. (Amount of ductwork to be tested to be determined by Engineer or Field Inspector).
   2. Test the following systems:
      a. Medium Pressure Ductwork (3-Inch wg), up to Air Terminal (branch taps included): Test representative duct sections totaling no less than 100 percent of total installed duct area.

b. Low Pressure Supply Ducts: Test representative duct totaling no less than 20 percent of total installed duct area.
c. Return Ducts: Test representative duct sections totaling no less than 20 percent of total installed duct area.
d. Exhaust Ducts: Test representative duct sections totaling no less than 20 percent of total installed duct area.
e. Outdoor Air Ducts: Test representative duct sections totaling no less than 20 percent of total installed duct area.
f. Grease Laden/Dishwasher Exhaust: Test representative duct sections per IMC "Light Test."

3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
4. Test for leaks before insulation application.

C. Duct system will be considered defective if it does not pass tests and inspections.

D. Contractor to disassemble, reassemble and seal segments of systems to accommodate leakage testing and for compliance with test requirements / leakage rates.

E. All testing equipment to be calibrated (by manufacturer) within 3 years of onsite duct pressure testing. Documentation to be provided for verification of certification to Engineer through submittal process.

F. Test Coupons: Cut out three (3) 4x4" test coupons in random locations selected by the design engineer for verification of gage thickness. Coupons shall be taken at the time of pressure testing.

G. Prepare test and inspection reports.

3.8 DUCT SCHEDULE

A. Fabricate ducts with galvanized sheet steel except as follows:
1. Acid-Resistant (Fume-Handling) Ducts:
a. Type 304, stainless-steel sheet – welded.
b. Exposed to View: No. 4 finish.
c. Concealed: No. 2D finish.
2. Moist Environment Ducts: Aluminum.
3. Spaces with pools, spas, hot tubs or water features: Aluminum.
4. Kitchen Exhaust – Reference applicable specification.

B. Intermediate Reinforcement:
1. Galvanized-Steel Ducts: Galvanized steel.
2. Stainless-Steel Ducts: Galvanized steel.
3. Aluminum Ducts: Aluminum or galvanized sheet steel coated with zinc chromate.

C. Liner:
1. Transfer Ducts: Fibrous glass, Type I 1 inch thick.

D. Double-Wall Duct Schedule:
1. All exposed Round/Flat Oval Ductwork.

E. Elbow Configuration:
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figure 2-2, "Rectangular Elbows".
a. Velocity 1000 fpm or Lower:
1) Radius Type RE 1 with minimum 0.5 radius-to-diameter ratio.
2) Mitered Type RE 4 without vanes.
b. Velocity 1000 to 1500 fpm:
1) Radius Type RE 1 with minimum 1.0 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 0.5 radius-to-diameter ratio and two vanes.

3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support Elbows."

c. Velocity 1500 fpm (7.6 m/s) or Higher:
1) Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.
2) Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
3) Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figure 2-3, "Vanes and Vane Runners," and Figure 2-4, "Vane Support in Elbows.

2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figure 3-3, "Round Duct Elbows".
a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
1) Velocity 1000 fpm or Lower: 0.5 radius-to-diameter ratio and three segments for 90-degree elbow.
2) Velocity 1000 to 1500 fpm: 1.0 radius-to-diameter ratio and four segments for 90-degree elbow.
3) Velocity 1500 fpm or higher: 1.5 radius-to-diameter and five segments for 90-degree elbow.
b. Round Elbows, 12 inches and smaller diameter: Stamped or pleated.
c. Round Elbows, 14 inches and larger in diameter: Welded.

F. Branch Configuration
1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards-Metal and Flexible," Figure 2-6, "Branch Connections."
a. Rectangular Main to Rectangular Branch: 45-degree entry.
b. Rectangular Main to Round Branch: Side takeoff fitting.
2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards – Metal and Flexible," Figure 3-4, "90 Degree Tees and Laterals," and Figure 3-5, "Conical Tees." Saddle taps are permitted in existing duct.
a. Velocity 1000 fpm or Lower: 90-degree tap.
b. Velocity 1000 to 1500 fpm: Conical tap.
c. Velocity 1500 fpm or higher: 45-degree lateral.

3.9 CLEANING NEW SYSTEMS

A. If ductwork is found onsite not protected or the newly installed ductwork is deemed as dirty, engineer can elect for the contractor to clean all duct at no cost to the owner per NADCA 1992.

B. System Cleaning: (If required)
1. Mark position of dampers and air-directional mechanical devices before cleaning, and perform cleaning before air balancing.
2. Provide service openings (approved duct access doors), as required, for physical and mechanical entry during cleaning and for inspection. All duct access doors to be installed prior to any duct pressure tests.
a. Removed and reinstall ceiling sections to gain access during the cleaning process.
3. Vent vacuuming system to the outside. Include filtration to conation debris removed from HVAC systems, and locate exhaust down wind and minimum of 20 feet away from air intakes and other points of entry into building.
4. Clean the following metal duct systems by removing surface contaminants and deposits:
a. Air outlets and inlets (registers, grilles and diffusers).
b. Supply, return and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers and drive assemblies.

c. Air-handling unit internal surfaces and components including mixing box, coil section, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
d. Coils and related components.
e. Return-air ducts, dampers and actuators except in ceiling plenums and mechanical equipment rooms.
f. Supply-air ducts, dampers, actuators and turning vanes.

5. Mechanical Cleaning Methodology:
   a. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
   b. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
   c. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner or duct accessories.
   d. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet.
   e. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
6. Cleanliness Verification:
   a. Visually inspect metal ducts for contaminants.
   b. Where contaminants are discovered, re-clean and re-inspect ducts.

END OF SECTION 233113

SECTION 233300

DUCT ACCESSORIES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
1. Backdraft dampers.
2. Manual-volume dampers.
3. Fire dampers
4. Fire and smoke dampers.
5. Turning vanes.
6. Duct-mounted access doors and panels.
7. Flexible ducts.
8. Flexible connectors.
9. Side takeoff fittings.
10. Duct accessory hardware.
11. Motorized control dampers.

B. Related Sections include the following:
1. Specification Section "Access Doors" for wall- and ceiling-mounted access doors and panels.
2. Specification Section "Louvers and Vents" for intake and relief louvers and vents connected to ducts and installed in exterior walls.
3. Specification Section "Air Terminal Units" for constant-volume and variable-air-volume control boxes and reheat boxes.
4. Specification Section "Air Inlets and Outlets."
5. Specification Section "Instrumentation and Controls for HVAC" for electric damper actuators.

1.3 SUBMITTALS

A. Product Data: For the following:
1. Backdraft dampers.
2. Manual-volume dampers.
3. Fire dampers.
4. Fire and smoke dampers.
5. Duct-mounted access doors and panels.
6. Flexible ducts.
7. Motorized control dampers.
8. Side takeoff fittings

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Comply with the following NFPA standards:
1. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
2. NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels describing contents.
   1. Fusible Links: Furnish quantity equal to 10 percent of amount installed.

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 (Z275) coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.

B. Reinforcement Shapes and Plates: Galvanized steel reinforcement where installed on galvanized, sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.

C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for 36-inch length or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

2.2 BACKDRAFT DAMPERS

A. Description: Suitable for horizontal or vertical installations.

B. Frame: 0.063-inch thick extruded aluminum, with mounting flange.

C. Blades: 0.050-inch thick aluminum sheet.

D. Blade Seals: Felt.

E. Blade Axles: Nonferrous.

F. Tie Bars and Brackets: Aluminum.

G. Return Spring: Adjustable tension.

2.3 MANUAL-VOLUME DAMPERS

A. General: Factory fabricated with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration. Close duct penetrations for damper components to seal duct consistent with pressure class.
   1. Pressure Classifications of 3-Inch wg or Higher: End bearings or other seals for ducts with axles full length of damper blades and bearings at both ends of operating shaft.

B. Standard Volume Dampers: Multiple- or single-blade, opposed-blade design, standard leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
   1. Roll-Formed Steel Blades: 0.064-inch thick, galvanized, sheet steel.
   2. Blade Axles: Galvanized steel.
   3. Tie Bars and Brackets: Galvanized steel.
   4. 1-1/2-inch insulation buildout with locking quadrant.

C. Low-Leakage Volume Dampers: Multiple- or single-blade, opposed-blade design, low-leakage rating, with linkage outside airstream, and suitable for horizontal or vertical applications.
   1. Steel Frames: Hat-shaped, galvanized, sheet steel channels, minimum of 0.064 inch thick, with mitered and welded corners; frames with flanges where indicated for attaching to walls; and flangeless frames where indicated for installing in ducts.
   2. Roll-Formed Steel Blades: 0.064-inch thick, galvanized, sheet steel.
   3. Blade Seals: Felt.
   4. Blade Axles: Galvanized steel.
   5. Tie Bars and Brackets: Galvanized steel.

6. 1-1/2-inch insulation buildout with locking quadrant.

D. Jackshaft: 1-inch diameter, galvanized steel pipe rotating within a pipe-bearing assembly mounted on supports at each mullion and at each end of multiple-damper assemblies.
   1. Length and Number of Mountings: Appropriate to connect linkage of each damper of a multiple-damper assembly.

E. Damper Hardware: Zinc-plated, die-cast core with dial and handle made of 3/32-inch thick zinc-plated steel, and a 3/4-inch hexagon locking nut. Include center hole to suit damper operating-rod size. Include elevated platform for insulated duct mounting.

F. Remotely Operated Damper Accessories:
   1. Galvanized steel rotary cable with termination for adjustment either at the diffuser face or at a wall- or ceiling-recessed box/cup as shown on drawings. Secure other cable end to damper worm gear assembly. Cable must be one-piece with no linkages along the length. Provide mounting clips to support cables at all changes in direction and at 3-foot intervals.

2.4 FIRE DAMPERS

A. General: Labeled to UL 555 (sixth edition). Ruskin Model D1BD2-B (or design engineer approved equivalent). Dampers shall be marked with a UL-Classified fire protection rating and marked “For Use in Dynamic Systems”.

B. Fire Rating: One and one-half and/or three hours as indicated.

C. Frame: SMACNA Type B with blades out of airstream; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.

D. Mounting Sleeve: Provide factory-mounted sleeve and retaining angles.
   1. Minimum Thickness (Sleeve shall not extend more than 6" past wall or floor without factory installed access door): 16 gauge and length to suit application.

E. Mounting Orientation: Vertical or horizontal as indicated.

F. Blades: Roll-formed, interlocking, 0.034-inch thick, galvanized, sheet steel. In place of interlocking blades, use full-length, 0.034-inch thick, galvanized steel blade connectors.

G. Horizontal Dampers: Include a blade lock and stainless-steel negator closure spring.

H. Fusible Link: Replaceable, 165 deg F rated as indicated.

2.5 COMBINATION FIRE / SMOKE DAMPERS (SFD)

A. General: Labeled to UL 555/UL 555S (sixth and fourth edition respectively) Combination fire and smoke dampers shall be labeled for one-and-one-half-hour rating to UL 555S. Provide Class II leakage rating. Dampers shall be marked with a UL-classified fire rating. Ruskin FSD-60 or approved equivalent. The SFD shall be listed to operate from the fire alarm control panel (FACP). Each SFD shall have an associated smoke detector that shall be addressable from the FACP. The smoke detector shall be provided by the Fire Alarm Contractor and installed by the Electrical Contractor. Coordinate damper installation with these trades.

B. Electric Fusible Link (EFL): 165 or 212 deg F rated as applicable.

C. Frame and Blades: 16 gauge, galvanized, sheet steel. Damper blades shall be airfoil-shaped, single-piece construction, with blade seals mechanically locked into blade edge (adhesive clip-on seals are not acceptable). Ruskin FSD-60 or equivalent. Damper blades shall be minimum 14 gauge. SFD’s installed off vertical chases shall have vertical airfoil blades (Ruskin FSD 60-V or equivalent).

D. Mounting Sleeve: Factory-installed, 16 gauge, galvanized, sheet steel; length to suit wall or floor application. Sleeve shall not extend more than 6" past wall or floor without factory installed access door. SFD shall be capable of mounting on either side of wall and working with airflow in either direction. Provide manufacturer-recommended duct-to-sleeve joints.

E. Electric controlled closure is not less than 7 seconds or more than 10 seconds to prevent HVAC and duct damage. Damper shall have local reset button and shall have automatic reset after test, smoke detection or power failure conditions. Damper shall close upon loss of power or AHU shut down. Actuator shall be 120V.

F. Provide with stainless steel jam seals and bearings. (Bronze bearings are not acceptable)

G. Furnish and install dampers according to manufacturer's instructions and in compliance with the latest edition of the SMACNA Duct Manual and NFPA Standards (90, 92A, and 92B).

2.6 TURNING VANES

A. Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Manufactured Turning Vanes: Fabricate of 1-1/2-inch wide, curved blades set 3/4 inch o.c.; support with bars perpendicular to blades set 2 inches o.c.; and set into side strips suitable for mounting in ducts.

2.7 DUCT-MOUNTED ACCESS DOORS AND PANELS

A. Manufactures:
   1. Greenheck
   2. Flexmaster
   3. Elgens
   4. No exceptions

B. Ratings
   1. Differential Pressure
      a. Access doors shall have a maximum differential pressure rating of 4.5 in.wg.

C. Construction
   1. Frame
      a. Access door shall be constructed of 27 ga. Galvanized steel on sizes up to 12 in. x 12 in. On sizes 14 in. x 14 in. and larger shall be constructed of 22 ga. Galvanized steel.
   2. Door Panel: Door panel is constructed of 24 ga. Galvanized steel on both sides of the insulation.
   3. Insulation: Insulation is 1 in. fiberglass.
   4. Gasket: Gasket is ½ in. wide dual gasket (compressible synthetic type). Gasket is to be used door to frame and frame to duct.
   5. Hinge: Continuous piano style.
   6. Latches: Latches is plated steel with galvanized steel strikes.
   7. Finish: Mill finish is standard.

2.8 FLEXIBLE CONNECTORS

A. General: Flame-retarded or noncombustible fabrics, coatings, and adhesives complying with UL 181, Class 1.

B. Standard Metal-Edged Connectors: Factory fabricated with a strip of fabric 3-1/2 inches wide attached to two strips of 2-3/4-inch wide, 0.028-inch thick, galvanized, sheet steel or 0.032-inch aluminum sheets. Select metal compatible with connected ducts.

C. Conventional, Indoor System Flexible Connector Fabric: Glass fabric double coated with polychloroprene.
   1. Minimum Weight: 26 oz./sq. yd.
   2. Tensile Strength: 480 lbf/inch in the warp, and 360 lbf/inch in the filling.

D. Conventional, Outdoor System Flexible Connector Fabric: Glass fabric double coated with a synthetic-rubber, weatherproof coating resistant to the sun's ultraviolet rays and ozone environment.
   1. Minimum Weight: 26 oz./sq. yd.
   2. Tensile Strength: 530 lbf/inch in the warp, and 440 lbf/inch in the filling.

2.9 INSULATED FLEXIBLE DUCT, LOW PRESSURE

A. Manufacturers:
   1. Flexmaster type 1M UL181 Class I Air Duct.
   2. Thermaflex MK-E
   3. No exceptions

B. The duct shall be constructed of a CPE fabric supported by helical wound galvanized steel.

C. The internal working pressure rating shall be at least 6" w.g. positive and 4" w.g. negative, with a bursting pressure of at least 2-1/2 times the working pressure.

D. The duct shall be rated for a velocity of at least 4000 feet per minute.

E. The duct must be suitable for continuous operation at a temperature range of -20 deg F to +250 deg F.

F. Acoustical performance, when tested by an independent laboratory in accordance with the Air Diffusion Council's *Flexible Air Duct Test Code FD 72-R1*, Section 3.0, Sound Properties, shall be as follows:
   1. The insertion loss (dB) of a 6-foot length of straight duct when tested in accordance with ASTM E 477, at a velocity of 500 feet per minute, shall be at least:

Octave Band	**2**	**3**	**4**	**5**	**6**	**7**
Hz.	125	250	500	1000	2000	4000
6" diameter	11	33	36	37	19	14
8" diameter	13	35	34	37	29	17
12" diameter	10	26	26	32	24	11

G. Factory insulate the flexible duct with fiberglass insulation. The R-value shall be at least 6 at a mean temperature of 75 deg F.

H. Cover the insulation with a fire retardant metalized vapor barrier jacket reinforced with crosshatched scrim (FSK) having a permeance of not greater than 0.05 perms when tested in accordance with ASTM E 96, Procedure A.

2.10 SIDE TAKEOFF FITTINGS

A. Provide Flexmaster Model STOD or SBMD takeoff for sheet metal for all taps connecting to flex duct, except for air devices with OBD's and flow bar. For devices with OBD, use Flexmaster Model STO- or SBM no exceptions.

B. The side takeoff fittings shall maintain a ratio of 1:1 of inlet to outlet on all units over 7-inch diameter to allow proper sizing of the duct system.

C. Model STOD side takeoff shall have a 1-inch offset rear edge for enhanced pressure drop characteristics and 1-1/2-inch insulation buildout with locking hand quadrant.

D. Fittings shall have a 1-inch-wide prepunched mounting flange with corner clips and adhesive gasket for minimal leakage and ease of installation.

E. The fittings shall be constructed of a two-piece 26-gauge G-90 galvanized steel body and collar.

F. The overall length of the fitting shall be 13 inches with or without damper to reduce turbulence in the airstream.

G. The round outlet shall be provided with a rolled stiffener bead for strength and ease of installation and sealing of spiral and flexible ductwork joints.

2.11 ACCESSORY HARDWARE

A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments, and length to suit duct insulation thickness.

B. Splitter Damper Accessories: Zinc-plated damper blade bracket; 1/4-inch, zinc-plated operating rod; and a duct-mounted, ball-joint bracket with flat rubber gasket and square-head set screw.

C. Flexible Duct Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action, in sizes 3 to 18 inches to suit duct size.

D. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

2.12 MOTORIZED CONTROL DAMPERS

A. Manufacturers:
   1. Greenheck.
   2. Nailor Industries Inc.
   3. Ruskin Company.
   4. Pottorff.

B. General Description: AMCA-rated, opposed-blade design; minimum of 0.1084-inch thick, galvanized-steel frames with holes for duct mounting; minimum of 0.0635-inch thick, galvanized-steel damper blades with maximum blade width of 8 inches.
   1. Secure blades to ½-inch diameter, zinc-plated axles using zinc-plated hardware, with nylon blade bearings, blade-linkage hardware of zinc-plated steel and brass, ends sealed against spring-stainless-steel blade bearings, and thrust bearings at each end of every blade.
   2. Operating Temperature Range: From minus 40 to plus 200 deg F.
   3. Provide parallel- or opposed-blade design with inflatable seal blade edging, or replaceable rubber seals, rated for leakage at less than 10 cfm per sq. ft. of damper area, at differential pressure of 4-inch wg when damper is being held by torque of 50 in.×lbf (5.6 N×m); when tested according to AMCA 500D.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install duct accessories according to applicable details shown in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for metal ducts and NAIMA's "Fibrous Glass Duct Construction Standards" for fibrous-glass ducts.

B. When installing volume dampers in lined duct, avoid damage to and erosion of duct liner.

C. Install manual volume dampers at all main branch lines for ease of balancing.

D. Provide test holes at fan inlet and outlet and elsewhere as indicated.

E. Install fire and smoke dampers according to manufacturer's UL-approved written instructions.
   1. Install fusible links in fire dampers.

F. Install mounting angles, minimum of 1 ½ "x 1 ½ "x 20 gauge steel on both sides of SFD or FD.

G. Install duct access panels for access to both sides of duct coils. Install duct access panels downstream from volume dampers, fire dampers, smoke-fire dampers, turning vanes, and equipment.

H. Install duct access panels to allow access to interior of ducts for cleaning, inspecting, adjusting and maintaining accessories and terminal units.
   1. Install access panels on side of duct where adequate clearance is available.
   2. Label access doors according to Specification Section “Mechanical Identification.”

3.2 ADJUSTING

A. Adjust duct accessories for proper settings.

B. Adjust fire and smoke dampers for proper action.

C. Final positioning of manual-volume dampers is specified in Specification Section "Testing, Adjusting, and Balancing."

END OF SECTION 233300

SECTION 233423

HVAC POWER VENTILATORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Ceiling-mounting ventilators.
   2. Centrifugal roof ventilators
   3. Destratification fans
   4. In-line centrifugal fans.
   5. Propeller fans.

1.3 PERFORMANCE REQUIREMENTS

A. Project Altitude: Base fan-performance ratings on actual Project site elevations.

B. Operating Limits: Classify according to AMCA 99.

C. Fan Unit Schedule: The following information is described in an equipment schedule on the Drawings.
   1. Fan performance data including capacities, static pressure, sound power characteristics, motor requirements and electrical characteristics.
   2. Fan arrangement, including wheel configuration inlet and discharge configurations and required accessories.

1.4 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties and accessories for each type of product indicated and include the following:
   1. Certified fan performance curves with system operating conditions indicated.
   2. Certified fan sound-power ratings.
   3. Motor ratings and electrical characteristics, plus motor and electrical accessories.
   4. Material thickness and finishes, including color charts.
   5. Dampers, including housings, linkages and operators.
   6. Roof curbs.
   7. Fan speed controllers.

B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components and location and size of each field connection.
   1. Wiring Diagrams: Power, signal and control wiring.
   2. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
   3. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails and base weights.

C. Coordination Drawings: Show roof penetration requirements and reflected ceiling plans drawn to scale and coordinating roof penetrations and units mounted above ceiling. Show the following:
   1. Roof framing and support members relative to duct penetrations.

2. Ceiling suspension assembly members.
3. Size and location of initial access modules for acoustical tile.
4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.

D. Maintenance Data: For power ventilators to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. AMAC Compliance: Products shall comply with performance requirements and shall be licensed to use the AMCA-Certified Ratings Seal.

C. NEMA Compliance: Motors and electrical accessories shall comply with NEMA standards.

D. UL Standard: Power ventilators shall comply with UL 705.

E. Listing and labeling: Provide electrically operated fixtures specified in this section that are listed and labels.
1. The terms “Listed” and “Labeled”. As defined in the Nations Electrical Code, Article 100.
2. Listing and Labeling Agency Qualifications: A “Nationally Recognized Testing laboratory” (NTRL) as defined in OSHA Regulation 1910.7.

F. UL Standard: Provide Power Ventilators that comply with UL 762, grease laden air at 300 deg. F where applicable (kitchen exhaust).

G. Warranty: The manufacturer’s standard warranty shall be for a period of 12 months from the date of Substantial Completion. Warranty is limited to manufacturer defects only. The warranty shall include parts and labor during this period.

1.6 DELIVERY, STORAGE AND HANDLING

A. Deliver fans as factory-assembled unit, to the extent allowable by shipping limitations, with protective crating and covering.

B. Disassemble and reassemble units, are required for moving to final location, according to manufacturer’s written instructions.

C. Lift and support units with manufacturer’s designated lifting or supporting points.

1.7 COORDINATION

A. Coordinate size and location of structural-steel support members.

B. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Specification Section “Cast-In-Place Concrete”.

C. Coordinate installation of roof curbs, equipment supports and roof penetrations. These items are specified in Specification Section “Roof Accessories”.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Belts: One set for each belt-driven unit.

1.9 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions by field Measurements. Verify clearances.

B. Do not operate fans until ductwork is clean, filters are in place, bearings are lubricated and fans have been commissioned.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Centrifugal Roof Ventilators:
      a. Cook, Loren Company
      b. Envirofan
      c. Greenheck Fan Corp.
      d. Leading Edge

2.2 CEILING-MOUNTING VENTILATORS

A. Description: Centrifugal fans designed for installing in ceiling or wall or for concealed in-line applications.

B. Housing: Steel, lined with acoustical insulation

C. Fan Wheel: Centrifugal wheels directly mounted on motor shaft. Fan shrouds, motor and fan wheel shall be removable for service.

D. Grille: Painted aluminum, louvered grille with flange on intake and thumbscrew attachment to fan housing.

E. Electrical Requirements: Junction box for electrical connection on housing and receptacle for motor plug-in.

F. Accessories:
   1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
   2. Filter: Washable aluminum to fit between fan and grille.
   3. Isolation: Rubber-in-shear vibration isolators.
   4. Manufacturer’s standard roof jack or wall cap and transition fittings.

G. Capacities and Characteristics: Refer to drawing schedules.

2.3 CENTRIFUGAL ROOF VENTILATORS – DOWNBLAST

A. Description: Belt-driven or direct-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base and accessories.

B. Housing: Removable, spun-aluminum, dome top and outlet baffle; square, two-piece, aluminum base with venture inlet cone.

C. Fan Wheels: aluminum hub and wheel with backward-inclined blades.

D. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:

1. Fan Shaft: turned, ground, and polished stainless steel; keyed to wheel hub.
2. Shaft Bearings: Heavy-duty re-greasable bail type in a pillow block cast iron housing, selected for a minimum L50 life in excess of 200,000 hours.
3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
4. Fan and motor isolated from exhaust airstream.
5. Belts: Oil and heat resistant, nonstatic.

E. Accessories: The following items are required as indicated:
1. Variable-Speed Controller: Solid-state control to reduce speed from 100 percent to less than 50 percent (required on direct drive fans only).
2. Disconnect Switch: Nonfusible type, with thermal-overload protection mounted inside fan housing, factory wired through an internal aluminum conduit.
3. Bird Screens: Removable, 1/2-inch mesh, aluminum or brass wire.
4. Dampers: Counterbalanced, parallel-blade, backdraft dampers mounted in curb base; factory set to close when fan stops.

F. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch- thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base. Built in cant and mounting flange.
1. Configuration: Built-in cant and mounting flange.
2. Overall Height: 18 inches
3. Pitch Mounting: Manufacture curb for roof slope, if necessary.
4. Metal Liner: Galvanized steel.

2.4 CENTRIFUGAL ROOF VENTILATORS – UPBLAST

A. Description: Belt-driven or direct-driven centrifugal fans consisting of housing, wheel, fan shaft, bearings, motor and disconnect switch, drive assembly, curb base, and accessories. Grease laden fans to comply with UL 762 Grease Laden Air.

B. Housing: Removable, spun-aluminum, dome top and outlet baffle; square, two-piece, aluminum base with venturi inlet cone.

C. Fan Wheels: Aluminum hub and wheel with backward-inclined blades.

D. Belt-Driven Drive Assembly: Resiliently mounted to housing, with the following features:
1. Fan Shaft: Turned, ground and polished stainless steel; keyed to wheel hub.
2. Shaft Bearings: heavy-duty re-greasable ball type in a pillow block cast iron housing, selected for a minimum L50 life in excess of 200,000 hours.
3. Pulleys: Cast-iron, adjustable-pitch motor pulley.
4. Fan and motor isolated from exhaust airstream.

E. Accessories: The following items are required as indicated:
1. Disconnect Switch: Non-fusible type, with thermal-overload protection mounted inside fan housing, factory wired through in internal aluminum conduit.

F. Roof Curbs: Galvanized steel; mitered and welded corners; 1-1/2-inch thick, rigid, fiberglass insulation adhered to inside walls; and 1-1/2-inch wood nailer. Size as required to suit roof opening and fan base.
1. Configuration: Built-in cant and mounting flange.
2. Overall Height: 18 inches
3. Pitch Mounting: Manufacture curb for roof slope, if necessary.
4. Metal Liner: Galvanized steel.
5. Vented Curb Extension, with hinged curb cap.

2.5 DESTRATIFICATION FANS

A. Ceiling Fans 60” diameter 3 blade fan, dynamically balanced with permanently lubricated ball bearing motor, U.L. listed (UL 507), with all necessary hooks and supports for a complete installation. Provide solid state speed controllers and secondary support cable.

B. Wall Mount Circulators: 24” 3-blade oscillating fan. Wall bracket, 2-speed motor, powder coated for guards, heavy duty pull chain, 45°-90° sweep. Safety cable mounting kit.

2.6 IN-LINE CENTRIFUGAL FANS (TUBULAR)

A. Description: In-line, direct or belt-driven (as scheduled on the drawings) centrifugal fans consisting of housing, wheel, outlet guide vanes, fan shaft, bearings, motor and disconnect switch, drive assembly, mounting brackets and accessories.

B. Housing: Spilt, spun aluminum with aluminum straightening vanes, inlet and outlet flanges and support bracket adaptable to floor, side wall or ceiling mounting.

C. Direct-Driven Units: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing; with wheel, inlet cone, and motor on swing-out service door.

D. Belt-Driven Units: Motor mounted on adjustable base, with adjustable sheaves, enclosure around belts within fan housing, and lubricating tubes from fan bearings extended to outside of fan housing.

E. Fan Wheels: Aluminum, air foil blades welded to aluminum hub.

F. Accessories:
   1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
   2. Companion Flanges: For inlet and outlet duct connections.
   3. Fan Guards: 1/2 by 1 inch mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork.
   4. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.

G. Capacities and Characteristics: Refer to drawing schedules.

2.7 IN-LINE CENTRIFUGAL FANS (SQUARE)

A. Description: In-line, direct driven (as scheduled on the drawings) centrifugal fans consisting of housing, wheel, outlet guide vanes, fan shaft, bearings, motor and disconnect switch, drive assembly, mounting brackets and accessories.

B. Housing: Insulated and galvanized with inlet and outlet flanges and support bracket adaptable to floor, side wall or ceiling mounting.

C. Direct-Driven Units: ECM Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing; with wheel, inlet cone, and motor on swing-out service door.

D. Fan Wheels: Aluminum, backward inclined air foil blades welded to aluminum hub.

E. Accessories:
   1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
   2. Companion Flanges: For inlet and outlet duct connections.
   3. Housing Insulation.
   4. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.

F. Capacities and Characteristics: Refer to drawing schedules.

2.8 PROPELLER FANS

A. Description: Direct-or belt-driven (as scheduled on the drawings) propeller fans consisting of fan blades, hub, housing, orifice ring, motor, drive assembly and accessories.

B. Housing: Galvanized-steel sheet with flanged edges and integral orifice ring with baked-enamel finish coat applied after assembly.

C. Steel Fan Wheels: Formed-steel blades riveted to heavy-gage steel spider bolted to cast-iron hub.

D. Fan Wheel: Replaceable, extruded-aluminum, airfoil blades fastened to cast-aluminum hub; factor set pitch angle of blades.

E. Belt-Drive Drive Assembly: Resiliently mounted to housing, statically and dynamically balanced and selected for continuous operation at maximum rated fan speed and motor horsepower, with final alignment and belt adjustment made after installation.
   1. Service Factor Based on Fan Motor Size: 1.4.
   2. Fan Shaft: Turned, ground and polished steel; keyed to wheel hub.
   3. Shaft Bearings: Permanently lubricated, permanently sealed, self-aligning ball bearings.
      a. Ball-Bearing Rating Life: ABMA 9, L_{10} of 100,000 hours.
   4. Pulleys: Cast iron with split, tapered bushing; dynamically balanced at factory.
   5. Motor Pulleys: Adjustable pitch for use with motors through 5 hp; fixed pitch for use with larger motors. Select pulley so pitch adjustment is at the middle of adjustment range at fan design conditions.
   6. Belts: Oil resistant, nonsparking, and nonstatic; matched sets for multiple belt drives.
   7. Belt Guards: Fabricate of steel motors mounted on outside of fan cabinet.

F. Accessories:
   1. Gravity Shutters: Aluminum blades in aluminum fame; interlocked blades with nylon bearings.
   2. Motor-Side Back Guard: Galvanized steel, complying with OSHA specifications, removable for maintenance.
   3. Wall Sleeve: Galvanized steel to match fan and accessory size.
   4. Weathershield Hood: Galvanized steel to match fan and accessory size.
   5. Weathershield Front Guard: Galvanized steel with expanded metal screen.

G. Capacities and Characteristics: Refer to drawing schedules.

2.9 MOTORS

A. Motor Construction: NEMA MG 1, general purpose, continuous duty, Design B.

B. Enclosure Type: The following features are required as indicted.
   1. Open drip proof motors where satisfactorily housed or remotely located during operation.
   2. Guarded drip proof where exposed to contact by employees or building occupants.

C. All motors shall be pre-wired to the disconnect at the factory.

2.10 SOURCE QUALITY CONTROL

A. Sound-Power Level Ratings: Comply with AMCA 301, “Methods for Calculating Fan Sound Ratings from Laboratory Test Data.” Factory test fans according to AMCA 300, “Reverberant Room Method for Sound Testing of Fans.” Label fans with AMCA-Certified Ratings Seal.

B. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation and efficiency by factory tests and ratings according to AMCA 210, “Laboratory Methods of Testing Fans for Rating.”

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install power ventilators level and plumb.

B. Support inline fans with galvanized all thread and spring isolators with a static deflection of 1 inch.

C. Support suspended units from structure using galvanized threaded steel rods and spring hangers.

D. Secure roof-mounting fans to roof curbs with stainless steel hardware. Anchor fan to curb with a minimum of two (2) fasteners per side. Refer to Specification Section “Roof Accessories” for installation of roof curbs.

E. Ceiling Units: Suspect units from structure; use steel wire or metal straps.

F. Install units with clearances for service and maintenance.

G. Label units according to requirements specified in Specification Section “Mechanical Identification.”

3.2 CONNECTIONS

A. Duct installation and connection requirements are specified in other Mechanical Sections. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors for all fans; no exceptions. Flexible connectors are specified in Specification Section “Duct Accessories.”

B. Install duct adjacent to power ventilators to allow service and maintenance.

C. Ground equipment according to Specification Section “Grounding and Bonding.”

3.3 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. Verify that shipping, blocking and bracing are removed.
   2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters and disconnect switches.
   3. Verify that cleaning and adjusting are complete.
   4. Disconnect fan drive from motor, verify proper motor rotation direction and verity fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts and install belt guards.
   5. Adjust belt tension.
   6. Adjust damper linkages for proper damper operation.
   7. Verity lubrication for bearings and other moving parts.
   8. Verity that manual and automatic volume control and fire and smoke dampers in connected ductwork system are in fully open positions.
   9. Disable automatic temperature-control operators, energize motor and adjust fan to indicated rpm, and measure and record motor voltage and amperage.
   10. Shut unit down and reconnect automatic temperature-control operators.
   11. Remove and replace malfunctioning units and retest as specified above.

B. Starting Procedures:
   1. Energize motor and adjust fan to indicated rpm.
   2. Measure and record motor voltage and amperage.

C. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation. Remove malfunctioning units, replace with new units, and retest.

D. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

E. Shut unit down and reconnect automatic temperature-control operators.

F. Refer to Specification Section “Testing, Adjusting and Balancing” for testing, adjusting, and balancing procedures.

G. Replace fan and motor pulleys as required to achieve design airflow.

H. Repair or replace malfunctioning units. Retest as specified above after repairs or replacements are made.

3.4 ADJUSTING

A. Adjust damper linkages for proper damper operation.

B. Adjust belt tension.

C. Refer to Specification Section “Testing, Adjusting and Balancing for HVAC” for testing, adjusting and balancing procedures.

D. Replace fan and motor pulleys as required to achieve design airflow.

E. Lubricate bearings.

3.5 CLEANING

A. On completion of installation, internally clean fans according to manufacturer’s written instructions. Remove foreign material and construction debris. Vacuum fan wheel and cabinet.

B. After completing system installation, including outlet fitting and devices, inspect exposed finish. Remove burns, dirt and construction debris and repair damaged finished.

3.6 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner’s maintenance personnel to adjust, operate, and maintain power ventilators.
   1. Train owner’s maintenance personnel on procedures and schedules for starting and stopping, troubleshooting servicing, and maintaining equipment and schedules.
   2. Review data in maintenance manuals. Refer to Specification Section “Closeout Procedures.”
   3. Review data in maintenance manuals. Refer to Specification Section “Operation and Maintenance Data.”
   4. Schedule training with Owner, through Architect, with at least seven days’ advance notice.

3.7 COMMISSIONING

A. Final Checks before Startup: Perform the following operations and checks before startup:
   1. Verify that shipping, blocking and bracing are removed.
   2. Verify that unit is secure on mountings and supporting devices and that connections for piping, ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters and disconnects.
   3. Perform cleaning and adjusting specified in this Section.
   4. Disconnect fan drive from motor, verify proper motor rotation direction and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts and install belt guards.
   5. Lubricate bearings, pulleys, belts and other moving parts with factory-recommended lubricants.

6. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in the fully open position.
7. Disable automatic temperature-control operators.

B. Starting Procedures for fans are as follows:
1. Energize motor; verify proper operation of motor, drive system and fan wheel. Adjust fan to be indicated RPM.
2. Measure and record motor voltage and amperage.

C. Shut unit down and reconnect automatic temperature-control operators.

D. Refer to Specification Section “Testing, Adjusting and Balancing,” for procedures for air-handling-system testing, adjusting and balancing.

E. Replace fan and motor pulleys as required to achieve design conditions.

END OF SECTION 233423

SECTION 233713

DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes ceiling- and wall-mounted diffusers, registers, and grilles.

B. Related Sections include the following:
   1. Specification Section "Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.
   2. Specification Section "Testing, Adjusting, and Balancing" for balancing diffusers, registers and grilles.

1.3 DEFINITIONS

A. Diffuser: Circular, square, or rectangular air distribution outlet, generally located in the ceiling and comprised of deflecting members discharging supply air in various directions and planes and arranged to promote mixing of primary air with secondary room air.

B. Grille: A louvered or perforated covering for an opening in an air passage, which can be located in a sidewall, ceiling, or floor.

C. Register: A combination grille and damper assembly over an air opening.

1.4 SUBMITTALS

A. Product Data: For each model indicated, include the following:
   1. Data Sheet: For each type of air outlet and inlet, and accessory furnished; indicate construction, finish, and mounting details.
   2. Performance Data: Include throw and drop, static-pressure drop, and noise ratings for each type of air outlet and inlet.
   3. Schedule of diffusers, registers, and grilles indicating drawing designation, model number, size, and accessories furnished.
   4. Assembly Drawing: For each type of air outlet and inlet; indicate materials and methods of assembly of components.

1.5 QUALITY ASSURANCE

A. NFPA Compliance: Install diffusers, registers, and grilles according to NFPA 90A, "Standard for the Installation of Air-Conditioning and Ventilating Systems."

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Krueger
2. Metalaire
3. Price
4. Titus

B. Performance characteristics, specific models, material, features, dimensions and finishes of diffusers, registers, and grilles are scheduled on Drawings.

2.2 SOURCE QUALITY CONTROL

A. Testing: Test performance according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install diffusers, registers, and grilles level and plumb, according to manufacturer's written instructions, Coordination Drawings, original design, and referenced standards.

B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Coordinate with architectural Reflected Ceiling Plans. Locate devices where indicated, as much as practical. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.

C. Install diffusers, registers, and grilles with airtight connection to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.

3.3 ADJUSTING

A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

3.4 CLEANING

A. After installation of diffusers, registers, and grilles, inspect exposed finish. Clean exposed surfaces to remove burrs, dirt, and smudges. Replace diffusers, registers, and grilles that have damaged finishes.

END OF SECTION 233713

SECTION 238126

SPLIT-SYSTEM AIR-CONDITIONING UNITS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes split system air conditioning and heat pump units consisting of separate evaporator fan and compressor condenser components. Units are designed for exposed or concealed mounting, and may be connected to ducts.

1.3 SUBMITTALS

A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.

B. Specification Compliance Review:
   1. Manufacturers and bidders must provide the consulting engineer with a Compliance Review of the Specifications and Addenda's. The Compliance Review shall be a paragraph-by-paragraph review of the Specifications and schedule with the following information; "C", "D", or "E" marked in the margin of the original Specifications and any subsequent Addenda's. If the manufacturer or bidder does not provide the Compliance Review to the engineer for review, with the submittal, the submittal will be subject to rejection as non-compliant.
      a. "C" Comply with no exceptions.
      b. "D" Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the Specification can be satisfied.
      c. "E" Exception, do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives. Non-compliance with the specifications is grounds for rejection as unacceptable. A bid from any alternative or listed equipment manufacturer with any number of exceptions will be reason for rejection for non-compliance without further review.
      d. Unless a deviation or exception is specifically noted in the Compliance Review, the manufacturer shall provide full compliance with entire specification. Deviations or exceptions taken in letters or cover letters in a bid document, subsidiary documents, by omission or by contradiction do not release the manufacturer or bidder from being in complete compliance, unless the exception or deviation has been specifically noted in the Compliance Review and approved by the consulting engineer.
      e. Equipment manufacturers or bidders that do not meet the specifications thru the above process will be subject to rejection without further review.

C. Shop Drawings: Diagram power, signal, and control wiring.

D. Samples for Initial Selection: For units with factory-applied color finishes.

E. Field quality-control test reports.

F. Operational and Maintenance Data: For split-system air-conditioning units to include in emergency operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Specification Section “Product Requirements.”

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Energy-Efficiency Ratio (EER): Equal to or greater than prescribed by ASHRAE 90.1,”Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.”

D. Coefficient of Performance: Equal to or greater than prescribed by ASHRAE 90.1, “Energy Efficient Design of New Buildings except Low-Rise Residential Buildings.”

E. Units shall be designed to operate with HCFC-free refrigerants.

1.5 COORDINATION

A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Specification Section “Special Conditions for All Mechanical Work.”

B. Coordinate size, location, and connection details with roof curbs, equipment supports, and roof penetrations specified in Specification Section “Special Conditions for All Mechanical Work.”

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Carrier Air Conditioning; Div. of Carrier Corporation
2. Lennox Industries, Inc.
3. Trane Company (The); Unitary Products Group.
4. York International Corp.
5. JCI

2.2 CONCEALED EVAPORATOR-FAN COMPONENTS

A. Chassis: Galvanized steel with flanged edges, removable panels for servicing, and insulation on back of panel.
1. Insulation: Faced, glass-fiber duct liner.
2. Drain Pans: Galvanized steel, with connection for drain; insulated.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.

C. Electric Coil: Helical, nickel-chrome, resistance-wire heating elements with refractory ceramic support bushings; automatic-reset thermal cutout; built-in magnetic contractors; manual-reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.

D. Fan: Forward-curved, double-width wheel of galvanized steel; directly connected to motor.

E. Fan Motors:
1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.

F. Disposable Filters: 1 inch (25 mm) thick, in fiberboard frames.

G. Wiring Terminations: Connect motor to chassis wiring with plug connection.

2.3 WALL-MOUNTING, EVAPORATOR-FAN COMPONENTS

A. Cabinet: Enameled steel with removable panels on front and ends, and discharge drain pans with drain connection.

B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal expansion valve.

C. Electric Coil: Helical, nickel chrome, resistance wire heating elements with refractory ceramic support bushings; automatic reset thermal cutout; built in magnetic contactors; manual reset thermal cutout; airflow proving device; and one-time fuses in terminal box for overcurrent protection.

D. Fan: Direct drive, centrifugal fan.

E. Fan Motors:
1. Special Motor Features: Multitapped, multispeed with internal thermal protection and permanent lubrication.

F. Filters: Permanent, cleanable.

2.4 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS

A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.

B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current sensitive overload devices, start capacitor, relay, and contactor.
1. Compressor Type: Scroll
2. Manual reset high pressure switch and automatic reset low pressure switch.
3. Refrigerant Charge: R-410.
4. 1 Compressor per unit

C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid sub-cooler. Coil shall be provided with a metal hail guard of either louvered construction or ½" x ½" wire mesh.

D. Heat Pump Components: Reversing valve and low temperature air cut-off thermostat.

E. Fan: Aluminum propeller type, directly connected to motor.

F. Motor: Permanently lubricated, with integral thermal overload protection.

G. Coordinate with drawing schedule for additional requirements.

2.5 ACCESSORIES

A. Unit shall have local control unless specified to be part of central control system.

B. Low-Voltage Control Wiring: Provide plenum-rated cabling (six-conductor) per manufacturer.

C. Thermostat: Low-voltage, programmable, with the following functions and features:
   1. Auto changeover (heat/cool).
   2. Seven-day programmable with three (3) different occupied settings per day.
   3. Large backlit liquid crystal display indicating temperature, setpoint temperature, time setting, operating mode, and cool/heat mode.
   4. Three (3) security levels with keypad lockout.
   5. Non-volatile memory.
   6. Four-hour override/setback.
   7. Seven-day holiday setback.

D. Automatic reset timer to prevent rapid cycling of compressor.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install units level and plumb.

B. Install evaporator fan components using manufacturer's standard mounting devices securely fastened to building structure.

C. Install ground mounting, compressor condenser components on 4-inch- (100-mm-) thick, reinforced concrete base; 4 inches (100 mm) larger on each side than unit. Concrete, reinforcement, and formwork are specified in Specification Section "Special Conditions for All Mechanical Work." Coordinate anchor installation with concrete base.

D. Install compressor condenser components on equipment supports specified in Specification Section "Special Conditions for All Mechanical Work." Anchor units to supports with removable, cadmium plated fasteners.

E. Install condensing unit on Korfund or equal pads and secure to housekeeping pad.

F. Charge unit with manufacturer required refrigerant and amount.

G. Support refrigerant piping from structure with hangers and saddles.

H. Insulate refrigerant lines with Armaflex. Provide aluminized jacket for exterior insulation.

I. Install t-stat in room on wall not in airflow stream. Connect t-stat to compressor/evaporator.

J. Provide condensate overflow switch to de-energize unit.

K. Provide and install plenum rated control cabling between condensing unit and evaporator.

3.2 CONNECTIONS

A. Connect condensate line to unit. Route condensate to floor drain. Support piping from structure with pipe hangers. Insulate condensate line with Armaflex.

B. Connect unit to controls system. Controls shall alarm with unit failure.

C. Piping installation requirements are specified in other Mechanical and Plumbing Sections.

D. Install piping adjacent to unit to allow service and maintenance.

E. Duct Connections: Duct installation requirements are specified in Specification Section "Metal Ducts." Drawings indicate the general arrangement of ducts. Connect supply and return ducts to split system air conditioning units with flexible duct connectors. Flexible duct connectors are specified in Specification Section "Duct Accessories."

F. Ground equipment according to Specification Section "Grounding and Bonding."

G. Electrical Connections: Comply with requirements in electrical specification sections for power wiring, switches, and motor controls. Install control wiring in conduit per electrical specification sections. All cabling shall be plenum rated. Disconnects shall be provided for the evaporator and condensing unit. Provide conduit and conductors from condensing unit to evaporator in conduit. Minimum #10 wire.

3.3 FIELD QUALITY CONTROL

A. Perform the following field tests and inspections and prepare test reports:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
   3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

B. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 238126

SECTION 238560

INTAKE AND RELIEF VENTILATORS

PART 1- GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following types of roof-mounting intake and relief ventilators:
   1. Roof hoods.
   2. Goosenecks

B. Related Sections include the following:
   1. Specification Section “Louvers and Vents” for ventilator assemblies provided as part of the general construction.
   2. Specification Section “Power Ventilators” for roof-mounting exhaust fans.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Intake and relief ventilators shall be capable of withstanding the effects of gravity loads, wind loads, and thermal movements without permanent deformation of components, noise or metal fatigue, or permanent damage to fasteners and anchors.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For intake and relief ventilators. Include plans, elevations, sections, details, and ventilator attachments to curbs and curb attachments to roof structure.

C. Welding certificates.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain ventilators through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Product Options: Information on Drawings and in Specifications establishes requirements for system's aesthetic effects and performance characteristics. Aesthetic effects are indicated by dimensions, arrangements, alignment, and profiles of components and assemblies as they relate to sightlines, to one another, and to adjoining construction. Performance characteristics are indicated by criteria subject to verification by one or more methods including preconstruction testing, field testing, and in-service performance.

C. Product Options: Drawings indicate size, profiles and dimensional requirements of intake and relief ventilators and are based on the specific equipment indicated. Refer to Section “Product Requirements.”
   1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect’s approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.2, “Structural Welding Code-Aluminum.”

2. AWS D1.3, “Structural Welding Code-Sheet Steel.”

1.6 COORDINATION

A. Coordinate installation of roof curbs and roof penetrations. These items are specified in Section "Roof Accessories."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5 or T-52.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005 with temper as required for forming or as otherwise recommended by metal producer for required finish.

C. Galvanized-Steel Sheet: ASTM A 653/A 653M, G90 (Z275) zinc coating, mill phosphatized.

D. Stainless-Steel Sheet: ASTM A 666, Type 304, with No. 4 finish.

E. Fasteners: Same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials.
   1. Use types and sizes to suit unit installation conditions.

F. Post-Installed Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

G. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

A. Factory or shop fabricate intake and relief ventilators to minimize field splicing and assembly. Disassemble units to the minimum extent as necessary for shipping and handling. Clearly mark units for reassembly and coordinated installation.

B. Fabricate frames, including integral bases, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

C. Fabricate units with closely fitted joints and exposed connections accurately located and secured.

D. Fabricate supports, anchorages, and accessories required for complete assembly.

E. Perform shop welding by AWS-certified procedures and personnel.

2.4 ROOF HOODS

A. Manufacturers:

1. Greenheck.
2. Loren Cook Company.

B. Factory or shop fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figures 5-6 and 5-7.

C. Materials: Aluminum sheet, minimum 0.063-inch- (1.6-mm-) thick base and 0.050-inch- (1.27-mm-) thick hood; suitably reinforced.

D. Roof Curbs: Galvanized-steel sheet; with mitered and welded comers: 1-1/2-inch- (40-mm-) thick, rigid fiberglass insulation adhered to inside walls; and 1-1/2-inch (40-mm) wood nailer. Size as required to fit roof opening and ventilator base.
1. Configuration: Self-flashing without a cant strip, with mounting flange.
2. Overall Height: 12 inches (300 mm).

E. Bird Screening: Aluminum, 1/2-inch- (12.7-mm-) square mesh, 0.063-inch (1.6-mm) wire.

F. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.

2.5 GOOSENECKS

A. Factory or shop fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 5-5; with a minimum of 0.052-inch- (1.3-mm-) thick, galvanized-steel sheet.

B. Roof Curbs: Galvanized-steel sheet; with mitered and welded comers: 1-1/2-inch (40-mm-) thick, rigid fiberglass insulation adhered to inside walls; and 1-1/2-inch (40-mm) wood nailer. Size as required to fit roof opening and ventilator base.
1. Configuration: Self-flashing without a cant strip, with mounting flange.
2. Overall Height: 12 inches (300 mm)

C. Bird Screening: Galvanized steel, 1/2-inch- (12.7-mm-) square mesh, 0.041-inch (1.04-mm) wire.

D. Insect Screening: Aluminum, 18-by-16 (1.4-by-1.6-mm) mesh, 0.012-inch (0.30-mm) wire.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install intake and relief ventilators level, plumb, and at indicated alignment with adjacent work.

B. Secure intake and relief ventilation to roof curbs with cadmium-plated hardware. Use concealed anchorages where possible.

C. Install goosenecks on curb base where throat size exceeds 9 by 9 inches (230 by 230 mm).

D. Install intake and relief ventilators with clearances for service and maintenance.

E. Install perimeter reveals and openings of uniform width for sealants and joint fillers as indicated.

F. Install concealed gaskets, flashings, joint fillers and insulation as installation progresses. Comply with Section “Joint Sealants” for sealants applied during installation.

G. Label intake and relief ventilators according to requirements specified in Specification Section “Mechanical Identification.”

H. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

I. Repair finishes damaged by cutting, welding, soldering and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations and refinish entire unit or provide new units.

3.2 CONNECTIONS

A. Duct installation and connection requirements are specified in other Mechanical Sections. Drawings indicate general arrangement of ducts and duct accessories.

3.3 ADJUSTING

A. Adjust damper linkages for proper damper operation.

END OF SECTION 238560

SECTION 238561

AIR FILTERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes factory-fabricated air-filter devices and media used to remove particulate matter from air for HVAC applications.

1.3 SUBMITTALS

A. Product Data: Include dimensions; shipping, installed, and operating weights; required clearances and access; rated flow capacity, including initial and final pressure drop at rated airflow; efficiency and test method; fire classification; furnished specialties; and accessories for each model indicated.

B. Shop Drawings: Include plans, elevations, sections and details to illustrate component assemblies and attachments.
   1. Show filter rack assembly, dimensions, materials and methods of assembly of components.
   2. Include setting drawings, templates and requirements for installing anchor bolts and anchorages.
   3. Wiring Diagrams: Detail wiring for power, signal and control systems and differentiate between manufacturer-installed and field-installed wiring.

C. Maintenance Data: for each type of filter and rack to include in maintenance manuals specified in Division 1.

1.4 QUALITY ASSURANCE

A. Electronic Air Cleaners and Electrical Devices and Accessories: Listed and labeled as defined in NFPA 70, Article 100 by a testing agency acceptable to authorities having jurisdiction.

B. Comply with NFPA 90A and NFPA 90B.

C. ASHRAE Compliance: Comply with provisions of ASHRAE 52.1 for method of testing and rating air-filter units.

D. Comply with NFPA 70 for installing electrical components.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Complete a “minimum” of three (3) complete sets of “construction” filters consisting of standard commercial 2" thick throwaway type filters fiberglass media type filters equal to American Air Filter “5700" Industrial filters shall be provided, installed and maintained prior to initial equipment start up, through construction and until final acceptance of the facility for operation by the Owner.

C. One complete set of “permanent” filters (the filters indicated to be provided for “permanent installation in the filter racks, frames, etc. shall be installed, by the Contractor, at time of final acceptance of the

air handling units by the Owner. Provide and deliver to the Owner at the project site, one (1) additional complete set of “permanent” filters for each filter rack, frame, etc. Delivery shall occur prior to final acceptance of the air handling systems by the Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the work include, but are not limited to, the following:
   1. Air Filters and Filter-Holding Systems:
      a. AAF International.
      b. Continental Air Filter Div.; NiCon Filter Corp.
      c. Farr Co.
      d. Flanders Filters, Inc.
   2. Filter Gages:
      a. Airguard Industries, Inc.
      b. Dwyer Instruments Inc.

2.2 DISPOSABLE PANEL FILTERS

A. Description: Factory-fabricated, viscous-coated, flat-panel type, disposable air filters with holding frames.

B. Media: Interlaced glass fibers sprayed with nonflammable adhesive.

C. Frame: Cardboard frame with perforated metal retainer.
   1. Frame: Galvanized steel with metal grid on outlet side, steel rod grid on inlet side, hinged, and with pull and retaining handles.
   2. Duct-Mounting Frames: Welded, galvanized steel with gaskets and fasteners and suitable for bolting together into built-up filter banks.

2.3 EXTENDED-SURFACE, DISPOSABLE PANEL FILTERS

A. Description: Factory-fabricated, dry, extended-surface filters with holding frames.

B. Media: Fibrous material formed into deep-V-shaped pleats and held by self-supporting wire grid.

C. Media and Media-Grid Frame: Galvanized steel.

D. Duct-Mounting Frames: Welded, galvanized steel with gaskets and fasteners, and suitable for bolting together into built-up filter banks.

2.4 EXTENDED-SURFACE, NONSUPPORTED-MEDIA FILTERS

A. Description: Factory-fabricated, dry, extended-surface, self-supporting filters with holding frames.
   1. Media: Fibrous material constructed so individual pleats are maintained in tapered form by flexible internal supports under rated-airflow conditions.
   2. Filter-Media Frame: Galvanized steel.
   3. Duct-Mounting Frames: Welded galvanized steel with gaskets and fasteners, and suitable for bolting together into built-up filter banks.

2.5 AIR HANDLING UNIT MANUFACTURER FRAMES

A. Refer to Air Handling Unit Specifications and Drawings for Filter Frames to be provided as part of the Air Handling Unit Equipment.

2.6 FRONT- AND REAR-ACCESS FILTER FRAMES

A. Framing System: Aluminum framing members with access for either upstream (front) or downstream (rear) filter servicing, cut to size and prepunched for assembly into modules. Vertically support filters prevent deflection of horizontal members without interfering with either filter installation or operation.

B. Prefilters: Incorporate a separate track, removable from front or back.

C. Sealing: Factory-installed, positive-sealing device for each row of filters to ensure seal between gasketed filter elements to prevent bypass of unfiltered air.

2.7 SIDE-SERVICE HOUSINGS

A. Description: Factory-assembled, side-service housings, constructed of galvanized steel, with flanges to connect to duct system.

B. Prefilters: Integral tracks to accommodate 2-inch50-mm disposable or washable filters.

C. Access Doors: Continuous gaskets on perimeter and positive-locking devices. Arrange so filter cartridges can be loaded from either access door.

D. Sealing: Incorporate positive-sealing gasket material on channels to seal top and bottom of filter cartridge frames to prevent bypass of unfiltered air.

2.8 FILTER GAGES

A. Description: Diaphragm type with dial and pointer in metal case, vent valves, black figures on white background, and front recalibration adjustment.
   1. Diameter: 4-1/2 inches.
   2. Range: 0- to 2.0-inch wg.

B. Manometer-Type Filter Gage: Molded plastic with epoxy-coated aluminum scale, logarithmic-curve tube gage with integral leveling gage, graduated to read from 0- to 3.0-inch wg, and accurate within 3 percent of full scale range.

C. Accessories: Static-pressure tips, tubing, gage connections, and mounting bucket.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install filter frames according to manufacturer's written instructions.

B. Position each filter unit with clearance for normal service and maintenance. Anchor filter holding frames to substrate.

C. Install filters in position to prevent passage of unfiltered air.

D. Install filter gage for each filter bank.

E. Install filter gage static-pressure tips upstream and downstream from filters to measure pressure drop through filter. Mount filter gages on outside of filter housing or filter plenum in an accessible position. Adjust and level inclined gages.

F. Coordinate filter installations with duct and air-handling unit installations.

G. Electrical wiring and connections are specified in Electrical Sections.

H. Ground equipment.
   1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.2 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components, filter and filter-frame installation, and electrical wiring. Report results in writing.

B. Operate automatic roll filters to demonstrate compliance with requirements. Test for leakage of unfiltered air while system is operating. Correct malfunctioning units, then retest to demonstrate compliance. Remove and replace units that cannot be corrected with new units and retest.

3.3 CLEANING

A. After completing system installation and testing, adjusting, and balancing air-handling and air-distribution systems, clean filter housings and install new filter media.

END OF SECTION 238561

SECTION 260005

ELECTRICAL DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Demolition and removal of selected portions of building or structure.
   2. Demolition and removal of selected site elements.
   3. Salvage of existing items to be reused or recycled.

B. Related Sections include the following:
   1. Division 1 Section “Summary” for use of premises, phasing, and Owner-occupancy requirements.
   2. Division 1 Section “Photographic Documentation” for preconstruction photographs taken before selective demolition operations.
   3. Division 1 Section “Temporary Facilities and Controls” for temporary construction and environmental-protection measures for selective demolition operations.
   4. Division 1 Section “Construction Waste Management and Disposal” for disposal of demolished materials.
   5. Division 1 Section “Cutting and Patching” for cutting and patching procedures.
   6. Division 2 Section “Building Demolition” for demolition of entire buildings, structures, and site improvements.
   7. Division 31 Section 31 10 00 “Site Clearing” for site clearing and removal of above- and below-grade improvements.

1.3 DEFINITIONS

A. Remove or Demolish: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Salvage: Detach items from existing construction and deliver them to Owner cleaned, packaged, and ready for reuse.

C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.

D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered during selective demolition remain Owner’s property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to Owner.
   1. Coordinate with Owner’s representative, who will establish special procedures for removal and salvage.

1.5 SUBMITTALS

A. Schedule of Selective Demolition Activities: Indicate the following:
   1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity.
   2. Interruption of utility services. Indicate how long utility services will be interrupted.
   3. Coordination for shut-off, capping, and continuation of utility services.
   4. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
   5. Means of protection for items to remain and items in path of waste removal from building.

B. Inventory: After selective demolition is complete, submit a list of items that have been salvaged.

C. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
   1. Comply with submittal requirements in Division 1 Section "Construction Waste Management and Disposal."
   2. Dispose of ballasts and lamps in accordance with current EPA Standards.

1.6 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI A10.6 and NFPA 241.

C. Predemolition Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to selective demolition including, but not limited to, the following:
   1. Inspect and discuss condition of construction to be selectively demolished.
   2. Review structural load limitations of existing structure.
   3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
   4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
   5. Review areas where existing construction is to remain and requires protection.

1.7 PROJECT CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is unknown whether hazardous materials will be encountered in the Work.
   1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Owner will remove hazardous materials under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
   1. Maintain fire-protection facilities in service during selective demolition operations.

1.8 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped.

B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Trace circuits feeding existing to-remain portions of the building. Do not demolish circuits in these areas. If circuits are in both “to remain” and “to be removed” areas, demolish back to nearest to-remain J-Box.

F. Provide to the Engineer a diagram and index of circuits traced in the “to remain” areas.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
   1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section “Summary.”

B. Service/System Requirements: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
   1. Arrange to shut off indicated utilities with utility companies.
   2. If services/systems are required to be removed, relocated, or abandoned, before proceeding with selective demolition provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
   3. Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit after bypassing.
      a. Where entire wall is to be removed, existing services/systems may be removed with removal of the wall.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
   1. Comply with requirements for access and protection specified in Division 1 Section “Temporary Facilities and Controls.”

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
   1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
   2. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
   3. Maintain adequate ventilation when using cutting torches.
   4. Dispose of demolished items and materials promptly.

B. Removed and Salvaged items:
   1. Clean salvaged items.
   2. Pack or crate items after cleaning. Identify contents of containers.
   3. Store items in a secure area until delivery to Owner.
   4. Transport items to Owner’s storage area designated by Owner.
   5. Protect items from damage during transport and storage.

C. Removed and Reinstalled Items:
   1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
   2. Pack or crate items after cleaning and repairing. Identify contents of containers.
   3. Protect items from damage during transport and storage.
   4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition [and cleaned] and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. General: Except for items or materials indicated to be reused, salvaged, reinstalled, or otherwise indicated to remain Owner’s property, remove demolished materials from Project site and legally dispose of them in an EPA- approved landfill.
   1. Do not allow demolished materials to accumulate on-site.
   2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

C. Disposal: Transport demolished materials off Owner’s property and legally dispose of them.

END OF SECTION 260005

SECTION 260015

GENERAL CONDITIONS FOR ALL ELECTRICAL WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including Conditions of the Contract (General and Supplementary Conditions) and Division 1 specification sections, apply to work of this section.

B. The requirements of this section apply to all sections of electrical, signal, and life safety, and all sections that are installed by the electrical contractor to include electrical work done under the mechanical contractor.

1.2 DESCRIPTION OF WORK

A. This section covers the general provisions of the electrical specifications applicable to the following systems:
   1. Electrical power and lighting to include generators, UPS Systems, and passive electrical generating equipment (solar).
   2. All Special Systems (fire alarm, security, telephone, data, television, and annunciators associated with power).
   3. Control wiring associated with electrical or mechanical equipment.

B. The use of the word “electrical” in any specification contained within the electrical, signal, or life safety division sections shall include all aspects of each systems complete install. This shall be extended to mechanical or plumbing signal systems.

C. The use of the word “life safety” shall refer to all fire alarm, fire protection, and mass notification systems installed by the electrical contractor.

D. The use of the word “mechanical” shall refer to both mechanical and plumbing.

E. The use of the word “pipe” shall refer to all electrical raceway.

1.3 DRAWINGS

A. These specifications are accompanied by drawings of the building and details of the installations showing the locations of equipment, lighting, panels, etc. The drawings and these specifications are complementary to each other, and what is called for by one shall be as binding as if called for by both.

B. Drawings and specification conflicts shall be identified as early as possible to ensure conflict resolution prior to installation. The contractor shall not install any equipment with known conflicts or pending information requests. The contractor shall contact the Engineer of Record or their representative for information clarification prior to installing any item that is in question. The contractor shall not install any equipment that is not consistent with the manufacturers approved installation instructions unless directed by the engineer.

C. In all cases all installations shall be at least in accordance with all the approved codes and their local amendments. The drawings and specifications may exceed local code allowances and the most stringent applies. The existence or allowance of a practice or product by code does not supersede requirements of the drawings and specifications. In other words, just because it is allowed by code does not mean that it is allowed on this project.

D. If any departures from the drawings are deemed necessary by the Contractor, details of such departures and the reasons therefore shall be submitted to the Owner's Representative for approval. No departures shall be made without prior written approval by the Owner's Representative.

E. There are intricacies of construction which are impractical to specify or indicate in detail; however, in such cases, the current rules of good practice and applicable specifications shall govern. In all cases the requirements specified in the NEC and local jurisdiction shall be followed.

F. It is the Contractor's responsibility to properly use all information found on the Architectural, Structural, Mechanical, and Electrical drawings and applicable shop drawings where such information affects his work. The contractor shall review the entire construction document set both prior to bid and construction.

G. All dimensional information related to new structures shall be taken from the appropriate drawings. All dimensional information relative to existing facilities shall be taken from actual measurements made by the Contractor on the site.

H. Any duplicate circuiting listed on the drawings shall be bid as multiple circuits with the intention of the next available circuit and breaker to be used. The contractor shall bring this to the attention of the engineer for clarification and updating the drawings. The new circuit numbers shall be annotated on both the panel schedules and the record drawings. The contractor is not required to follow the exact circuit numbers on the panel schedules (balancing phases, wiring convenience, or conduit routing installation), however, the contractor is responsible for keeping the panel schedules accurate and up to date in addition to ensuring the circuit numbers are identified correctly.

I. Any installation that is not in compliance with these requirements shall be corrected at the contractors cost and responsibility.

1.4 BIDDING

A. The contractor is responsible for bidding complete and working systems. In the event that some part of the system is not included in the construction document or the specifications and it is a necessary part of the system to work properly, the contractor shall include that work as part of the bid amount. This includes, but not limited to:
   1. Power for equipment shown on the drawings. Examples include, but are not limited to:
      a. Equipment Panels
      b. Controllers
      c. Electronic Devices
      d. Mechanical Equipment
      e. Plumbing Equipment
   2. Cabling to communicate with the head end equipment. Examples include, but are not limited to:
      a. Generator to Annunciator
      b. Generator and ATS
      c. Security
      d. Access Control
      e. Switching
      f. Equipment starters and the switching locations
      g. Monitoring equipment

B. The contractor is not responsible for interpreting additional accessory options that are not included in the drawings or specifications or equipment that is not shown or indicated as part of the entire contract documents or specifications.

C. The contractor shall review the entire set of specifications and contract documents for all equipment and connections requiring electrical work.

D. Equipment Substitutions or Proposed Equivalents:

1. Contractor shall submit proposed substitutions or equivalents to the Architect or engineer during the bidding process prior to any final dates for questions as indicated on the bid forms or RFP's and provide a reasonable time to complete to comparison. All changes to the documents indicated a deviation from the specifications or drawings shall be part of the addenda process or written notification from the engineer of record, architect, owner, or a designated representative. Reasonable time for review is minimum one working week. The contractor shall retain the written notification of approval (if not published in an addenda) for purposes of future verification.
2. The contractor is responsible for providing full comparison information for the products to be substituted. Incomplete information is subject to immediate rejection.
3. Bids taken for equipment that is not approved is under the contractor's own risk. Should the equipment be rejected under the post bid submittal process, the contractor is responsible for providing the specified equipment at no cost to the owner.
4. Under no circumstances should the contractor accept bids for non-specified equipment from vendors who do not have prior approval or "speculate" that it will be approved. This is subject to immediate rejection and the specified equipment shall be required to be installed.
5. No response from the architect, owner, or engineer shall not be considered an approval.

1.5 CONSTRUCTION REQUIREMENTS

A. The architectural, structural, and electrical plans and specifications and other pertinent documents issued by the Architect are a part of these specifications and the accompanying electrical drawings and shall be complied with in every respect. All the above is included in the Contract Documents and shall be examined by all bidders. Failure to comply shall not relieve the Contractor of responsibility or be used as a basis for additional compensation because architectural, structural, or mechanical details were not included in the electrical drawings.

B. It is the intent of the Contract Documents to provide an installation complete in every respect. In the event that additional details or special construction may be required for work indicated or specified in this section or work specified in other sections, it shall be the responsibility of the Contractor to provide same as well as to provide material and equipment usually furnished with such systems or required to complete the installation, whether mentioned or not.

C. The Contractor shall be responsible for fitting his material and apparatus into the building and shall carefully lay out his work at the site to conform to the structural conditions, to avoid all obstructions, to comply with Codes, to facilitate the work of other trades, to conform to the details of the installation supplied by the manufacturer of the equipment to be installed, and thereby to provide an integrated satisfactory operating installation.

D. The mechanical, electrical, and associated drawings are necessarily diagrammatic in character and do not show every connection in detail or every pipe or conduit in its exact location. These details are subject to the requirements of ordinances and also structural and architectural conditions. It shall be the contractor's responsibility to coordinate with other disciplines to facilitate their equipment installation.

E. The Contractor shall carefully investigate structural and finish conditions and shall coordinate the separate trades in order to avoid interference between the various phases of work. Work shall be laid out so that it will be concealed in furred chases and above suspended ceilings, etc. in finished portions of the building, unless specifically noted to be exposed. Work shall be installed to avoid crippling of structural members; therefore, inserts to accommodate hangers shall be set before concrete is poured, and proper openings through floor, walls, beams, etc. shall be provided as hereinafter specified or as otherwise indicated or required. All work shall be installed parallel or perpendicular to the lines of the building unless otherwise noted.

F. Conduit and equipment are generally intended to be installed true and square to the building construction and located as high as possible against the structure in a neat and workmanlike manner. The plans do not show all required offsets, elbows, and other location details. Work shall be

concealed in all finished areas. Conduit is intended to be installed with factory fittings or bent in a professional, workmanlike manner.

G. All parts of equipment requiring adjustment shall be easily accessible. Equipment shall be so located and installed as to permit convenient and safe maintenance and future replacement. The trade furnishing the equipment shall be responsible for notifying the Contractor, who shall notify the Owner's Representative prior to ordering same in the event that equipment specified and/or proposed is incompatible with this requirement.

H. Location of Lighting and Outlets in Rooms:
   1. All lighting, plumbing, acoustical tile, modular lighting outlets, diffusers, sprinkler heads, grilles, registers, and other devices shall be referenced to coordinated, established data points and shall be located to present symmetrical arrangements with these points and to facilitate the proper arrangements of acoustical tile panels and other similar panels with respect to the mechanical outlets and electrical lighting and devices. Those mechanical and electrical outlets shall be referenced to such features as wall and ceiling furring's, balanced border widths, masonry joints, etc. Outlets in acoustical tile shall occur symmetrically in tile joints or in the centers of whole tiles. The final determination of the exact location of each outlet and the arrangements to be followed shall be acceptable to the Owner's Representative.
   2. The drawings show diagrammatically the locations of the various outlets and apparatus. Exact locations of these outlets and apparatus shall be determined by reference to the general plans and to all detail drawings, equipment drawings, roughing-in drawings, etc. by measurements at the building, and in cooperation with the other trades. The Owner reserves the right to make any reasonable change in location of any outlet or apparatus before installation, without additional cost to the Owner or the Architect. Contractor shall coordinate work with architectural reflective ceiling plan.

I. The Contractor, by submitting a bid on this work, sets forth that he has the necessary technical training and ability, and that he will install his work in a satisfactory and workmanlike manner which is up to the best standards of the trade, complete and in good working order. If any of the requirements of the plans and specifications are impossible of performance, or if the installation when made in accordance with such requirements will not perform satisfactorily, he shall report same to the Owner's Representative for correction promptly after discovery of the discrepancy.

J. No extra compensation will be allowed for extra work or change caused by failure to comply with the above requirements.

1.6 JOB CONDITIONS

A. Submittal of bid implies bidder has read paragraphs of the specifications and will be bound by their conditions.

B. Contractor Qualifications: A minimum of five years' experience installing commercial electrical power lighting and special systems, similar to those described in these specifications, and make available at the owner or engineer's request a list of five previous projects including name of project and contact person names and phone numbers as a separate document in addition to the bid or proposal submitted.

C. Contractor must be licensed and hold a current contracting license that has been valid for a minimum of five years in the local State.

D. Contractor must be able to bond work for performance of work being bid and provide a written statement from the bonding agency proposed to be used for this project as a separate document in addition to the bid or proposal submitted. The bonding agency proposed to be used shall have a Best's insurance rating of A or A+.

1.7 INSPECTION OF THE SITE

A. The Contractor shall visit the site, verifying all existing items indicated on drawings and/or specified, and familiarize himself with the existing work conditions, hazards, grades, actual formations, soil conditions, structures, utilities, equipment, systems, facilities, and local requirements. The submission of bids shall be deemed evidence of such visits. All proposals shall take these existing conditions into consideration, and the lack of specific information shall not relieve the Contractor of any responsibility.

1.8 PERMITS, UTILITY CONNECTIONS, AND INSPECTIONS

A. Fees and Costs: The contractor shall obtain and pay for all permits, utility connections, utility extensions, and/or relocations and pay all costs required by the utility, including inspection fees, for all work included therein.

B. Compliance: The Contractor shall comply in every respect with all requirements of local inspection departments, Board of Fire Underwriters, local ordinances and codes, and utility company requirements. In no case does this relieve the Contractor of the responsibility of complying with these specifications and drawings where specified conditions are of a higher quality than the requirements of the above-specified offices. Where requirements of the specifications and drawings are below the requirements of the above offices having jurisdiction, the Contractor shall make installations in compliance with the requirements of the above offices.

C. Utilities: The Contractor shall check with the various utility companies involved in this project and shall provide complete in all respects the required utility relocations, extensions, modifications, and/or changes. Contractor shall verify the location of all existing utilities with the applicable Utility Company. The Contractor shall be responsible for all damages to existing utilities caused by his construction work, whether indicated on drawings or not, and repair all damage to existing utilities as acceptable to the Utility Company concerned.

D. Utility Services:
   1. Power for the building service shall be obtained from local utility service. Contractor shall coordinate with the local utility for shutdowns and transformer installations. Contractor shall coordinate underground feeders with other underground piping and mark his conduit clearly. Contractor shall install feeders to the building transformer in accordance with utility company requirements.
   2. Contractor shall coordinate meter location and provide access in accordance with local utility requirements.
   3. Transformer and ductbank rough-ins shall be in accordance with Utility provider requirements.

E. Contractor Temporary Power: The contractor shall obtain temporary power in their name, from the local utility for the construction trailer and any equipment needed to perform his work. The contractor shall be responsible for the installation and removal of the temporary service at the conclusion of the project.

F. Certification: Prior to final acceptance, the Contractor shall furnish a certificate of acceptance from the inspection departments having jurisdiction over the work for any and all work installed under this Contract. Any additional labor costs incurred as a result of a substitution shall be the Contractor’s responsibility.

1.9 EXISTING FACILITIES

A. The Contractor shall be responsible for loss or damage to the existing facilities caused by him and his workmen and shall be responsible for repairing or replacing such loss or damage. The Contractor shall send proper notices, make necessary arrangements, and perform other services required for the care, protection, and in-service maintenance of all electrical and special systems for the new and existing facilities. The Contractor shall erect temporary barricades, with necessary safety devices, as required to protect personnel from injury, removing all such temporary protection upon completion of

the work. Barricades shall clearly indicate with signage that which they are protecting. Contractor shall observe all OSHA rules.

B. The Contractor shall provide temporary or new services to all existing facilities as required to maintain their proper operation when normal services are disrupted as a result of the work being accomplished under this project.

C. Where existing construction is removed to provide working and extension access to existing utilities, Contractor shall remove doors, piping, conduit, outlet boxes, wiring, light fixtures, and equipment, etc. to provide this access and shall reinstall same upon completion of work in the areas affected.

D. Where partitions, walls, floors, or ceilings of existing construction are indicated to be removed, all Contractors shall remove and reinstall in locations approved by the Architect/Engineer all devices required for the operation of the various systems installed in the existing construction. This is to include but is not limited to temperature controls system devices, electrical switches, relays, fixtures, piping, conduit, etc.

E. Outages of services as required by the new installation will be permitted but only at a time approved by the Owner. The Contractor shall allow the Owner two weeks in order to schedule required outages. The time allowed for outages will not be during normal working hours unless otherwise approved by the Owner. All costs of outages, including overtime charges, shall be included in the contract amount. Unless otherwise scheduled by the Owner, planned shutdowns of the existing facilities shall occur between 6 p.m. Friday through 5 am Monday. The existing building shall be ready for morning start-up by 5 am Monday.

1.10 DEMOLITION AND RELOCATION

A. The Contractor shall modify, remove, and/or relocate all materials and items so indicated on the drawings or required by the installation of new facilities. All removals and/or dismantling shall be conducted in a manner as to produce maximum salvage. Salvage materials shall remain the property of the Owner and shall be delivered to such destination or otherwise disposed of as directed by the Owner. Materials and/or items scheduled for relocation and which are damaged during dismantling or reassembly operations shall be repaired and restored to good operative condition. The Contractor may, at his discretion, and upon the approval of the Owner, substitute new materials and/or items of like design and quality in lieu of materials and/or items to be relocated.

B. All items which are to be relocated shall be carefully removed in reverse to original assembly or placement and protected until relocated. The Contractor shall clean and repair and provide all new materials, fittings, and appurtenances required to complete the relocations and to restore to good operative order. All relocations shall be performed by workmen skilled in the work and in accordance with standard practice of the trades involved.

C. When items scheduled for relocation and/or reuse are found to be in damaged condition before work has been started on dismantling, the Contractor shall call the attention of the Owner to such items and receive further instructions before removal. Items damaged in repositioning operations are the Contractor’s responsibility and shall be repaired or replaced by the Contractor as approved by the Owner, at no additional cost to the Owner.

D. Service lines and wiring to items to be removed, salvaged, or relocated shall be removed to points indicated on the drawings, specified, or acceptable to the Owner. Service lines and wiring not scheduled for reuse shall be removed to the points at which reuse is to be continued or service is to remain. Such services shall be sealed, capped, or otherwise tied off or disconnected in a safe manner acceptable to the Owner. All disconnections or connections into the existing facilities shall be done in such a manner as to result in minimum interruption of services to adjacent occupied areas. Services to existing areas or facilities which must remain in operation during the construction period shall not be interrupted without prior specific approval of the Owner as hereinbefore specified.

1.11 SUBMITTAL DATA

A. General: As soon as practical and within 30 days after the date of award of contract and before purchasing or starting installation of any materials or equipment, the Contractor prepare or cause to be prepared shop drawings, product data, materials and equipment lists, diagrams, data, samples, and other submittals as required by the contract documents, hereinafter referred to as "Submittal Data." The Contractor shall review and approve all submittal data for compliance with the contract documents, manufacturer's recommendations, adequacy, clearances, code compliance, safety, and coordination with associated work.

B. The Contractor shall submit approved submittal data to the Owner's Representative for review and comment as to general conformance with the design concept and general compliance with information given in the contract documents. Owner's Representative's review shall not include review of quantities, dimensions, weights or gauges, fabrication processes, construction methods, coordination with other trades or work, or construction safety and precautions, all of which are the sole responsibility of the Contractor. The reviewers shall make every effort to "catch" discrepancies and identify these to the contractor prior to ordering equipment. However, it shall remain the contractor's responsibility to order and install the equipment as listed in the drawings and specifications. At the owner's representative's discretion a detailed submittal may be required.

C. Substitutions shall be clearly identified as such in the submittal by a cover sheet indicating that items are different from what is specified or scheduled. It shall be the contractor responsibility to provide complete substitution information so an accurate comparison can be made.

D. Detail Submittals: Materials and equipment requiring detailed submittal data shall be submitted with sufficient data to indicate that all requirements of the specifications have been met and samples shall be furnished when requested. All manufacturer's data used as part of the submittal shall have all non-applicable features crossed out or deleted in a manner that will clearly indicate exactly what is to be furnished. The detailed submittals shall be accompanied by the same number of sets of pictorial and descriptive data derived from the manufacturer's catalogs and sales literature or incorporated in the shop drawings. The Contractor may provide a detailed submittal on any item even though not required by the Owner's Representative.

E. The Engineer's review of Shop Drawings and Brochures shall not relieve the Contractor of the responsibility for dimensions, errors that may be contained therein, or deviations from Contract Document requirements. It shall be clearly understood that the Engineer's noting some errors but overlooking others does not grant the Contractor permission to proceed in error. Regardless of any information contained in the Shop Drawings, the requirements of the Contract Documents shall govern and are not waived or superseded in any way by the submittal data review.

F. The Contractor shall clearly and specifically identify and call to the attention of the Owner's Representative any deviation from the contract documents for which Owner acceptance is desired. The responsibility for such a deviation accepted by the Owner shall remain with the Contractor.

G. Timeliness: The burden of timeliness in the complete cycle of submittal data is on the Contractor. The Contractor shall allow a minimum of four (4) weeks' time frame for the submittal cycle of each submission by the Owner's Representative. The Contractor is responsible for allowing sufficient time in the construction schedule to cover the aforementioned cycles of data processing, including time for all re-submission cycles on non-conforming materials, equipment, etc. covered by the data submitted. Construction delays and/or lack of timeliness in the above regard are the responsibility of the Contractor and will not justify any request for scheduled construction time extensions or extra compensation.

H. Work performed in accordance with approved submittal data that is not in accordance with the Contract Documents and did not have the specific acceptance of the Owner's Representative shall be replaced at Contractor's cost.

I. Submittals shall be provided in the following format:

1. The submittal brochures shall be in pdf format. The first page shall be titled “ELECTRICAL SUBMITTAL INFORMATION” and shall list the name and location of project, the Owner, the Engineer(s), the General Contractor, and the Subcontractors installing equipment represented in the brochure.
2. A table of contents will follow the first page and shall list all of the sections contained in the specification manual. Each section will be tabbed and will include its’ respective brochures. All brochures will be three-hole punched and folded (if required). Each submittal section will correspond to the appropriate specification section number.
3. Provide submittal data for all materials to be used on this project as indicated in each specification manual section.
4. Brochures submitted shall contain only information which is relevant to the particular equipment or materials to be furnished. Do not submit catalogs that describe several different items other than those items to be used unless all irrelevant information is marked out or relevant information is clearly marked.
5. Brochures: Brochures submitted to the Engineer shall be published by the Manufacturers and shall contain complete and detailed engineering and dimensional information to show that the equipment will fit into the allotted space.
6. Any submittal that is disapproved must be resubmitted within two (2) weeks following notification of such disapproval. If no satisfactory material is submitted within the two-week period, the Engineer reserves the right to require the Contractor to furnish items exactly as described in the Contract Documents.
7. No allowances will be made for submittals which are not made in a timely fashion or which are turned down because they do not meet the specifications. Should delivery problems arise due to the above, affecting the completion time of the project, the Contractor will furnish and install acceptable alternates until the proper materials arrive and then replace the alternate materials with the approved materials, all at no cost to the Owner, Architect, or Engineer. If the Contractor is not able to furnish an acceptable alternate until the proper materials arrive, he will assume all costs for furnishing and installing all alternates as directed by the Engineer.
8. Submittal shall have the certification information as listed hereafter.
9. Shop Drawings:
    a. All shop drawings shall have the certification as listed hereafter.
    b. Each Shop Drawing shall indicate in the lower right hand corner and each Brochure shall indicate on the front cover the following: Title of the Sheet or Brochure; name and location of the building; names of the Engineer, Contractor, Manufacturer, Supplier, Vendor, etc., the date of submittal; and the date of each correction and revision. So far as is practical, each Shop Drawing and/or Brochure shall bear a cross-reference note to the sheet number or numbers of the Contract Drawings and Specifications showing the same work. Shop Drawings shall be prepared as follows:
        1) Shop Drawings: Drawings shall be newly prepared and not reproduced from the Contract Documents, drawn to a scale that can be easily read and shall contain sufficient plans, elevations, sections, and isometrics to describe clearly the items in question. Drawings shall be prepared by a draftsman skilled in this type of work. All equipment layouts and similar Shop Drawings shall be drawn to at least ⅛-inch = 1'-0" scale.
        2) All Shop Drawings shall indicate the equipment actually purchased. The elevation, location, support points, load imposed on the structure at support and anchor points, shall be indicated. All beam penetrations and slab penetrations shall be indicated and sized and shall be coordinated. All Design Drawing space allocations shall be maintained, such as ceiling height, chase walls, equipment room size, etc., unless proper written authorization is required from the Engineer to change them. All associated equipment shall be coordinated and clearly shown on the Shop Drawings.
10. Submittal data for each section must be complete. Partial submittals, or submittals not in the specified format, will be rejected and returned to the Contractor without further review.

J. All equipment installed on this project shall have **local (within 125 miles)** representation, local factory-authorized service, and a local stock of repair parts. This requirement is essential and will be

strictly reviewed by the Owner's Representative prior to concurrence with the Contractor's approval for all submittals covered by electrical division sections.

K. Physical Size of Equipment: Space is critical; therefore, equipment of larger sizes than shown, even though of approved manufacturer, will not be acceptable unless it can be demonstrated that ample space exists for proper installation, operation, and maintenance.

L. These paragraphs related to electrical divisions submittal data rescind, amend, and supersede any provisions to the contrary contained in the Project Manual.

1.12 CERTIFICATION OF SUBMITTAL DATA

A. The Contractor shall provide the following certification with all submittal data furnished to the Owner's Representative for review and comment.

Project Title:

Description of Submittal Data:

This is to certify that the above-described submittal data has been reviewed and is approved for compliance with the Contract Documents, manufacturer's recommendation, adequacy, clearances, code compliance, safety, and coordination with other trades and/or work except as follows: (list "none" or itemize and explain). In addition, the Contractor shall submit to the Owner's Representative a signed statement from each representative certifying as follows:

EXCEPTIONS:

"I certify that the materials and/or equipment listed below have been personally inspected by the undersigned authorized manufacturer's representative and is properly installed and operating in accordance with the manufacturer's recommendations and are asbestos free."

_____

Name and Company

1.13 ACCEPTANCE OF MATERIALS AND EQUIPMENT

A. Owner's Manual: After the submittals have been accepted the Contractor is requested to include a minimum of three (3) additional copies for insertion in the project's Owner's Manuals at the completion of the project.

B. **NOTICE: The Contractor is responsible for providing materials and equipment that conform to the requirements of the project manual in every respect unless a deviation has been "accepted" in writing. Removal of any nonconforming materials and equipment and the replacement with conforming materials and equipment shall be at the Contractor's sole expense, regardless of when nonconformance was discovered. If the owner or owner's representative elects to keep the equipment it shall be contractors responsibility to provide any additional connections or services required to make the equipment function as specified or required by the manufacturer. The contractor shall coordinate with other subs for any different material requirements (wire size, breakers, cooling, mounting requirements, etc.).**

C. Approval of materials and equipment shall be based on manufacturer's published data and shall be tentatively subject to the submission of complete shop drawings which comply with the contract documents. Approval is also dependent upon the existence of adequate and acceptable clearances for entry, servicing, and maintenance.

D. Approval of materials and equipment under this provision shall not be construed as authorizing any deviations from the specifications, unless the attention of the Owner's Representative has been directed in writing to the specific deviations. Data submitted shall not contain unrelated information unless all pertinent information is properly identified.

1.14 SHOP DRAWINGS

A. As soon as practicable after the award of contract and approval of materials and equipment, but prior to installation, complete and detailed shop drawings of the following shall be submitted for review and comment:
   1. Equipment arrangements.
   2. Fire alarm system.
   3. Data drops.
   4. Security system.
   5. Equipment foundations.
   6. Factory-fabricated equipment and materials.
   7. Anchors.
   8. Control.
   9. Interlock.
   10. Switch gear configuration.
   11. Other details as directed by the Owners Representative. Composite drawings of areas requiring coordination between trades shall be provided and expedited to eliminate conflicts and to ensure maximum cooperation and work progress.

B. Work performed without benefit of reviewed and approved shop drawings will not be recommended for payment by the Engineer until such time as the shop drawings are submitted, reviewed, and approved. Any work performed without the benefit of reviewed and approved shop drawings may require removal, relocation, and/or replacement at the Contractors sole expense in order to resolve conflicts between the various systems and provide the performance specified.

C. All installation of equipment, fixtures, terminal devices, etc. shall be made in accordance with approved composite shop drawings. The Contractor shall modify installation and relocate installed work to provide code clearances, service access, and eliminate conflict with other systems.

D. Separate and submit shop drawings per building and floor. Do not combine buildings into one submittal.

1.15 SITE OBSERVATION

A. Site observation by the Architect, Engineer, and/or Owner's Representative is for the express purpose of verifying compliance by the Contractor with the contract documents, and shall not be construed as construction supervision nor indication of approval of the manner or location in which the work is being performed as being a safe practice or place.

1.16 SUPERVISION

A. In addition to the Superintendent required under the conditions of the contract, each subcontractor shall keep a competent superintendent or foreman on the job at all times.

B. It shall be the responsibility of each superintendent to study all plans and familiarize himself with the work to be done by other trades. He shall coordinate his work with other trades and, before material is fabricated or installed, make sure that his work will not cause an interference with another trade. Where interferences are encountered, they shall be resolved at the jobsite by the superintendents involved. Where interferences cannot be resolved without major changes to the plans, the matter shall be referred to the Owner's Representative for comments.

1.17 OPERATION PRIOR TO COMPLETION

A. When any piece of electrical equipment is operable and it is to the advantage of the Contractor to operate the equipment, he may do so, providing that he properly supervises the operation and has the written permission of the Owner's Representative to do so. The contractor shall energize the power distribution in a timely manner to facilitate completion of other trades work. Electrical lighting shall be energized after ceiling has been completed. New permanent fixtures shall not be used as temporary under any circumstances. The warranty period shall not commence, however, until such time as the equipment is operated for the beneficial use of the Owner or date of substantial completion, whichever occurs first.

B. Regardless of whether or not the equipment has or has not been operated, the Contractor shall properly clean the equipment, properly adjust, and complete all deficiency list items before final acceptance by the Owner. The date of acceptance and the start of the warranty may not be the same date.

1.18 MANUFACTURER'S RECOMMENDATIONS

A. The manufacturer's published directions shall be followed in the delivery, storage, protection, installation, piping, and wiring of all equipment and material. The Contractor shall promptly notify the Owner's Representative, in writing, of any conflict between the requirements of the contract documents and the manufacturer's directions and shall obtain the Owner's Representative's comments before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturer's directions or applicable comments from the Owner's Representative, he shall bear all costs arising in connection with the correction of such deficiencies.

1.19 CHECKING AND TESTING MATERIALS AND/OR EQUIPMENT

A. Before final acceptance of the work, an authorized representative of the manufacturer of the installed materials and/or equipment shall personally inspect the installation and operation of his materials and/or equipment to determine that it is properly installed and in proper operating order. Testing and checking shall be accomplished during the course of the work where required by work being concealed, and at the completion of the work otherwise. In addition, the Contractor shall submit to the Owner's Representative a signed statement from each representative certifying as follows:

> "I certify that the materials and/or equipment listed below have been personally inspected by the undersigned authorized manufacturer's representative and is properly installed and operating in accordance with the manufacturer's recommendations and are asbestos free."

1.20 OPERATING AND MAINTENANCE INSTRUCTION

A. The Contractor shall prepare for the owner's manual hereinafter specified complete sets of operating and maintenance instruction's, control and interlock diagrams, manuals, parts lists, etc. for each item of equipment. These are to be assembled as hereinafter specified for owner's manual.

B. In addition, the Contractor shall provide the service of a competent engineer or a technician acceptable to the Owner's Representative to instruct a representative of the Owner in the complete and detailed operation of all equipment and systems. These instructions shall be provided for a period of sufficient duration to fully accomplish the desired results. Upon completion of these instructions, a letter of release will be required, acknowledged by the Owner, stating the dates of instruction and personnel to whom instructions were given.

C. Additional diagrams, operating instructions, etc. shall be provided as specified hereinafter in the other sections of these specifications.

1.21 MATERIAL AND EQUIPMENT SCHEDULES

A. Contractor shall refer to both drawings and specification for schedules. Where reference is made to items “scheduled on drawings” or “scheduled in specifications,” same shall include schedules contained in both the drawings and the specifications. The Contractor’s attention is directed to the various specification sections and drawings for schedules.

1.22 APPLICABLE CODES AND STANDARDS

A. The installation shall meet the minimum standards prescribed in the latest editions of the following listed codes and standards, which are made a part of these specifications, except as may be hereinafter specifically modified in these specifications and associated drawings.
   1. National Fire Protection Association Standards (NFPA):
      a. NFPA No. 10, Portable Fire Extinguishers
      b. NFPA No. 54, National Fuel and Gas Code
      c. NFPA No. 70, National Electrical Code
      d. NFPA No. 101, Life Safety Code
      e. NFPA No. 255, Method of Test of Surface Burning Characteristics of Building Materials
   2. American National Standards Institute (ANSI):
   3. American Society of Mechanical Engineers (ASME): Section IV, V, CSD-1
   4. American Society of Testing Materials (ASTM): All applicable manuals and standards.
   5. National Electrical Manufacturers’ Association (NEMA): All applicable manuals and standards.
   6. State Occupational Safety Act: All applicable safety standards.
   7. Occupational Safety and Health ACT (OSHA): National Sanitation Foundation, Standard No. 2
   8. Americans with Disabilities Act, 1990
   9. State jurisdiction Accessibility Standards
   10. American Gas Association (AGA)
   11. Underwriters Laboratories, Inc. (UL)
   12. Applicable State Building Codes (Uniform Building Codes, as amended):
   13. All County codes related to mechanical, electrical, plumbing, and system equipment; piping; conduit; wiring; etc. furnished and installed under these specifications.
   14. All City ordinances related to mechanical, electrical, plumbing, and systems and equipment; piping; conduit; wiring; etc. furnished and installed under these specifications.
   15. Refer to specification sections heretofore bound for additional codes and standards.

B. All materials and workmanship shall comply with all applicable city, state, and national codes, specifications, and industry standards. All materials shall be listed by the Underwriters Laboratories, Inc. as conforming to its standards and so labeled in every case where such a standard has been established for the particular type of material in question.

C. The contract documents are intended to comply with the aforementioned rules and regulations; however, some discrepancies may occur. Where such discrepancies occur, the Contractor shall immediately notify the Owner’s Representative in writing of said discrepancies and apply for an interpretation. Should the discovery and notification occur after the execution of a contract, any additional work required for compliance with said regulations shall be paid for as covered by Division 1 of these contract documents, providing no work or fabrication of materials has been accomplished in a manner of noncompliance. Should the Contractor fabricate and/or install materials and/or workmanship in such a manner that does not comply with the applicable codes, rules, and regulations, the Contractor who performed such work shall bear all costs arising in correcting these deficiencies to comply with said rules and regulations.

1.23 DEFINITIONS

A. Refer to the condition of the contract for Division 1 for additional requirements regarding definitions.

B. Where “as required” is used in these specifications or on the drawings, it shall mean “that situations exist that are not necessarily described in detail or indicated that may cause the Contractor certain complications in performing the work described or indicated. These complications entail the normal coordination activities expected of the Contractor where multiple trades are involved and new or

existing construction causes deviations to otherwise simplistic approaches to the work to be performed. The term shall not be interpreted to permit an option on the part of the Contractor to achieve the end result."

C. Where "and/or" is used in these specifications or on the drawings, it shall mean "that situations exist where either one or both conditions occur or are required and shall not be interpreted to permit an option on the part of the Contractor.

D. Unless specifically indicated otherwise elsewhere in these specifications or on the drawings the word "furnish" or any of its derivatives shall be understood to indicate the purchase, delivery, storage and protection of an item at the job site in a location and manner suitable for use by the recipient who will be responsible for installation of this item. The word "install" or any of its derivatives shall be understood to indicate taking receipt of an item, properly mounting it, and providing the related utilities (electrical, communication, etc.) for proper and complete operation of the item. Installation shall also include calibration, programming and operational testing of said item. The word "provide" or any of its derivatives shall be understood to indicate both furnishing and installing an item.

1.24 SUBSTANTIAL COMPLETION

A. Refer to Division 1 for additional requirements for substantial completion.

B. Substantial completion shall be defined as the level of project completion where the owner is ready to occupy the building. The contractor shall have ensured that all mechanical, electrical, plumbing, and building systems (elevators, automatic doors, hardware, security, etc.) are complete and in fully functional working order. This level of completion does not absolve the contractor from the requirements of final inspection or final acceptance. The contractor shall ensure there are no life safety issues unresolved with the project at the time of substantial completion.

C. All "punch" list items shall have been resolved or shall be identified as pending resolution. Items listed as unresolved shall be either pending information or direction from the owner or owner's representative or shall be awaiting parts or supplies that are "on order". The contractor at the owner's discretion shall produce documentation of the part or supply on order status.

1.25 FINAL INSPECTION

A. Refer to Division 1 for additional requirements for final inspection.

B. It shall be the responsibility of the Contractor to personally conduct a careful inspection, assuring himself that the work on the project is ready for final acceptance and developing his own "punchlists," before calling upon the Owner's Representative to make a final inspection. Failure of the Contractor to conduct such inspections and provide the Owner's Representative with a copy of his "punchlists" prior to the final inspection shall be adequate cause for the Owner's Representative to cancel any Contractor-requested final inspection.

C. In order not to delay final acceptance of the work, the Contractor shall conduct his own "final inspections" prior to requesting the Owner's Representative to "final" the project; will have all necessary bonds, guarantees, receipts, affidavits, etc. called for in the various articles of this specification prepared and signed in advance; and together with a letter of transmittal listing each paper included, shall deliver the same to the Owner's Representative at or before the time of said final inspection. The Contractor is cautioned to check over each bond, receipt, etc. before preparing same for submission to see that the terms check with the requirements of the specifications.

D. The final inspection will be made jointly by the Owner's Representative and the Owner.

1.26 REQUIREMENTS FOR FINAL ACCEPTANCE

A. Requirements for final acceptance shall include but not be limited to the Contractor accomplishing the following:
   1. Construction: Complete all construction.
   2. Deficiency Lists: Correct all deficiencies listed at time of Substantial Completion.
   3. Owner's Manual: Submit at least 30 days prior to final acceptance one (1) copy of the owner's manual for the Owner's Representative's review and comments. Following acceptance, prepare three (3) copies of bound and indexed owner's manual, to be delivered at the time of final acceptance, which shall include but not be limited to the following:
      a. System operating instructions.
      b. System control drawings.
      c. System interlock drawings.
      d. System maintenance instructions.
      e. Manufacturers', suppliers', and subcontractors' names, addresses, and telephone numbers, both local representatives and manufacturers' service headquarters.
      f. Equipment operating and maintenance instructions and parts lists.
      g. Manufacturers' certifications (see Checking and Testing Materials and/or Equipment, this section).
      h. Contractor's warranty.
      i. Acceptance certificates of authorities having jurisdiction.
      j. Log of all tests made during course of work.
      k. Owner's acknowledgment of receipt of instruction, enumerating items in owner's manual.
      l. List of manufacturers' guarantees executed by the Contractor.
      m. Owner's acknowledgment of items of equipment or accessories indicated or specified to be turned over to Owner.
   4. Instructions:
      a. Verbal, as herein specified.
      b. Posted, framed under glass or plastic laminated:
         1) System operating instructions.
         2) System control drawings.
         3) System interlock drawings.
   5. Record Drawings: Deliver the specified record drawings to the Owner's Representative.

1.27 RECORD DRAWINGS

A. The Contractor shall maintain a set of contract drawings at the job site on which he shall indicate the installed locations of all equipment, electrical lighting, data drops, fire alarm devices, PA system devices, security devices, outlets, and electrical feeders. These drawings shall be used for reference or construction and shall not leave the field office. Upon completion of the work, the Contractor shall obtain and pay for Mylar's and/or disks (if available as CAD files) of the contract drawings from the Owner's Representative and transfer the above information to these Mylar's to provide "Record Drawings." The above-mentioned prints and "Record Drawings" shall then be delivered to the Owner's Representative. Refer to paragraph entitled "Record "Drawings" of the Supplemental General Conditions.

1.28 ALLOWANCES

A. Refer to Division 1 for allowances.

1.29 ALTERNATE PROPOSALS

A. Alternate proposals are summarized in Division 1 and on the bid proposal form. Refer to all sections of the specifications and the drawings to determine the exact extent and scope of the various alternate proposals as each pertains to the work of the various trades.

1.30 WARRANTY

A. General: All work performed (including equipment and materials furnished) under the various sections of these specifications shall be 100% warranted, for a period of one (1) year from the date of substantial completion thereof, against defective materials, design, and unauthorized substitution. Upon receipt of note of failure of any part of the guaranteed equipment and/or facilities during the guaranty period, the affected part(s) or facilities shall be replaced promptly with new parts, etc. by and at the expense of the Contractor. Further, the Contractor shall properly obtain, execute, and forward any and all manufacturer's warranties on equipment furnished under the Contract. Refer to Division 1 for additional requirements.

B. Extended Period: The Contractor shall provide all extended time warranties available from the manufacturer of the equipment provided as standard at no additional cost. This includes all extended warranties where specified with certain equipment as directed in other sections of this Specification.

1.31 SPARE PARTS

A. Spare Parts Data: As soon as practicable after approval of materials and equipment and, if possible, not later than four months prior to the date of beneficial occupancy, the Contractor shall furnish spare parts data for each different item of equipment listed. The data shall include a complete list of parts and supplies with current unit prices and sources of supply, a list of parts and supplies that are either normally furnished at no extra cost with the purchase of the equipment or specified hereinafter to be furnished as part of the Contract, and a list of additional items recommended by the manufacturer to assure efficient operation for a period of 120 days at the particular installation. The foregoing shall not relieve the Contractor of any responsibilities under the warranty specified.

PART 2 - PRODUCTS

2.1 MATERIALS AND WORKMANSHIP

A. All materials, unless otherwise specified, shall be current United States manufacture, new, free from all defects, and of the best quality. Foreign goods specifically approved for use by the Owner's Representative prior to bidding may be furnished.

B. Materials and equipment shall be installed in accordance with the manufacturer's recommendations and the best standard practice for the type of work involved. All work shall be executed by electricians skilled in their respective trades, and the installations shall present a neat, precise appearance.

C. The responsibility for the furnishing and intended installation of the proper electrical equipment and/or material as intended rests entirely upon the Contract. The Contractor shall request advice and supervisory assistance from the representative of specific manufacturers during the installation.

2.2 MATERIAL AND EQUIPMENT REQUIREMENTS

A. Manufacturer's Instructions: The manufacturer's published instructions shall be followed for preparing, assembling, installing, erecting, and cleaning manufacturer materials or equipment, unless otherwise indicated. The Contractor shall promptly notify the Owner's Representative in writing of any conflict between the requirements of the Contract Documents and the manufacturer's direction and shall obtain the clarification of the Owner's Representative before proceeding with the work. Should the Contractor perform any such work that does not comply with the manufacturer's directions or such clarification by the Owner's Representative, he shall bear all costs arising in connection with the correction of the deficiencies.

B. Storage at Site: The Contractor shall not receive material or equipment at the jobsite until there is suitable space provided to properly protect equipment from rust, drip, humidity, and dust damage from surrounding work. All new or relocated equipment shall be stored inside or protected from the

environment. Equipment that is not properly stored shall be replaced by the contractor at no cost to the owner.

C. Capacities shall be not less than those indicated and shall be such that no component or system becomes inoperative or is damaged because of startup or other overload conditions.

D. Conformance to Agency Requirements: Where materials or equipment are specified to be approved, listed, tested, or labeled by the Underwriters Laboratories, Inc., or constructed and/or tested in accordance with the standards as listed in the NEC, the Contractor shall submit proof that the items furnished under this section of the specifications conform to such requirements. The label of the Underwriters Laboratories, Inc. applied to the item will be acceptable as sufficient evidence that the items conform to such requirements.

E. Nameplates: Each major component of equipment shall have the manufacturer's name, address, and model-identification number embossed on a plate securely attached to the item of equipment. All data on nameplates shall be legible at the time of Final Inspection. All equipment starters and disconnects shall be tagged with the equipment designated mark and circuit.

F. Prevention of Rust: Standard factory finish will be acceptable on equipment specified by model number otherwise surfaces of ferrous metal shall be given a rust-inhibiting coating. The treatment shall withstand 200 hours in salt-spray fog test, in accordance with Method 6061 of Federal Standard No. 141. Immediately after completion of the test, the specimen shall show no signs of wrinkling or cracking and no signs of rust creepage beyond 1/8 inch on either side of the scratch mark. Where rust inhibitor coating is specified hereinafter, any treatment that will pass the above test is acceptable unless a specific coating is specified, except that coal tar or asphalt-type coatings will not be acceptable unless so stated for a specific item. Where steel is specified to be hot-dip galvanized, mill-galvanized sheet steel may be used provided all raw edges are painted with a zinc-pigmented paint conforming to Military Specification MIL-P-26915.

G. Protection of Connections: Switches, breaker handles, keys setscrews, handles and other parts not listed for normal occupied operation (light switches, etc.) shall be located accessible to but out of paths to prevent their accidental shutoff.

H. Verifications of Dimensions: The Contractor shall be responsible for the coordination and proper relation of his work to the building structure and to the work of all trades. The Contractor shall visit the premises and thoroughly familiarize himself with all details of the work and working conditions, to verify all dimensions in the field, and to advise the Owner's Representative of any discrepancy before performing any work. Adjustments to the work required in order to facilitate a coordinated installation shall be made at no additional cost to the Owner, Architect, or Engineer.

I. Standard Products: Materials and equipment to be provided shall be the standard catalog products of manufacturers regularly engaged in the manufacture of products conforming to these specifications and shall essentially duplicate materials and equipment that have been in satisfactory use at least two years.

2.3 SUBSTITUTION OF MATERIALS AND EQUIPMENT

A. No substitution of materials or equipment herein specified or called for on the drawings will be permitted, except by written permission of the Owner's Representative. Where several makes of equipment or material are mentioned, any item named may be bid upon provided it meets space, capacity specifications, finish, usage (switching, ballasts, similar operation), and looks and functions as what was specified.

B. Do not submit substitutions that do not match in whole what was specified or scheduled. Deviations from scheduled or specified items are installed at the contractor's risk and are subject to replacement if the owner/engineer deems the product different from the specified item.

C. If the specified item is no longer available, it is the contractors responsibility to contact the architect/engineer and notify that the item is not available and suggest a suitable substitution that matches in whole the form, function, and appearance of the scheduled or specified item.

D. Refer to Conditions of the Contract and Division 1 for additional requirements regarding substitutions.

2.4 FLAME SPREAD AND SMOKE DEVELOPED PROPERTIES OF MATERIALS

A. Plenum cable, conduit, insulation, equipment support and mounting hardware, tapes, adhesives, core materials, jackets, and other materials in concealed locations, including any above-ceiling area, shall have a flame spread rating not over 25 without evidence of continued progressive combustion and a smoke developed rating no higher than 50. Flame spread and smoke developed ratings shall be in accordance with NFPA Standard No. 255.

2.5 MOTORS

A. The Contractor shall provide all motors required for equipment supplied under each portion of the work. Motors shall be built in accordance with the latest ANSI, IEE, and NEMA standards, shall be fully coordinated with the equipment served, shall be of sizes and electrical characteristics scheduled.

2.6 STARTING EQUIPMENT

A. Each motor shall be provided with proper starting equipment. This equipment, unless hereinafter specified or scheduled to the contrary, shall be provided by the trade furnishing the motor. All motor starting equipment provided by any one trade shall be of the same manufacture unless such starting equipment is an integral part of the equipment on which the motor is mounted.

2.7 SLEEVES, INSERTS, AND FASTENINGS

A. General: Proper openings through floors, masonry walls, roofs, etc. for the passage of conduits shall be provided. All conduit through floors and walls must pass through sleeves, except conduit that is cast-in-place. Sleeves shall be set in new construction before concrete is poured, as cutting holes through any part of the concrete will not be permitted unless acceptable to the Owner's Representative.

B. Materials: Sleeves shall be of standard weight galvanized iron pipe, except heavy-gauge galvanized iron sleeves may be utilized in concrete pours where acceptable to the Owner's Representative for size and metal gauge. Sleeves in fittings, grade beams, and where pipes enter or leave the building or pass through concrete or masonry shall be Schedule 40 PVC along the pipe route from the underground installation to the insulating coupling installed above ground.

2.8 FOUNDATIONS

A. General: All special foundations and supports required for the proper installation of equipment and pipe shall be provided as hereinafter specified and under the section of the specifications covering the equipment, unless otherwise indicated on the drawings.

B. Concrete foundations for the support of equipment such as floor-mounted transformers, switchgear, equipment, etc. shall be not less than 5 inches high and 4 inches beyond the equipment, unless otherwise noted, and shall be poured in forms built of new dressed lumber. All corners of the foundations shall be neatly chamfered by means of sheet metal or triangular wood strips nailed to the form. Foundation bolts shall be placed in the forms when the concrete is poured, the bolts being correctly located by means of templates. Allow 1 inch below the equipment bases for alignment and grouting. Foundations for equipment located on the exterior of the building shall be provided as indicated. Foundations shall be constructed in accordance with approved shop drawings and shall be

reinforced with #4 bars at 12 inches on center both ways (minimum). Refer to Division 3: Concrete Work for materials, placement, etc. Coordinate with the equipment manufacturer for heavy (greater than 1000 pounds) pieces of equipment.

2.9 ACCESS DOORS

A. General: Provide wall, ceiling, or duct access doors for unrestricted access to all concealed items of electrical equipment.

B. Manufacturers shall be Inland-Milcor, Bilco, Miami Carey, or approved equal.

C. UL labeled when in fire-rated construction, one and one-half hour rating.

D. Equipment access doors shall be of sufficient size to remove/replace equipment and provide routine maintenance as necessary, unless otherwise noted. All doors shall have wedge-type latches except where cylinder locks are otherwise indicated or specified. Doors shall be set flush with adjacent finish surfaces. Exterior doors shall be provided with cylinder locks.

E. Access doors into ductwork shall be 14-gauge insulated galvanized steel with 16-gauge galvanized gasketed steel frame and cam-type locks. Access door shall be a minimum of 12" $\times$ 12" in size.

2.10 CONDITION OF MATERIALS

A. All materials required for the installation of the electrical systems shall be new and unused. Any material or equipment damaged in transit from the factory, during delivery to premises, while in storage on premises, while being erected and installed, or while being tested, until time of final acceptance, shall be replaced by this Contractor without extra cost to Owner.

PART 3 - EXECUTION

3.1 SPACE AND EQUIPMENT ARRANGEMENTS

A. The size of electrical equipment indicated on the drawings is based on the dimensions of a particular manufacturer. While other manufacturers will be acceptable, it is the responsibility of the Contractor to determine whether the equipment he proposes to furnish will fit in the space. Shop drawings shall be prepared when required by the Owner’s Representative to indicate a suitable arrangement.

B. All equipment shall be installed in a manner to permit access to all surfaces.

3.2 LARGE APPARATUS

A. Any large piece of apparatus which is to be installed in any space in the building, and which is too large to permit access through stairways, doorways, or shafts shall be brought to the job and placed in the space before the enclosing structure is completed. Following placement in the space, such apparatus shall be thoroughly, completely protected from damage as hereinafter specified.

3.3 HOISTING, SCAFFOLDING, AND TRANSPORTATION

A. Provide hoisting and scaffolding facilities as required to set materials and equipment in place.

3.4 PROTECTION

A. The Contractor shall take such precautions as may be necessary to properly protect all materials and equipment from damage from the time of delivery until the completion of work. This shall include the erection of all required temporary shelters and supports to adequately protect any items stored in the open on the site from the weather, the ground and surrounding work; the cribbing of any items above the floor of the construction; and the covering of items in the uncompleted building with tarpaulins or other protective covering. Failure on the part of the Contractor to comply with the above will be sufficient cause for the rejection of the items in question.

B. The Contractor shall protect existing facilities, the work of others, and the premises from any and all damages that may be made possible by the execution of work.

C. Equipment and materials shall be protected from rust both before and after installation. Any equipment or materials found in a rusty condition at the time of final inspection must be cleaned of rust and repainted as specified elsewhere in these specifications.

3.5 COOPERATION BETWEEN TRADES AND WITH OTHER CONTRACTORS

A. Each trade, subcontractor, and/or Contractor must work in harmony with the various trades, subcontractors, and/or Contractors on the job as may be required to facilitate the progress to the best advantage of the job as a whole. Each trade, subcontractor, and/or Contractor must pursue its work promptly and carefully so as not to delay the general progress of the job. This Contractor shall work in harmony with Contractors working under other contracts on the premises.

B. It shall be the responsibility of each trade to cooperate fully with the other trades on the job to help keep the jobsite in a clean and safe condition. At the end of each day's work, each trade shall properly store all of its tools, equipment, and materials and shall clean its debris from the job. Upon the completion of the job, each trade shall immediately remove all of its tools, equipment, any surplus materials, and all debris caused by its portion of the work.

3.6 PRECEDENCE OF MATERIALS

A. These specifications and the accompanying drawings are intended to cover systems which will not interfere with the structural design of the building, which will fit into the several available spaces, and which will ensure complete and satisfactory systems. Each subcontractor and/or trade shall be responsible for the proper fitting of his material and apparatus into the building.

B. The work of the various trades shall be performed in the most direct and workmanlike manner without hindering or handicapping the work of other trades. Piping interferences shall be handled by giving precedence to pipe lines which require a stated grade for proper operation. Where space requirements conflict, the following order or precedence shall, in general, be observed:
   1. Building lines.
   2. Structural members.
   3. Soil and drain piping.
   4. Condensate drains.
   5. Vent piping.
   6. Supply, return, and outside air ductwork.
   7. Exhaust ductwork.
   8. HVAC water and steam piping.
   9. Steam condensate piping.
   10. Fire protection piping.
   11. Natural gas piping.
   12. Domestic water (cold and hot).
   13. Refrigerant piping.
   14. Electrical conduit.

3.7 CONNECTIONS FOR OTHERS

A. This Contractor shall rough-in for and make all electrical connections to all fixtures, equipment, machinery, etc. provided by others in accordance with detailed roughing-in drawings provided by the equipment suppliers, by actual measurements of the equipment connections, or as detailed.

B. After the equipment is set in place, this Contractor shall make all final connections and shall provide all required conduit, fittings, whips, connectors, etc.

C. The Mechanical Contractors will set in place, ready for connection, all motors to be provided under their Contracts. The Mechanical Contractors will furnish and deliver all starter and control equipment not shown in motor control centers for any motors which they furnish. The Mechanical Contractor shall be responsible for the complete installation of all automatic temperature control systems, including wire, conduit, and interlocking connections.

D. The Electrical Contractor shall connect all motors and shall set in place all control devices, furnishing supports if and as necessary, and shall furnish and install all interconnecting line voltage wiring and make all connections ready for operation between motors, starters, and disconnect switches, as required. The Electrical Contractor shall furnish and install all motor control centers, including breakers, starters, etc. The Contractor shall refer to the Mechanical drawings and specifications for his scope of the connections to equipment furnished under these Contracts.

3.8 INSTALLATION METHODS

A. Where to Conceal: All conduits shall be concealed in chases, walls, furred spaces, below suspended floors, or above the ceilings of the building unless otherwise indicated. All concealed conduit shall be run in a professional manner, and parallel or perpendicular to the building lines.

B. Where to Expose: In mechanical rooms, only where necessary, conduit may be run exposed. All exposed conduit shall be run in the neatest, most inconspicuous manner, and parallel or perpendicular to the building lines. Conduit shall be bent in a manner as to run parallel to other conduits and not cross at angles.

C. Support: All conduit shall be adequately and properly supported from the building structure by means of hangers or clamps to walls as herein specified.

D. Maintaining Clearance: Where limited space is available above the ceilings and below concrete beams or other deep projections, conduit shall be sleeved through the projection where it crosses, rather than hung below them, in a manner to provide maximum above-floor clearance. Sleeves shall be as herein specified. Approval shall be obtained from the Owner’s Representative for each penetration.

E. All conduits, etc. shall be cut accurately to measurements established at the building and shall be worked into place without springing or forcing. All conduits run exposed in machinery and equipment rooms shall be installed parallel to the building lines. Conduits in furred ceilings and in other concealed spaces may be run at angles to the construction but shall be neatly grouped and racked indicating good workmanship. All conduit openings shall be kept closed until the systems are closed with final connections.

F. Special Requirements:
   1. The Contractor shall study all construction documents and carefully lay out all work in advance of fabrication and erection in order to meet the requirements of the extremely limited spaces. Where conflicts occur, the Contractor shall meet with all involved trades and the Owner’s Representative and resolve the conflict prior to erection of any work in the area involved.
   2. All conduit not directly buried in the ground or installed outside shall be considered as “interior.”
   3. Prior to the installation of any ceiling material, gypsum, plaster, or acoustical board, the Contractor shall notify the Owner’s Representative so that arrangements can be made for an inspection of the above-ceiling area about to be “sealed off.” The Contractor shall give as

much advance notice as possible up to ten (10) working days, but in no case less than five (5) working days.

4. The purpose of this inspection is to verify the completeness and quality of the installation of the electrical systems and any other special above-ceiling systems, such as data, fire alarm, security. The ceiling supports (tee bar or lath) should be in place so that access panel and light fixture locations are identifiable and so that clearances and access provisions may be evaluated.
5. No ceiling material shall be installed until the deficiencies listed from this inspection have been corrected to the satisfaction of the Owner's Representative.

3.9 CUTTING AND PATCHING

A. General: Cut and patch walls, floors, etc. resulting from work in existing construction or where made necessary by failure to provide proper openings or recesses in new construction.

B. Methods of Cutting: Openings cut through concrete and masonry shall be made with masonry saws and/or core drills and at such locations acceptable to the Owner's Representative. Impact-type equipment will not be used except where specifically acceptable to the Owner's Representative. Openings in concrete for pipes, conduits, outlet boxes, etc. shall be core drilled to exact size. Determine location of embedded conduit and reinforcing bars prior to cutting.

C. Restoration: All openings shall be restored to "as-new" condition under the appropriate specification section for the materials involved, and shall match remaining surrounding materials and/or finishes.

D. Masonry: Where openings are cut through masonry walls, provide and install lintels or other structural supports to protect the remaining masonry. Adequate supports shall be provided during the cutting operation to prevent any damage to the masonry occasioned by the operation. All structural members, supports, etc. shall be of the proper size and shape, and shall be installed in a manner acceptable to the Owner's Representative.

E. Plaster: All mechanical work in area containing plaster shall be completed prior to the application of the finish plaster coat. Cutting of finish plaster coat will not be permitted.

F. Weakening: No cutting, boring, or excavating which will weaken the structure shall be undertaken.

3.10 SLEEVES, INSERTS, AND FASTENINGS

A. Sleeves: The minimum clearance between horizontal conduit and sleeve shall be ¼ inch, except that the minimum clearance shall be ½ inch where piping contacts the ground. Sleeves through floors shall extend ¾ inch above the floor; sleeves through walls and partitions shall be installed flush with exposed surfaces. Sleeves are not required for piping indicated to the cast-in-concrete slabs-on-fill.

B. Inserts: Suitable concrete inserts for conduit and equipment hangers shall be set and properly located for all conduit and equipment to be suspended from concrete construction.

C. Fasteners: Fastening of pipes, conduits, etc. in the building shall be as follows:
   1. To wood members: by wood screws.
   2. To masonry and concrete: by threaded metal inserts, metal expansion screws, or toggle bolts, whichever is appropriate for the particular type of masonry or concrete.
   3. To steel: machine screws or welding (when specifically permitted or directed), or bolts.

D. Weatherproofing: The annular space between a conduit and its sleeve in exterior walls or through floor to below grade shall be filled with polyurethane foam rods 50% greater in diameter than the space as backing and fill material and made watertight with a permanent elastic polysulfide compound. Seal both surfaces of wall or floor with a fire-resistant sealant.

3.11 FLOOR AND CEILING PLATES

A. Except as otherwise noted, provide one-piece chrome-plated brass floor and ceiling plates (or escutcheons) around all pipes, conduits, etc. passing through walls, floors, or ceilings in any spaces, except underfloor and attic spaces. Plates shall be sized to fit snugly against the outside of the conduit. Plates will not be required for piping where sleeves extend ¾ of an inch above finish floor and are concealed. Plates shall be one piece.

3.12 FIRE AND SMOKE PARTITION, WALL, AND/OR FLOOR PENETRATIONS

A. Conduit passing through fire- or smoke-rated floors, partitions, walls, or other barriers within a UL-listed assembly which shall maintain the rating of the applicable wall, floor, partition, or barrier. Flexible conduit shall not be used in rated walls. Provide connections between “hard” pipe and flexible whips on either side of wall. Fireproof around conduits.

B. The Contractor shall review the architectural and structural drawings and determine the location of the fire-rated building elements. Where these elements are penetrated, UL-listed fire-rated penetration assemblies approved by the local authority shall be provided in accordance with the manufacturer’s instructions to obtain the required rating.

3.13 METAL BUILDING SYSTEMS/ELECTRICAL SUPPORTS

A. Metal building systems are required to be designed by the manufacturer to accommodate and support the electrical systems indicated on the electrical drawings and specifications.

B. The metal building systems manufacturer is required to provide the following:
   1. Framed openings through the roofs with supports, roof curbs, and flashings for roof-mounted equipment, fans, vents, and air intakes.
   2. Structural support for piping, conduits, and suspended equipment consisting of beam, joists, purlins, and/or blocking above and perpendicular to conduit routes and equipment hangers at intervals not to exceed 8 feet.
   3. Structural support for suspended ceilings and light fixtures, including associated raceways.

C. The electrical trade shall:
   1. Provide all routes, weights, installation heights, opening locations, etc. for all equipment, conduits, sleeves, etc. to the metal building system manufacturer and coordinate requirements for structural supports, hangers, attachments, etc. with the metal building systems manufacturer.
   2. Provide all supporting devices (hangers, attachments, brackets, cross beams, etc.) to attach to the metal building structural system.

3.14 CONDUIT SUPPORT

A. Conduit Support: All conduits throughout the building, both horizontal and vertical, shall be adequately supported from the construction to line of grade, with proper provision for expansion, contraction, vibration elimination, and anchorage. Vertical conduits shall be supported from floor lines with riser clamps sized to fit the lines and to adequately support their weight. At the bases of lines, where required for proper support, provide anchor base fittings or other approved supports.

B. Conduit shall not be supported from any other system.

3.15 HANGERS

A. General: Each hanger shall be properly sized to fit the supported pipe or to fit the outside of the insulation on lines where specified.

B. Attachment:
   1. The load on each hanger and/or insert shall not exceed the safe allowable load for any component of the support system, including the concrete which holds the inserts. Reinforcement at inserts shall be provided as required to develop the strength required.
   2. Where pipes are supported under steel beams, approved-type beam clamps shall be used.
   3. Where conduit is supported under wood joists, hanger rods shall be attached to joists with side beam brackets or angle clips.

C. Spacing: All hangers shall be so located as to properly support horizontal lines without appreciable sagging of these lines. All PVC shall be supported at intervals recommended by the manufacturer, or as otherwise specified or indicated.

D. Trapezes: Where multiple lines are run horizontally at the same elevation and grade, they may be supported on trapezes of Kindorf, Elcen, or approved equal, channel-suspended on rods or pipes. Trapeze members including suspension rods shall each be properly sized for the number, size, and loaded weight of the lines they are to support.

E. Ceiling-Mounted Devices: All lighting and devices or assemblies mounted in lay-in-type ceilings and which are supported by the ceiling grid, directly or indirectly, and which weigh in excess of 2 lbs., shall be provided with at least two 12-gauge minimum wire supports connected securely between the device or assembly and the structure, to serve as a safety support in the event of the collapse of or a disturbance in the support of the ceiling system that might cause the device or assembly to fall through the ceiling. This includes, but is not limited to, light fixtures, J-boxes, and heavy speakers. Provide additional support as required where the weight of the device or assembly will exceed the safe limits of the wire supports.

F. Perforated strap iron or wire will not be acceptable as hanger material.

G. Miscellaneous: Provide any other special foundations, hangers, and supports indicated on the drawings, specified elsewhere herein, or required by conditions at the site. Hangers and supporting structures for suspended equipment shall be provided as required to support the load from the building structure in a manner acceptable to the Owner's Representative.

3.16 ACCESS DOORS

A. Provide in walls, floors, and ceilings to permit access to all equipment and piping requiring service or adjustment. Examples of such equipment needing access are disconnects, actuators, contacts, and equipment needing periodic or replacement maintenance.

B. Use panels equal to Milcor Style M for masonry and drywall construction, equal to Milcor Style K for plastered masonry walls and ceilings. Stainless steel panels shall be used in ceramic tile or glazed structural tile.

C. Access doors located outside or in a moisture-laden environment (e.g., toilet room, dressing area, shower area, etc.) shall be stainless steel.

3.17 ROOF PENETRATIONS AND FLASHING

A. The contractor shall obtain from the Owner all warranty requirements for new or existing roofing systems and shall have all work on roof penetrations, curbs or equipment supports performed by a subcontractor acceptable to the Owner and the new or existing roofing system installer and manufacturer in order that all roofing system and materials warranties are preserved.

B. Pipe and conduit ducts, pitch pockets, curb bases, and flashing compatible with the roofing installation shall be provided for roof penetrations. Provide framing or other support around all openings through roof as required to preserve the structural integrity of the roof system and make the penetration weathertight.

C. Roof curbs for all roofs except standing seam metal roofs shall be provided by the equipment supplier supplying the roof-mounted equipment, etc., and such curbs shall be installed by the roofing trades. Contractor shall coordinate all roof curb requirements with all trades and the roofing trades at the earliest possible stage of the project.

D. Roof curbs for standing seam metal roofs shall be provided by the roofing trades. Curb base size, height, and type shall be coordinated with the roofing trades at the earliest possible stage of the project.

E. Flashing for pipe and conduit penetrations of standing seam metal roofs shall be provided and installed by the roofing trades.

F. See Division 7: Thermal and Moisture Protection for metal roof curbs, flashing, etc.

3.18 ROOFTOP EQUIPMENT

A. Install all starters and disconnects within 5 feet of equipment being served.

B. Mount starters and disconnects on the equipment only if allowed or recommended by the manufacturer. Otherwise, mount disconnects on unistrut-style framing in an “L” configuration. Secure unistrut to roof with a flashed wood nailer. Provide cross bracing.

C. Run “hard” conduit (IMC) through conduit curb to starter or disconnect. Install IMC from starter or disconnect to equipment. Flexible watertight conduit is acceptable only for equipment on a vibration-type (spring) curb or that has movement. This does not include AHU, chillers, fans on factory non-spring curbs, package units, or other internally isolated rooftop equipment.

3.19 TESTS AND INSPECTIONS

A. Refer to conditions of the contract and Division 1 for additional requirements regarding tests and inspections.

B. General: The Contractor shall make all tests deemed necessary by the inspection departments of the authority having jurisdiction, Board of Underwriters, etc. He shall provide all equipment, materials, and labor for making such tests. Fuel and electrical energy for system operational tests following beneficial occupancy by the Owner will be paid for by the Owner.

C. Other: Additional tests specified hereinafter under the various specification sections shall be made.

D. Notification: The Owner’s Representative shall be notified at his office 36 hours prior to each test and other specifications requirements requiring action on the part of the Owner, Architect, Engineer, and/or Owner’s Representative.

E. Test Logs: All tests which the Contractor conducts shall have pertinent data logged by the Contractor at the time of testing. Data shall include date, time, personnel, description and extent of system tested, test conditions, test results, specified results, and any other pertinent data. Data shall be delivered to the Owner’s Representative as specified under “Requirements for Final Acceptance.

F. Inspections: In general, an inspection by the Owner’s Representative shall be required prior to closing up any work and prior to beneficial occupancy or final project completion. The closing up of work includes, but is not limited to, conduit installations prior to backfilling; electrical and fire protection work prior to placement of concrete; or closing up walls and overhead electrical and fire protection work prior to installation of the ceiling.

3.20 CLEANING AND PAINTING

A. The contractor shall at all times keep the premises free from accumulations of waste material or rubbish. Debris shall be removed from the site and from any street or alley adjacent to the site.

B. Thoroughly clean and touch up the finish on all parts of the materials and equipment. Exposed parts in equipment rooms, and all other spaces except sealed chases and attics shall be thoroughly cleaned of cement, plaster, and other materials, and all oil and grease spots shall be removed. Such surfaces shall be carefully wiped and all cracks and corners scraped out.

C. Exposed metal work which is not galvanized shall be carefully brushed down with steel brushes to remove rust and other spots and left smooth and clean and then painted with a suitable rust resistant primer. Exposed metal work includes work exterior to the building; exposed in mechanical or electrical equipment rooms and storage rooms; and other areas where occupants could see the work, whether normally occupied or not.

D. All other painting shall be accomplished under the Painting Section of Division 9 of the specifications.

E. At completion of the project, the Contractor shall remove all tools, scaffolding, and surplus materials. Contractor shall leave the area “broom clean”. Before final acceptance, vacuum all panels, switchboards, starters, and other electrical devices. Wipe clean all fixture lenses and reflectors, all panelboard and switchboard interior and exterior surfaces, being careful to remove all stray paint, construction materials, dust, and particles. Touch-up all marred surfaces to restore existing conditions to those provided by the manufacturer.

3.21 IDENTIFICATION AND LABELING

A. General: The Contractor shall make it possible for the personnel operating and maintaining the equipment and systems in this project to readily identify the various pieces of equipment, disconnects, panels, etc. by marking them. All disconnects/starters/panels shall be labeled for the equipment they serve. Marks shall be the same as the drawings.

3.22 COORDINATION OF WORK

A. The light fixture grid layout as indicated on the drawings must be maintained. This Contractor shall refer to all light fixture plans and details indicated on the drawings.

B. The electrical trades shall locate all junction boxes, pull boxes, conduits, etc. to avoid interference with the diffusers, dampers, grilles, etc. The mechanical trades shall furnish to all other trades copies of approved ductwork shop drawings to assist in the coordination of the rough-in and installation of all items of work.

C. The order of space allocation priority in plan and in elevation shall be as follows.
1. 1st Light Fixtures, at Ceiling Soffit + 6"
2. 2nd Grade Plumbing Waste and Vent Systems
3. 3rd Ductwork
4. 4th Pressurized Piping Systems
5. 5th Electrical Conduit
6. 6th Ceiling Support System, where required

3.23 DISCHARGE OF WASTES FROM CONSTRUCTION SITE

A. The Contractor shall comply with all applicable provisions of local, state, and federal laws regarding the discharge of wastes into sewer and waterways. Special caution shall be exercised to prevent the discharge of wastes which contain oil, tar, asphalt, roofing compound, kerosene, gasoline, paint, mud, cement, lime, or other materials which would degrade the water quality of the receiving water course.

B. Disposal of Lamps and Ballasts: The proper disposal of all ballasts and lamps from the demolition of lighting fixtures as part of this project will be the responsibility of the Electrical Contractor. All lamps and ballasts found to contain hazardous contaminants will be removed from the site and transported to a licensed disposal facility by a contractor licensed in this field. All work shall be performed in accordance with current state and Federal rules and regulations pertaining to the processing of contaminated waste materials. A certificate of proper disposal from the licensed waste contractor shall be provided to the Engineer.

3.24 OPERATING AND MAINTENANCE MANUAL

A. The Contractor shall furnish indexed operating and maintenance manuals with complete technical data for each electrical system, piece of equipment, and material installed under this Contract.

B. The manuals shall be identified on the cover as “Operating and Maintenance Manual” and shall list the name and location of project, the Owner, the Engineers, the General Contractor, and the Subcontractors installing equipment represented in the brochure.

C. Two (2) copies of the manual, bound in three-ring hardback binders shall be provided. One copy shall be completed and delivered to the Engineer prior to the time that system and equipment tests are performed. The second copy shall be delivered prior to final acceptance. The manual shall have a Table of Contents and shall be grouped in tabbed sections according to the specification sections. Each section shall be organized as follows:
   1. Approved engineering submittals with complete performance and technical data.
   2. Manufacturer’s local representative and/or distributor's name and address.
   3. Manufacturer’s installation instructions and brochures.
   4. Manufacturer’s operating and maintenance brochures.
   5. Manufacturer’s installation wiring diagram.
   6. Contractor’s field wiring diagram, if different.
   7. Manufacturer’s brochure listing recommended spare parts.
   8. Manufacturer’s brochure listing replacement part numbers and descriptions.

D. Provide a final section entitled, “Warranties and Guarantees”, for all equipment as well as Contractor’s warranty.

3.25 CONDITIONS OF EQUIPMENT AT FINAL ACCEPTANCE

A. At the time of acceptance, the Contractor shall have inspected all installed systems to assure the following has been completed:
   1. Fixtures are operating, and lenses and reflectors are free of dust, debris, and fingerprints.
   2. Panelboards have all conductors neatly formed, bundled, and made-up tight. Cans shall be vacuum cleaned and surfaces cleaned of stray paint, dust, grease, and fingerprints. All circuit directories to be neatly typed and in place.
   3. Wall plates and exposed switch and receptacle parts to be clean, free of paint, plaster, etc.
   4. Safety and disconnect switches and motor starters to be vacuum cleaned of debris and dust, and all surfaces free of stray paint, grease, and fingerprints.
   5. Switchgear, transformers, and system devices shall be cleaned internally and externally and have all surfaces restored to original surface conditions.
   6. Touch-up all scratched surfaces using paint matching the existing equipment paint. Where paint cannot be matched, the entire surface shall be repainted in a color and manner approved by the Engineer.

END OF SECTION 260015

SECTION 260050

BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Raceways.
   2. Building wire and connectors.
   3. Supporting devices for electrical components.
   4. Electricity-metering components.
   5. Concrete equipment bases.
   6. Electrical demolition.
   7. Cutting and patching for electrical construction.
   8. Touchup painting.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. FMC: Flexible metal conduit.

C. IMC: Intermediate metal conduit.

D. LFMC: Liquidtight flexible metal conduit.

E. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For electricity-metering equipment.

B. Shop Drawings: Dimensioned plans and sections or elevation layouts of electricity-metering equipment.

C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devised, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow:

1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.

C. Coordinate electrical service connections to components furnished by utility companies.
1. Coordinate installation and connection of exterior underground and overhead utilities and services, including provision for electricity-metering components.
2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.

D. Coordinate location of access panels and doors for electrical items that are concealed by finished surfaces. Access doors and panels are specified in Division 8 Section “Access Doors.”

E. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.

F. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.

PART 2 - PRODUCTS

2.1 RACEWAYS

A. See Section “Raceways and Boxes.”

2.2 CONDUCTORS

A. See Section “Conductors and Cables.”

2.3 SUPPORTING DEVICES

A. Material: Cold-formed steel, with corrosion-resistant coating acceptable to authorities having jurisdiction.

B. Metal items for Use Outdoors or in Damp Locations: Hot-dip galvanized steel.

C. Slotted-Steel Channel Supports: Flange edges turned toward web, and 9/16-inch- diameter slotted holes at a maximum of 2 inches o.c., in webs.

D. Nonmetallic Channel and Angle Systems: Structural-grade, factory-formed, glass-fiber-resin channels and angles with 9/16-inch- diameter holes at a maximum of 8 inches o.c., in at least one surface.
1. Fittings and Accessories: Products of the same manufacturer as channels and angles.
2. Fittings and Accessory Materials: Same as channels and angles, except metal items may be stainless steel.

E. Raceways and Cable Supports: Manufactured clevis hangers, riser clamps, straps, threaded C-clamps with retainers, ceiling trapeze hangers, wall brackets, and spring-steel clamps or click-type hangers.

F. Pipe Sleeves: ASTM A 53, Type E, Grade A, Schedule 40, galvanized steel, plain ends.

G. Cable Supports for Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug for nonarmored electrical cables in riser conduits. Plugs have number and size of conductor gripping holes as required to suit individual risers. Body constructed of malleable-iron casting with hot-dip galvanized finish.

H. Expansion Anchors: Carbon-steel wedge or sleeve type.

I. Toggle Bolts: All-steel springhead type.

2.4 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

A. Current-Transforming Cabinets: Comply with requirements of electrical power utility company.

B. Meter Sockets: Comply with requirements of electrical power utility company.

C. Modular Meter Centers: Factory-coordinated assembly of a main meter center circuit-breaker unit with wireways, tenant meter socket modules, and tenant branch circuit breakers arranged in adjacent vertical sections complete with interconnecting buses.
   1. Housing: NEMA 250, Type 3R enclosure
   2. Tenant Branch Circuit Breakers: Series combination rated to protect circuit breakers in downstream panelboards that have 10,000-A interrupting capacity, minimum.

D. Provide power utility company communication conduit to meter.

E. Relocate communication conduit with meter as required to maintain minimum utility company clearances.

2.5 EQUIPMENT FOR ELECTRICITY METERING BY OWNER

A. Meter: Electronic kilowatt-hour/demand measuring to record electricity used and highest peak demand over a time period according to electric utility. Meter is designed for used on the type and rating of circuit indicated for its application.
   1. Kilowatt-Hour Display: Digital liquid crystal.
   2. Kilowatt-Demand Display: Digital, liquid-crystal type to register highest peak demand.
   3. Enclosure: NEMA 250, Type 1, Minimum, with hasp for padlocking or sealing.
   4. Memory Backup: Self-contained to maintain memory throughout power outages of 72 hours, minimum.
   5. Sensors: Current-sensing type, with current or voltage output, selected for optimum range and accuracy for the ratings of the circuits indicated for this application.
      a. Type: Solid core.
   6. Accuracy: Nationally recognized testing laboratory certified to meet ANSI C12.16 specifications.
   7. Demand Signal Communication Interface: Match signal to building automation system input that conveys data on instantaneous/integrated demand level measured by meter used for load switching to control demand.

B. Current-Transformer Cabinets: Listed or recommended by metering equipment manufacturer for use with sensors indicated.

C. Available Metering Equipment Manufacturers: Subject to compliance with requirement, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. E-MON Corporation.
   2. National Meter Industries, Inc.
   3. Osaki Meter Sales, Inc.

2.6 CONCRETE BASES

A. Concrete: 3000-psi, 28-day compressive strength as specified in Division 3 Section “Cast-in-Place Concrete.”

2.7 TOUCHUP PAINT

A. For Equipment: Equipment manufacturer’s paint selected to match installed equipment finish.

B. Galvanized Surfaces: Zinc-rich paint recommended by item manufacturer.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components and equipment to provide the maximum possible headroom.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

E. Mount all non-wall mounted equipment minimum of:
1. Two (2) inches off the wall for switchboards, free standing distribution boards, disconnects, panels and all other non-vibrating equipment.
2. Minimum of four (4) inches for vibrating equipment to include transformers.

3.2 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials or nonmetallic, U-channel system components.

B. Dry Locations: Steel materials.

C. Support Clamps for PVC Raceways: Click-type clamp system.

D. Selection of Supports: Comply with manufacturer’s written instructions.

E. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four; minimum of 200-lb design load.

3.3 SUPPORT INSTALLATION

A. Install support devices to securely and permanently fasten and support electrical components. Supports for electrical raceways, boxes, equipment, fire alarm / public address / data / special system(s) / other low-voltage enclosures, and other entities encompassing wiring or devices of any voltage shall be connected to a recognized structural element. [Note: For purposes of MEP work, ceiling grid shall **NOT** be considered a structural element unless prior written approval is given by Engineer on a case-by-cases basis.]

B. Install individual and multiple raceway hangers and riser clamps to support raceways. Provide U-bolts, clamps, attachments, and other hardware necessary for hanger assemblies and for securing hanger rods and conduits.

C. Support parallel runs of horizontal raceways together on trapeze- or bracket-type hangers.

D. Size supports for multiple raceway installations so capacity can be increased by a 25 percent minimum in the future.

E. Support individual horizontal raceways with separate, malleable-iron pipe hangers or clamps.

F. Install ¼-inch-diameter or larger threaded steel hanger rods, unless otherwise indicated.

G. Spring-steel fasteners specifically designed for supporting single conduits or tubing may be used instead of malleable-iron hangers for 1½ inch and smaller raceways serving lighting and receptacle branch circuits above suspended ceilings and for fastening raceways to slotted channel and angle supports.

H. Arrange supports in vertical runs so the weight of raceways and enclosed conductors is carried entirely by raceway supports, with no weight load on raceway terminals.

I. Simultaneously install vertical conductor supports with conductors.

J. Separately support cast boxes that are threaded to raceways and used for fixture support. Support sheet-metal boxes directly from the building structure or by bar hangers. If bar hangers are used for alignment, attach bar to raceways on opposite sides of the box and support the raceway with an approved fastener not more than 24 inches from the box. Support the box and raceway from structural supports.

K. Install metal channel racks for mounting cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices unless components are mounted directly to structural elements of adequate strength.

L. Where exterior electrical equipment is mounted on unistrut racks and the top of the mounted equipment is taller than 60” above the mounting surface, provide rear triangular support for unistrut rack angled 30 degrees connected 2/3 way up the rack and mounted to the same structure as the unistrut rack. If mounting on a roof assembly support for the rear support shall go through the roof at 90 degrees.

M. Install sleeves for cable and raceway penetrations of concrete slabs and walls. Install sleeves for cable and raceway penetrations of masonry and fire-rated gypsum walls and of all other fire-rated floor and wall assemblies. Install sleeves during erection of concrete and masonry walls.
   1. Exception: Sleeves are not required for core-drilled penetrations where the hole is the same size as the outer conduit dimension. Tape or wrap conduit in contact with the concrete and firecaulk as required to maintain fire rating.

N. Provide x-ray scans for all penetrations through concrete floors that are post tension.

O. Securely fasten electrical items and their supports to the building structure, unless otherwise indicated. Perform fastening according to the following unless other fastening methods are indicated:
   1. Wood: Fasten with wood screws or screw-type nails.
   2. Masonry: Toggle bolts on hollow masonry units and expansion bolts on solid masonry units.
   3. New Concrete: Concrete inserts with machine screws and bolts.
   4. Existing Concrete: Expansion bolts.
   5. Steel: Welded threaded studs or spring-tension clamps on steel.
      a. Field Welding: Comply with AWS D1.1.
   6. Welding to steel structure may be used only for threaded studs, not for conduits, pipe straps, or other items.

7. Light Steel: Sheet-metal screws.
8. Fasteners: Select so the load applied to each fastener does not exceed 25 percent of its proof-test load.

3.4 UTILITY COMPANY ELECTRICITY-METERING EQUIPMENT

A. Install equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.5 FIRESTOPPING

A. Apply firestopping to cable and raceway penetrations of fire-rated floor and wall assemblies to achieve fire-resistance rating of the assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Firestopping."

3.6 CONCRETE BASES

A. Construct concrete bases of dimensions indicated, but not less than 6 inches larger, in both directions, than supported unit and bollards.

B. Follow supported equipment manufacturer's anchorage recommendations and setting templates for anchor-bolt and tie locations, unless otherwise indicated. Use 3000-psi, 28-day compressive-strength concrete and reinforcement as specified in Sections "Cast-in-Place Concrete," "Concrete Reinforcement," and "Concrete Formwork."

C. Bollards: Provide bollards around utility provider pad mount transformer. Protect equipment on road or driveway sides.

D. Provide bollards around owner genset if within 10 feet of roadway.

E. Provide 36 inch concrete pads in front of exterior switchboards full length of switchboard.

F. Provide 30 inch concrete pads in front of ground mounted disconnect racks.

3.7 DEMOLITION

A. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

B. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

C. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

D. Remove demolished material from Project site.

E. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation.

3.8 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.

B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.9 FIELD QUALITY CONTROL

A. Inspect installed components for damage and faulty work, including the following:
   1. Raceways.
   2. Building wire and connectors.
   3. Supporting devices for electrical components.
   4. Electrical identification.
   5. Electricity-metering components.
   6. Concrete bases.
   7. Electrical demolition.
   8. Cutting and patching for electrical construction.
   9. Touchup painting.

B. Test Owner's electricity-metering installation for proper operation, accuracy, and usability of output data.
   1. Connect a load of known kW rating, 1.5 kW minimum, to a circuit supplied by the metered feeder.
   2. Turn off circuits supplied by the metered feeder and secure them in the "off" condition.
   3. Run the test load continuously for eight hours, minimum, or longer to obtain a measurable meter indication. Use a test load placement and setting that ensure continuous, safe operation.
   4. Check and record meter reading at end of test period and compare with actual electricity used based on test load rating, duration of test, and sample measurements of supply voltage at the test load connection. Record test results.
   5. Repair or replace malfunctioning metering equipment or correct test setup; then retest. Repeat for each meter in installation until proper operation of entire system is verified.

3.10 REFINISHING AND TOUCHUP PAINTING

A. Refinish and touch up paint. Paint materials and application requirements are specified in Division 9 Section "Painting."
   1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
   2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
   3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
   4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.11 CLEANING AND PROTECTION

A. On completion of installation, including outlets, fittings, and devices, inspect exposed finish. Remove burrs, dirt, paint spots, and construction debris.

B. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.

END OF SECTION 260050

SECTION 260519

CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes building wires and cables and associated connectors, splices, and terminations for wiring systems rated 600 V and less.

B. Related Sections include “Control/Signal Transmission Media” for transmission media used for control and signal circuits.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For testing agency.

C. Field Quality-Control Test Reports: From Contractor.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, all conductors shall be listed for the application, temperature, and insulation rating to which they are intended.

2.2 CONDUCTORS AND CABLES

A. Refer to Part 3 “Conductor and Insulation Applications” Article for insulation type, cable construction, and ratings.

B. Conductor Material:
   1. Copper complying with NEMA WC-70.
   2. Solid conductors, sizes 10 and 12, uncoated copper per ASTM B3.
   3. Stranded conductor, all other sizes, uncoated copper per ASTM B3, ASTM B787, and ASTM B8.

C. Conductor Insulation Types: Type THHN-THWN and complying with NEMA WC-70.

1. Rated for sunlight resistance all colors.
2. Conductors shall be color coded for voltage and phase as per NEC and any local amendments.
3. Larger conductors shall have taped color coding.
4. Size, rating, temperature, and type shall be permanently marked on conductor jacket.
5. Insulation shall be PVC, heat and moisture resistant, flame retardant compound as per UL-83 and UL-1063.
6. Jacket shall be polyamide outer nylon covering per UL-83 and UL-1063.

D. Rated for sunlight resistance all colors.

2.3 CONNECTORS

A. Wire Connectors Size 6-14 AWG:
1. Description: Factory-fabricated UL listed connected and of size, ampacity rating, material, type, and class for application and service indicated.
2. Provide self-locking square wire spring grab screw on wire connectors sized as per NEC and the number of conductors to be connected.
3. Thermoplastic deep shell design, with wings on smaller connectors, rated for application temperature, Minimum 105 degrees C.
4. Copper to copper connection, 600V.
5. Provide high temp wire connectors for all high temperature equipment applications.

B. Push-in wire connectors are Not Approved and shall not be used for any power or lighting circuits above 50V.

C. Pre-Insulated Multi-Conductor Connectors Dry Location for conductors larger than #6.
1. UL Listed rated for 90 degree C, insulated with high dialectric plastisol or equal, UV resistance, Polaris, NSI, or equal.
2. Dual rating for copper and/or aluminum.
3. Provide correct type based upon wire stranding (fine or coarse).
4. Supplied with removable plugs.

D. Pre-Insulated Multi-Conductor Connectors Wet or submersible Dry Location for conductors larger than #6.
1. UL Listed rated for 90 degree C, insulated with 125 mils rubber or equal, UV resistance, Polaris, NSI, or equal.
2. Dual rating for copper and/or aluminum.
3. Provide correct type based upon wire stranding (fine or coarse).
4. Supplied with removable plugs.

E. Pre-insulated single conductor in-line connector for conductors larger than #6 Dry Location.
1. UL Listed rated for 90 degree C, insulated with high dialectric plastisol or equal, UV resistance, Polaris, NSI or equal.
2. Dual rating for copper and/or aluminum.
3. Provide correct type based upon wire stranding (fine or coarse).
4. Supplied with removable plugs.

2.4 ALTERNATES

A. Blue Jacketed steel MC Cable is only permitted for 6 foot (maximum) lighting whips. It shall be used for no other purpose.

B. AC cable is not permitted at all.

PART 3 - EXECUTION

3.1 CONDUCTOR AND INSULATION APPLICATIONS

A. Service Entrance: Type THHN-THWN, single conductors in raceway.

B. Exposed Feeders: Type THHN-THWN, suitable for use in air return plenums.

C. Feeders Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

D. Feeders Concealed in Concrete, below Slabs-on-Grade, and in Crawlspaces: Type THHN-THWN, single conductors in raceway.

E. Exposed Branch Circuits, including in Crawlspaces: Type THHN-THWN, single conductors in raceway.

F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway.

G. Branch Circuits Concealed in Concrete and below Slabs-on-Grade: Type THHN-THWN, single conductors in raceway.

H. Underground Feeders and Branch Circuits: Type THHN-THWN, single conductors in raceway.

I. Cord Drops and Portable Appliance Connections: Type SO, hard service cord.

J. Fire Alarm Circuits: Power-limited, fire-protective, signaling circuit cable.

K. Class 1 Control Circuits: Type THHN-THWN, in raceway.

L. Class 2 Control Circuits: Type THHN-THWN, in raceway.

3.2 INSTALLATION

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Minimum line voltage conductor size is #12.

C. Neutrals shall not be shared on any single pole circuit.

D. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members and follow surface contours where possible.

F. Install without damaging conductors/cable, shield, or jacket.
   1. Do not bend conductors/cable, in handling or installation, to smaller radii than minimum recommended by manufacturer.
   2. All new installation cabling shall be one piece without breaks or splices except at device connections.

G. Conductor/Cable extensions if indicated: Provide splices and connectors suitable for the environment and conductors. Each conductor to be individually extended using either pre-insulated in-line connectors or hydraulically crimped butt connectors with 3m Scotchcast™ resin kits to complete the insulation. Connector and insulation shall be suitable for environment. All splice and tap connectors shall be compatible with cable material. Make no splices except at indicated splice points.

H. Conductor/Cable splits: Provide multi-conductor pre-insulated connectors suitable for environment with specific number of connectors to split. Provide with wireway or pull box for access. Torque to manufacturers specific requirements. Provide configuration per connections. For service wireways, provide with in-tap-out for future use.

I. Pull conductors/cables without exceeding manufacturer's recommended pulling tensions.
   1. Pull simultaneously if more than one is being installed in same raceway.
   2. Use pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation.
   3. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage media or raceway.

J. Provide pull boxes as per NEC.

K. Provide junction or pull boxes at all splice points.

L. Support cables according to Section “Basic Electrical Materials and Methods.”

M. Seal around cables penetrating fire-rated elements according to Section “Firestopping.”

N. Identify and color-code conductors and cables according to Section “Electrical Identification” and adhere to local color code requirements.

3.3 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
   1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.4 FIELD QUALITY CONTROL

A. Testing: Engage a qualified testing agency to perform the following field quality-control testing:
   1. After installing conductors and cables and before electrical circuitry has been energized, test for compliance with requirements.
   2. Perform each electrical test and visual and mechanical inspection stated in NETA ATS, Section 7.3.1. Certify compliance with test parameters.

B. Test Reports: Prepare a written report to record the following:
   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260526

GROUNDING AND BONDING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes grounding of electrical systems and equipment. Grounding requirements specified in this Section may be supplemented by special requirements of systems described in other Sections.

B. Related Sections include Section “Lightning Protection” for additional grounding and bonding materials.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Qualification Data: For firms and persons specified in “Quality Assurance” Article.

C. Field Test Reports: Submit written test reports to include the following:
   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

1.4 QUALITY ASSURANCE

A. Testing Agency Qualifications: Testing agency as defined by OSHA in 29 CFR 1910.7 or a member company of the International Electrical Testing Association and that is acceptable to authorities having jurisdiction.
   1. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
   1. Comply with UL 467.

C. Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Grounding Conductors, Cables, Connectors, and Rods:
      a. Apache Grounding/Erico Inc.
      b. Boggs, Inc.

c. Chance/Hubbell.
d. Copperweld Corp.
e. Dossert Corp.
f. Erico Inc.; Electrical Products Group.
g. Framatome Connectors/Burndy Electrical.
h. Galvan Industries, Inc.
i. Harger Lightning Protection, Inc.
j. Hastings Fiber Glass Products, Inc.
k. Heary Brothers Lightning Protection, Co.
l. Ideal Industries, Inc.
m. ILSCO.
n. Kearney/Cooper Power Systems.
o. Korns: C.C. Korns Co.; Division of Robroy Industries.
p. Lightning Master Corp.
q. Lyncole XIT Grounding.
r. O-Z/Gedney Co.; a business of the EGS Electrical Group.
s. Raco, Inc.; Division of Hubbell.
t. Robbins Lightning, Inc.
u. Salisbury: W.H. Salisbury & Co.
v. Superior Grounding Systems, Inc.
w. Thomas & Betts, Electrical.

2.2 GROUNDING CONDUCTORS

A. For insulated conductors, comply with Section “Conductors and Cables.”

B. Material: Copper.

C. Equipment Grounding Conductors: Insulated with green-colored insulation.

D. Isolated Ground Conductors: Insulated with green-colored insulation with yellow stripe. On feeders with isolated ground, use colored tape, alternating bands of green and yellow tape to provide a minimum of three bands of green and two bands of yellow.

E. Grounding Electrode Conductors: Stranded cable.

F. Underground Conductors: Bare, tinned, stranded, unless otherwise indicated.

G. Bare Copper Conductors: Comply with the following:
1. Solid Conductors: ASTM B 3.
2. Assembly of Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

H. Copper Bonding Conductors: As follows:
1. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG copper conductor, ¼ inch in diameter.
2. Bonding Conductor: No. 4 or No. 6 AWG, stranded copper conductor.
3. Bonding Jumper: Bare copper tape, braided bare copper conductors, terminated with copper ferrules; 1_inches wide and 1/16 inches thick.
4. Tinned Bonding Jumper: Tinned-copper tape, braided copper conductors, terminated with copper ferrules; 1_inches wide and 1/16 inches thick.

I. Ground Conductor and Conductor Protector for Wood Poles: As follows:
1. No. 4 AWG minimum, soft-drawn copper conductor.
2. Conductor Protector: Half-round PVC or wood molding. If wood, use pressure-treated fir, or cypress or cedar.

J. Grounding Bus: Bare, annealed copper bars of rectangular cross section, with insulators.

2.3 CONNECTOR PRODUCTS

A. Comply with IEEE 837 and UL 467; listed for use for specific types, sizes, and combinations of conductors and connected items.

B. Bolted Connectors: Bolted-pressure-type connectors, or compression type.

C. Welded Connectors: Exothermic-welded type, in kit form, and selected per manufacturer's written instructions.

2.4 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel.

B. Ground Rods: Sectional type; copper-clad steel.
1. Size: ¾ by 120 inches.

C. Test Wells: Provide handholes for test wells.

PART 3 - EXECUTION

3.1 APPLICATION

A. Use only copper conductors for both insulated and bare grounding conductors in direct contact with earth, concrete, masonry, crushed stone, and similar materials.

B. In raceways, use insulated equipment grounding conductors.

C. Exothermic-Welded Connections: Use for connections to structural steel, ground rods, and for underground connections, except those at test wells.

D. Equipment Grounding Conductor Terminations: Use bolted pressure clamps.

E. Ground Rod Clamps at Test Wells: Use bolted pressure clamps with at least two bolts.

F. Grounding bus: Install in electrical and telephone equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
1. Use insulated spacer; space 1 inch from wall and support from wall 6 inches above finished floor, unless otherwise indicated.
2. At doors, route the bus up to the top of the door frame, across the top of the doorway, and down to the specified height above the floor.

G. Underground Grounding Conductors: Use tinned-copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade or bury 12 inches above duct bank when installed as part of the duct bank.

3.2 EQUIPMENT GROUNDING CONDUCTORS

A. Comply with NFPA 70, Article 250, for types, sizes, and quantities of equipment grounding conductors, unless specific types, larger sizes, or more conductors than required by NFPA 70 are indicated.

B. Install equipment grounding conductors in all feeders and circuits.

C. Busway Supply Circuits: Install insulated equipment grounding conductor from the grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.

D. Computer Outlet Circuits: Install insulated equipment grounding conductor in branch-circuit runs from computer-area power panels or power-distribution units.

E. X-Ray Equipment Circuits: Install insulated equipment grounding conductor in circuits supplying x-ray equipment.

F. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

G. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure and install a separate equipment grounding conductor. Isolate equipment grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.

H. Nonmetallic Raceways: Install an equipment grounding conductor in nonmetallic raceways unless they are designated for telephone or data cables.

I. Air-Duct Equipment Circuits: Install an equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners and heaters. Bond conductor to each unit and to air duct.

J. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate equipment grounding conductor to each electric water heater, heat-tracing, and antifrost heating cable. Bond conductor to heater units, piping, connected equipment, and components.

K. Signal and Communication Systems: For telephone, alarm, voice and data, and other communication systems, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
   1. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a ¼-x2x12-inch grounding bus.
   2. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.

L. Metal Poles Supporting Outdoor Lighting Fixtures: Provide a grounding electrode in addition to installing a separate equipment grounding conductor with supply branch-circuit conductors.

M. Common Ground Bonding with Lightning Protection System: Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor and install in conduit.

3.3 COUNTERPOISE

A. Ground the steel framework of the building with a driven ground rod at the base of every corner column and at intermediate exterior columns at distances not more than 60 feet apart. Provide a grounding conductor (counterpoise), electrically connected to each ground rod and to each steel column, extending around the perimeter of the building. Use tinned-copper conductor not less than No. 2/0 AWG for counterpoise and for tap to building steel. Bury counterpoise not less than 18 inches below grade and 24 inches from building foundation.

3.4 INSTALLATION

A. Ground Rods: Install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes.
   1. Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated.
   2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as otherwise indicated. Make connections without exposing steel or damaging copper coating.

B. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

C. Bonding Straps and Jumpers: Install so vibration by equipment mounted on vibration isolation hangers and supports is not transmitted to rigidly mounted equipment. Use exothermic-welded connectors for outdoor locations, unless a disconnect-type connection is required; then, use a bolted clamp. Bond straps directly to the basic structure taking care not to penetrate any adjacent parts. Install straps only in locations accessible for maintenance.

D. Metal Water Service Pipe: Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

E. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with grounding clamp connectors.

F. Bond interior metal piping systems and metal air ducts to equipment grounding conductors of associated pumps, fans, blowers, electric heaters, and air cleaners. Use braided-type bonding straps.

G. Bond each aboveground portion of gas piping system upstream from equipment shutoff valve.

H. Install one test well for each service at the ground rod electrically closest to the service entrance. Set top of well flush with finished grade or floor.

I. Ufer Ground (Concrete-Encased Grounding Electrode): Fabricate according to NFPA 70, Paragraph 250-81(c), using a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG. If concrete foundation is less than 20 feet long, coil excess conductor within the base of the foundation. Bond grounding conductor to reinforcing steel in at least four locations and to anchor bolts. Extend grounding conductor below grade and connect to building grounding grid or to a grounding electrode external to concrete.

3.5 CONNECTIONS

A. General: Make connections so galvanic action or electrolysis possibility is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
   1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer to order of galvanic series.
   2. Make connections with clean, bare metal at points of contact.
   3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
   4. Make aluminum-to-galvanized steel connections with tin-plated copper jumpers and mechanical clamps.

5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

B. Exothermic-Welded Connections: Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.

C. Equipment Grounding Conductor Terminations: For No. 8 AWG and larger, use pressure-type grounding lugs. No. 10 AWG and smaller grounding conductors may be terminated with winged pressure-type connectors.

D. Noncontact metal Raceway Terminations: If metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically non-continuous conduits at entrances and exits with grounding bushings and bare grounding conductors, unless otherwise indicated.

E. Connections at Test Wells: Use compression-type connectors on conductors and make bolted- and clamped-type connections between conductors and ground rods.

F. Tighten screws and bolts for grounding and bonding connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

G. Compression-Type Connections: Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.

H. Moisture Protection: If insulated grounding conductors are connected to ground rods or grounding buses, insulate entire area of connection and seal against moisture penetration of insulation and cable.

3.6 UNDERGROUND DISTRIBUTION SYSTEM GROUNDING

A. Duct Banks: Install a grounding conductor with at least 50 percent ampacity of the largest phase conductor in the duct bank.

B. Manholes and Handholes: Install a driven ground rod close to wall and set rod depth so 4 inches will extend above finished floor. If necessary, install ground rod before manhole is placed and provide a No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive tape or heat-shrunk insulating sleeve from 2 inches above to 6 inches below concrete. Seal floor opening with waterproof, nonshrink grout.

C. Connections to Manhole Components: Connect exposed-metal parts, such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, stranded, hard-drawn copper conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect to cable armor and cable shields as recommended by manufacturer of splicing and termination kits.

D. Pad-Mounted Transformers and Switches: Install two ground rods and counterpoise circling pad. Ground pad-mounted equipment and noncurrent-carrying metal items associated with substations by connecting them to underground cable and grounding electrodes. Use tinned-copper conductor not less than No. 2 AWG for counterpoise and for taps to equipment ground pad. Bury counterpoise not less than 18 inches below grade and 6 inches from the foundation.

3.7 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:
   1. After installing grounding system but before permanent electrical circuitry has been energized, test for compliance with requirements.
   2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Measure ground resistance not less than two full days after the last trace of precipitation, and without the soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance. Perform tests, by the fall-of-potential method according to IEEE 81.
   3. Provide drawings locating each ground rod and ground rod assembly and other grounding electrodes, identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
      a. Equipment Rated 500 kVA and Less: 10 ohms.
      b. Equipment Rated 500 to 1000 kVA: 5 ohms.
      c. Equipment Rated More Than 1000 kVA: 3 ohms.
      d. Substations and Pad-Mounted Switching Equipment: 5 ohms.
      e. Manhole Grounds: 10 ohms.

   4. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

3.8 GRADING AND PLANTING

A. Restore surface features, including vegetation, at areas disturbed by Work of this Section. Reestablish original grades, unless otherwise indicated. If sod has been removed, replace it as soon as possible after backfilling is completed. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 2 Section “Landscaping.” Maintain restored surfaces. Restore disturbed paving as indicated.

END OF SECTION 260526

SECTION 260533

RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:
   1. Division 7 Section “Firestopping” for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.
   2. Section “Basic Electrical Materials and Methods” for supports, anchors, and identification products.
   3. Section “Wiring Devices” for devices installed in boxes and for floor-box service fittings.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquidtight flexible metal conduit.

F. LFNC: Liquidtight flexible nonmetallic conduit.

G. RNC: Rigid nonmetallic conduit.

H. PVC-GRS: PVC-Coated galvanized rigid steel.

1.4 SUBMITTALS

A. Product Data:
   1. For surface raceways, wireways and fittings.
   2. Floor boxes.
   3. Hinged-cover enclosures and cabinets.
   4. Conduit spacers.
   5. Conduit rack supports.

B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, enclosures, and cabinets.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
   1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
   2. Refer to 3.1, RACEWAY APPLICATION, for materials to be used.

2.2 METAL CONDUIT AND TUBING

A. Available Manufacturers:
   1. AFC Cable Systems, Inc.
   2. Alflex, Inc.
   3. Anamet Electrical, Inc.; Anaconda Metal Hose.
   4. Calbond / Atkore
   5. Electri-Flex Co.
   6. Grinnell Co./Tyco International; Allied Tube and Conduit Div.
   7. Republic Conduit.
   8. Manhattan/CDT/Cole-Flex.
   9. O-Z Gedney; Unit of General Signal.
   10. Wheatland Tube Co.
   11. Perma-Cote
   12. Plasti Bond
   13. KorKap

B. Rigid Steel Conduit: ANSI C80.1.

C. IMC: ANSI C80.6.

D. PVC--Coated Steel Conduit and Fittings: UL514b NEMA RN 1.

E. PVC- Coated IMC and Fittings: ETL PVC-001 NEMA RN 1 UL6.

F. EMT: ANSI C80.3.

G. FMC: Zinc-coated steel. Non UL listed FMC is not allowed for any line voltage (greater than 70V) system.

H. LFMC: Flexible steel conduit with PVC jacket.

I. Fittings: NEMA FB 1; compatible with conduit and tubing materials. Provide fittings factory matched with conduit types.
   1. Indoor Fittings: Steel Set Screw or Steel Compression
   2. Outdoor Fittings: Threaded fittings on IMC or Rigid Conduit
   3. Outdoor Fittings: Compression fittings with gaskets on all transitions to flexible conduit.
   4. Die cast fittings are not acceptable anywhere.
   5. Provide factory fittings with MC cable where allowed.
   6. EMT crimp type fittings are not acceptable.

2.3 NONMETALLIC CONDUIT AND TUBING

A. Available Manufacturers:
   1. American International.
   2. Anamet Electrical, Inc.; Anaconda Metal Hose.
   3. Amco Corp.
   4. Cantex, Inc.
   5. Certainteed Corp.; Pipe & Plastics Group.
   6. Condux International.
   7. ElecSYS, Inc.
   8. Electri-Flex Co.
   9. Lamson & Sessions; Carlon Electrical Products.
   10. Manhattan/CDT/Cole-Flex.
   11. RACO; Division of Hubbell, Inc.
   12. Thomas & Betts Corporation.

B. ENT: NEMA TC 13.

C. RNC: NEMA TC 2, Schedule 40 and Schedule 80 PVC.

D. LFNC: UL 1660.

E. Fittings: NEMA TC 3; match to conduit or tubing type and material. Provide fittings factory matched with conduit types.
   1. Indoor/Outdoor Fittings: Compression.
   2. Outdoor Fittings: Compression fittings with gaskets on all transitions to flexible conduit.

2.4 METAL WIREWAYS

A. Available Manufacturers:
   1. Hoffman.
   2. Square D.

B. Material and Construction: Sheet metal sized and shaped as indicated, NEMA 1.

C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

D. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

E. Wireway Covers: Hinged type, or as indicated.

F. Finish: Manufacturer's standard enamel finish.

2.5 NONMETALLIC WIREWAYS

A. Available Manufacturers:
   1. Hoffman.
   2. Lamson & Sessions; Carlon Electrical Products.

B. Description: Fiberglass polyester, extruded and fabricated to size and shape indicated, with no holes or knockouts. Cover is gasketed with oil-resistant gasket material and fastened with captive screws treated for corrosion resistance. Connections are flanged, with stainless-steel screws and oil-resistant gaskets.

C. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

E. Select features, unless otherwise indicated, as required to complete wiring system and to comply with NFPA 70.

2.6 SURFACE RACEWAYS

A. Surface Metal Raceways: Galvanized steel with snap-on covers. Finish with manufacturer's standard prime coating.
   1. Available Manufacturers:
      a. Airey-Thompson Sentinel Lighting; Wiremold Company (The).
      b. Thomas & Betts Corporation.
      c. Walker Systems, Inc.; Wiremold Company (The).
      d. Wiremold Company (The); Electrical Sales Division.

B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC compound with matte texture and manufacturer's standard color.
   1. Available Manufacturers:
      a. Butler Manufacturing Co.; Walker Division.
      b. Enduro Composite Systems.
      c. Hubbell, Inc.; Wiring Device Division.
      d. Lamson & Sessions; Carlon Electrical Products.
      e. Panduit Corp.
      f. Walker Systems, Inc.; Wiremold Company (The).
      g. Wiremold Company (The); Electrical Sales Division.

C. Types, sizes, and channels as indicated and required for each application, with fittings that match and mate with raceways.

D. Provide raceway base, cover, base coupling, coupling covers, angle fittings, end caps at ends, and entrance end fittings. Provide divider wall throughout raceway. Provide device brackets and snap-on bezels at all devices shown on drawings. Provide blank covers at all non-used bezels.

E. Provide raceway full length, mounted as per drawings or 6" above counters if height is not indicated, as shown on drawings. Provide elbows and raceway to 6 inches above ceiling if risers are indicated on the drawings.

2.7 BOXES, ENCLOSURES, AND CABINETS

A. Available Manufacturers:
   1. Cooper Crouse-Hinds; Div. of Cooper Industries, Inc.
   2. Emerson/General Signal; Appleton Electric Company.
   3. Erickson Electrical Equipment Co.

4. Hoffman.
5. Hubbell, Inc.; Killark Electric Manufacturing Co.
6. O-Z/ Gedney; Unit of General Signal.
7. RACO; Division of Hubbell, Inc.
8. Stahlin
9. Scott Fetzer Co.; Adalet-PLM Division.
10. Spring City Electrical Manufacturing Co.
11. Thomas & Betts Corporation.
12. Walker Systems, Inc.; Wiremold Company (The).
13. Woodhead, Daniel Company; Woodhead Industries, Inc. Subsidiary.

B. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

C. Cast-Metal Outlet and Device Boxes: NEMA FB 1, Type FD, with gasketed cover.

D. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Cast-Metal Pull and Junction Boxes: NEMA FB 1, cast aluminum with gasketed cover.

G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous hinge cover and flush latch.
1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic, finished inside with radio-frequency-resistant paint.

H. Cabinets: NEMA 250, Type 1, galvanized steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel. Hinged door in front cover with flush latch and concealed hinge. Key latch to match panelboards. Include metal barriers to separate wiring of different systems and voltage and include accessory feet where required for freestanding equipment.

2.8 FACTORY FINISHES

A. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard prime-coat finish ready for field painting.

B. Finish: For raceway, enclosure, or cabinet components, provide manufacturer's standard paint applied to factory-assembled surface raceways, enclosures, and cabinets before shipping.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors:
1. Exposed: Rigid steel or IMC.
2. Concealed: Rigid steel or IMC.
3. Underground Secondary, Single Run: PVC Schedule 40 with long radius elbows.
4. Underground Secondary, Grouped: PVC Schedule 40 with long radius elbows.
5. Underground Primary: PVC Schedule 80 with long radius elbows.
6. Primary Risers: PVC Schedule 80. With long radius elbows.
7. Underground Data: PVC Schedule 40 with long radius elbows.
8. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFNC.
9. Boxes and Enclosures: NEMA 250, Type 3R.
10. Under Canopies: IMC with sealed fittings.
11. Penetrations though exterior walls: RMC or IMC

12. Embedded in Concrete: Only in Approved locations – wrapped RMC or IMC.
13. Coastal or Corrosive Locations or where specifically indicated on drawings: ETL PVC-001 PVC-GRS

B. Indoors:
1. Exposed in Mechanical/Electrical/Unfinished Spaces: EMT.
2. Exposed in Finished Spaces: Metal Surface Raceway painted/finished to match space finishes.
3. Concealed: EMT.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC; except use LFNC in damp or wet locations or with water equipment.
5. Damp or Wet Locations: Sealed EMT with sealed fittings.
6. Underfloor: Sealed EMT with sealed fittings or IMC.
7. Boxes and Enclosures: NEMA 250, Type 1, except as follows:
   a. Damp or Wet Locations: NEMA 250, Type 4, nonmetallic.

C. Minimum Raceway Size: 1/2-inch for single 20A or less circuits; otherwise, 3/4-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings approved for use with that material. Patch all nicks and scrapes in PVC coating using the manufacturer's PVC touch up compound after installing conduits.

E. Install nonferrous conduit or tubing for circuits operating above 60 Hz.

F. Aluminum conduit will not be accepted on this project.

3.2 INSTALLATION

A. Conduit Routing:
1. All branch circuit conduit shall be run overhead unless specifically directed by the engineer.
   a. Exceptions:
      1) Conduit to floor boxes.
      2) Conduit to locations otherwise inaccessible overhead (exposed or not).
      3) Conduit to exterior slab locations without overhead cover.
      4) Conduit to column mounted lighting, devices, or equipment inaccessible from above.
2. Panel feeder conduits may be run in the floor or underfloor ONLY IF indicated on the drawings or directed by the engineer.
3. Service secondary conduits may be run underfloor or in-ground.
4. Conduit for exterior equipment or lighting may be run underfloor or in-ground.
5. All conduit serving any equipment or devices (to include panels, transformers, and switchboards, or any other electrical distribution equipment) within the perimeter of the building shall be run within the perimeter of the building. Conduit shall not run across courtyards or underground from one section of the building to another section of the contiguous building.
   a. Exception: Service entrance conduit.
6. All conduit shall be run at right angles or parallel to the building lines to the limits that the structure will allow. Raceways shall not be run diagonal or curved.

B. Installation of the PVC Coated Conduit System shall be performed in accordance with the Manufacturer's Installation Manual. To assure correct installation, the installer shall be certified by Manufacturer to install coated conduit

C. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

D. Install raceways as high as possible and coordinate installation with other equipment.

E. Install raceways to equipment mounted on the floor away from walls from overhead down to the equipment or disconnects. Do not run across the floor creating a tripping hazard. Rack support conduit at the disconnect.

F. Provide clear access to all pull and j-boxes. Provide access doors over hard (non-lay-in ceilings) to all pull boxes. Minimum access required 1.5x (times) box cover size or 18 inches.

G. Label all j-box and pull box covers with circuits contained within box.

H. Under no circumstances shall power and data or any signal below 50V be shared in the same raceway, tray, channel, or sleeve.

I. Install raceways for power conductors (any conductor over 50V) 12 inches from any signal/communications conductor (data, fiber optics, telephone, fire alarm, PA, community antenna and radio distribution (CATV), low power or network powered broadband communications, systems controls, and any other system operating under 50V) not in conduit on J-hooks.

J. Install raceways for power conductors (any conductor over 50V) 12 inches from communications raceways. Communications raceways include; data, fiber optics, telephone, fire alarm, PA, community antenna and radio distribution (CATV), low power or network powered broadband communications, systems controls, and any other system operating under 50V.
   1. Exception: Data and power raceways shall be permitted to be 2 inches apart only at the wall drop to the devices. Above the ceiling or overhead the minimum 12 inch spacing shall be maintained.
   2. Exception: Listed dual channel power poles
   3. Exception: Within the surface raceways. When not within the surface raceway, the power and communications raceways shall be 12 inches apart.
   4. Underground: Data and power conduit/raceway shall be allowed in the same trench only if specifically allowed by the engineer and then there shall be a minimum of 12 inches of fill between the power and communications raceways. Magnetic marking tape shall be placed above the level of the highest (closest to grade) raceway.

K. Exterior Exposed Raceways:
   1. See application schedule for raceway types.
   2. Provide non-flexible raceways through roofs to disconnects, panels, or receptacles as per application schedule.
   3. Provide transitions from non-flexible raceways to flexible raceways within 3 feet of the equipment.
      a. Exception: Flexible raceways may exceed 3 feet only to accommodate the drip legs.
   4. Penetrate roofing membranes with approved methods only for the type of roof used. See roofing or architectural details.
   5. Provide chem-curbs on built-up roofs unless otherwise directed from roofing or architectural details.
   6. Support all exposed raceway on roofs with manufactured neoprene blocks with integral galvanized channel, conduit hangers as part of a manufactured assembly with galvanized channel (portable pipe hangers or equal), or approved method as per architectural.
   7. Exposed raceways on roofs shall not be unsupported in any areas nor attached directly to the roof.
   8. Provide roof hoods for multiple conduits through roofs as indicated.
   9. Provide drip legs for all exterior exposed raceways from disconnects to equipment.

L. Buried Raceways:
   1. See application schedule for raceway types.
   2. Label all buried conduits.
   3. Provide spacers between all buried conduits for a neat and uniform installation. Conduit shall not be “stacked” on top of each other without manufactured spacers.

4. IF telecommunications conduits and power conduits (only under 600V) are allowed in the same trench by owner or engineer, provide a minimum of 12 inches of compacted earth between the conduit racks. Provide magnetic marking tape between the communications conduits and the power conduits.
5. Under NO circumstances shall power conduits over 600V be in the same trench as the communications conduits.
6. All communications conduits shall have long radius elbows 10x the conduit diameter, but no less than 30", rising up into the building or communications equipment.
7. Provide concrete encasement for all primary building feeders unless directed by utility company.
8. Provide concrete encasement for all secondary building feeders unless otherwise noted.
9. Provide pull strings/tape (per size and distance) for all empty conduits.
10. Minimum depth of primary or medium voltage conduits 42 inches. (600V and above).
11. Minimum depth of secondary or low voltage conduits 30 inches. (0 to 600V).
12. All 90 degree changes in direction shall be long radius.
13. Provide metal backed marking tape at 12 inches below grade and 6 inches above all buried raceways.
14. Clean and swab out all conduits prior to installing conductors.
15. Any metallic conduit coming in contact with concrete, asphalt or earth, insulate with approved tape or asphalt paint.

M. All underfloor conduits shall be supported as per NEC.
1. See application schedule for conduit types.
2. All conduit supports shall be anchored to structure.
3. Provide support for multiple conduits with galvanized kindorf rack, conduit straps, all thread rod to angles, and mount angles to structure.
4. ONLY IF specifically directed by owner or engineer to use RNC underfloor;
   a. Provide support for conduit 2" and below every 48 inches.
   b. Provide support for 2-1/2" and above every 60 inches.

N. Complete raceway installation before starting conductor installation.

O. Support raceways as specified in Section "Basic Electrical Materials and Methods."

P. Install temporary closures to prevent foreign matter from entering raceways during construction. Remove prior to completion of conduit.

Q. Sleeves: Provide metallic raceway sleeves through walls or floors for all conductors/cabling not in raceways. Provide bushings at both ends of sleeves prior to installing any conductors or wiring. Firestop as per opening fire rating requirements.

R. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portions of bends are not visible above the finished slab.

S. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and keep straight legs of offsets parallel, unless otherwise indicated.

T. Firestop: Firestop all raceway penetrations in rated walls. Provide intumescent fill in all sleeve openings. Contractor shall be responsible for all wall repair and damage. Excessive firestop for holes too large (½ inch beyond the edge of the raceway) is unacceptable. Holes shall be repaired with suitable wall materials to maintain the integrity of the wall construction.

U. Cut openings in walls as per the outer edges of the raceway. Openings made with hammers or other wall damaging tools are not acceptable. Holes too large (½ inch beyond the edge of the raceway) are unacceptable and shall be repaired with suitable wall materials to maintain the integrity of the wall construction. Contractor shall be responsible for repair to match existing.

V. Provide manufactured elbows of conduit type specified for PVC raceways. Field constructed elbows are not allowed. Rigid Non-metallic tubing shall not have any field fabricated 90 degree bends. Provide manufactured elbows at all 90 degree changes in direction.

W. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
   1. Install concealed raceways with a minimum of bends in the shortest practical distance, considering type of building construction and obstructions, unless otherwise indicated.

X. Raceways Embedded in Slabs are allowed ONLY where specifically called out or ALLOWED by structural and electrical engineer: Install in middle one-third of slab thickness where practical and leave at least 2 inches of concrete cover on the top and bottom.
   1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
   2. Space raceways laterally to prevent voids in concrete.
   3. Run raceways parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.

Y. Expansion Joints: Provide flexible connections suitable for use with conduit type for all conduit in structural expansion joints or independent slabs that are within another structural assembly.

Z. Raceways Through Slabs to Interior Spaces: Install where practical and leave at least 2 inches from any walls unless required to come up in the wall. Coordinate with grade or perimeter beams prior to installation.
   1. Secure raceways to concrete with conduit clamps.
   2. Change from nonmetallic raceways to rigid steel conduit or IMC before rising above the floor.
      a. Exception: Raceways from below grade into transformers and switchgear enclosures shall be RNC with bushings.
      b. Exception: Raceways from below grade for telephone boards and data/signal equipment shall be RNC with bushings.
   3. Tape conduit from minimum 3 inches below transition to 3 inches above the floor so that no portion of the rigid steel conduit or IMC is in contact with the concrete.

AA. Raceways Through Floors: Install where practical and leave at least 2 inches from any walls. Coordinate with grade or perimeter beams prior to installation.
   1. Secure raceways to concrete with conduit clamps.
   2. Provide sleeve seals for conduit penetrations through floors. Provide firestopping at all floor penetrations.

BB. Install ALL exposed raceways parallel or at right angles to nearby surfaces or structural members and follow surface contours as much as possible.
   1. Run parallel or banked raceways together on common supports.
   2. Make parallel bends in parallel or banked runs. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
   3. Install conduit as high as possible.
   4. Flexible cable or raceway for general circuiting is allowed exposed in mechanical or electrical spaces only. Not allowed in finished spaces.
      a. Exception: As equipment connection only.

CC. Join raceways with fittings designed and approved for that purpose and make joints tight.
   1. Use insulating bushings to protect conductors.

DD. Tighten set screws of threadless fittings with suitable tools.

EE. Terminations:
   1. Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against box. Use two locknuts, one inside and one outside box.

2. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into hub so end bears against wire protection shoulder. Where chase nipples are used, align raceways so coupling is square to box; tighten chase nipple so no threads are exposed.

FF. Install pull tape/wires in empty raceways.
1. For raceways under 2 inches and under less than 100 feet, use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
2. Raceways under 2 inches and over 100 feet without intermediate pull boxes, provide mule tape. With intermediate pull boxes use pull wire.
3. For raceways over 2 inches and use mule tape.
4. Sleeves under 36 inches do not require pull tape/wire.

GG. Telephone and Signal System Raceways, 2-Inch Trade Size and Smaller: In addition to above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

HH. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with UL-listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Label boxes “seal-off”. Install raceway sealing fittings at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

II. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded plugs flush with floor for future equipment connections.

JJ. Flexible Connections: Use maximum of 72 inches of flexible conduit for recessed and semi-recessed lighting fixtures if not using MC Cable for lighting whips; for equipment subject to vibration, noise transmission, or movement, and for all motors indoors of non-water operating equipment. Use LFNC in damp or wet locations or to any water operating equipment. Install separate ground conductor across flexible connections.

KK. Prime and Paint exposed conduit in finished spaces, unless pre-painted surface raceways is provided, as per owner/architect. Provide with paintable surface.

LL. Surface Raceways: Install a separate, green, ground conductor in raceways from junction box supplying raceways to receptacle or fixture ground terminals.

MM. Wiring Device Box mounting:
1. Provide stud to stud box bracket support for all wiring devices (receptacles, switches, data/communications, thermostats, pull stations, pushbuttons, or other user interactive devices)
2. Trim box bracket adjustment rods to fit between studs with smaller than standard spacing width
3. Install so boxes shall be flush with walls and extension brackets are not required.
4. Screw brackets into studs with manufacturer approved hardware

NN. Floor Boxes:
1. Set floor boxes level. Grout around floor box to fill in area around box opening.
2. Trim after installation to fit flush with finished floor surface.
3. Ground floor box with circuit grounding conductor.
4. Coordinate covers with floor finishes. Provide covers with inserts for tile or carpet.
5. Floor boxes shall be flush with finish floor.

OO. Install hinged-cover enclosures and cabinets plumb. Support at each corner.

PP. Cap all un-used/spare conduits. Does not include sleeves.

QQ. Wireways or gutters above panelboards, switchboards, distribution boards, or any other circuit distributing panel shall not be wider than 1.5x (times) the width of the panel or panels if adjoining.

RR. Under no circumstances shall wireways, pull boxes, or gutters wrap the room and be used as a channel for circuits, unless specifically called out by the engineer or per manufacturers shop drawings.

3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
   1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
   2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.
   3. Provide cover over conduits during storage to prevent dirt and debris from entering conduits during storage.

3.4 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

B. Remove debris from conduits prior to capping any spare conduits.

C. Blow-out empty conduits that are future spares in any exterior or underground installation prior to capping.

3.5 RECORD

A. Record the location of all spare conduits buried for future use by the owner.

END OF SECTION 260533

SECTION 260553

ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes electrical identification materials and devices required to comply with ANSI C2, NFPA 70, OSHA standards, and authorities having jurisdiction.

1.3 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

B. Schedule of Nomenclature: An index of electrical equipment and system components used in identification signs and labels.

C. Samples: For each type of label and sign to illustrate color, lettering style, and graphic features of identification products.

1.4 QUALITY ASSURANCE

A. Comply with ANSI C2.

B. Comply with NFPA 70.

C. Comply with ANSI A13.1 and NFPA 70 for color-coding.

PART 2 - PRODUCTS

2.1 RACEWAYS AND CABLE LABELS

A. Comply with ANSI A13.1, Table 3, for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
   1. Color: Black letters on orange field.
   2. Legend: Indicates voltage and service.

B. Adhesive Labels: Preprinted, flexible, self-adhesive vinyl with legend over laminated with a clear, weather- and chemical-resistant coating.

C. Pretensioned, Wraparound Plastic Sleeves: Flexible, preprinted, color-coded, acrylic band sized to suit the diameter of the line it identifies and arranged to stay in place by pretensioned gripping action when placed in position.

D. Colored Adhesive Tape: Self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

E. Underground-Line Warning Tape: Permanent, bright-colored, continuous-printed, vinyl tape.
   1. Not less than 6 inches wide by 4 mils thick.

2. Compounded for permanent direct-burial service.
3. Embedded continuous metallic strip or core.
4. Printed legend indicating type of underground line.

F. Tape Markers: Vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.

G. Aluminum, Wraparound Marker Bands: Bands cut from 0.014-inch- thick aluminum sheet, with stamped or embossed legend, and fitted with slots or ears for permanently securing around wire or cable jacket or around groups of conductors.

H. Plasticized Card-Stock Tags: Vinyl cloth with preprinted and field-printed legends. Orange background, unless otherwise indicated, with eyelet for fastener.

I. Aluminum-Faced, Card-Stock Tags: Weather-resistant, 18-point minimum card stock faced on both sides with embossable aluminum sheet, 0.002 inch thick, laminated with moisture-resistant acrylic adhesive, punched for fasteners, and preprinted with legends to suit each application.

J. Brass or Aluminum Tags: 2×2×0.05-inch metal tags with stamped legend, punched for fastener.

2.2 NAMEPLATES AND SIGNS

A. Safety signs: Comply with 29 CFR, Chapter XVII, Part 1910.145.

B. Engraved Plastic Nameplates and Signs: Engraving stock, melamine plastic laminate, minimum 1/16 inch thick for signs up to 20 sq. in. and 1/8 inch thick for larger sizes.
1. Engraved legend with black letters on white face.
2. Punched or drilled for mechanical fasteners.

C. Baked-Enamel Signs for Interior Use: Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for the application. ¼-inch grommets in corners for mounting.

D. Exterior, Metal-Backed, Butyrate Signs: Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch galvanized-steel backing; and with colors, legend, and size required for the application. ¼-inch grommets in corners for mounting.

E. Fasteners for Nameplates and Signs: Self-tapping, stainless-steel screws or No. 10/32, stainless-steel machine screws with nuts and flat and lock washers.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Cable Ties: fungus-inert, self-extinguishing, one-piece, self-locking, Type 6/6 nylon cable ties.
1. Minimum Width: 3/16 inch.
2. Tensile Strength: 50 lb minimum.
3. Temperature Range: Minus 40 to plus 185 deg F.
4. Color: According to color-coding.

B. Paint: Formulated for the type of surface and intended use.
1. Primer for Galvanized Metal: Single-component acrylic vehicle formulated for galvanized surfaces.
2. Primer for Concrete Masonry Units: Heavy-duty-resin block filler.
3. Primer for Concrete: Clear, alkali-resistant, binder-type sealer.
4. Enamel: Silicone-alkyd or alkyd urethane as recommended by primer manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Identification Materials and Devices: Install at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Lettering, Colors, and Graphics: Coordinate names, abbreviations, colors, and other designations with corresponding designations in the Contract Documents or with those required by codes and standards. Use consistent designations throughout Project.

C. Sequence of Work: If identification is applied to surfaces that require finish, install identification after completing finish work.

D. Self-Adhesive Identification Products: Clean surfaces before applying.

E. Install painted identification according to manufacturer's written instructions and as follows:
1. Clean surfaces of dust, loose material, and oily films before painting.
2. Prime surfaces using type of primer specified for surface.
3. Apply one intermediate and one finish coat of enamel.

F. Color Banding Raceways and Exposed Cables: Band exposed and accessible raceways of the systems listed below:
1. Bands: Pretensioned, wraparound plastic sleeves; colored adhesive tape; or a combination of both. Make each color band 2 inches wide, completely encircling conduit, and place adjacent bands of two-color markings in contact, side by side.
2. Band Locations: At changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
3. Apply the following colors to the systems listed below:
    a. Fire Alarm System: Red.
    b. Fire-Suppression Supervisory and Control System: Red and yellow.
    c. Combined Fire Alarm and Security System: Red and blue.
    d. Security System: Blue and yellow.
    e. Mechanical and Electrical Supervisory System: Green and blue.
    f. Telecommunication System: Green and yellow.

G. Caution Labels for Indoor Boxes and Enclosures for Power and Lighting: Install pressure-sensitive, self-adhesive labels identifying system voltage with black letters on orange background. Install on exterior of door or cover.

H. Circuit Identification Labels on Boxes: Install labels externally.
1. Exposed Boxes: Pressure-sensitive, self-adhesive plastic label on cover.
2. Concealed Boxes: Plasticized card-stock tags.
3. Labeling Legend: Permanent, waterproof listing of panel and circuit number or equivalent.
4. Normal Power Circuits: Black lettering and numbers
5. Emergency Power Circuits: Red lettering and numbers

I. Paths of Underground Electrical Lines: During trench backfilling, for exterior underground power, control, signal, and communication lines, install continuous underground plastic line marker located directly above line at 6 to 8 inches below finished grade. Where width of multiple lines installed in a common trench or concrete envelope does not exceed 16 inches overall, use a single line marker. Install line marker for underground wiring, both direct-buried cables and cables in raceway.

J. Color-Coding of Secondary Branch Circuit Conductors: Use the following colors for service, feeder, and branch-circuit branch circuit conductors:
1. 120/208V 3 Phase Conductors:
    a. Phase A: Black.
    b. Phase B: Red.
    c. Phase C: Blue.
    d. Neutral: White.

e. Ground: Green.

2. 120/240V 3 Phase Conductors:
   a. Phase A: Black.
   b. Phase B: Orange (High Leg Only).
   c. Phase C: Blue.
   d. Neutral: White.
   e. Ground: Green.
3. 120/240V Single Phase Conductors:
   a. Phase A: Black.
   b. Phase B: Red or Blue.
   c. Neutral: White.
   d. Ground: Green.
4. 277/480V 3 Phase Conductors:
   a. Phase A: Purple.
   b. Phase B: Brown.
   c. Phase C: Yellow.
   d. Neutral: Gray.
   e. Ground: Green.
5. Factory apply color the entire length of conductors, except the following field-applied, color-coding methods may be used instead of factory-coded wire for sizes larger than No. 10 AWG:
   a. Colored, pressure-sensitive plastic tape in half-lapped turns for a distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Use 1-inch-wide tape in colors specified. Adjust tape bands to avoid obscuring cable identification markings.
   b. Colored cable ties applied in groups of three ties of specified color to each wire at each terminal or splice point starting 3 inches from the terminal and spaced 3 inches apart. Apply with a special tool or pliers, tighten to a snug fit, and cut off excess length.

K. Power-Circuit Identification: Metal tags or aluminum, wraparound marker bands for cables, feeders, and power circuits in vaults, pull and junction boxes, manholes, and switchboard rooms.
1. Legend: ¼-inch- steel letter and number stamping or embossing with legend corresponding to indicated circuit designations.
2. Tag Fasteners: Nylon cable ties.
3. Band Fasteners: Integral ears.

L. Apply identification to conductors as follows:
1. Conductors to Be Extended in the Future: Indicate source and circuit numbers.
2. Multiple Power or Lighting Circuits in the Same Enclosure: Identify each conductor with source, voltage, circuit number, and phase. Use color-coding to identify circuits' voltage and phase.
3. Multiple Control and Communication Circuits in the Same Enclosure: Identify each conductor by its system and circuit designation. Use a consistent system of tags, color-coding, or cable marking tape.

M. Apply warning, caution, and instruction signs as follows:
1. Warnings, Cautions, and Instructions: Install to ensure safe operation and maintenance of electrical systems and of items to which they connect. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
2. Emergency Operation: Install engraved laminated signs with white legend on red background with minimum 3/8-inch- high lettering for emergency instructions on power transfer, load shedding, and other emergency operations.

N. Equipment Identification Labels: Engraved plastic laminate. Install on each unit of equipment, including central or master unit of each system. This includes power, lighting, communication, signal, and alarm systems, unless units are specified with their own self-explanatory identification. Unless otherwise indicated, provide a single line of text with ½-inch- high lettering on 1½-inch-high label;

where two lines of text are required, use labels 2 inches high. Use white lettering on black field. Apply labels for each unit of the following categories of equipment using mechanical fasteners:

1. Panelboards, electrical cabinets, and enclosures.
2. Access doors and panels for concealed electrical items.
3. Electrical switchgear and switchboards.
4. Electrical substations.
5. Emergency system boxes and enclosures.
6. Motor-control centers.
7. Disconnect switches.
8. Enclosed circuit breakers.
9. Motor starters.
10. Push-button stations.
11. Power transfer equipment.
12. Contactors.
13. Remote-controlled switches.
14. Dimmers.
15. Control devices.
16. Transformers.
17. Inverters.
18. Rectifiers.
19. Frequency converters.
20. Battery racks.
21. Power-generating units.
22. Telephone switching equipment.
23. Clock/program master equipment.
24. Call system master station.
25. TV/audio-monitoring master station.
26. Fire alarm master station or control panel.
27. Security-monitoring master station or control panel.

END OF SECTION 260553

SECTION 260800

ELECTRICAL SYSTEMS COMMISSIONING

PART 1 – GENERAL

1.1 DESCRIPTION

A. The purpose of this section is to specify Division 26 responsibilities in the commissioning process which are being directed by the CxA. Other electrical systems testing may be required by other specification sections and under the direction of the CM.

B. The list of commissioned equipment and systems is found in Section 019100.1.3.C.

C. Commissioning requires the participation of Division 26 to ensure that all systems are operating in a manner consistent with the Contract Documents. The general commissioning requirements and coordination are detailed in Section 019100. Division 26 shall be familiar with all parts of Section 019100 and shall execute all commissioning responsibilities assigned to them in the Contract Documents.

D. Related Sections
1. Section “Submittal Procedures”
2. Section “Project Closeout”
3. Section “Warranties and Guarantees”
4. Section “Interior Lighting”
5. Section “Exterior Lighting”

1.2 RESPONSIBILITIES

A. Electrical Contractors. The commissioning responsibilities applicable to the electrical contractor are as follows (all references apply to commissioned equipment only):

Construction and Acceptance Phases
1. Include the commissioning cost of the electrical contractor in the contract price.
2. In each purchase order or subcontract written, include requirements for submittal data, O&M data, and training.
3. Attend a commissioning scoping meeting and other necessary meetings scheduled by the CxA to facilitate the Cx process.
4. Contractors shall provide normal cut sheets and shop drawing submittals to the CxA of commissioned equipment.
5. Provide additional requested documentation, prior to normal O&M manual submittals, to the CxA for development of start-up and functional testing procedures.
    a. Typically, this will include detailed manufacturer installation and start-up, operating, troubleshooting and maintenance procedures and full warranty information, including all responsibilities of the Owner to keep the warranty in force clearly identified. In addition, the installation and checkout materials that are actually shipped inside the equipments and the actual field checkout sheet forms to be used by the factory or field technicians shall be submitted to the CxA.
    b. The Commissioning Agent may request further documentation necessary for the commissioning process.
    c. This data request may be made prior to normal submittals.
6. Provide a copy of the O&M manuals submittals of commissioned equipment, through normal channels, to the CxA for review and approval.
7. Provide limited assistance to the CxA in preparing a full start-up and initial checkout plan using manufacturer’s start-up procedures. Submit manufacturer’s detailed start-up procedures and

the full start-up plan and procedures and other requested equipment documentation to CxA for review. Refer to Section 019100 for further details on start-up plan preparation.

8. Perform all completed start-up and system operational checkout procedures in the presence of the CxA.
9. Address current A/E punch list items before functional testing.
10. Provide skilled technicians to execute starting of equipment and to execute the functional performance tests. Ensure that they are available and present during the agreed upon schedules and for sufficient duration to complete the necessary tests, adjustments, and problem-solving.
11. Perform functional performance testing under the direction of the CxA for specified equipment in Section 019100. Assist the CxA in interpreting the monitoring data, as necessary.
12. Correct deficiencies (difference between specified and observed performance) as interpreted by the CxA, CM and A/E and retest the equipment.
13. Prepare O&M manuals according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.
14. During construction, maintain as-built red-line drawings for all drawings and final CxAD as-builts for contractor-generated coordination drawings. Update after completion of commissioning (excluding deferred testing). Prepare red-line as-built drawings for all drawings and final as-builts for contractor-generated coordination drawings.
15. Provide training of the Owner's operating personnel as specified.
16. Coordinate with equipment manufacturers to determine specific requirements to maintain the validity of the warranty.

Warranty Period

1. Correct deficiencies and make necessary adjustments to O&M manual and as-built drawings for applicable issues identified in any seasonal testing.

1.3 RELATED WORK

A. Refer to Section 019100, Part 1.1 for a listing of all sections where commissioning requirements are found.

B. Refer to Section 019100 Part 1.3 C for systems to be commissioned.

PART 2 – PRODUCTS

2.1 TEST EQUIPMENT

A. Division 26 shall provide all test equipment necessary to fulfill the testing requirements of this Division.

PART 3 – EXECUTION

3.1 SUBMITTALS

A. Division 26 shall provide submittal documentation relative to commissioning as required in this Section Part 1 and Section 019100.

3.2 STARTUP

A. The electrical contractors shall follow the start-up and initial checkout procedures listed in the Responsibilities list in this section and in 019100. Division 26 has start-up responsibility and is required to complete systems and sub-systems so they are fully functional, meeting the design

objectives of the Contract Documents. The commissioning procedures and functional testing do not relieve or lessen this responsibility or shift that responsibility partially to the commissioning agent or Owner.

B. Functional testing is intended to begin after completion of the Field Installation Verifications and Operational Performance Tests. Functional testing shall not proceed prior to the completion of systems or sub-systems.

3.3 FUNCTIONAL PERFORMANCE TESTS

A. Refer to Section 019100 Part 1.3 for a list of systems to be commissioned and to Part 1.5 for a description of the process.

3.4 TESTING DOCUMENTATION, NON-CONFORMANCE AND APPROVALS

A. Refer to Section 019100 Part 3.7 for specific details on non-conformance issues relating to pre-functional checklists and tests.

3.5 OPERATIONS AND MAINTENANCE (O&M) MANUALS

A. Division 26 shall compile and prepare documentation for all equipment and systems covered in Division 26 and deliver to the GC for inclusion in the O&M manuals, according to this section and Division 1 Section “O&M Documentation,” prior to the training of owner personnel.

B. The CxA shall receive a copy of the O&M manuals for review.

C. Review and Approvals. Review of the commissioning related sections of the O&M manuals shall be made by the A/E and by the CxA. Refer to Division 1 Section “O&M Documentation” for details.

3.6 TRAINING OF OWNER PERSONNEL

A. The GC shall be responsible for training coordination and scheduling and ultimately to ensure that training is completed. Refer to Section 019100 for additional details.

B. The CxA shall be responsible for overseeing and approving the content and adequacy of the training of Owner personnel for commissioned equipment. Refer to Section 019100 for additional details.

C. Electrical Contractor. The electrical contractor shall have the following training responsibilities:
   1. Provide the CxA with a training plan two weeks before the planned training according to the outline described in Section 019100, Part 3.9.
   2. Provide designated Owner personnel with comprehensive training in the understanding of the systems and the operation and maintenance of each major piece of commissioned electrical equipment or system.
   3. Training shall start with classroom sessions, if necessary, followed by hands on training on each piece of equipment, which shall illustrate the various modes of operation, including start-up, shutdown, fire/smoke alarm, power failure, etc.
   4. During any demonstration, should the system fail to perform in accordance with the requirements of the O&M manual or sequence of operations, the system will be repaired or adjusted as necessary and the demonstration repeated.
   5. The appropriate trade or manufacturer’s representative shall provide the instructions on each major piece of equipment.
   6. The training sessions shall follow the outline in the Table of Contents of the operation and maintenance manual and illustrate whenever possible the use of the O&M manuals for reference.
   7. Hands-on training shall include start-up, operation in all modes possible, including manual, shut-down and any emergency procedures and maintenance of all pieces of equipment.

8. The electrical contractor shall fully explain and demonstrate the operation, function and overrides of any local packaged controls, not controlled by the central control system.
9. Training shall occur after functional testing is complete, unless approved otherwise by the Project Manager.

3.7 DEFERRED TESTING

A. Refer to Section 019100, Part 3.6 for requirements of deferred testing.

3.8 WRITTEN WORK PRODUCTS

A. Written work products of Contractors will consist of the startup and initial checkout plan described in Section 019100.

END OF SECTION 260800

SECTION 261310

PULL AND JUNCTION BOXES

PART 1 - GENERAL

1.1 DESCRIPTION

A. Work covered by this Section includes furnishing of and paying for all materials, labor, services, equipment, licenses, taxes, other items, and appliances necessary for the execution, installation and completion of all work specified herein and/or shown on the drawings.

B. Pull and junction boxes of appropriate size and depth as indicated on the drawings and as specified hereinafter.

1.2 SUBMITTALS

A. Submittals for products furnished under this section are not required.

PART 2 - PRODUCTS

2.1 MATERIALS

A. For interior work, provide galvanized sheet metal boxes of code thickness with lapped and welded joints, ¾-inch flanges, screw covers, etc.

B. For exterior work, provide galvanized sheet metal boxes of code thickness with lapped and welded joints, ¾-inch flanges, bolted covers with full gaskets forming a completely raintight assembly for above ground installations. Provide concrete boxes with screw fittings and drains for in ground pull boxes. Boxes shall be sized as per NEC or as indicated on the drawings.

C. See drawings for pull boxes requiring racks.

D. Boxes with concentric knockouts are not acceptable.

E. Provide ground terminal strip and ground pull box and circuits.

F. As shown on Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide junction boxes as shown on drawings and otherwise where required, sized according to number of conductors in box or type of service to be provided. Minimum junction box size 4 inches square and 2⅛ inches deep. Provide screw covers for junction boxes.

B. Use minimum 16-gauge steel for pull boxes and provide with screw cover.

C. Install boxes in conduit runs wherever necessary to avoid too long runs or too many bends. Do not exceed 100-foot runs without pull boxes.

D. Rigidly secure boxes to walls or ceilings. Conduit runs will not be considered adequate support.

E. Install boxes with covers in accessible locations.

F. Pull boxes, wireways or gutters above panelboards, switchboards, distribution boards, or any other circuit distributing panel shall not be wider than 1.5x (times) the width of the panel or panels if adjoining.

G. Under no circumstances shall wireways, pull boxes, or gutters wrap the room and be used as a channel for circuits, unless specifically called out by the engineer or per manufacturers shop drawings.

H. Observe maximum conductor fill as required by the National Electrical Code.

END OF SECTION 261310

SECTION 261320

FLOOR BOXES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. Related Sections include the following:
   1. Division 7 Section “Firestopping” for firestopping materials and installation at penetrations through walls, ceilings, and other fire-rated elements.
   2. Section “Basic Electrical Materials and Methods” for supports, anchors, and identification products.
   3. Section “Wiring Devices” for devices installed in boxes and for floor-box service fittings.

1.3 DEFINITIONS

A. EMT: Electrical metallic tubing.

B. ENT: Electrical nonmetallic tubing.

C. FMC: Flexible metal conduit.

D. IMC: Intermediate metal conduit.

E. LFMC: Liquidtight flexible metal conduit.

F. LFNC: Liquidtight flexible nonmetallic conduit.

G. RNC: Rigid nonmetallic conduit.

1.4 SUBMITTALS

A. Product Data: For floor boxes and covers.

B. Shop Drawings: Show fabrication and installation details of components for raceways, fittings, boxes, and covers.

1.5 QUALITY ASSURANCE

A. Floor boxes, covers, above the floor fittings, and accessories shall be of the same manufacturer and be designed, manufactured, tested, and installed to comply with UL514 and NEC/NFPA 370-17(b), covers are suitable for tile and carpeted floors (UL 514A-scrub water test).

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NFPA 70.

D. All floor boxes shall be of the same size and type as indicated on the drawings or specified herein. All floor box locations shall be coordinated with the architect/engineer.

1.6 COORDINATION

A. Coordinate layout and installation of raceways, boxes, enclosures, cabinets, and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 DESCRIPTION

A. Floor boxes shall be recessed metallic multi-function floor boxes suitable for installation in concrete above grade. Boxes shall allow for the activation of power, data, and communication in a single box. All connections shall be made below the floor, recessed inside the box. When the box is in use only the cords shall be visible.

2.2 MANUFACTURERS

A. Subject to compliance with the requirements equipment shall come from the following manufacturers:
   1. Hubbell, Inc.; Killark Electric Manufacturing Co.
   2. Walker Systems, Inc.; Wiremold Company (The).
   3. Hoffman
   4. Additional manufacturers need to submit to the design engineer 10 working days prior to bid for approval. Submittal shall include a comparison of the specified box and the submitted box with cutsheets. Approval shall be in writing from the engineer. No response is not an acceptable response.

2.3 RECESSED METAL BOXES

A. Material: Stamped steel with galvanized finish.

B. Size: Box depth shall not exceed 3½ inches and 13 inches square.

C. Adjustments: The box shall have vertical and angular adjustments of 1¼ inches before and ½ ⅝ inches after the pour.

D. Connections: Circuit connections shall be made through six (6) ¾-inch and six (6) 1¼-inch combination style concentric knockouts. Box shall have six (6) individual wiring chambers with barriers between power and low voltage conductors. Barriers shall have chamber plugs for future wiring changes.

E. Grounding: Provide six (6) #12 green grounding lead wires.

F. Box shall be Hubbell type LCFBSS or approved equal.

2.4 COVERS

A. Material: Covers/flange assemblies shall be reinforced with metal cover plate and mounted to the box. Cover shall be made of high impact reinforced nylon. Flanges and cable doors shall be made of thermoplastic. Covers shall be brown.

B. Operation: Cover shall be hinged to allow access to the connections inside the box. When the box is in use, cables shall exit through two cable doors located on opposite ends of the cover. When box is not in use cover shall lay flush with the floor. Cover shall be 180 degrees reversible and accept a carpet insert.

C. Cover shall be Hubbell LCFBCBR or approved equal.

2.5 ACCESSORIES

A. Provide ivory service plates for each chamber used. Provide appropriate service plate for chamber use (receptacle, twist lock, data, style-line). Provide metal blank plates for chambers not being used.

PART 3 - EXECUTION

3.1 BOX INSTALLATION

A. Install boxes in accordance with manufacturers written instructions.

B. Locate boxes to prevent moisture from entering or accumulating within them.

C. Support outlet boxes independently of conduit, as required by the National Electrical Code.

D. Provide boxes as shown on Drawings.

E. Effectively close unused openings in boxes with metal plugs or plates.

F. Set boxes so that front edges of plaster rings are flush with finished surfaces.

G. Secure boxes to surfaces upon which they are mounted or embed boxes in concrete masonry. Support boxes from structural members with approved braces.

H. Install blank device plates on outlet boxes left for future use.

I. Provide bushings in holes through which cords or conductors pass.

J. Install boxes so that the covers will be accessible at all times.

K. Observe maximum conductor fill as required by the National Electrical Code.

3.2 CONDUIT

A. Provide a minimum of two (2) 1-inch conduits to each floor box for circuits and low voltage. Coordinate location of stub up with walls. See Section “Raceways and Boxes” for stub up requirements.

3.3 PROTECTION

A. Provide final protection and maintain conditions that ensure coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion.
   1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
   2. Repair damage to PVC or paint finishes with matching touch-up coating recommended by manufacturer.

3.4 CLEANING

A. After completing installation of exposed, factory-finished raceways and boxes, inspect exposed finishes and repair damaged finishes.

END OF SECTION 261320

SECTION 262416

PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes load centers and panel boards, overcurrent protective devices, and associated auxiliary equipment rated 600 V and less for the following types:
   1. Lighting and appliance branch-circuit panel boards.
   2. Distribution panel boards.
   3. Transient voltage surge suppressor panel boards.

B. Related Sections include Section “Fuses.”

1.3 DEFINITIONS

A. EMI: Electromagnetic interference.

B. GFCI: Ground-fault circuit interrupter (GFI).

C. RFI: Radio-frequency interference.

D. RMS: Root mean square.

E. SPDT: Single pole, double throw.

F. TVSS: Transient voltage surge suppressor.

1.4 SUBMITTALS

A. Product Data: For each type of panel board, overcurrent protective device, TVSS device, accessory, and component indicated. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Specification Compliance Review:
   1. Manufacturers and bidders must provide the consulting engineer with a Compliance Review of the Specifications and Addenda’s. The Compliance Review shall be a paragraph-by-paragraph review of the Specifications and schedule with the following information; “C”, “D”, or “E” marked in the margin of the original Specifications and any subsequent Addenda’s. If the manufacturer or bidder does not provide the Compliance Review to the engineer for review, with the submittal, the submittal will be subject to rejection as non-compliant.
      a. “C” Comply with no exceptions.
      b. “D” Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the Specification can be satisfied.
      c. “E” Exception do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives. Non-compliance with the specifications is grounds for rejection as unacceptable. A bid from any alternative or listed equipment

manufacturer with any number of exceptions will be reason for rejection for non-compliance without further review.

d. Unless a deviation or exception is specifically noted in the Compliance Review, the manufacturer shall provide full compliance with entire specification. Deviations or exceptions taken in letters or cover letters in a bid document, subsidiary documents, by omission or by contradiction do not release the manufacturer or bidder from being in complete compliance, unless the exception or deviation has been specifically noted in the Compliance Review and approved by the consulting engineer.

e. Equipment manufacturers or bidders that do not meet the specifications thru the above process will be subject to rejection without further review.

C. Shop Drawings: For each panelboard and related equipment.

1. Dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings. Include the following:
   a. Enclosure types and details for types other than NEMA 250, Type 1.
   b. Bus configuration, current, and voltage ratings.
   c. Short-circuit current rating of panelboards and overcurrent protective devices.
   d. UL listing for series rating of installed devices.
   e. Features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
2. Wiring Diagrams: Diagram power, signal, and control wiring and differentiate between manufacturer-installed and field-installed wiring.

D. Field Tests Reports: Submit written test reports and include the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Results of failed tests and corrective action taken to achieve test results that comply with requirements.

E. Panel board Schedules: For installation in panel boards. Submit final versions after load balancing.

F. Maintenance Data: For panel boards and components to include in maintenance manuals specified in Division 1. In addition to requirements specified in Division 1 Section “Closeout Procedures,” include the following:

1. Manufacturer’s written instructions for testing and adjusting overcurrent protective devices.
2. Time-current curves, including selectable ranges for each type of overcurrent protective device.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Testing agency that is a member company of the International Electrical Testing Association and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the International Electrical Testing Association or National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

C. Comply with NEMA PB 1.

D. Comply with NFPA 70.

1.6 COORDINATION

A. Coordinate layout and installation of panel boards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, and encumbrances to workspace clearance requirements.

1.7 EXTRA MATERIALS

A. Keys: Six (6) spares of each type of panel board cabinet lock.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, the following:
   1. Panel boards, Overcurrent Protective Devices, Controllers, Contactors, and Accessories:
      a. Siemens
      b. Square D Co.
      c. Eaton
   2. Electronic Grade Panel boards:
      a. Liebert Corporation.
      b. Square D Co.
      c. Eaton
      d. Siemens

2.2 FABRICATION AND FEATURES

A. Enclosures: Flush- and surface-mounted cabinets as indicated on drawings. NEMA PB 1, Type 1, to meet environmental conditions at installed location.
   1. Outdoor Locations: NEMA 250, Type 3R.
   2. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
   3. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.

B. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.

C. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.

D. Finish: Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

E. Directory Card: With transparent protective cover, mounted inside metal frame, inside panelboard door.

F. Bus: Hard-drawn copper, 98 percent conductivity. Aluminum is **NOT** acceptable.

G. Main and Neutral Lugs:
   1. Compression type suitable for use with conductor material on MLO panels.
   2. Mechanical type suitable for use with conductor material on MCB panels.

H. Equipment Ground Bus: Copper, Adequate for feeder and branch-circuit equipment ground conductors; bonded to box.

I. Service Equipment Label: UL labeled for use as service equipment for panel boards with main service disconnect switches.

J. Future Devices: Mounting brackets, bus connections, and necessary appurtenances required for future installation of devices.

K. Isolated Equipment Ground Bus: Adequate for branch-circuit equipment ground conductors; insulated from box, where indicated on drawings.

L. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and UL listed as suitable for nonlinear loads, where indicated on drawings.

M. Split Bus: Vertical buses divided into individual vertical sections.

N. Skirt for Surface-Mounted Panel boards: Same gage and finish as panel board front with flanges for attachment to panel board, wall, and ceiling or floor.

O. Gutter Barrier: Arrange to isolate individual panel sections.

P. Feed-through Lugs: Compression type suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.

Q. Provide power meters (peak KW, phase amperage, and kWh) with digital displays in the panels where indicated on the drawings. Provide single enclosure large enough for all panel components. Remote mounted meters are not acceptable. Mount meters in the upper portion of the enclosure. Provide correct trim kit for panel and meter. Meter shall have:
1. Phase Amperage
2. Peak Phase Amperage or KW
3. KWh
4. Phase Voltage
5. Data Output connection to building management system for monitoring
6. Digital Display

2.3 PANEL BOARD SHORT-CIRCUIT RATING

A. UL label indicating series-connected rating with integral or remote upstream devices. Include size and type of upstream device allowable, branch devices allowable, and UL series-connected short-circuit rating.

B. Fully rated to interrupt symmetrical short-circuit current available at terminals.

C. See panel schedules for minimum rating.

2.4 LOAD CENTERS

A. Overcurrent Protective Devices: Plug-in, full-module circuit breaker.

B. Conductor Connectors: Mechanical type for main, neutral, and ground lugs and buses.

2.5 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANEL BOARDS

A. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

B. Doors: Front mounted with concealed hinges; secured with flush latch with tumbler lock; keyed alike.

2.6 DISTRIBUTION PANEL BOARDS

A. Doors: Front mounted, except omit in fused-switch panelboards; secured with vault-type latch with tumbler lock; keyed alike. Square D I-Line or approved equal.

B. Main Overcurrent Protective Devices: Thermal magnetic circuit breaker.

C. Branch Overcurrent protective devices shall be one of the following:
   1. For Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
   2. For Circuit-Breaker Frame Sizes Larger Than 125 A: Bolt-on circuit breakers; plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.7 ELECTRONIC GRADE PANEL BOARDS

A. Doors: Front mounted; secured with vault-type latch with tumbler lock; keyed alike. Manufacturer's standard enamel finish over corrosion-resistant treatment or primer coat.

B. Main Overcurrent Devices: Thermal-magnetic circuit breaker.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers.

D. Bus: Copper phase and neutral buses; 200 percent capacity neutral bus.

E. TVSS Device: IEEE C62.41, integrally mounted, plug-in-style, solid-state, parallel-connected, sine-wave tracking suppression and filtering modules.
   1. Minimum single-impulse current rating shall be as follows:
      a. Line to Neutral: 100,000 A.
      b. Line to Ground: 100,000 A.
      c. Neutral to Ground: 50,000 A.
   2. Protection modes shall be as follows:
      a. Line to neutral.
      b. Line to ground.
      c. Neutral to ground.
   3. EMI/RFI Noise Attenuation Using 50-ohm Insertion Loss Test: 55 dB at 100 kHz.
   4. Category C combination wave clamping voltage shall not exceed 600 V, line to neutral and line to ground on 120/208 V systems or 1000 V, line to neutral and line to ground on 277/480 V systems.
   5. UL 1449 clamping levels shall not exceed 400 V, line to neutral and line to ground on 120/208 V systems or 800 V, line to neutral and line to ground on 277/480 V systems.
   6. Withstand Capabilities: 3000 Category C surges with less than 5 percent change in clamping voltage.
   7. Accessories shall include the following:
      a. Form-C contacts, one normally open and one normally closed, for remote monitoring of system operation. Contacts to reverse position on failure of any surge diversion module.
      b. Audible contacts, one normally open and one normally closed, for remote monitoring of system operation. Contacts to reverse position on failure of any surge diversion module.
      c. Six-digit transient-counter set to total transient surges that deviate from the sine-wave envelope by more than 125 V.

2.8 OVERCURRENT PROTECTIVE DEVICES

A. Molded-Case Circuit Breaker: NEMA AB 1, with interrupting capacity to meet available fault currents. Breakers shall be fully rated for panel AIC rating.
   1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
   2. GFCI Circuit Breakers: Single- and two-pole configurations with 30-mA trip sensitivity.

B. Molded-Case Circuit-Breaker Features and Accessories. Standard frame sizes, trip ratings, and number of poles.
   1. Lugs: Compression style, suitable for number, size, trip ratings, and material of conductors.
   2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HACR for heating, air-conditioning, and refrigerating equipment.
   3. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
   4. Communication Capability: Circuit-breaker-mounted communication module with functions and features compatible with power monitoring and control system.
   5. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 75 percent of rated voltage.
   6. Undervoltage Trip: Set to operate at 35 to 75 percent of rated voltage without intentional time delay.
   7. Auxiliary Switch: Two SPDT switches with “a” and “b” contacts; “a” contacts mimic circuit-breaker contacts, “b” contacts operate in reverse of circuit-breaker contacts.
   8. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
   9. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function.

C. Fused Switch: NEMA KS 1, Type HD; clips to accommodate specified fuses; lockable handle.

2.9 CONTROLLERS

A. Motor Controllers: NEMA ICS 2, Class A combination controller equipped for panelboard mounting and including the following accessories:
   1. Individual control-power transformers.
   2. Fuses for control-power transformers.
   3. Bimetallic-element overload relay.
   4. Melting-alloy overload relay.
   5. Indicating lights.
   6. Seal-in contact.
   7. Two convertible auxiliary contacts.
   8. Push buttons.
   9. Selector switches.

B. Contactors: NEMA ICS 2, Class A combination controller equipped for panelboard mounting and including the following accessories:
   1. Individual control-power transformers.
   2. Fuses for control-power transformers.
   3. Indicating lights.
   4. Seal-in contact.
   5. Two convertible auxiliary contacts.
   6. Push buttons.
   7. Selector switches.

C. Controller Disconnect Switches: Fused switch mounted adjacent to and interlocked with controller.
   1. Auxiliary Contacts: Integral with disconnect switches to de-energize external control-power source.

D. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held general-purpose controller.
   1. Control-Power Source: Control-power transformer, with fused primary and secondary terminals, connected to main bus ahead of contactor connection.

2.10 ACCESSORY COMPONENTS AND FEATURES

A. Accessory Set: Tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.

B. Portable Test Set: To test functions of solid-state trip devices without removal from panel board.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panel boards and accessories according to NEMA PB 1.1 and the NEC.

B. Provide minimum clearance in front of panelboards: 36 inches clearance in front of 120/208V and 42 inches in front of 277/480V panel boards.

C. Space panels 4 inches apart and provide spacing for future panels.

D. Locate Surge suppression above and adjacent to panelboard serving. Provide additional spacing between panelboards. Surge suppression to be no greater than 7 feet above finished floor.

E. Locate contactors adjacent to panelboards and provide additional spacing. Small contactor enclosures can be above and to the right or left of the panelboard. Contactor mounting height to be no greater than 7 feet above finished floor.

F. Coordinate with other equipment in the room.

G. Coordinate location of panelboards with transformers and conduit feeders.

H. Mounting Heights: Top of trim 74 inches above finished floor, unless otherwise indicated. Mount with at least 6 inches of clearance below panel board.

I. Mounting: Plumb and rigid without distortion of box. Mount recessed panel boards with fronts uniformly flush with wall finish.

J. Circuit Directory: Create a directory to indicate installed circuit loads after balancing panel board loads. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable. Use manufacturers supplied card and permanent slot location.

K. Install filler plates in unused spaces.

L. Provision for Future Circuits at Flush Panel boards: Stub four 1-inch empty conduits from panel board into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.

M. Provision for Future Circuits at Recessed panel boards: Stub four ¾” inch empty conduits from panel board into accessible ceiling space or space designated to be ceiling space in the future. Stub four ¾” inch empty conduits into raised floor space or below slab not on grade.

N. Wiring in Panel board Gutters: Arrange conductors into groups and bundle and wrap with wire ties after completing load balancing.

O. Where panelboard meters are indicated, provide power to the meter from the panel being served. Provide CT’s in the panel enclosure. Connect CT’s to the meter and verify operation of demand and voltage.

P. Wireways or gutters above panelboards, distribution boards, or any other circuit distributing panel shall not be wider than 1.5x (times) the width of the panel or panels if adjoining. Under no circumstances shall wireways, pull boxes, or gutters wrap the room and be used as a channel for circuits, unless specifically called out by the engineer or per manufacturers shop drawings.

Q. Where exterior panels are mounted on unistrut racks and the top of the mounted panel is taller than 60” above the mounting surface, provide rear triangular support for unistrut rack angled 30 degrees connected 2/3 way up the rack and mounted to the same structure as the unistrut rack. If mounting on a roof assembly support for the rear support shall go through the roof at 90 degrees.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs as specified in Section “Electrical Identification.”

B. Label and identify all breakers with permanent engraved labels for panel subfeeders and equipment connections on all distribution panelboards.

C. Panel board Nameplates: Label all panel boards with engraved metal or laminated-plastic nameplate mounted with corrosion-resistant screws. Provide red nameplates for emergency or stand-by power branch fed panels. Nameplate shall include:
   1. Normal Power
      a. Panel Name
      b. Voltage “277/480", “120/208", or “120/240"
      c. Panel fed from “panel name or transformer name”
   2. Generator Powered Panels
      a. Panel Name
      b. Voltage “277/480", “120/208", or “120/240"
      c. Panel fed from “panel name or transformer name”
      d. Non-Hospital
         1) Non-emergency, “Stand-By Branch”
         2) Life Safety Non-Hospital, “Life Safety Branch”
      e. Hospital Essential Branches:
         1) “Life Safety”
         2) “Critical Branch”
         3) “Equipment Branch”

3.3 CONNECTIONS

A. Install equipment grounding connections for panel boards with ground continuity to main electrical ground bus.

B. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Prepare for acceptance tests as follows:
   1. Test insulation resistance for each panel board bus, component, connecting supply, feeder, and control circuit.
   2. Test continuity of each circuit.

B. Testing: After installing panel boards and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.

1. Procedures: Perform each visual and mechanical inspection and electrical test indicated in NETA ATS, Section 7.5 for switches and Section 7.6 for molded-case circuit breakers. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

C. Balance Loads: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes as follows:
1. Measure as directed during period of normal system loading.
2. Perform load-balancing circuit changes outside normal occupancy/working schedule of the facility and at time directed. Avoid disrupting critical 24-hour services such as fax machines and on-line data-processing, computing, transmitting, and receiving equipment.
3. After circuit changes, recheck loads during normal load period. Record all load readings before and after changes and submit test records.
4. Tolerance: Difference exceeding 20 percent between phase loads, within a panel board, is not acceptable. Rebalance and recheck as necessary to meet this minimum requirement.

3.5 ADJUSTING

A. Provide factory technician to set field-adjustable switches and circuit-breaker trip ranges.

3.6 CLEANING

A. On completion of installation, inspect interior and exterior of panel boards. Remove paint splatters and other spots. Vacuum dirt and debris; do not use compressed air to assist in cleaning. Repair exposed surfaces to match original finish.

END OF SECTION 262416

SECTION 262726

WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes receptacles, connectors, switches, and finish plates.

1.3 DEFINITIONS

A. GFCI/GFI: Ground-fault circuit interrupter.

B. SPD: Surge protective device.

1.4 SUBMITTALS

A. Product Data: For each product specified.

B. Shop Drawings: Legends for receptacles and switch plates.

C. Samples: For devices and device plates for color selection and evaluation of technical features.

D. Maintenance Data: For materials and products to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

B. Comply with NEMA WD 1.

C. Comply with NFPA 70.

1.6 COORDINATION

A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
   1. Cord and Plug Sets: Match equipment requirements.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents. Deliver extra materials to Owner.
   1. Telephone/Power Service Poles: One for each 10, but not less than one.
   2. Floor Service-Outlet Assemblies: One for each 10, but not less than one.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Wiring Devices:
      a. Bryant Electric, Inc.
      b. Eaton.
      c. Hubbell, Inc.; Wiring Devices Div.
      d. Killark Electric Manufacturing Co.
      e. Leviton Manufacturing Co., Inc.
      f. Pass & Seymour/Legrand; Wiring Devices Div.
   2. Multi-outlet Assemblies:
      a. Airey-Thompson Co.
      b. Wiremold.
   3. Floor Service Outlets and Telephone/Power Poles:
      a. American Electric.
      b. Hubbell, Inc.; Wiring Devices Div.
      c. Pass & Seymour/Legrand; Wiring Devices Div.
      d. Square D Co.
      e. Wiremold.

2.2 RECEPTACLES

A. Straight-Blade and Locking Receptacles: Commercial spec grade Configuration NEMA 5-20R. Color by Architect/Owner.

B. GFCI Receptacles: Feed-through type, with integral NEMA WD 6, Configuration 5-20R duplex receptacle arranged to protect connected downstream receptacles on same circuit. Design units for installation in a 2¾-inch-deep outlet box without an adapter. Provide with test light as per NEC.

C. Isolated-Ground Receptacles: Equipment grounding contacts connected only to the green grounding screw terminal of the device with inherent electrical isolation from mounting strap.
   1. Devices: Orange in color and listed and labeled as isolated-ground receptacles.
   2. Isolation Method: Integral to receptacle construction and not dependent on removable parts.

D. TVSS Receptacles: Duplex type, NEMA WD 6, Configuration 5-20R, with integral TVSS in line to ground, line to neutral, and neutral to ground.

E. USB Receptacles:
   1. USB Charger Tamper-Resistant Receptacle, Two USB Type 2.0 ports 3.5 Amp, 5 Volt DC, 20 Amp, 125 Volt AC Decorator Duplex.
      a. Green LED indicator to show USB power available.
      b. Impact and chemical resistant.
      c. Flush fit design.
      d. Meets UL94 for 5V flammability rating.
      e. Complies with battery charging specification USB BC1.2.
      f. Compatible with USB 1.1/2.0/3.0 devices.
      g. Listed to UL498 and UL1310.

F. Industrial Heavy-Duty Receptacle: Comply with IEC 309-1.

G. All receptacles on emergency/stand-by power shall be red hospital grade. Faceplate color by Architect. All emergency/stand-by power receptacles shall have circuit numbers on faceplate. Refer to panel schedules and one-line for emergency/stand-by power branches.

H. Fifteen-amp (15A) receptacles are not acceptable and shall not be installed unless specifically directed by the engineer.

2.3 PENDANT CORD/CONNECTOR DEVICES

A. Description: Matching, locking type, plug and receptacle body connector, NEMA WD 6, Configurations L5-20P and L5-20R, Heavy-Duty grade.
   1. Body: Nylon with screw-open cable-gripping jaws and provision for attaching external cable grip.
   2. External Cable Grip: Woven wire-mesh type made of high-strength galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector. (Kellum or equal)

2.4 CORD AND PLUG SETS

A. Description: Match voltage and current ratings and number of conductors to requirements of equipment being connected.
   1. Cord: Rubber-insulated, stranded-copper conductors, with type SOW-A jacket. Green-insulated grounding conductor, and equipment-rating ampacity plus a minimum of 30 percent.
   2. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.5 SWITCHES

A. Snap Switches: Commercial spec grade.

B. Combination Switch and Receptacle: Both devices in a single gang unit with plaster ears and removable tab connector that permit separate or common feed connection.
   1. Switch: 20 A, 120/277-V ac.
   2. Receptacle: NEMA WD 6, Configuration 5-20R.

C. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on/off switches and audible and electromagnetic noise filters rated for amperage and voltage listed.
   1. Control: Continuously adjustable slide, and push-button on/off. Single-pole or three-way switch to suit connections.
   2. Incandescent Lamp Dimmers: Modular, 120 V, 60 Hz with continuously adjustable slide and toggle or rocker; single pole with soft tap or other quiet switch; electromagnetic filter to eliminate noise, RF, and TV interference; and 5-inch wire connecting leads.

2.6 WALL PLATES

A. Single and combination types match corresponding wiring devices. CSA certified and UL listed.
   1. Plate-Securing Screws: Metal with head color to match plate finish. Color by Architect.
   2. Material for Finished Spaces:
      a. Smooth, high impact self-extinguishing nylon, reinforcement ribs, captive screws; color by Architect/Owner.
   3. Material for Kitchens, Unfinished spaces (Mechanical, Electrical), and surface mounted locations: 302 brushed stainless steel.

2.7 FLOOR SERVICE FITTINGS

A. Type: Modular, flush-type, dual-service units suitable for wiring method used.

B. Compartmentation: Barrier separates power and signal compartments.

C. Housing Material: Die-cast aluminum, satin finished.

D. Power Receptacle: NEMA WD 6, Configuration 5-20R, gray finish, unless otherwise indicated.

E. Signal Outlet: Blank cover with bushed cable opening, unless otherwise indicated.

2.8 MULTI-OUTLET ASSEMBLIES

A. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.

B. Raceway Material: Metal, with manufacturer's standard finish.

C. Raceway Material: Nonmetal.

D. Wire: No. 12 AWG.

2.9 TELEPHONE/POWER SERVICE POLES

A. Description: Factory-assembled and -wired units to extend power, telephone, and data service from distribution wiring concealed in ceiling to devices or outlets in pole near floor.
   1. Poles: Nominal 2.5-inch-square cross section with height adequate to extend from floor to at least 6 inches above ceiling, and separate channels for power and signal wiring.
   2. Mounting: Ceiling trim flange with concealed bracing arranged for positive connection to ceiling supports, and pole foot with carpet pad attachment.
   3. Finishes: One of manufacturers standard finish and trim combinations, including painted and satin anodized-aluminum finishes and wood-grain-type trim.
   4. Wiring: Sized for six No. 12 AWG power and ground conductors; one 75-ohm coaxial telephone/data cable; and four four-pair, 75-ohm telephone/data cable.
   5. Power Receptacles: four single; 20-A; heavy-duty; NEMA WD 6, Configuration 5-20R units.
   6. Signal Outlets: Blank insert with bushed cable opening.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install devices and assemblies straight, plumb and secure. Do not overtighten to deform faceplate. Adjust receptacle depth so faceplate mounts flush with wall. Adjust receptacle to extend equilaterally 1/8” beyond the faceplate opening.

B. Install devices as per ADA height requirements.

C. Review Architectural elevations to coordinate locations and mounting heights. If there are any discrepancies request information prior to install. If height is not listed on the drawings refer to the following:
   1. General purpose receptacles @ 18" AFF to the center of the duplex or simplex.
   2. General purpose receptacles at retirement facilities, nursing homes, hospice, nursing facilities @ 24" AFF.
   3. TV receptacles at the TV mounting location (see architectural elevations) or at 96" AFF.
   4. Above counter receptacles @ 6" above backsplash.
   5. Toilet room receptacles @ 48" AFF to the top of the box
   6. Switches to be 48” AFF to the centerline of the switch.
   7. Equipment receptacles at the piece of equipment. Coordinate with architectural elevations and equipment submittals.
   8. Refrigerator receptacles mount at 36” AFF to the center of the receptacle.
   9. Receptacles shall not be installed flat on any counter surface.

10. No general purpose receptacles shall be below 15” in height or above 48” AFF.

D. Install wall plates when painting is complete. Remove all paint from any wall plates.

E. Provide GFI receptacles within 6 feet of all sinks, exterior receptacles, undercounter equipment, at exterior HVAC equipment, vending machines, and in kitchens.

F. Install wall dimmers to achieve indicated rating after de-rating for ganging as instructed by manufacturer.

G. Do not share neutral conductor on load side of dimmers.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical, and grounding terminal of receptacles on bottom. Group adjacent switches under single, multi-gang wall plates.

I. Protect devices and assemblies during painting.

J. Mount receptacles in millwork flush with the millwork. Provide extension rings.

K. Adjust locations at which floor service outlets and telephone/power service poles are installed to suit arrangement of partitions and furnishings.

L. GFCI or GFI receptacles shall be wired to “trip” individually not the entire circuit. Receptacles shall not be daisy chained together from a GFI and create a GFI “protected” receptacle.

3.2 IDENTIFICATION

A. Comply with Section “Electrical Identification.”
   1. Switches: Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on wall plate.
   2. Receptacles: Identify panelboard and circuit number from which served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of plate and durable wire markers or tags within outlet boxes.

3.3 CONNECTIONS

A. Connect wiring device grounding terminal to branch-circuit equipment grounding conductor.

B. Isolated-Ground Receptacles: Connect to isolated-ground conductor routed to designated isolated equipment ground terminal of electrical system.

C. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturers torque values are not indicated, use those specified in UL 486A and UL 486B.

3.4 FIELD QUALITY CONTROL

A. Test wiring devices for proper polarity and ground continuity. Operate each device at least six times.

B. Provide receptacle tension testing as requested by owner/engineer. Tension shall be greater than 4 oz.

C. Test GFCI operation with both local and remote fault simulations according to manufacturer's written instructions.

D. Replace damaged or defective components.

3.5 CLEANING

A. Internally clean devices, device outlet boxes, and enclosures. Replace stained or improperly painted wall plates or devices.

END OF SECTION 262726

SECTION 262816

DISCONNECT SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes individually mounted switches and circuit breakers used for the following:
   1. Service disconnect switches.
   2. Feeder and equipment disconnect switches.
   3. Feeder branch-circuit protection.
   4. Motor disconnect switches.

B. Related Sections: The following Sections contain requirements that relate to this Section:
   1. Section “Wiring Devices” for attachment plugs and receptacles, and snap switches used for disconnect switches.

1.3 SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for disconnect switches, circuit breakers, and accessories specified in this Section.

C. Wiring diagrams detailing wiring for power and control systems and differentiating between manufacturer-installed and field-installed wiring.

D. Field test reports.

E. Maintenance data for tripping devices to include in the operation and maintenance manual specified in Division 1.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain disconnect switches and circuit breakers from one source and by a single manufacturer.

B. Comply with NFPA 70 for components and installation.

C. Listing and Labeling: Provide disconnect switches and circuit breakers specified in this Section that are listed and labeled.
   1. The Terms “Listed” and “Labeled”: As defined in the National Electrical Code, Article 100.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Molded-Case Circuit Breakers:
      a. Siemens Energy & Automation, Inc.
      b. Square D Co.
      c. Eaton
   2. Combination Circuit Breaker and Ground Fault Trip:
      a. Siemens Energy & Automation, Inc.
      b. Square D Co.
      c. Eaton
   3. Molded-Case, Current-Limiting Circuit Breakers:
      a. Siemens Energy & Automation, Inc.
      b. Square D Co.
      c. Eaton
   4. Integrally Fused, Molded-Case Circuit Breakers:
      a. Siemens Energy & Automation, Inc.
      b. Square D Co.
      c. Eaton

2.2 DISCONNECT SWITCHES

A. General: Heavy Duty safety switch, service entrance rated if indicated, with grounding lug kit, rated for equipment amperage, capable to be locked in the open position, with number of poles matching equipment connections.

B. Enclosed, 600V Nonfusible Switch: NEMA KS 1, Type HD, with lockable handle. Switch shall be rated for equipment amperage.

C. Enclosed, 600V Fusible Switch, 800 A and Smaller: NEMA KS 1, Type HD, clips to accommodate specified fuses, enclosure consistent with environment where located, handle lockable with 2 padlocks, and interlocked with cover in CLOSED position. Switch shall be rated for equipment amperage.

D. Enclosure: NEMA KS 1, Type 1, unless otherwise specified or required to meet environmental conditions of installed location.
   1. Outdoor Locations: Type 3R.
   2. Wet or Damp Indoor Locations: Type 4, 304 stainless steel.
   3. Kitchen Locations: Type 4X 304 stainless steel.
   4. Pools and Coastal Locations: Type 4X 316 stainless steel.
   5. Hazardous Areas Indicated on Drawings: Type 7 stainless steel.

E. Lugs: Mechanical lugs and power-distribution connectors for number, size, and material of conductors indicated.

F. Shunt Trip: Where indicated.

G. Accessories: As indicated.

2.3 ENCLOSED CIRCUIT BREAKERS

A. Enclosed, Molded-Case Circuit Breaker: UL 489, with lockable handle. Bolt on mounting.

B. Characteristics: Frame size, trip rating, number of poles, and auxiliary devices as indicated and interrupting rating to meet available fault current. Breakers will be fully rated for circuit AIC rating.

C. Application Listing: Appropriate for application, including switching fluorescent lighting loads or heating, air-conditioning, and refrigerating equipment.

D. Circuit Breakers, 200 A and Larger: Trip units interchangeable within frame size.

E. Circuit Breakers, 400 A and Larger: Field-adjustable, short-time and continuous-current settings.

F. Current-Limiting Trips: Where indicated, let-through ratings less than NEMA FU 1, Class RK-5.

G. Current Limiters: Where indicated, integral fuse listed for circuit breaker.

H. Molded-Case Switch: Where indicated, molded-case circuit breaker without trip units.

I. Lugs: Mechanical lugs and power-distribution connectors for number, size, and material of conductors indicated.

J. Shunt Trip: Where indicated.

K. Accessories: As indicated.

L. Enclosure: NEMA AB 1, Type 1, unless otherwise specified or required to meet environmental conditions of installed location.
   1. Outdoor Locations: Type 3R.
   2. Wet or Damp Indoor Locations: Type 4, 304 stainless steel.
   3. Hazardous Areas Indicated on Drawings: Type 7 stainless steel.
   4. Kitchen Locations: Type 4X 304 stainless steel.
   5. Pools and Coastal Locations: Type 4X 316 stainless steel.

M. Surge Protective Device: IEEE C62.41, to meet requirements for category indicated.
   1. Exposure: High.
   2. Impulse sparkover voltage coordinated with system circuit voltage.
   3. Factory mounted with UL-recognized mounting device.

2.4 MOTOR CONTROL CENTER ADDED BREAKERS

A. Motor circuit breakers shall be thermal magnetic breakers.

B. Match AIC ratings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install disconnect switches and circuit breakers in locations as indicated, according to manufacturer's written instructions. Provide 2-inch clearance for operation and maintenance.

B. Install disconnect switches and circuit breakers level and plumb. Height of handle centerline shall not exceed 68 inches. Provide required clearance in front of disconnect switches voltage requirements by NEC.

C. Install disconnecting means (safety switch, enclosed circuit breaker, motor rated switch) for equipment independent of the equipment unless directly by engineer. In interior installations, mount on unistrut racks or suspend from structure. Exterior installations shall be mounted on galvanized unistrut racks. Provide working clearance in front of disconnecting means. Interior above ceiling disconnecting means shall be clearly visible from the equipment point of connection. Coordinate location with equipment.

D. Install wiring between disconnect switches, circuit breakers, control, and indication devices.

E. Provide power to all shunt trip circuit breakers/switches from panel the breakers are mounted in or fed from unless indicated otherwise on drawings. Provide 20A 1P CB and label shunt trip power.

F. Grounding: Ground case and metallic conduit of disconnects.

G. Provide working clearance in front of disconnect switch per NEC, minimum 36 inches.

H. Connect disconnect switches and circuit breakers and components to wiring system and to ground as indicated and instructed by manufacturer.
   1. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486 A and UL 486 B.

I. Label and identify each disconnect switch and enclosed circuit breaker according to requirements specified in Section "Electrical Identification." Labels shall be 1" for 100A and smaller, 2" for 200 – 400A switches, and 3 inch for larger switches.

J. Label and identify each switch and breaker in MCC, distribution panels, and switchboards with 1" permanent engraved label indicating name and rating.

K. Engage factory tech to set all adjustable breaker settings per actual equipment installed. Coordinate with manufacturer for required settings and engage qualified agency (testing company/manufacturer) to obtain breaker settings.

3.2 FIELD QUALITY CONTROL

A. Testing: After installing disconnect switches and circuit breakers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
   1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.5 for disconnect switches 7.6 for molded-case circuit breakers. Certify compliance with test parameters.

B. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, remove and replace with new units and retest.

C. Infrared Scanning: After Substantial Completion, but not more than two (2) months after Final Acceptance, perform an infrared scan of each disconnect switch and circuit breaker. Remove fronts to make joints and connections accessible to a portable scanner.
   1. Follow-up Infrared Scanning: Perform one (1) additional follow-up infrared scan of each disconnect switch and circuit breaker 11 months after date of Substantial Completion.
   2. Instrument: Use an approved infrared scanning device designed to measure temperature or detect significant deviations from normal values. Provide calibration record for device used.
   3. Record of Infrared Scanning: Prepare a certified report identifying disconnect switch and circuit breaker checked and describing results of scanning. Include notation of deficiencies detected, remedial action taken and observations after remedial action.

3.3 ADJUSTING

A. Set field-adjustable disconnect switches and circuit-breaker trip ranges as indicated by the Electrical System Coordination Study. Refer to Section – Overcurrent Protection for fault current analysis, coordination study, electrical tests, and device setting requirements.

3.4 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish including chips, scratches, and abrasions.

END OF SECTION 262816

SECTION 264313

SURGE PROTECTIVE DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes Surge Protective Devices for low-voltage (1000V and less) power, control, and communication equipment. Surge protective devices must exceed any short circuit rating of the equipment it is protecting. All safety emergency equipment shall have surge protection.

B. Related Sections include the following:
   1. Section “Wiring Devices” for devices with Surge Protective Devices.
   2. Section “Panelboards” for factory-installed Surge Protective Devices.
   3. Section “Switchboards” for factory-installed Surge Protective Devices.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities; shipping, installed, and operating weights; furnished specialties; and accessories.

B. Product Certificates: Signed by manufacturers of surge protective devices, certifying that products furnished comply with the following testing and labeling requirements:
   1. UL 1283 certification.
   2. UL 1449 Third Edition, or most recent edition, listing and classification.

C. Field Test Reports: Written reports of tests specified in Part 3 of this Section. Include the following:
   1. Test procedures used.
   2. Test results that comply with requirements.
   3. Failed test results and corrective action taken to achieve requirements.

D. Specification Compliance Review:
   1. Manufacturers and bidders must provide the consulting engineer with a Compliance Review of the Specifications and Addenda’s. The Compliance Review shall be a paragraph-by-paragraph review of the Specifications and schedule with the following information; “C”, “D”, or “E” marked in the margin of the original Specifications and any subsequent Addenda’s. If the manufacturer or bidder does not provide the Compliance Review to the engineer for review, with the submittal, the submittal will be subject to rejection as non-compliant.
      a. “C” Comply with no exceptions.
      b. “D” Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the Specification can be satisfied.
      c. “E” Exception do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives. Non-compliance with the specifications is grounds for rejection as unacceptable. A bid from any alternative or listed equipment manufacturer with any number of exceptions will be reason for rejection for non-compliance without further review.
      d. Unless a deviation or exception is specifically noted in the Compliance Review, the manufacturer shall provide full compliance with entire specification. Deviations or

exceptions taken in letters or cover letters in a bid document, subsidiary documents, by omission or by contradiction do not release the manufacturer or bidder from being in complete compliance, unless the exception or deviation has been specifically noted in the Compliance Review and approved by the consulting engineer.

e. Equipment manufacturers or bidders that do not meet the specifications thru the above process will be subject to rejection without further review.

E. Maintenance Data: For surge protective devices to include in maintenance manuals specified in Division 1.

F. Warranties: Special warranties specified in this Section.

G. All surge suppression device shall be sourced from the same company and current models.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain surge protective devices and accessories through one source from a single manufacturer.

B. Product Options: Drawings indicate size, dimensional requirements, and electrical performance of surge protective device and are based on the specific system indicated. Other manufacturers' products complying with requirements may be considered. Refer to Division 1 Section “Substitutions.”

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. IEEE Compliance: Comply with IEEE C62.41.1-2002, “IEEE Guide for Surge Voltages in Low Voltage AC Power Circuits,” IEEE C62.41.2 - 2002. “IEEE Recommended Practice on Characterization of Surges in Low Voltage AC Power Circuits” and test devices according to IEEE C62.45-2002, “IEEE Recommended Practice on Surge Testing for Equipment connected to Low Voltage AC Power Circuits.

E. NOTE: NEMA LS 1 was rescinded in 2009. Any reference to NEMA LS1 should be removed. We can provide documentation if necessary.

F. UL Compliance: Comply with UL 1283, “Electromagnetic Interference Filters,” and UL 1449 most recent edition, “Surge Protective Devices.”

1.5 PROJECT CONDITIONS

A. Placing into Service: Do not energize or connect service entrance equipment, panelboards, control terminals, or data terminals to their sources until the installer verifies the service and separately derived system’s Neutral to Ground bonding jumpers per NEC. After the system is energized and stable, connect the surge protective device.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect's written permission.

C. Service Conditions: Rate surge protective devices for continuous operation under the following conditions, unless otherwise indicated:

1. Maximum Continuous Operating Voltage: Not less than 115 percent of nominal system operating voltage for 480Y/277V and not less than 125 percent of nominal voltage for 208Y/120V (Verifiable at UL.com).
2. Operating Temperature: 30 to 120 deg F.
3. Humidity: 0 to 85 percent, noncondensing.
4. Altitude: Less than 20,000 feet above sea level.

1.6 COORDINATION

A. Coordinate location of field-mounted surge protective device to allow adequate clearances for maintenance.

1.7 WARRANTY

A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
   1. Provide 5-year manufacturer warranty, 1 year labor install warranty.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Manufacturers of a Broad Line of Surge Protective Devices:
      a. Atlantic Scientific Corp.
      b. Current Technology, Inc.
      c. Cutler-Hammer, Inc.
      d. Hubbell.
      e. Leviton Manufacturing Co., Inc.
      f. Liebert Corp.
      g. Northern Technologies.
      h. Siemens Energy & Automation.
      i. Square D Co.
      j. Tycor International, Inc.
      k. Advanced Protection Technologies, Inc. (APT).
   2. Manufacturers of Category A and Telephone/Data Line Surge Protective Devices:
      a. MCG Electronics, Inc.
      b. NTE Electronics, Inc.
      c. Telebyte Technology, Inc.
      d. Advanced Protection Technologies, Inc. (APT).

2.2 SERVICE ENTRANCE SURGE PROTECTIVE DEVICE

A. Surge Protective Device Description: Non-modular type with the following features and accessories:
   1. Visual LED indicator lights for power and protection status including a minimum of one green LED indicator per phase, and one red service LED.
   2. Audible alarm, with a diagnostic test function and a silencing switch, to indicate when protection has failed.
   3. One set of dry contacts rated at 5 a, 250-V ac, for remote monitoring of protection status.

B. Peak Single-Impulse Surge Current Rating: 200 kA per phase, minimum.

C. Connection Means: Permanently wired.

D. Protection modes and UL 1449 Third Edition, or most recent edition, Voltage Protection Rating (VPR) for grounded wye circuits with voltages of 480Y/277 and 208Y/120; three-phase, four-wire circuits, shall be as follows:
   1. Line to Neutral: 1200 V for 480Y/277 and 700 V for 208Y/120.
   2. Line to Ground: 1200 V for 480Y/277 and 700 V for 208Y/120.
   3. Neutral to Ground: 1200 V for 480Y/277 and 700 V for 208Y/120.

E. SPD shall be UL labeled with 200 kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.

F. SPD shall be UL labeled as Type 1 (verifiable at UL.com), intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.

G. SPD shall be UL labeled with 20 kA Inominal (I-n), which is verifiable at UL.com for compliance to UL 96A Lightning Protection Master Label and NFPA 780.

2.3 PANELBOARD SURGE PROTECTIVE DEVICES

A. Surge Protective Device Description: Non-modular type with the following features and accessories:
   1. Visual LED indicator lights for power and protection status including a minimum of one green LED indicator per phase and one red service LED.
   2. Audible alarm, with silencing switch, to indicate when protection has failed.
   3. One set of dry contacts rated at 5 a, 250-V ac, for remote monitoring of protection status.

B. Peak Single-Impulse Surge Current Rating: 100 kA per phase minimum.

C. Protection modes and UL 1449 Third Edition Voltage Protection Rating (VPR) for grounded wye circuits with voltages of 480Y/277 and 208Y/120; three-phase, four-wire circuits, shall be as follows:
   1. Line to Neutral: 1200 V for 480Y/277 and 700 V for 208Y/120.
   2. Line to Ground: 1200 V for 480Y/277 and 700 V for 208Y/120.
   3. Neutral to Ground: 1200 V for 480Y/277 and 700 V for 208Y/120.

D. SPD shall be UL labeled with 200 kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.

E. SPD shall be UL labeled as Type 1 (verifiable at UL.com), intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.

F. SPD shall be UL labeled with 20 kA Inominal (I-n), which is verifiable at UL.com, for compliance to UL 96A Lightning Protection Master Label and NFPA 780.

2.4 AUXILIARY PANEL SURGE PROTECTIVE DEVICES

A. Surge Protective Device Description: Unit type, panel-mounted design with the following features and accessories:
   1. Visual LED indicator lights for power and protection status including a minimum of one green LED indicator per phase and one red service LED.
   2. Audible alarm, with silencing switch, to indicate when protection has failed.
   3. One set of dry contacts rated at 5 A, 250-V ac, for remote monitoring of protection status.
   4. Arrangement with wire connections to phase buses, neutral bus, and ground bus.

B. Peak Single-Impulse Surge Current Rating: 100 kA per phase minimum.

C. Protection modes and UL 1449 Third Edition Voltage Protection Rating (VPR) for grounded wye circuits with voltages of 480Y/277 and 208Y/120; three-phase, four-wire circuits, shall be as follows:
   1. Line to Neutral: 1200 V for 480Y/277 and 700 V for 208Y/120.
   2. Line to Ground: 1200 V for 480Y/277 and 700 V for 208Y/120.
   3. Neutral to Ground: 1200 V for 480Y/277 and 700 V for 208Y/120.

D. SPD shall be UL labeled with 200 kA Short Circuit Current Rating (SCCR). Fuse ratings shall not be considered in lieu of demonstrated withstand testing of SPD, per NEC 285.6.

E. SPD shall be UL labeled as Type 1 (verifiable at UL.com), intended for use without need for external or supplemental overcurrent controls. Every suppression component of every mode, including N-G, shall be protected by internal overcurrent and thermal overtemperature controls. SPDs relying upon external or supplementary installed safety disconnectors do not meet the intent of this specification.

F. SPD shall be UL labeled with 20 kA Inominal (I-n), which is verifiable at UL.com, for compliance to UL 96A Lightning Protection Master Label and NFPA 780.

2.5 SPECIAL SYSTEMS CONTROL AND DATA TERMINALS

A. Protectors for fire alarm, copper control, data, antenna, and telephone conductors entering the building from the outside shall be as recommended by the manufacturer for the type of line being protected.

2.6 ENCLOSURES

A. NEMA 250, with type matching the enclosure of panel or device being protected.

PART 3 - EXECUTION

3.1 INSTALLATION OF SURGE PROTECTIVE DEVICES

A. Provide surge suppression for the incoming service at the switchboard or service entrance equipment.

B. Provide surge suppression at the tele/data demark phone board or cabinet as close as possible to the incoming conduit and conductors. Provide surge suppression for all tele/data conductors that are run underground from one MDF/IDF to another.

C. Provide surge suppression at all fire alarm panels that connect to any fire alarm panel or device with underground conductors.

D. Install devices at service entrance on load side, with ground lead bonded to service entrance ground.

E. Install devices for panelboard and auxiliary panels with conductors between surge protective device and points of attachment as short (less than 24") and straight as possible. Gently twist conductors together. Do not exceed manufacturer's recommended lead length. Do not bond neutral and ground.

F. Install devices at service entrance on load side with ground lead bonded to service entrance ground. At Service Entrance or Transfer Switch, a UL approved disconnect switch shall be provided as a means of servicing disconnect if a 60 A breaker is not available.

G. Install devices for Distribution, MCC and Branch panelboards with conductors between supressors and points of attachment as short and straight as possible. Do not exceed manufacturer’s recommended lead length. Do not bond neutral to ground.

H. SPD shall have an independent means of servicing disconnect such that the protected panel remains energized. Provide a 30 Amp breaker (or larger sized by manufacturer) to serve this function.

I. Installer may reasonably rearrange breaker locations to ensure short & straightest possible leads to SPDs.

J. Before energizing, installer shall verify service and separately derived system Neutral to Ground bonding jumpers per NEC.

K. For surface mounted panel boards, associated surge protective device shall be surface mounted adjacent to the panel board with user access. For recessed mounted panel boards, associated surge protective devices shall be mounted recessed adjacent to the panel board with user access. Do not mount above 84 inches unless directed.

3.2 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

3.3 FIELD QUALITY CONTROL

A. Testing: Perform the following field quality-control testing:
   1. After installing surge protective devices, test for compliance with requirements.
   2. Complete startup checks according to manufacturer's written instructions.
   3. Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Section 7.19. Certify compliance with test parameters.
   4. If the SPD led are not green, replace with new unit.

B. Repair or replace malfunctioning units. Retest after repairs or replacements are made.

C. Manufacturer’s Field Service: Engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including piping and electrical connections. Report results in writing.
   1. Verify that electrical wiring installation complies with manufacturer's installation requirements.

END OF SECTION 264313

SECTION 265100

INTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes interior lighting fixtures, lighting fixtures mounted on exterior building surfaces, lamps, ballasts, emergency lighting units, and accessories.

1.3 SUBMITTALS

A. Product Data: For each type of lighting fixture indicated, arranged in order of fixture designation. Include data on features, accessories, and the following:
   1. Dimensions of fixtures.
   2. Certified results of independent laboratory tests for fixtures and lamps for electrical ratings and photometric data.
   3. Certified results of laboratory tests for fixtures and lamps for photometric performance.
   4. Fluorescent and high-intensity-discharge ballasts.
   5. Types of lamps.

B. Specification Compliance Review:
   1. Manufacturers and bidders must provide the consulting engineer with a Compliance Review of the Specifications and Addenda's. The Compliance Review shall be a paragraph-by-paragraph review of the Specifications and schedule with the following information "C", "D", or "E" marked in the margin of the original Specifications and any subsequent Addenda's. If the manufacturer or bidder does not provide the Compliance Review to the engineer for review, with the submittal, the submittal will be subject to rejection as non-compliant.
      a. "C" Comply with no exceptions.
      b. "D" Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the Specification can be satisfied.
      c. "E" Exception do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives. Non-compliance with the specifications is grounds for rejection as unacceptable. A bid from any alternative or listed equipment manufacturer with any number of exceptions will be reason for rejection for non-compliance without further review.
      d. Unless a deviation or exception is specifically noted in the Compliance Review, the manufacturer shall provide full compliance with entire specification. Deviations or exceptions taken in letters or cover letters in a bid document, subsidiary documents, by omission or by contradiction do not release the manufacturer or bidder from being in complete compliance, unless the exception or deviation has been specifically noted in the Compliance Review and approved by the consulting engineer.
      e. Equipment manufacturers or bidders that do not meet the specifications thru the above process will be subject to rejection without further review.

C. Shop Drawings: Show details of nonstandard or custom fixtures. Indicate dimensions, weights, method of field assembly, components, features, and accessories.
   1. Wiring Diagrams: Detail wiring for fixtures and differentiate between manufacturer-installed and field-installed wiring.

D. Samples for Verification: For lighting fixtures designated for sample submission in the Interior Lighting Fixture Schedule.
   1. Lamps: Specified units installed.
   2. Ballast: 120-V model of specified ballast type.
   3. Accessories: Cord and plug.

E. Product Certificates: Signed by manufacturers of lighting fixtures certifying that products comply with requirements.

F. Dimming Driver Compatibility Certificates: Signed by manufacturer of driver certifying that drivers are compatible with dimming systems and equipment with which they are used.

G. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

H. Maintenance Data: For lighting fixtures to include in maintenance manuals specified in Division 1.

I. Photometric Analysis: Submit point-by-point values on 1/8" = 1'-0" plans for all interior rooms. Calculations shall be made using (1) no masking, (2) light loss factor of 0.95, (3) point-by-point spacing of 24" x 24", and (4) reflectances of 80/50/20. In addition, also provide calculated average, maximum, and minimum footcandle values in a schedule for each room. Illuminance values (in footcandles) shall be for a calculation plane (workplane) at 30" AFF unless stated otherwise. Architectural plans in AutoCAD format shall be provided by Engineer for calculations upon request. Refer to architectural drawings for ceiling heights.

1.4 QUALITY ASSURANCE

A. Fixtures, Emergency Lighting Units, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

B. Comply with NFPA 70.

C. FM Compliance: Fixtures for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM.

D. NFPA 101 Compliance: Comply with visibility and luminance requirements for exit signs.

1.5 COORDINATION

A. Fixtures, Mounting Hardware, and Trim: Coordinate layout and installation of lighting fixtures with ceiling system and other construction.

1.6 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
   1. Warranties for LED Drivers; Written warranty, executed by manufacturer agreeing to replace LED drivers that fail in materials or workmanship within five years from date of manufacture, but not less than four years from date of Substantial Completion.
   2. Warranties for Electronic Ballasts; Written warranty, executed by manufacturer agreeing to replace Electronic Ballasts that fail in materials or workmanship within five years from date of manufacture, but not less than four years from date of Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. LED Fixtures: Provide 10 extra 2x4 fixtures in boxes. Deliver to owner.
   2. Lamps: Ten (10) for every 100 of each type and rating installed. Furnish at least one (1) of each type.
   3. Plastic Diffusers and Lenses: One (1) for every 100 of each type and rating installed. Furnish at least one (1) of each type.
   4. Ballasts: One (1) for every 100 of each type and rating installed. Furnish at least one (1) of each type.
   5. Globes and Guards: One (1) for every 20 of each type and rating installed. Furnish at least one (1) of each type.
   6. Remote Battery Packs: One (1) for every 10, no less than two (2).

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers and Models: All manufacturers (including those in the Lighting Fixture Schedule) are required to submit photometrics that illustrate the performance and light distribution as well as prove equal in quality to match those in the Lighting Fixture Schedule. Additional manufacturers beyond those in the Lighting Fixture Schedule may be considered as equal after review from the design engineer. For manufacturers not specified in the Lighting Fixture Schedule, submit photometrics to the design engineer for review prior to bid. Include a cross reference for each fixture submitted. Equipment submitted for “as-equal” without complete cutsheet cross reference, to include drawing fixture lettering, is subject to immediate rejection.
   1. Additional manufacturers will be considered on a case by case basis prior to bid. Post-bid non-approved manufacturers/models are subject to rejection and any cost difference for approved fixtures will be the contractors’ responsibility.

2.2 FIXTURES AND FIXTURE COMPONENTS, GENERAL

A. Metal Parts: Free from burrs, sharp corners, and edges.

B. Sheet Metal Components:
   1. Steel, unless otherwise indicated.
   2. Form and support to prevent warping and sagging.
   3. Housing painted after fabrication.
   4. Smooth hemmed sides and smooth inward formed end flanges.

C. Doors, Frames, and Other Internal Access:
   1. Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position.
   2. Standard extruded aluminum door frame has superior structural integrity with premium appearance and mitered corners. Door frame is painted after fabrication, standard. Powder-painted rotary cam latches provide easy, secure door closure. Integral T-bar clips are standard. Acrylic shielding materials is 100% UV stabilized.

D. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
   1. White Surfaces: 85 percent.
   2. Specular Surfaces: 83 percent.
   3. Diffusing Specular Surfaces: 75 percent.
   4. Laminated Silver Metallized Film: 90 percent.

E. Lenses, Diffusers, Covers, and Globes: 100 percent virgin acrylic plastic or annealed crystal glass, unless otherwise indicated.

1. Plastic: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.
2. Lens Thickness: 0.125-inch minimum, unless greater thickness is indicated.

F. Electromagnetic Interference Filters: Integral to fixture assembly. Provide one filter for each ballast where indicated on drawings. Suppress conducted electromagnetic interference filters as required by MIL-STD-461.

G. Housings: Manufacturers standard with integral heat sink.

H. Fixture Type Components:
1. Cylinder: With integral mounting provisions.
2. Downlight:
   a. Universal mounting bracket.
   b. Integral junction box with conduit fittings.
   c. Battery backup test button and integral to fixture.
3. Highbay, Linear
   a. Pendant mounted with secondary support provision.
   b. Universal mounting bracket.
4. Highbay, Nonlinear
   a. Pendant mounted with secondary support provision.
   b. Universal mounting bracket.
   c. Integral junction box with conduit fittings.
5. Linear Industrial
   a. Housing and heat sink rated to the following:
      1) Class 1, Division 2 Groups A, B, C, and D.
      2) NEMA 4X.
      3) IP 54.
      4) IP 66.
      5) Marine and wet locations.
      6) CSA C22.2 No 137.
6. Lowbay
   a. Pendant mounted with secondary support provision.
   b. Universal mounting bracket.
7. Parking Garage (Minimum damp location rated)
   a. Pendant mounted with secondary support provision.
   b. Universal mounting bracket.
   c. Low-profile housing and heat sink.
   d. Fully gasketed and sealed. IP 65 rated.
   e. Stainless-steel latches.
   f. Integral pressure equalizer.
8. Recessed Linear: Integral junction box with conduit fittings.
9. Strip Light
   a. Pendant mounted with secondary support provision.
   b. Universal mounting bracket.
   c. Integral junction box with conduit fittings.
   d. Wire guard or lens.
10. Surface Mount, Linear
   a. Universal mounting bracket.
   b. Integral junction box with conduit fittings.
11. Surface Mount, Nonlinear
   a. Universal mounting bracket.
   b. Integral junction box with conduit fittings.
12. Suspended, Linear
   a. Pendant mounted with secondary support provision.
   b. Universal mounting bracket.
   c. Provide with aircraft cable.
   d. Fixtures shall join with factory fittings of length on drawings with factory ends.

e. Coordinate cord drop.
f. Power feed thru factory quick connect.
g. White cord drop to end of fixture.
h. Minimum two supports per run. Minimum one every 8 feet.

13. Suspended, Nonlinear
    a. Pendant mounted with secondary support provision.
    b. Universal mounting bracket.

2.3 LED LIGHTING

A. General: Comply with fixture component requirements.

B. All LED products must be UL, ETL and/or CSA listed.

C. All LED products must have LM-79 and LM-80 testing minimum and noted on specification sheet by an independent test lab and in accordance with the following:
1. Lay-in Troffers: L90 at 60,000 hours at 25 degrees C.
2. Surface Mounted: L80 at 60,000 hours at 25 degrees C.
3. Pendant Mount: L90 at 60,000 hours at 25 degrees C.
4. Recessed Can: L70 at 50,000 hours at 25 degrees C.
5. High Bay: L70 at 90,000 hours at 25 degrees C. or
6. L95 at 60,000 hours at 25 degrees C. *
7. Exterior Surf Mtd: L90 at 100,000 hours at 40 degrees C or
   L80 at 100,000 hours at 25 degrees C *
8. High Bay and Exterior Fixtures shall be Thermally Protected Drivers

D. All LED products should be identified as L70 and/or L90 ratings based on independent test lab data.

E. Long-life LEDs, coupled with high-efficiency drivers, provide superior level and quality of illumination for extended service life.

F. All outdoor and wet location listed products must clearly state the IP rating carried on the fixture based on independent test lab data.

G. All LED products must be serviceable for accessible for field repair needs. Drivers and internal components are accessible from floor. LED boards include plug-in connectors for easy replacement or servicing. Suitable for direct insulation contact. Suitable for damp location.

H. Standard embedded controls continuously monitor system performance, allow for constant lumen management/compensation function, facilitate simple “plug-and-play’ network and controls upgrading via Cat-5 cable.

I. Minimum CRI 80.

J. All outdoor lighting color rendering should be within a 7 step McAdams Ellipse. All outdoor lighting should be 4100 Kelvin unless specifically noted.

K. All indoor lighting color rendering should be within a 3 step McAdams ellipse. All indoor lighting should be 4000 Kelvin unless specifically noted.

L. All LED drivers should be capable of 0-10 volt controls and DMX control and shall dim to 1% of total lumen output. Where specifically specified the dimming driver may be required to dim to .1% of lumen output, otherwise known as “dim to dark”.

M. Driver manufacturers must have a 5-year history producing dimmable electronic LED drivers for the North American market.

N. Ambient driver temperatures must be within -20 degrees to 50 degrees C (-4 degrees to 122 degrees F).

O. Driver must limit inrush current.
   1. Base specification: meet or exceed NEMA 410 driver inrush standard of 430 amp per 10 amps load with a maximum of 370 amps/2 seconds
   2. Preferred specification: Meet or exceed 30ma's at 277 VAC for up to 50 watts of load and 75A at 240us att 277 VAC for 100 watts of load
   3. Withstand up to a 1,000 volt surge without impairment of performance as defined by ANSI C62.41 Category A
   4. No visible change in light output with a variation of plus/minus 10percent line voltage input.
   5. Total harmonic distortion less than 20% and meet ANSI C82.11 maximum allowable THD requirements at full output. THD shall at no point in the dimming curve allow imbalance current to exceed full output THD

P. Any exceptions are at the engineer's discretion based on project needs and applicability.

2.4 EXIT SIGNS

A. General Requirements: Comply with UL 924 and the following:
   1. Sign Colors and Lettering Size: Comply with authorities having jurisdiction.
   2. Die cast brushed metal finish exit signage with manufacturer's multi-style mounting (wall, surface, and top). Plastic exit signage is not acceptable.

B. Internally Lighted Signs: As follows:
   1. Lamps for AC Operation: Light-emitting diodes, 70,000 hours minimum rated lamp life.
   2. All exit signs shall have battery back-up.
   3. Provide with self-diagnostics as indicated on the drawings.

2.5 LAMPS

A. Fluorescent Color Temperature and Minimum Color-Rendering Index: 3500 K and 90 CRI, SPX 830, unless otherwise indicated.

B. Noncompact Fluorescent Lamp Life: Rated average is 20,000 hours at 3 hours per start when used on rapid-start circuits.

C. Metal-Halide Color Temperature and Minimum Color-Rendering Index: 3600 K and 70 CRI, unless otherwise indicated.

2.6 FIXTURE SUPPORT COMPONENTS

A. Comply with Section "Basic Electrical Materials and Methods," for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: ½-inch steel tubing with swivel ball fitting and ceiling canopy. Finish same as fixture.

C. Twin-Stem Hangers: Two, ½-inch steel tubes with single canopy arranged to mount a single fixture. Finish same as fixture.

D. Rod Hangers: 3/16-inch- minimum diameter, cadmium-plated, threaded steel rod.

E. Hook Hangers: Integrated assembly matched to fixture and line voltage and equipped with threaded attachment, cord, and locking-type plug.

F. Aircraft Cable Support: Use cable, anchorages, and intermediate supports recommended by fixture manufacturer.

2.7 FINISHES

A. Fixtures: See fixture schedule for colors and finishes. Otherwise manufacturer's standard.
   1. Paint Finish: Applied over corrosion-resistant treatment or primer, free of defects.
   2. Metallic Finish: Corrosion resistant.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fixtures, General: Set level, plumb, and square with ceiling and walls, and secure according to manufacturer's written instructions and approved submittal materials. Install lamps in each fixture.
   1. Coordinate location of fixtures with architectural ceiling plan.
   2. Review architectural elevations prior to rough-in for any wall mounted fixtures. Mount at 84 inches or above, unless otherwise indicated. All wall mounted fixtures shall be ADA compatible if below 84 inches.
   3. Center single fixtures in rooms as much as possible.
   4. Center fixtures in exposed ceilings. Provide equal distance between fixtures and structural elements (walls, columns, furrdowns, etc.).
   5. Provide switching mechanisms for all fixtures whether indicated on the drawings or not.
   6. Provide supports without causing deflection of ceiling or wall.
   7. Secure to outlet box.

B. Track Lighting
   1. Install track parallel with structural or grid. Secure track to structural mounted j-boxes.
   2. Conceal transformers above accessible ceiling.
   3. Coordinate with architect for track lighting head locations.
   4. Aim track heads at objects to be illuminated
   5. Adjust pendant track fixtures per architect/owner.

C. Remote Battery or Ballasts:
   1. Mount battery backup over accessible ceiling spaces. Provide appropriate battery backup for mounting distance away from fixture.
   2. Remote mount ballasts for fixtures in stairwells or over hard ceilings where ballast is not directly accessible from below.
   3. Mount all remote ballasts and battery packs together as much as possible over accessible ceiling spaces and mount on unistrut with backboard. **Do not mount directly to wall**. Bundle cabling together and label ballasts/battery packs corresponding to fixture. Provide diagram as required.

D. Support for Fixtures in or on Grid-Type Suspended Ceilings: Use grid for alignment.
   1. Install a minimum of four (4) ceiling support system rods or wires attached to the fixture structure on **EACH** fixture secured to the building structure. Locate not more than 6 inches from fixture corners.
   2. Support Clips: Fasten to fixtures and to ceiling grid members at or near each fixture corner.
   3. Fixtures of Sizes Less Than Ceiling Grid: Arrange as indicated on reflected ceiling plans or center in acoustical panel, and support fixtures independently with at least two (2) ¾-inch metal channels spanning and secured to ceiling tees.

E. Suspended Fixture Support: As follows:
   1. Pendants and Rods: Where longer than 48 inches, brace to limit swinging. Provide blocking for heavy fixtures.
   2. Stem- Mounted, Single-Unit Fixtures: Suspend with twin-stem hangers. Support with approved outlet box and accessories that hold stem and provide damping of luminaire oscillations. Support outlet box vertically to building structure using approved devices.
   3. Continuous Rows: Use tubing or stem for wiring at one point and tubing or rod for suspension for each unit length of fixture chassis, including one at each end.

4. Coordinate mounting heights with Architect/Engineer. Consult prior to hanging. Stems may need to be field cut.
5. Chain hung fixtures are NOT acceptable unless indicated on the drawings.
6. Provide secondary support for all fixtures without canopy support from structure.
   a. All high and low bay fixtures shall have secondary support cables secured to structure.
7. Sized and rated for fixture weight.
8. Do not use ceiling grid as support for pendant luminaires. Connect support wired or rods to building structure.

F. Flush-Mounted Luminaire Support:
1. Secured to outlet box.
2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
3. Trim ring flush with finished surface.

G. Wall-Mounted Luminaire Support:
1. Attached to structural members in walls.
2. Do not attach luminaires directly to gypsum board.
3. Provide blocking to support.

3.2 CONNECTIONS

A. Ground equipment:
1. Tighten electrical connectors and terminals according to manufacturers' published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Connect to switch mechanisms (wall switch, contactors, relays) room controllers.

C. Provide dual switching for room mounted dual ballast fixtures. Wire each switch leg to each ballast. Do not connect together unless directed by engineer.
1. Exception: Step dimming fixtures in corridors may be connected together. Consult engineer prior to connections and installing switch legs.

D. Fixture Connections:
1. Indoors
   a. With Lay-in ceilings: Provide EMT home runs to structure mounted J-boxes. Provide MC Cable from above ceiling j-boxes to fixtures. Do not daisy chain fixtures together unless specifically indicated on the drawings or allowed by engineer.
   b. With gypboard ceilings: Provide EMT home runs to structure mounted J-boxes. Provide access to j-boxes or locate above fixtures. Provide MC Cable from above ceiling j-boxes to fixtures. Do not wire daisy chain fixtures together, unless indicated on the drawings.
   c. Exposed (no ceiling) in finished spaces: Conceal EMT as much as possible in adjacent walls. Route EMT to fixtures in exposed spaces with steel compression fittings and install parallel along structural members to structural mounted j-boxes. Conceal conduit along structural members. DO NOT route conduit across open spaces suspended from structural members unless directed by architect or engineer. Mount fixtures from j-boxes. Center fixtures in spaces.
   d. Exposed unfinished spaces: Provide EMT runs to structural mounted j-boxes. Route parallel to structural members as much as possible. Mount fixtures or fixture support to j-boxes.
2. Outdoor: Provide IMC for exterior fixtures and connect directly to fixtures or j-boxes as required for fixture mounting. Exterior fixtures mounted in ceilings or structure can use EMT to fixture j-box mounts.

3.3 FIELD QUALITY CONTROL

A. Inspect each installed fixture for damage. Replace damaged fixtures and components.

B. Advance Notice: Give dates and times for field tests.

C. Provide instruments to make and record test results.

D. Tests: As follows:
   1. Verify normal operation of each fixture after installation.
   2. Emergency Lighting: Interrupt electrical supply to demonstrate proper operation.
   3. Verify normal transfer to battery source and retransfer to normal.
   4. Report results in writing.

E. Malfunctioning Fixtures and Components (Except LED Fixtures): Replace or repair, then retest. Repeat procedure until units operate properly.

F. Malfunctioning LED Fixtures: Replace fixture then retest. LED fixtures shall not be repaired.

G. Corrosive Fixtures: Replace during warranty period.

3.4 CLEANING AND ADJUSTING

A. Clean fixtures internally and externally after installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable fixtures to provide required light intensities.

END OF SECTION 265100

SECTION 265600

EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior lighting units with luminaires, lamps, ballasts, poles/support structures, and accessories.

B. Related Sections include Section “Interior Lighting” for interior fixtures, lamps, ballasts, emergency lighting units, and accessories; and for exterior luminaires normally mounted on buildings.

1.3 DEFINITIONS

A. Lighting Unit: A luminaire or an assembly of luminaires complete with a common support, including pole, post, or other structure, and mounting and support accessories.

B. Luminaire (Light Fixture): A complete lighting device consisting of lamp(s) and ballast(s), when applicable, together with parts designed to distribute light, to position and protect lamps, and to connect lamps to power supply.

1.4 SUBMITTALS

A. Product Data: For each type of lighting unit indicated, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and the following:
   1. Materials and dimensions of luminaires and poles.
   2. Certified results of independent laboratory tests for fixtures and lamps for electrical ratings and photometric data.
   3. Certified results of laboratory tests for fixtures and lamps for photometric performance.
   4. High--intensity-discharge luminaire ballasts.

B. Specification Compliance Review:
   1. Manufacturers and bidders must provide the consulting engineer with a Compliance Review of the Specifications and Addenda’s. The Compliance Review shall be a paragraph-by-paragraph review of the Specifications and schedule with the following information; “C”, “D”, or “E” marked in the margin of the original Specifications and any subsequent Addenda’s. If the manufacturer or bidder does not provide the Compliance Review to the engineer for review, with the submittal, the submittal will be subject to rejection as non-compliant.
      a. “C” Comply with no exceptions.
      b. “D” Comply with deviations. For each and every deviation, provide a numbered footnote with reasons for the proposed deviation and how the intent of the Specification can be satisfied.
      c. “E” Exception, do not comply. For each and every exception, provide a numbered footnote with reasons and possible alternatives. Non-compliance with the specifications is grounds for rejection as unacceptable. A bid from any alternative or listed equipment manufacturer with any number of exceptions will be reason for rejection for non-compliance without further review.

d. Unless a deviation or exception is specifically noted in the Compliance Review, the manufacturer shall provide full compliance with entire specification. Deviations or exceptions taken in letters or cover letters in a bid document, subsidiary documents, by omission or by contradiction do not release the manufacturer or bidder from being in complete compliance, unless the exception or deviation has been specifically noted in the Compliance Review and approved by the consulting engineer.
e. Equipment manufacturers or bidders that do not meet the specifications thru the above process will be subject to rejection without further review.

C. Shop Drawings: Anchor-bolt templates keyed to specific poles and certified by manufacturer.

D. Samples for Verification: For lighting units or luminaires designated for sample submission in the Exterior Lighting Unit Schedule.
1. Lamps: Specified units installed.
2. Ballast: 120-V model of specified ballast type.
3. Finishes: For each finished metal used in support components.

E. Product Certificates: Signed by manufacturers of lighting units certifying that products comply with requirements.

F. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

G. Maintenance Data: For lighting units to include in maintenance manuals specified in Division 1.

1.5 QUALITY ASSURANCE

A. Luminaires and Accessories: Listed and labeled as defined in NFPA 70, Article 100, for their indicated use, location, and installation conditions by a testing agency acceptable to authorities having jurisdiction.

B. Comply with ANSI C2.

C. Comply with NFPA 70.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Package aluminum poles for shipping according to ASTM B 660.

B. Store poles on decay-resistant treated skids at least 12 inches above grade and vegetation. Support poles to prevent distortion and arrange to provide free air circulation.

C. Retain factory-applied pole wrappings on metal poles until just before pole installation. For poles with nonmetallic finishes, handle with web fabric straps.

1.7 WARRANTY

A. General Warranty: Special warranty specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Lamps: Ten (10) for every 100 of each type and rating installed. Furnish at least one (1) of each type.
2. Glass and Plastic Lenses, Covers, and Other Optical Parts: One (1) for every 100 of each type and rating installed. Furnish at least one (1) of each type.
3. Ballasts: One (1) for every 100 of each type and rating installed. Furnish at least one (1) of each type.
4. Globes and Guards: One (1) for every 20 of each type and rating installed. Furnish at least one (1) of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the products indicated on the drawings and fixture schedules.

B. Products: Subject to compliance with requirements, provide products indicated on the drawings. Submit “as equals” to engineer two weeks prior to bid for approval.

2.2 LUMINAIRES

A. Comply with IESNA RP-8 for parameters of lateral light distribution patterns indicated for luminaires.

B. All exterior fixtures shall be wet location rated.

C. Metal Parts: Free from burrs, sharp corners, and edges.

D. Sheet Metal Components: Corrosion-resistant aluminum, unless otherwise indicated. Form and support to prevent warping and sagging.

E. Housings: Rigidly formed, weather- and light-tight enclosures that will not warp, sag, or deform in use. Provide filter/breather for enclosed luminaires.

F. Doors, Frames, and Other Internal Access: Smooth operating, free from light leakage under operating conditions, and arranged to permit relamping without use of tools. Arrange doors, frames, lenses, diffusers, and other pieces to prevent accidental falling during relamping and when secured in operating position. Provide for door removal for cleaning or replacing lens. Arrange to disconnect ballast when door opens.

G. Exposed Hardware Material: Stainless steel.

H. Plastic Parts: High resistance to yellowing and other changes due to aging, exposure to heat, and ultraviolet radiation.

I. Reflecting Surfaces: Minimum reflectance as follows, unless otherwise indicated:
   1. White Surfaces: 85 percent.
   2. Specular Surfaces: 83 percent.
   3. Diffusing Specular Surfaces: 75 percent.

J. Lenses and Refractors: Materials as indicated. Use heat- and aging-resistant, resilient gaskets to seal and cushion lens and refractor in luminaire doors.

K. Photoelectric Relays: As follows:
   1. Contact Relays: Single throw, arranged to fail in the on position and factory set to turn light unit on at 1.5 to 3 fc and off at 4.5 to 10 fc with 15-second minimum time delay.
   2. Relay Mounting: In luminaire housing.

L. Auxiliary, Instant-on, Quartz System: Automatically switches quartz lamp on when luminaire is initially energized and when momentary power outages occur. Automatically turns quartz lamp off when high-intensity-discharge lamp reaches approximately 60 percent light output.
   1. Mount control components internal to ballast.
   2. Connect to ballast with tap so quartz lamp operates at 120 V.

M. Lamps: Comply with the standard of the ANSI C78 series that is applicable to each type of lamp. Provide luminaires with indicated lamps of designated type, characteristics, and wattage. Where a lamp is not indicated for a luminaire, provide medium wattage lamp recommended by manufacturer for luminaire.
   1. Metal- Halide Color Temperature and Minimum Color-Rendering Index: 3600 K and 70 CRI, unless otherwise indicated.

P. LED Pole Luminaires
   1. Construction: Single-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. The LED drivers are mounted in direct contact with the casting to promote low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). Low EPA ($0.98ft^2$) for optimized pole wind loading.
   2. Finish: Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish. Minimum 3 mils thickness.
   3. Optics: Precision-molded acrylic lenses are engineered for superior area lighting distribution, uniformity, and pole spacing. Light engine is standard 4000K zero uplight and qualifies as a Nighttime Friendly™ product.
   4. Electrical: High-efficacy LEDs mounted to a metal-core circuit board to maximize heat dissipation and promote long life (L87/100,000 hrs at 40°C). Class 1 electronic drivers have a power factor >90%, THD <20%, and an expected life of 100,000 hours with <1% failure rate.
   5. Hardware: Stainless steel bolts fasten the mounting block securely to poles and walls.

Q. LED Wall Luminaires
   1. Construction: Two-piece die-cast aluminum housing has integral heat sink fins to optimize thermal management through conductive and convective cooling. The LED driver is mounted to the door to thermally isolate it from the light engines for low operating temperature and long life. Housing is completely sealed against moisture and environmental contaminants (IP65). Housing weep holes for wet location listing in the face-up orientation; permitting safe drainage while maintaining the luminaire's IP65 rating.
   2. Finish: Exterior parts are protected by a zinc-infused Super Durable TGIC thermoset powder coat finish. Minimum 3 mils thickness.
   3. Optics: Precision-molded proprietary acrylic lenses with photometric distributions tailored specifically to building mounted applications. Light engines are 4100K (70 min. CRI).
   4. Electrical: High-efficacy LEDs mounted to a metal-core circuit board to maximize heat dissipation and promote long life. Class 1 electronic driver has a power factor >90%, THD <20%, and has an expected minimum life of 90,000 hours with <1% failure rate.
   5. Hardware: Universal mounting plate with integral mounting support arms.

2.3 LUMINAIRE SUPPORT COMPONENTS

A. Description: Comply with AASHTO LTS-3 for pole or other support structures, brackets, arms, appurtenances, base, and anchorage and foundation.

B. Wind-Load Strength of Total Support Assembly: Adequate to carry support assembly plus luminaires at indicated heights above grade without failure, permanent deflection, or whipping in steady winds of 100 mph with a gust factor of 1.3. Support assembly includes pole or other support structures, brackets, arms, appurtenances, base, and anchorage and foundation.
   1. Strength Analysis: For each pole type and luminaire combination, multiply the actual equivalent projected area of luminaires and brackets by a factor of 1.1 to obtain the equivalent projected area to be used in pole selection strength analysis.

C. Finish: Match finish of pole/support structure for arm, bracket, and tenon mount materials.

D. Mountings, Fasteners, and Appurtenances: Corrosion-resistant items compatible with support components.
   1. Materials: Will not cause galvanic action at contact points.
   2. Mountings: Correctly position luminaire to provide indicated light distribution.
   3. Anchor Bolts, Nuts, and Washers: Hot-dip galvanized after fabrication unless stainless-steel items are indicated. Provided by the pole manufacturer.
   4. Anchor- Bolt Template: Plywood or steel.

E. Pole/Support Structure Bases: Anchor type with hold-down or anchor bolts, leveling nuts, and bolt covers.

F. Steel Poles: (Galvanized only) Tubing complying with ASTM A 500, Grade B, carbon steel with a minimum yield of 55,000 psig; one-piece construction up to 40 feet in length with access handhole in pole wall.
   1. Steps: Fixed steel with nonslip treads, positioned for 15-inch vertical spacing, alternating on opposite sides of pole; first step at elevation 10 feet above finished grade.
   2. Intermediate Handhole and Cable Support: Locate at midpoint of pole height. Weathertight 3-by-5-inch handhole with cover provides access to internal welded attachment lug for electric cable support grip.
   3. Cable Support Grip: Wire-mesh type with rotating attachment eye, sized for diameter of cable and rated for a minimum load equal to weight of supported cable times a 5.0 safety factor.
   4. Platform for Lamp Servicing: Factory fabricated of steel with finish matching that of pole.

G. Aluminum Poles: Fabricated from seamless, extruded structural tube complying with ASTM B 429, 6063-T6 alloy with access handhole in pole wall.
   1. Grounding Provisions for Metal Pole/Support Structure: Welded 1/2-inch threaded lug, accessible through handhole and listed for copper conductor connection.

H. Aluminum Mast Arms: Tapered oval arms continuously welded to pole attachment plate with span and rise as indicated.

I. Metal Pole Brackets: Match pole metal. Provide cantilever brackets without underbrace, in sizes and styles indicated, with straight tubular end section to accommodate luminaire.

J. Pole-Top Tenons: Fabricated to support luminaire or luminaires and brackets indicated, and securely fastened to pole top.

K. Lowering System for Luminaires: Include luminaire mounting assembly, lowering device, lowering cable, and portable winch.
   1. Coordinate with pole and luminaire manufacturers for assembly details, wind-loading and vibration analysis, and compatibility of materials for electrolysis-free attachment and connection.
   2. Structural and Mechanical Design: Use a safety factor of 5.0 for static and dynamic loading of load-bearing components, including cable.
   3. Lowering Device: Weatherproof, cast-aluminum housing with multipin, plug-receptacle assembly.
   4. Lowering Cable: Stainless-steel aircraft cable.
   5. Portable Winch: Electric drive with cord and plug and 120-V, weatherproof receptacle mounted in pole base.

L. Concrete for Pole Foundations: Comply with Division 3 Section “Cast-in-Place Concrete,” “Concrete Formwork,” and “Concrete Reinforcement.”
   1. Design Strength: 3000-psig, 28-day compressive strength.

2.4 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Aluminum: Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
   1. Natural Satin Finish: Provide fine, directional, medium satin polish (AA-M32); buff complying with AA-M20; and seal aluminum surfaces with clear, hard-coat wax.
   2. Class I, Clear Anodic Finish: AA-M32C22A41 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 607.1.
   3. Class I, Color Anodic Finish: AA-M32C22A42/A44 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, integrally colored or electrolytically deposited color coating 0.018 mm or thicker) complying with AAMA 606.1 or AAMA 608.1.
      a. Color: Light bronze.
      b. Color: Medium bronze.
      c. Color: Dark bronze.
      d. Color: Black.
   4. Gold Anodic Finish: AA-M32C22A43 (Mechanical Finish: medium satin; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, impregnated color coating 0.018 mm or thicker) complying with AAMA 611; gold color.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Concrete Foundations: Construct according to Division 3 Section "Cast-in-Place Concrete," "Concrete Formwork," and "Concrete Reinforcement."
   1. Comply with details for reinforcement and for anchor bolts, nuts, and washers. Verify anchor-bolt templates by comparing with actual pole bases furnished.
   2. Finish for Parts Exposed to View: Trowel and rub smooth. Comply with Division 2 Section "Cast-in-Place Concrete" for exposed finish.

B. Concrete Pole Bases:
   1. Set pole bases to indicated depth below grade
   2. Dig holes large enough to permit use of tampers the full depth of hole
   3. Backfill in 6 inch layers and thoroughly tamp each layer so the compaction is equal to or greater than that of disturbed earth
   4. Extend concrete base 4 inches beyond pole base in all directions. Chamfer edges
   5. Concrete base for poles with 1-2 luminaires shall have minimum depths below grade
      a. Poles less than 10' – 36 inches
      b. Poles greater than 10' to 15' – 48 inches
      c. Poles greater than 15'to 27' – 72 inches
      d. Poles greater than 27' to 40' – 96 inches
      e. Poles greater than 40' to 50' – 144 inches
      f. Poles greater than 50' to 60' – 192 inches
      g. Poles greater than 60' sized per structural engineer
   6. Poles with 3-4 luminaires add 24 inches to base depth.
   7. Concrete bases shall be 8 inches above grade in landscaped areas
   8. Concrete bases shall be 30 inches above grade in traffic areas
   9. Concrete bases shall be 42 inches above grade in bus parking areas.

C. Install poles as follows:
   1. Use web fabric slings (not chain or cable) to raise and set poles.
   2. Mount pole to foundation with leveling nuts, and tighten top nuts to torque level recommended by pole manufacturer.

3. Secure poles level, plumb, and square.
4. Mount bolt cover over base.

D. Luminaire Attachment: Fasten to indicated structural supports.

E. Luminaire Attachment with Adjustable Features or Aiming: Attach luminaires and supports to allow aiming for indicated light distribution.

F. Lamp luminaires with indicated lamps according to manufacturer's written instructions. Replace malfunctioning lamps.

G. Wall Mounted Fixtures:
1. See architectural elevations.
2. Mount at 84 inches or above, unless otherwise indicated. All wall mounted fixtures shall be ADA compatible if below 84 inches.

3.2 CONNECTIONS

A. Ground equipment; see electrical pole base detail.
1. Tighten electrical connectors and terminals according to manufacturers' published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

B. Ground metal poles/support structures according to Section "Grounding"; see electrical base detail.
1. Nonmetallic Poles: Ground metallic components of lighting units and foundations. Connect luminaires to grounding system with No. 6 AWG conductor.

3.3 CONTROLS VERIFICATION

A. Verify operation of light pole or building luminaire controls. Verify photocell operation. Coordinate with owner for the schedule. Program time clock per owner or through software controls.

3.4 FIELD QUALITY CONTROL

A. Inspect each installed unit for damage. Replace damaged units.

B. Advance Notice: Give dates and times for field tests.

C. Provide instruments to make and record test results.

D. Tests and Observations: Verify normal operation of lighting units after installing luminaires and energizing circuits with normal power source, and as follows:
1. Measure light intensities at night if specific illumination performance is indicated. Use photometers with calibration referenced to NIST standards.
2. Check intensity and uniformity of illumination.
3. Check excessively noisy ballasts.

E. Prepare a written report of tests, inspections, observations and verifications indicating and interpreting results.

F. Malfunctioning Fixtures and Components: Replace or repair, then retest. Repeat procedure until units operate properly.

3.5 CLEANING AND ADJUSTING

A. Clean units after installation. Use methods and materials recommended by manufacturer.

B. Adjust aimable luminaires and luminaires with adjustable lamp position to provide required light distributions and intensities.

END OF SECTION 265600

SECTION 21 47 15 PERFORMANCE SOUND REINFORCEMENT SYSTEMS AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION OF THE WORK

A. Complete Audio and Video systems in the renovated school building, including, but not limited to, the following items:

1. An Audio-Visual system in the multi-use room, including a wired and wireless microphones, signal processors and amplifiers housed in a wall-mounted equipment rack, full-range loudspeaker system, a video system including operable cameras, video switcher with live streaming and projector with motorized screen.

2. Wiring and accessories, as needed, to provide complete and working Audio-Visual Systems, as described in the Drawings and Specifications.

1.02 RELATED DOCUMENTS

A. General Conditions and Requirements, Special Provisions, and applicable portions of Division I of the general contract are hereby made a part of this section.

B. Architectural, Structural, Mechanical, Electrical, and other applicable documents are considered a part of the Sound System documents insofar as they apply as if referred to in full.

1.03 SCOPE OF THE WORK

A. These Specifications, together with the related Drawings and General Conditions of the contract, comprise the requirements for the Audio-Visual Systems for the project.

B. Furnish, deliver, erect, install and connect completely all of the material and appliances described herein and in the Drawings, and supply all other incidental material and appliances, tools, transportation, etc., required to make the work complete, and to leave the Audio-Visual Systems in first class operating condition, excluding those items listed under Section 1.10, RELATED WORK IN OTHER SECTIONS.

C. Perform all assembly of equipment, wiring and inter-connection and soldering of wires to jacks, devices, terminals or equipment, using technical employees only, who are experienced in the installation of Sound System equipment and its inter-connectivity. Coordinate final utility rough-in locations with actual equipment furnished.

D. Verify dimensions and conditions at the job site prior to installation, and perform installation in accordance with these Specifications, manufacturers' recommendations and all applicable code requirements.

E. Verify all existing conditions before ordering equipment. Owner shall not be liable for costs associated with return of equipment.

1.04 QUALITY ASSURANCE

A. The intent of these Specifications is to describe and provide for complete Audio-Visual Systems of high professional quality and reliability. Professional performance standards by the Audio-Visual Systems Contractor (hereafter referred to as Installer) and the equipment will be required.

B. In all cases, the Owner and Architect shall determine the acceptability of the work based upon the visits, observations, and reports of the Audio-Visual Systems Consultant, BAi, LLC of Austin, Texas (hereafter referred to as Consultant).

1.05 SUBSTITUTIONS

A. Refer to Division 01 for specific substitution procedures and submittal requirements.

B. Many items are listed in the Specifications by the manufacturer's type or model number, without a detailed performance specification, and may not include the phrase "or approved equal". Where this is the case, no substitutions will be accepted, without a written request from the Installer and the written consent of the Consultant.

C. Where the phrase "or approved equal" appears, the item specified shall set a standard of quality and performance, based on the published specifications of the manufacturer and on the actual performance as known by the Consultant.

D. Requests for substitution, when forwarded by the Installer to the Consultant, are understood to mean that the Installer represents that he has personally investigated the proposed substitute product and determined that it is equal to or superior in all respects to that specified, that the same guarantee will be provided for the substitution as for the specified product, and that the Installer will coordinate the installation of the accepted substitute, making such changes as may be required for the work to be complete in all respects.

E. Substitutions will be considered on the basis of equal performance, only if requested prior to bid date, in writing. No substitutions will be allowed without prior approval.

F. Substitutions will not be considered if they are indicated or implied in Shop Drawing submissions without previous formal request, or, for their implementation, they require a substantial revision of the Contract Documents in order to accommodate their use

G. Space allocations and utility rough-ins have been designed on the basis of equipment items named by manufacturer and model number. If any equipment not so named is offered which differs substantially in dimension or configuration from the named equipment, provide scaled shop drawings showing that the substitute can be installed in the space available without interfering with other trades or with access for operation and maintenance in the completed project. The Installer shall coordinate final utility rough-in locations with actual equipment furnished.

H. Where substitute equipment requiring different arrangement or connections from those shown in the Drawings is accepted by the Consultant, install the equipment to operate properly and in harmony with the intent of the Drawings and Specifications, making all necessary incidental changes without increasing the Contract amount. Pay all additional costs incurred by adjoining or connecting trades.

I. All requests for substitutions should be submitted before the bid opening date. Substitutions shall be requested and approved in writing only, based upon these criteria. Substitutions requested after bid date will not be considered unless it is determined by the Consultant and Architect that such consideration is in the best interests of the Project.

1.06 INSTALLER QUALIFICATIONS

A. The work performed under this Section shall be performed by a Sound Systems contractor, normally engaged in the business of Audio-Visual Systems installation. The prospective contractor shall show proof, as part of the bid that the contractor has been in the Audio-Visual Systems installation business for a period of not less than five years and has successfully completed projects of similar size and scope.

B. Each bidder shall hold a current, valid franchise for the major lines of Audio-Visual equipment furnished by them under these Specifications.

C. All work shall be performed by employees of the sound subcontractor, and not by contract employees. Work crew must be supervised by a technician holding CTS-I certification.

D. All systems engineering and shop drawings shall be performed by a technician holding a CTS-D certification.

E. The Owner and Architect reserve the right to reject any bids submitted by firms without sufficient experience in projects of similar size and scope.

1.07 COOPERATION AND COORDINATION

A. Cooperate and coordinate as required with the other contractors who are responsible for work not included in this section.

B. Provide any and all information as required or requested by the Owner, Architect, Consultant, or General Contractor in order for this work to be completed to the satisfaction of the Owner, and in the best interests of the Project. Such assistance or information shall be transmitted in writing to the requesting party in all cases. All written correspondence shall be copied to the Consultant.

1.08 GUARANTEE AND WARRANTY

A. Guarantee all parts, labor, and workmanship furnished under this contract for a period of twelve months from the date of substantial completion.

B. During the warranty period, report to the site and repair or replace any defective materials or workmanship without cost to the Owner. Warranty service shall be rendered within 48 hours after request by the Owner. Equivalent replacement equipment shall be temporarily provided when immediate on-site repairs cannot be made.

C. Where warranties on individual pieces of equipment exceed twelve months, the guarantee period shall be extended to the warranty period of the particular items.

D. Furnish complete and working Audio-Visual Systems. Be of maximum assistance to the Owner during the guarantee period of the system, to the degree that maximum Owner satisfaction is assured.

E. After completion of the work, the Installer shall submit a Certificate of Warranty, stating commence and expiration dates and conditions of the warranty, for signature of both parties. Incremental warranties for completed portions of the work may be negotiated at the discretion of the Owner, if delays occur beyond the control of the Installer.

1.09 SHOP DRAWINGS AND SUBMITTALS

A. Completely detailed shop drawings shall be prepared prior to the procurement of equipment or commencement of work. With permission from the Architect, electronic files of select drawings will be made available to the Installer from the Consultant for a $500.00 USD handling and service fee. The available drawings shall include only: (1) Legend/Advisory Power Requirements, (2) Conduit Riser, (3) Floor and Reflected Ceiling Plans, (4) Section Views. Drawings shall be prepared and submitted on 30" x 42" paper. Equipment lists, data sheets, etc. shall be 8-½” x 11" size, properly bound into a single or multiple volumes as necessary. Submit quantity in accordance with Division 1, General Requirements.

B. Within 3 weeks after the notice to proceed, submit to the Architect/Owner identical copies of the following for approval:

1. A complete equipment list, with manufacturers' names, model numbers, and quantities of each item
2. Manufacturers' data sheets on all equipment items
3. Equipment rack layouts showing locations of all rack mounted equipment items
4. Floor plans and reflected ceiling plans, prepared at a scale of not less than 1/8”=1'-0", showing loudspeaker locations and orientation, wall plates, and all other related device locations
5. Proposed construction details for any custom fabricated items, including loudspeaker mounting, custom interface panels, patch panels, and wall plates. These details shall show dimensions, materials, finishes and color selection
6. Loudspeaker mounting details shall be certified by a structural engineer licensed in the State of Texas.

7. Comprehensive system schematics, showing detailed connections to all equipment, with wire numbers, terminal block numbers, and color coding
8. Riser diagrams showing conduit requirements with pull boxes, outlet boxes, physical cable layouts, part numbers of cable types used, and number of circuits in each conduit
9. Electrical power requirements for head-end and ancillary equipment. Include diagrams for any remote control of electrical power, in sufficient detail to coordinate with the electrical contractor, showing exact conduit requirements and locations for switched duplex receptacles
10. Certain other submittals as noted elsewhere in this Specification, and as may be required for various equipment items prior to construction, fabrication, or finishing of that item.
11. Submission of the Audio-Visual contract documents does not constitute a legitimate submittal, and will not be reviewed.
12. Incomplete submittals will not be reviewed.

C. All final documentation shall be submitted and approved before final acceptance by the Owner will be granted. Submit the following in accordance with Division 1, General Requirements.

1. A complete as-installed equipment list, listed by room, with manufacturers' names, model numbers, serial numbers, and quantities of each item
2. A complete and correct system schematic, showing detailed connections for all parts of the system, including wire numbers, terminal block numbers and layouts, and other designations and codes. System performance measurements as noted elsewhere in this Specification shall be documented. Include diagrams or charts showing final settings of all control knobs in the system (mixers, equalizers, power amplifiers, etc.). Submit copies of processor data files with software settings of each piece of equipment that is software controlled
3. Complete equipment rack layouts showing locations of all rack mounted equipment items
4. Floor plans and reflected ceiling plans, prepared at a scale of not less than 1/8"=1'-0", showing loudspeaker locations and orientation, wall plates, rack locations, and other related device locations
5. Riser diagrams showing as-installed conduit with pull boxes, outlet boxes, physical cable layouts, part numbers of cable types used, and number of circuits in each conduit
6. Manufacturer's warranties and operating instructions for each and every equipment item furnished. Include a copy of the certificate of warranty, signed by both parties
7. Technical Systems Operations Manual, custom-written by the Contractor, for the purpose of instructing the Owner's operating personnel in the detailed step-by-step operation of the system and preventive maintenance procedures. This manual shall include descriptions of the system components and their relationship to system function. This manual shall be bound separately and labeled appropriately.
8. Incomplete submittals will not be reviewed.

1.10 RELATED WORK IN OTHER SECTIONS

A. All conduit with pull strings, all electrical pull boxes, and all outlet boxes shall be furnished and installed under the electrical section of Division 26. Conduits shall be run continuously from outlet box to outlet box. Conduit stub-outs are not acceptable except as indicated in Drawings. Coordinate as necessary for proper installation.

B. All 120VAC power conductors and conduits associated with power circuits to all equipment locations shall be furnished and installed under the electrical section of Division 26. The 120VAC

power to the equipment racks shall be terminated inside the racks to AV Contractor supplied rack mounted outlets.

C. An insulated THW stranded copper ground wire, sized according to NEC, shall be installed under the electrical section of Division 26 from the equipment racks sheet metal to the primary ground point within the building, and terminated at each end to bare metal using approved connectors and clamps.

D. All built-in millwork and grillecloth shall be furnished under other sections.

E. Electrical circuits shown in the AV system Drawings are for reference only in depicting the number of electrical circuits needed for operation of these systems.

PART 2 PRODUCTS

2.01 GENERAL

A. All items shall be new and unused, unless specifically noted otherwise.

B. The following sections specifically list the acceptable equipment types and items for this project. Where quantities are not noted, they may be obtained from the Drawings. In the event of a discrepancy between the Specifications and the Drawings, the greater quantity or better quality shall be furnished.

C. Refer to Section 1.05, SUBSTITUTIONS of this Specification.

2.02 WIRE AND CABLE

A. Wire not installed in equipment racks, not portable, or not installed in conduit shall be plenum-rated and meet all applicable codes.

B. Voice coil loudspeaker: West Penn HA210 stranded 10AWG jacketed twisted pair, or approved substitution

C. Constant voltage (70.7-volt) loudspeaker cable (runs of less than 300 feet): West Penn 225 stranded 16AWG jacketed twisted pair, or approved equal. Provide 25225B Plenum-rated cable, where applicable.

D. Constant voltage (70.7-volt) loudspeaker cable (runs of 300’ to 500’): West Penn 226 stranded 14AWG jacketed twisted pair, or approved equal. Provide 25226B Plenum-rated cable, where applicable.

E. Constant voltage (70.7-volt) loudspeaker cable (runs of 500’ or more): West Penn 227 stranded 12AWG jacketed twisted pair, or approved equal. Provide 25227B Plenum-rated cable, where applicable.

F. Microphone-level audio cable (installed in conduit, not portable): West Penn Wire 292 stranded 20AWG jacketed twisted pair with foil shield, or approved substitution.

G. Line-level audio cable and all inter-rack audio cable: West Penn Wire 292 stranded 20AWG jacketed twisted pair with foil shield, or approved substitution.

H. Wireless microphone antenna cable: Belden 9310, 50-ohm RG-58A/U coaxial cable with Amphenol 50-ohm connectors, or equal. For runs that exceed 50 feet, Belden 9914, 50 ohm RG-8A/U type coaxial cable or approved equal with Amphenol Connex 112563 connectors.

I. Data wire for AV Control Network: Mohawk Category 6 F/UTP Shielded Cable, or approved equal.

J. Other equipment control cables shall be stranded wire, appropriately shielded, of gauge and number of conductors required by the manufacturer for proper operation of the system or equipment item furnished.

K. Wire and cable for all devices shall be supplied in accordance with the recommendations of the device manufacturer and the National Electrical Code.

2.03 JACKS, CONNECTORS, FLOOR BOXES AND WALL PLATES

A. All plate-mounted connectors shall be ground-insulated from the plates on which they are mounted.

B. Floor-mounted jacks, unless noted otherwise, shall be installed in floor pockets (described in this section). The interior plates shall be painted or anodized black. Nomenclature shall be engraved into the interior plate of each floor box with 1/8” block letters filled with white paint.

C. All wall plates installed in partitions with exposed masonry or wall tile shall be standard brushed stainless steel finish plates. Nomenclature shall be engraved into the plate with 1/8” block letters filled with black paint. All mic locations shall be numbered logically and consecutively, starting from one (1), as shown on Drawings.

D. For non-standard custom panels at stage and performance areas, connectors shall be installed on 1/8” thick black anodized brushed aluminum panels. Nomenclature shall be engraved into the panels with 1/8” block letters filled with white paint.

E. All wall plates installed in partitions with exposed painted gypsum board shall be commercial-grade vinyl in color white. Nomenclature shall be engraved into the plate with 1/8” block letters filled with black paint. All mic locations shall be numbered logically and consecutively, starting from one (1), as shown on Drawings.

F. Floor boxes shall be sized to accommodate Audio-Visual and 120VAC connections as indicated in the Drawings, and shall be welded steel construction, powder-coated for durability.

G. Floor box shall be Ace Backstage model 124SLBK with custom panels as indicated in the Drawings. Floor box to be provided by Div. 27, and installed by Div. 26. (Qty: 2)

H. Unless otherwise specified, all jacks and connectors for the Audio-Visual Systems shall be as follows:

1. Microphone and line-level input jacks: Neutrik NC3FD-L-1-B 3-pin female XLR panel-mount jacks with gold-plated contacts, or approved equal.
2. Audio output jacks: Neutrik NC3MD-L-1-B 3-pin male XLR panel-mount jacks with gold-plated contacts, or approved equal.
3. Female cable-end audio connectors: Neutrik NC3FX-B 3-pin female XLR connectors with gold-plated contacts, or approved equal.
4. Male cable-end audio connectors: Neutrik NC3MX-B 3-pin male XLR connectors with gold-plated contacts, or approved equal.
5. 4-Pole Loudspeaker jacks: Neutrik NL4MP 4-pole Speakon® connectors with gold-plated contacts and mating NL4FC-B with gold-plated contacts, or approved equal.
6. 8-Pole Loudspeaker jacks: Neutrik NLT8MP 8-pole Speakon® connectors with gold-plated contacts and mating NLT8FX-BAG with gold-plated contacts, or approved equal.
7. Wireless antenna wall-mount jack: Neutrik NBB75FI BNC bulkhead jack, or approved equal.
8. RJ 45 connectors: Neutrik NE8FDY-C6 EtherCon D-Series data connector.
9. Network data jacks: Neutrik NE8FDX-P6-B CAT-6 shielded panel connectors
10. Furnish and install the required number of jacks and connectors as shown on the Drawings.

2.04 EQUIPMENT RACKS AND POWER DISTRIBUTION

A. Furnish equipment racks for use in housing equipment including, but not limited to, power amplifiers, signal processors, microphone splitters, playback equipment, intercom equipment, etc.

B. Equipment rack colors shall be satin black. All mounting screws shall be theft resistant.

C. Heat-producing components – such as power amplifiers – shall be mounted with one 1-3/4" vent panel installed between units. Fill all other portions of unused rack front sections with matching blank panels.

D. Power distribution within racks shall be supplied via sequentially switched convenience outlets, allowing incremental switching of components. Program so that when rack power is switched, power amplifiers are last to turn on, and first to turn off.

E. Install the required number of units, of sufficient size to accommodate the equipment specified, at the locations indicated in the drawings.

F. Furnish (5) sets of replacement keys for each equipment rack type of lock.

G. Furnish and install power sequencing equipment for Equipment Rack 'WR'.

H. Furnish and install the following:

1. Equipment Rack 'WR': Middle Atlantic Products model EWR-12-17SD wall-mounted rack with lockable front door, or approved equal. Furnish and install accessories including model UD utility drawer, as indicated in Drawings. (Qty: 2 ea.)

2. Sequenced Power and Conditioner: Furnish and install Furman model CN-2400S power sequencer and conditioner, or approved equal. Power On/Off sequence control shall be available on the touchscreen. Amplifier power shall be controlled from the remote relay and not connected directly to the power sequencing. Amplifier shall be set to standby when turned off. (Qty: as required)

2.05 DIGITAL SIGNAL PROCESSING

A. The audio processing shall be in the digital domain following the input source and shall remain until power amplification is required.

B. The system processor shall provide up to 64 x 64 networked audio channels individually configurable as either Q-LAN or AES67 formatted networked audio. Additionally, the system processor shall include 8 x 8 Software-based Dante network audio channels and is licensable for up to 32 x 32 Software-based Dante capacity. Software-based Dante channels used subtract from the overall 64 x 64 network audio capacity. The system processor shall support an 8-channel total analog I/O capacity and shall be presented as 8 Flex Channel I/O which shall be software definable as analog inputs or outputs in single channel increments in any combination ratio.

C. The system processor shall have the following front panel controls and indicators: Unit ID button and Power On blue LED. Device Status, monitoring, and logging shall be provided by a standard web interface.

D. On the rear panel, the system processor shall have two 3-pin RS232 Euro Block Connectors, 8 GPI general purpose control inputs on a 10-pin Euro Block Connector, 8 GPIO general purpose control outputs on a 10-pin Euro Block Connector, USB C and B connectors to support AV bridging with QSC Q-SYS cameras and/or present itself as one or more multi-channel USB audio interfaces. Q-SYS Network: LAN A RJ45 1000 Mbps only, LAN B: RJ45 1000 Mbps only. The system processor shall be mountable in a standard AV rack.

E. The system processor shall operate from a single design, which can be comprised of components, wiring, links, text, and graphics on a single or multiple schematic pages. Designs shall include any of the following DSP function blocks, test and measurement components, control components, and layout components: Acoustic Echo Cancellers, SIP Softphone instances, USB Audio host and device blocks, Audio Players, Audio Streaming components, Crossfaders, Crossovers, Delay

components, Auto Gain control elements, Compressors, Gates, Duckers, Expanders, Ambient Noise Compensators, Limiters, Gain blocks, Graphic Equalizers, Parametric Equalizers, FIR Filters, All-Pass Filters, Band-Pass Filters, Band-Stop Filters, High-Pass Filters, Low-Pass Filters, FIR High-Pass filters, FIR Low-Pass Filters, Dual-Shelf Equalizers, Notch Filters, Meters, Matrix Mixers, Gain-Sharing Automatic Mixers, Gated Automatic Mixers, Signal Routers, Public Address Routers, Room Combiners, Signal Presence Meters, Tone Generators, Tone and Noise Generators, Dual Trace FFT Measurement Modules, Real Time Analyzers, Signal Injectors, and Signal Probes.

F. The system processor shall support custom user control interfaces on either proprietary touch screen controllers, network computers utilizing a control application, iOS devices, or any device with a standard web browser. Custom control interfaces shall be capable of having multiple user-selectable pages with different controls on each.

G. Native system control shall be accomplished via proprietary touch screen controllers located at locations as indicated in the drawings. The Installer shall program a custom user interface incorporating all end user controls, to include controls and presets for default house system, as as well as controls and presets for system for use with the portable mixing console. The custom user interfaces shall be programmed to remotely power on/off the system via the touch screen controllers. Custom control interfaces shall be capable of providing multiple user-selectable pages with different controls on each. All program file pages not intended for end-user operational access shall be password protected.

H. Provide and install most current version of manufacturer's configuration software at time of installation. All DSP hardware devices shall be updated to the most current firmware version at time of installation; all devices shall run the same firmware version.

I. Provide all data interconnection cabling as shown.

J. System programmer shall be QSys Level 2 certified.

K. Include all licensing for DSP plug-ins and Dante™ routing by software, as required.

L. Furnish and install the following as indicated in the accompanying Audiovisual drawings, or approved equal:

M. Furnish and install the following, mount as indicated in the Drawings. These devices are associated with the Multi-Purpose Room:

N. Furnish and install the following for the Multi-Purpose Room:

1. Digital Signal Processor: QSC Q-Sys CORE 8 Flex. (Qty: 1)
2. DSP I/O Expander: QSC QIO-ML4i. (Qty: 1)
3. Type "C" Control Panel: QSC TSC-70-G3 5" touch control panel. (Qty: 3 ea)
4. Automated Room Combiner: Ivie model IR-3D Infrared sensor system. Mount at locations shown in drawings. Set jumper to Analog mode. (Qty: 1 system)
5. Network Switches: Netgear AV Line M4250-PoE+ Model network switch with 10/100/1000Mbps half / full duplex RJ45 ports, SFP/SFP+ 1/10GbE ports. Size appropriately for device quantities and POE requirements. Provide 10GbE SFP Fiber transmitters as noted in drawings. Size as required. (Qty: as shown)
6. Wireless Access Point: Ubiquiti Networks UAP-IW-HD 802.11ac PoE-powered Wi-Fi access point. This device is dedicated to the Sound System data network and is not associated with any building network functionality. Coordinate wireless frequencies and channels with owner. (Qty: as shown)

O. DSP Programming:

1. Successful Contractor shall be responsible for programming the software configuration file for system based on intended functionality as follows:
    a. Volume control of local wired and wireless microphones, Bluetooth media inputs, audio from video.
    b. Bluetooth pairing controls.
    c. Video System power, screen control and routing.
    d. Room Combiner override.
2. Contractor shall provide a review copy of each file to the Consultant for review no later than two weeks prior to scheduled commissioning trip.

2.06 POWER AMPLIFIERS

A. Each power amplifier shall have an input connector which is either a screw-type barrier strip or XLR type. Output connections shall be barrier strip. Other types of connectors shall not be accepted.

B. All power amplifiers shall have detented stepping input level controls. Install the units in the equipment racks, and connect as indicated in the Drawings.

C. Provide security covers on all amplifiers.

D. Furnish and install the following for the Multi-Purpose Room system:

1. PA-1: QSC model CX-Q 2k4 installed in Equipment Rack ‘WR’ as indicated in the Drawings

2.07 LOUDSPEAKERS

A. Measure and record the impedance of each driver at the amplifier terminals. High frequency drivers shall be measured at 1000Hz; low frequency drivers shall be measured at 250Hz. Include the measurements in the final documentation.

B. Verify factory loudspeaker color prior to product acquisition.

C. Furnish and install the following in the Multi-Purpose Room System:

1. Pendant Loudspeaker: JBL Control 67P/T Full-Range Pendant Loudspeaker. (Qty: 15 ea.)

2.08 ASSISTIVE LISTENING SYSTEM

A. Furnish and install an assistive listening system in the Auditorium for use by hearing-impaired persons.

B. The assistive listening system shall be capable of broadcasting audio over both the 72 MHz frequency and 2.4/5.0 GHz Wi-Fi frequencies, allowing users to receive the audio through a receiving device with ear speaker/headphones or directly to Bluetooth enabled hearing aids. The 72 MHz frequency shall be transmitted to a receiving device as defined below. The 2.4/5.0 GHz frequency shall be transmitted to personal smart devices such as cellular phones and tablets through a free application as defined below.Furnish and install the following:

C. The stationary RF transmitter shall be capable of broadcasting on 57 channels. The transmitter shall have an SNR of 80 dB or greater. The output power shall be adjustable to quarter, half or full. Channel tuning shall be capable of being locked. The device shall have an audio frequency response of 50 Hz to 15k Hz, ±3 dB at 72 MHz. It shall have two (2) mixing audio inputs and a mixed signal output. The device shall have the following audio controls: input level, mix level and an adjustable low pass filter (contour). The device shall have an audio processor that is capable of automatic gain control and limiting. The Listen Technologies LT-800-072 is specified.

D. The stationary audio over Wi-Fi server shall be capable of delivering 2 mono / 1 stereo audio channels in 1 RU space and shall be capable of connecting to and residing on the venues existing local area network (LAN) via a single RJ45 Ethernet connection. Venue content and channel listings shall be administered through a cloud managed service. The audio over Wi-Fi server shall be compatible with the latest Wi-Fi IEEE 802.11 standards and capable of handling up to 1,000 simultaneous users. The Listen EVERYWHERE 2 Channel Server LW-100P-02 is specified.

E. The RF receiver shall be capable of receiving on 57 wide and narrow band channels. The receiver shall have a signal-to-noise ratio of 80 dB or greater and shall have an audio frequency response of 50 Hz – 15 kHz (±3 dB). The device shall employ a unique DSP SQTM noise reduction technology. The unit shall have a programmable squelch circuit. The unit shall incorporate a multi-functional display that indicates battery status, inventory number and channel. The device shall have the option of being lanyard or belt clip worn and the lanyard shall have the option of an integrated neck loop. The device shall have a USB connector used for inventory control, set up, charging and firmware upgrades. The device shall incorporate automatic battery charging circuitry and use a non-proprietary lithium ion battery. The device shall have additional charging contacts to allow multiple charging options. The Listen LR-4200-072 is specified.

F. The Wi-Fi receiver shall be personal smart devices such as cellular phones and tablets as provided by the users. The audio over Wi-Fi shall be delivered to the personal smart device via a free application downloaded onto the personal device. When the free application is launched, the personal smart device will automatically connect to the audio over Wi-Fi server. The application will list the available channels and play the audio when selected by the user. The free application shall also be capable of containing user documentation and instructions in addition to ads, promotional banners and videos. The app shall be customizable, allowing the venue to load in its color pallet and logos. The Listen Technologies Listen EVERYWHERE App is specified.

G. Furnish and install a COMBO Wi-Fi/RF assistive listening system in the Multi-Purpose Room System:

1. Listen Technologies Performance System LCS-121-01 kit. (Qty: 1 system)

2.09 WIRELESS MICROPHONE SYSTEMS

A. Operating frequencies shall be selected so as to avoid interference. Consult with the manufacturer for frequency coordination.

B. The wireless receivers shall be provided with rack-mount kits.

C. Furnish and install the following wireless system and accessories:

1. Shure model ULXD4Q quad channel wireless receiver. (Qty: 2 ea.)
2. Shure model ULXD8 tabletop transmitter with Shure model MX410 cardioid gooseneck microphone for ULXD8 transmitter. (Qty: 8 ea.)
3. Shure model ULXD2/SM58 handheld transmitter. (Qty: 2 ea.)
4. Shure model ULXD1digital bodypack transmitter with WL 183 omni-directional lavalier microphone. (Qty: 2 ea.)
5. Point Source Audio model CO-8WS omni-directional earworn microphone adapted to work with Shure beltpack. Verify color selection with owner prior to product acquisition. (Qty: 2)
6. Shure model UA864 directional wall-mount antenna, installed at mark ‘WL’, as indicated in Drawings. (Qty: 2)
7. Shure model SBC850 8-bay docking station for charging ULXD8 tabletop transmitter. (Qty: 1 ea)
8. Shure model SBC200-US Dual Docking Charger with power supply. (Qty: 2)

9. Shure model SB900B Rechargeable Lithium-Ion Battery. (Qty: 12)

2.10 MICROPHONES, AND ACCESSORIES

A. Provide a variety of stands for microphones. Stands should be ebony in color, have weighted bases, and have telescopic height adjustment.

B. Provide high quality microphone cables in various lengths.

C. Furnish and install the following:

1. Atlas Sound model MS12CE Stand with PB21XEB Boom Arm, or approved equal. (Qty: 2 ea.)

2. Shure model SM58-LC handheld dynamic cardioid microphone. (Qty: 2)

3. Portable microphone cable: Whirlwind model MKQ25NP-Black. (Qty: 2)

2.11 RECESSED FLOOR POCKETS

A. Recessed floor boxes shall be used in the auditorium to house microphone and monitor speaker connections.

B. Modify the interior plate to accept connectors as indicated in the drawings. The interior plates shall be painted or anodized black. Nomenclature shall be engraved into the interior plate of each floor box with 1/8" block letters filled with white paint.

1. Furnish the following floor pockets to the Electrical Contractor for installation:

a. ACE Backstage 122SLBK Floor Pocket with ISO102BBX Back Box. Provide PNL-106 Plate with PE power receptacle plate. Provide Voltage Divider between low voltage connections and Electrical Receptacles. Recess the lid flush with the stage floor. Coordinate blocking requirements with ARCH/GC. (QTY: 3 ea.)

2.12 VIDEO ENCODER AND DECODERS

A. Provide and install a video encoders and decoders in the configuration as shown and terminate as indicated.

B. Unit to have HDMI inputs and HDMI outputs in the configuration as shown in the drawings, be HDCP compliant, have EDID minder and isolated inputs and outputs, RS-232 controllable, individually controlled inputs and outputs, automatic equalization and re-clocking and have an internal power supply.

C. Furnish and install all necessary manufacturer recommended wire and connectors for installation.

1. Visionary Solutions D5100 Decoder Output device, mount one at projector, mount one to the back of the mobile TV cart, mount one in the rack for Live StreamVideo switching system: (Qty: 3 ea.)

2. Visionary Solutions DuetE-WP-BT Wallplate Encoder Input device: (Qty: 3 ea.)

2.13 VIDEO PRODUCTION EQUIPMENT

A. Provide and install a video streaming system as shown in the drawings.

B. Unit to have 12G-SDI inputs, HDMI inputs, and support NDI 5 or NDI/HX Network and HDMI and NDI outputs in the configuration as shown in the drawings, individually controlled inputs and outputs, automatic equalization and re-clocking and have an external power supply.

C. Unit shall include audio mixing from video inputs and from (4) local XLR analog audio inputs.

D. Unit shall provide direct to internet video streaming in both RTP and MPEG-TS formats.

E. Furnish and install all necessary manufacturer recommended wire and connectors for installation.

1. Furnish and install the following in the Production Studio:

    a. Video Switcher: Epiphan model Pearl 2 Rackmount: (Qty: 1 ea.)

2.14 PTZ CAMERA

A. Furnish and install a wall mounted pan/tilt/zoom camera at the back and two sides of the auditorium, as shown in the drawings. Coordinate exact locations with Owner, including which locations include camera installation and which locations include cable, infrastructure and plate only, for future use.

B. Furnish and install the following:

1. QSC Q-SYS NC-20x60 camera with HDMI and 3G-SDI output and all standard accessories. Verify actual camera locations with Owner prior to install. (Qty: 2 ea)

2.15 VIDEO MONITOR SCREENS

A. Provide the following video monitor . To be connected to wall mounted video transmitter. Units to be provided with all cabling and hardware as required for a complete installation.

B. Furnish and install the following:

1. Units to be Panasonic TH-75EQ2W 75” Class HD Digital Display with Chief PFC2000B large flat panel mobile cart, or approved equal. (Qty. 1 ea.)

2.16 VIDEO PROJECTOR

A. Furnish and install ceiling mounted projection high light output video projector for projection of video, data, and graphic images on the projection screens in the areas as indicated.

B. Perform all setup procedures and image convergence for each input according to the manufacturer’s recommendations. The image shall be adjusted for full available screen width for each input.

C. Projectors shall be installed plumb and level with the screen. Lens shift shall be used for all image adjustment, digital geometry correction or corner adjustment shall not be used when aligning the projected image to the screen.

D. Video projector shall be 3-chip 3LCD projector with WUXGA native resolution and 16,000 ANSI lumen brightness. Shall have HDMI input that is HDCP compliant and lens, verify with field conditions. Shall have RS-232 control via network or control cable to allow integrated controls from Audio Visual DSP Control Panels.

1. Furnish and install the following:

    a. Unit to be Epson EB-PU2116B with ELPLM08 medium zoom lens for throw distance as shown. Verify photometrics in field. (Qty: 1 ea.)

    b. Mounting Hardware: Chief model VCMU projector mount, with hardware as required for structural mounting. (Qty: 1)

2.17 MOTORIZED PROJECTION SCREENS

A. Furnish and install a projection screens in the area as indicated. Verify locations with architect prior to installation. Refer to architectural drawings for size and location.

B. Provide black extruded aluminum case for initial installation process. Install actual screens only when a clean and controlled environment is present. Provide all support as required, including threaded rods, supplemental framing, unistrut, anchors, and blocking. Screen case to be hung plumb and square.

C. The viewing surfaces shall be seamless. The screens shall operate on 120 VAC. Motor to be mounted inside the roller, to be 3-wire, instantly reversible with lifetime lubrication. Motor to be mounted with rubber vibration isolators. Case to be 22 gauge steel with black oxide finish.

D. All painting, metalwork, and woodwork shall be completed prior to installation, to protect against damage by other contractors.

E. The screens shall be delivered to the job site, still in factory crating, while access is still available for a screen of these dimensions. Store the screens in such a way as to protect it from moisture and adverse weather conditions. Take all precautions necessary to protect the screen from damage during storage and installation. Projection screens must remain in a climate-controlled environment at all times.

F. Furnish and install the following:

1. Projection Screen: DaLite Professional Electrol 92”X164” viewing surface area (188” diagonal) 16:9 format screen with Matte White viewing surface. Provide LVC low voltage control module for interface with Q-SYS control system. Include an additional 4’ of extra black drop on the screen surface. (Qty: 1)

PART 3 EXECUTION

3.01 INSTALLATION

A. Furnish components, racks, wire, cabinetry, connectors, materials, parts, equipment and labor necessary for the complete installation of the systems, in full accordance with the recommendations of the equipment manufacturers and the requirements of the Drawings and Specifications.

B. Installation shall follow standard broadcast wiring and installation practice, and shall meet or exceed industry standards for such work, with particular attention given to any installation instructions in Part 2 of these Specifications.

C. Equipment shall be held firmly in place with proper types of mounting hardware. All equipment affixed to the building structure must be self-supporting with a safety factor of at least five. All equipment shall be installed so as to provide reasonable safety to the operator and occupants. Supply adequate ventilation for all enclosed equipment items which produce heat.

D. Furnish the system to facilitate expansion and servicing using modular, solid-state components. All equipment shall be designed and rated for continuous operation and shall be UL listed, or manufactured to UL standards.

E. Observe proper circuit polarity and loudspeaker wiring polarity. No cables shall be wired with a polarity reversal between connectors with respect to either end. Special care shall be taken when wiring microphone cables, to ensure that constant polarity is maintained. Balanced audio connectors shall be wired as follows.

Wire	Connector	Signal
Black	Pin #3 or Ring	Negative
Red or White	Pin#2 or Tip	Positive
Bare	Pin#1 or Shield	Ground

F. Provide all audio circuits balanced and floating, except as noted in the Specifications or directed by the Consultant at the time of final equalization and testing. Shields of audio cables shall be grounded at one end only, at the outputs of the various equipment items in the system.

G. Route cables and wiring within equipment racks and cabinetry according to function, separating wires of different signal levels (microphone level, line level, amplifier output, 120VAC, control, etc.)

by as much physical distance as possible. Neatly arrange and bundle all cables loosely with plastic cable ties. Cables and wires shall be continuous lengths without splices.

H. All system wire, except spare wire, after being cut and stripped, shall have the wire strands twisted back to their original lay and be terminated by approved soldered or mechanical means. No un-terminated wire ends will be accepted. Heat-shrink type tubing shall be used to insulate and dress the ends of all wire and cables. Include a separate tube for the ground or drain wire.

I. All cables in conduits shall be insulated from each other and from the conduit the entire length and shall not be spliced. All cables and wires are to be continuous lengths without splices.

J. All solder joints and terminations shall be made with rosin-core solder.

K. Temperature regulated soldering irons rated at least 60 watts shall be used for all soldering work. No soldering guns or temperature unregulated irons shall be used on the job site.

L. Mechanical connections shall be made using approved connectors of the correct size and type for the connection. Wire nuts will not be accepted.

M. Each mechanical connector shall be attached using the proper size controlled-duty-cycle ratcheting crimp tool which has been approved by the manufacturer of the connectors. Conventional non-ratcheting type crimping tools are unacceptable, and shall not be used on the job site.

N. Label all wires in racks and console as to destination and purpose with permanent labels. Clearly and permanently label all controls, connections, and equipment at the front and back of the rack with permanent Lamacoid labels. Wall plates and custom panels shall be engraved and filled with contrasting paint, unless otherwise noted. All labeling shall be completed prior to final system inspection.

3.02 SOUND SYSTEM FINAL TESTING AND EQUALIZATION

A. Installer shall perform thorough preliminary testing of the Sound Systems prior to the final inspection by the Consultant. All systems and subsystems shall be tested to ensure that they are in proper working order and meet the performance specifications outlined in Part 3.03 below. Build the program for the digital signal processor and submit it to the consultant for review prior to commissioning. Install the processing program on the digital signal processor and test it for functionality.

B. The completed Sound System shall be physically inspected by the Consultant to assure that all equipment is installed in a neat and professional manner, and in accordance with these Specifications. The Audio System shall be inspected and equalized by the Consultant with assistance from the Installer. Provide a minimum of two weeks' notice to the Consultant for final inspection and equalization.

C. The testing and equalization work shall be performed after the installation work has been completed, but prior to any use of the system. During the testing and equalization work, the Installer shall have on the job site at least one (1) competent technician who is familiar with the project, and who will be prepared to stay as long as his services are needed. It is estimated that approximately four (4) hours will be required for this work.

D. The process of equalizing and testing the system may necessitate moving and adjusting certain loudspeakers. Adjustments shall be performed without claim for additional payment.

E. Coordinate as necessary to ensure a totally quiet room during the Sound System testing and balancing period.

F. Prior to requesting systems testing, verify the following:

1. All systems are in first-class working condition and free of short circuits, ground loops, parasitic oscillations, excessive system noise beyond published specifications of the equipment, hum, RF interference, or instability of any form.
2. All specified equipment, including loose and portable equipment is on the job site for proper accounting.
3. All loudspeaker circuits have been tested, are configured at the proper crossover frequency, and are in perfect working order. Furnish impedance measurements of each circuit prior to final tests.
4. All equipment controls are labeled, even if unused. If permanent labels cannot be furnished prior to system inspection, temporarily label every control as to its function with write-on tape. Supply labels or markers suitable for indicating knob settings after equalization is performed.
5. Operation manuals for every equipment item furnished are on hand at the job site.
6. Installer shall provide all signal processing software loaded on a portable PC and ready for use at time of testing. Installer shall provide a calibrated RTA and microphone, and pink noise generator at time of testing.
7. Installer shall provide a temporary wireless router at the DSP to remotely connect to the DSP from anywhere within the Project area.

G. Should the performance testing show that the Installer has not properly completed the systems, the Installer shall make all necessary corrections or adjustments and a second demonstration shall be arranged at the Installer's expense.

H. The final acceptance of the system by the Owner will be based upon the report of the Consultant following inspection, testing, and demonstration. A list of items in need of completion or correction shall be prepared by the Consultant, which must be corrected by the Installer before final acceptance will be granted.

3.03 SOUND SYSTEM PERFORMANCE

A. After equalization and testing, the Sound System shall meet or exceed the following specifications:

1. System shall be free of short circuits, ground loops, parasitic oscillation, excessive system noise, hum, RF interference, and instability of any form.
2. Maximum SPL with band-limited pink noise input to the system shall be 105 dB before audible distortion occurs.
3. Spatial variation in SPL at 4 kHz octave band pink noise shall be within a tolerance of plus or minus 2.5 dB SPL.
4. Acoustic response of the system shall be plus or minus 1.5dB along a line which is +5dB per octave from 65 Hz to 125 Hz, flat from 125 Hz to 4 kHz, and which rolls off at 2dB per octave to 16 kHz.

3.04 OWNER TRAINING AND FAMILIARIZATION

A. The Installer shall furnish the Owner's representatives with training necessary to properly operate the systems. Demonstrate in detail all functions of the systems. Provide a minimum of 8 hours for this basic training, broken up into several training sessions, at the discretion of the owner. These training session shall be videotaped by the installer and copies provided to the Owner with the as-built documentation.

B. The Installer shall have a qualified representative, familiar with the Audio-Visual System, to assist in operation at (1) scheduled event in the Cafeteria, selected by the Owner.

C. END OF SECTION 27 41 15

SECTION 283000

FIRE ALARM WITH VOICE EVACUATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SCOPE

A. The scope of work is to install a complete operational licensed fully addressable manual fire alarm system with pull stations at all exits, visual devices in all common and multi-use spaces, remote annunciator panel(s), and a main fire alarm control panel (FACP).

B. Fire alarm provider shall compute all devices requirements and provide expansion panels as required. Contractor shall coordinate power for any expansion panels with electrical contractor and provide 120V circuits as required. Contractor shall bid a complete and working system. Refer to specifications for devices and locations in addition to the floor plan drawings. The contractor shall be responsible prior to bid for a price for a complete system to include; manual stations, detectors, signal equipment, controls, expansion panels, and devices. The drawings are schematic in nature and include approximate locations of devices. The fire alarm contractor shall coordinate the exact location of the visual signaling device in accordance with the candela of the installed devices.

C. Provide expansion panels or NAC panels to supply additional signal or initiating circuits for a complete system.

D. Daisy chain campus panels together for one complete system. All signals shall be received by the main FACP. All expansion panels shall be compatible with the main FACP. Provide fiber optic cabling between buildings with wire to fiber wire convertors.

E. Provide software programming for individual testing of devices without putting the building in alarm (walk-thru mode) or shutting down the entire system.

F. Provide interface and connection with Dry Pipe System for full monitoring and alarm.

G. Provide interface and connection to Pre-action System for full monitoring and alarm.

H. Provide interface and connection to Air Sampling Smoke Detection System for full monitoring and alarm.

I. This section provides for the supply and installation of fire alarm system components, which includes manual pull stations, detectors, signal/alarm devices, wiring and conduit installed in the fire control panel (FACP) as specified in Specification Sections Fire-Suppression Piping Wet-Pipe Sprinkler System, Fire-Suppression Piping Dry-Pipe Sprinkler System, Fire-Suppression Piping Preaction-Type Sprinkler System and Air Sampling Smoke Detection System. These components shall be integrated into the building's general fire alarm system AND the pre-action and control system. All equipment in this section shall be compatible with the new Fire Management System, and installed and formatted in a similar fashion.

J. It is the intent and requirement of these documents that all the sprinkler/detection/alarm systems shall be incorporated into one integrated system, with sole-source responsibility. Thus, some devices

(such as smoke detectors) can be utilized to signal the building, wet, dry and preaction alarm sequences. It is not intended nor is it acceptable to provide two or more “stand alone” systems.

1.3 SUMMARY

A. This Section includes fire alarm systems with manual stations, detectors, signal equipment, controls, and devices.

B. Related Sections include the following:
   1. Section “Door Hardware” for door closers/holders/smoke detectors, electric door locks, and release devices that interface with fire alarm systems.
   2. Section “Control/Signal Transmission Media” for transmission media used for control and signal circuits.

1.4 DEFINITIONS

A. FACP: Fire alarm control panel.

B. LED: Light-emitting diode.

C. RAP: Remote Annunciator Panel

D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.5 SYSTEM DESCRIPTION

A. General: Noncoded, addressable-analog system with manual and automatic alarm initiation; automatic sensitivity control of certain smoke detectors; and multiplexed signal transmission dedicated to fire alarm service only. “System shall individually identify each addressable initiating device and other addressable monitor functions. System shall be capable of individually operating each alarm notification appliance and other addressable monitor functions.” Zoning is not acceptable.

B. Provide a fully automatic fire alarm in all building. Fire Alarm system shall be configured such that an alarm condition initiated in one building with activate annunciation devices in all other buildings on the campus. Provide a complete intelligent analog addressable fire alarm system, compliant with the more stringent of local codes having jurisdiction.

C. A full system test/inspection shall be provided by the fire alarm Contractor for a period of one (1) year as a part of the contract.

D. The system shall operate as on integrated protected premise fire alarm control system. Changes in the status of monitored points shall be detected by the microprocessor based fire alarm control panel. Sensor “dirty” and “excessively dirty” trouble conditions shall report automatically. Devices shall be listed by UL for sensitivity testing by means of the portable programmer/tester or by a readout from the control panel. Each addressable device shall be set electronically, devices requiring dipswitch settings, rotary switch settings, staples or jumper settings are not acceptable. Smoke detectors shall alarm at their programmed sensitivity settings and shall not revert to a common default setting when their operating system segment is in the fail safe degrade mode. System shall individually identify each addressable initiating device and other addressable monitor functions. System shall be capable of individual operating each alarm notification appliance and other addressable monitor functions. System shall be capable of individually operating each alarm notification application and other control functions. Life safety alarm function programs shall perform automatically upon system alarm actuation. In addition, control points may be operated manually at any time by the attendant through appropriate keyboard commands. The system FACP shall also provide integral programmable

function control switches to allow personal to manually operate specific pre-programmed control output functions.

E. The system as described shall be installed, programmed, tested and delivered to the Owner complete and in fully operational condition. The system shall include all necessary hardware, software, raceways and interconnecting wiring to accomplish the requirements of this specification and the Contract Drawings.

1.6 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show details of graphic annunciator.
1. Wiring Diagrams: Detail wiring and differentiate between manufacturer-installed and field-installed wiring. Include diagrams for equipment and for system with all terminals and interconnections identified.
2. Battery: Sizing calculations.
3. Floor Plans: Indicate final outlet locations and routings of raceway connections.
4. Device Address List: Coordinate with final system programming.
5. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.

C. Coordination Drawings: Plans, sections, and elevations drawn to scale and coordinating installation of smoke detectors, control modules, and relays in ducts and access to them. Show the following near each duct smoke provision of detector installation:
1. Size and location of ducts, including lining.
2. Size and location of piping.
3. Size and arrangement of structural elements.
4. Size and location of duct smoke detector, including air-sampling elements.
5. Size and location of speakers.

D. Operating Instructions: For mounting at the FACP.

E. Product Certificates: Signed by manufacturers of system components certifying that products furnished comply with requirements.

F. Installer Certificates: Signed by manufacturer certifying that installers comply with requirements.

G. Field Test Reports: Indicate and interpret test results for compliance with performance requirements. Comply with NFPA 72.

H. Maintenance Data: For fire alarm systems to include in maintenance manuals specified in Division 1. Comply with NFPA 72.

I. Submissions to Authorities Having Jurisdiction: In addition to distribution requirements for Submittals specified in Section “Submittals,” make an identical submission to authorities having jurisdiction. Include copies of annotated Contract Drawings as needed to depict component locations to facilitate review. Resubmit if required to make clarifications or revisions to obtain approval. On receipt of comments from authorities having jurisdiction, submit them to Architect for review.

J. Certificate of Completion: Comply with NFPA 72, AHJ, and local amendments.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is an authorized representative of the FACP manufacturer for both installation and maintenance of units required for this Project.

B. Manufacturer Qualifications: A firm experienced in manufacturing systems similar to those indicated for this Project and with a record of successful in-service performance.

C. Source Limitations: Obtain fire alarm system components through one source from a single manufacturer.

D. Compliance with Local Requirements: Comply with applicable building code, local ordinances and regulations, and requirements of authorities having jurisdiction.

E. Comply with NFPA 72.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than one unit.
   2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than one unit.
   3. Smoke Detectors, Fire Detectors, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than one unit of each type.
   4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than one unit of each type.
   5. Keys and Tools: One extra set for access to locked and tamper proofed components.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Edwards Systems Technology; Unit of General Signal.
   2. Federal Signal Corp.; Commercial Products Group.
   3. Fire Control Instruments, Inc.
   4. Fire Lite Alarms, Inc.
   5. Gamewell Co. (The).
   6. Notifier; Div. of Pittway Corp.
   7. Siemens.
   8. Silent Knight.
   9. Tyco Life Safety (SimplexGrinnell).

2.2 FUNCTIONAL DESCRIPTION OF SYSTEM

A. Control of System: By the FACP.

B. System Supervision: Automatically detect and report open circuits, shorts, and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.

C. Priority of Signals: Automatic alarm response functions resulting from an alarm signal from one zone or device are not altered by subsequent alarm, supervisory, or trouble signals. An alarm signal is the highest priority. Supervisory and trouble signals have second- and third-level priority. Higher-priority signals take precedence over signals of lower priority, even when the lower-priority condition occurs

first. Annunciate and display all alarm, supervisory, and trouble signals regardless of priority or order received.

D. System Reset: All zones are manually resettable from the FACP after initiating devices are restored to normal.

E. Transmission to Remote Alarm Receiving Station: Automatically route alarm, supervisory, and trouble signals to a remote alarm station by means of a digital alarm communicator transmitter and telephone lines.

F. System Alarm Capability during Circuit Fault Conditions: System wiring and circuit arrangement prevent alarm capability reduction when an open circuit, ground or wire-to-wire short occurs, or an open circuit and a ground occur at the same time in an initiating device circuit, signal line circuit, or notification-appliance circuit.

G. Loss of primary power at the FACP initiates a trouble signal at the FACP and the annunciator. An emergency power light is illuminated at both locations when the system is operating on the secondary power supply.

H. Basic Alarm Performance Requirements: Unless otherwise indicated, operation of a manual station, automatic alarm operation of a smoke or flame or heat detector, or operation of a sprinkler flow device initiates the following:
   1. Notification-appliance operation.
   2. Identification at the FACP and the remote annunciator of the device originating the alarm.
   3. Transmission of an alarm signal to the remote alarm receiving station.
   4. Unlocking of electric door locks in designated egress paths.
   5. Release of fire and smoke doors held open by magnetic door holders.
   6. Shutdown of fans and other air-handling equipment serving zone when alarm was initiated.
   7. Closing of smoke dampers in air ducts of system serving zone where alarm was initiated.
   8. Recording of the event in the system memory.

I. Alarm Silencing, System Reset and Indication: Controlled by switches in the FACP and the remote annunciator.
   1. Silencing-switch operation halts alarm operation of notification appliances and activates an “alarm silence” light. Display of identity of the device is retained.
   2. Subsequent alarm signals from other devices reactivate notification appliances until silencing switch is operated again.
   3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.

J. Water-flow alarm switch operation initiates the following:
   1. Notification-appliance operation.
   2. Flashing of the device location-indicating light for the device that has operated.

K. Smoke detection with alarm verification initiates the following:
   1. Audible and visible indication of an “alarm verification” signal at the FACP.
   2. Activation of a listed and approved “alarm verification” sequence at the FACP and the detector.
   3. General alarm if the alarm is verified.
   4. Cancellation of the FACP indication and system reset if the alarm is not verified.

L. Sprinkler valve-tamper switch operation initiates the following:
   1. A supervisory, audible, and visible “valve-tamper” signal indication at the FACP and the annunciator.
   2. Flashing of the device location-indicating light for the device that has operated.
   3. Transmission of supervisory signal to remote alarm receiving station.

M. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system initiates the following:

1. A supervisory, audible, and visible “sprinkler trouble” signal indication at the FACP and the annunciator.
2. Flashing of the device location-indicating light for the device that has operated.
3. Transmission of trouble signal to remote central station.

N. Remote Detector Sensitivity Adjustment: Manipulation of controls at the FACP causes the selection of specific addressable smoke detectors for adjustment, display of their current status and sensitivity settings, and control of changes in those settings. Same controls can be used to program repetitive, scheduled, automated changes in sensitivity of specific detectors. Sensitivity adjustments and sensitivity-adjustment schedule changes are recorded in system memory.

O. Removal of an alarm-initiating device or a notification appliance initiates the following:
1. A “trouble” signal indication at the FACP and the annunciator for the device or zone involved.
2. Transmission of trouble signal to remote alarm receiving station.

P. FACP Alphanumeric Display: Plain-English-language descriptions of alarm, supervisory, and trouble events; and addresses and locations of alarm-initiating or supervisory devices originating the report. Display monitoring actions, system and component status, system commands, programming information, and data from the system's historical memory.

Q. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

R. Voice/Alarm Signaling Service: Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided as a special module that is part of fire-alarm control unit.
1. Indicate number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall comply with UL 1711.
   a. Allow the application of, and evacuation signal to, indicated number of zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
   b. Programmable tone and message sequence selection.
   c. Standard digitally recorded messages for “Evacuation” and “All Clear.”
   d. Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification-appliance circuits of fire-alarm control unit.
2. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters’ two-way telephone communication zones.
3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

2.3 MANUAL PULL STATIONS

A. Description: Fabricated of metal or plastic, and finished in red with molded, raised-letter operating instructions of contrasting color.
1. Single-action mechanism initiates an alarm.
2. Double-action mechanism requires two actions, such as a push and a pull, to initiate an alarm.
3. Station Reset: Key or wrench operated; double pole, double throw; switch rated for the voltage and current at which it operates.
4. Indoor Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false alarm operation.
5. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure, hinged at the top to permit lifting for access to initiate an alarm.
6. Integral Addressable Module: Arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.

7. Outdoor device to be complete with weatherproof outlet box, mounting plate, mounting hardware, and terminal strip for wiring connections.

2.4 SMOKE DETECTORS

A. General: Include the following features:
   1. Operating Voltage: 24V powered from the fire alarm control panel.
   2. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
   3. Plug-in Arrangement: Detector and associated electronic components are mounted in a module that connects in a tamper-resistant manner to a fixed base with a twist-locking plug connection. Terminals in the fixed base accept building wiring.
   4. Integral Visual-Indicating Light: LED type. Indicates detector has operated.
   5. Sensitivity: Can be tested and adjusted in-place after installation.
   6. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
   7. Remote Controllability: Unless otherwise indicated, detectors are analog-addressable type, individually monitored at the FACP for calibration, sensitivity, and alarm condition, and individually adjustable for sensitivity from the FACP.

B. Smoke detectors shall be photoelectric type.
   1. Sensor: LED or infrared light source with matching silicon-cell receiver.
   2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot smoke obscuration when tested according to UL 268A.
   3. Integral Thermal Detector: Fixed-temperature type with 135 deg F setting.

C. Duct Smoke Detector: Photoelectric Type.
   1. Sampling Tube: Design and dimensions as recommended by the manufacturer for the specific duct size, air velocity, and installation conditions where applied. Detectors shall be capable of self-sensitivity testing and report back to the fire alarm panel. All detectors shall be addressable and resettable from FACP.
   2. Provide necessary relays and control module to interface with the fire alarm for damper closure and AHU shutdown.
   3. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.
   4. Unit shall have local reset.
   5. Provide remote test station and status indicator for duct smoke detectors above hard ceilings or mounted higher than 12 feet AFF.
   6. Unit shall be 24V powered from the Fire Alarm Control Panel.
   7. Each smoke sensor and its duct housing shall be self-compensating for the effects of air velocity (from 300 to 4000 FPM), temperature, humidity and atmospheric pressure. It shall not be necessary to field adjust the sensitivity to compensate for the above effects.

D. Combination Smoke and CO detectors in Sleeping Areas: Addressable detector for smoke detection and CO detection in the same device.
   1. Sensor: Four sensing elements for detection and false signal rejection.
   2. Separate CO Signal.
   3. Intelligent Sounder Base
   4. Sync with other devices
   5. Ceiling or wall mounted

2.5 OTHER DETECTORS

A. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or rate of rise of temperature that exceeds 15 deg F per minute, unless otherwise indicated.
   1. Mounting: Adapter plate for outlet box mounting.
   2. Mounting: Plug-in base, interchangeable with smoke detector bases.

3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Unit shall be 24V powered from the fire alarm control panel.

B. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F.
1. Mounting: Adapter plate for outlet box mounting.
2. Mounting: Plug-in base, interchangeable with smoke detector bases.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
4. Unit shall be 24V powered from the fire alarm control panel.

C. Waterflow Solid State Detector (Flow Switch): Actuated by water flow in the specified direction after a preset time delay.
1. Unit shall be 24V powered from the fire alarm control panel. Exterior detectors may be powered 120V AC. See drawings for circuit. If no circuit is shown detector shall be 24V, powered from FACP.
2. Mounting: Vertical or Horizontal on any clear pipe span. Provide detector compatible with pipe size and schedule.
3. Outputs: Unit shall have two contacts for wiring directly to FACP or addressable control module and local bell or notification device.
4. A local grounding provision shall be provided.
5. All enclosures shall be NEMA 4 suitable for indoor or outdoor use, unless otherwise specified.

D. Supervisory Switch (Tamper Switch): Actuated by more than two revolutions of the valve control or when the stem has move more than one-fifth the distance from its normal position.
1. Unit shall be 24V powered from the fire alarm control panel. Exterior detectors may be powered 120V AC. See drawings for circuit. If no circuit is shown detector shall be 24V, powered from FACP.
2. Mounting: Vertical (down position only) or horizontal.
3. Outputs: Unit shall have two contacts for wiring directly to FACP or addressable control module and local bell or notification device.
4. A local grounding provision shall be provided.
5. All enclosures shall be NEMA 4 suitable for indoor or outdoor use, unless otherwise specified. Unit shall be NEMA 3R when vertical.

2.6 NOTIFICATION APPLIANCES

A. Description: Equipped for mounting as indicated and have screw terminals for system connections.
1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.
2. Devices shall be red in color.

B. Audio Alarm Devices (Horns – Interior Installation):
1. Electronic-vibrating-polarized type, 24V dc; with provision for housing the operating mechanism behind a grille. Horns produce a minimum sound pressure level of 85 dB, measured 10 feet from the horn.
2. Device to be complete with outlet box, mounting plate, mounting hardware, and terminal strip for wiring connections.

C. Audio Alarm Devices (Horns – Mini Horns):
1. Electronic-vibrating-polarized type, 24V dc, “mini horn”, with provision for housing the operating mechanism behind a grille. Horns produce a minimum sound pressure level of 85 dB, measured 10 feet from the horn.
2. Device to be complete with outlet box, mounting plate, mounting hardware, and terminal strip for wiring connections.

D. Audio Alarm Devices (Horns – Exterior Installation):
   1. Electronic--vibrating-polarized type, 24V dc; with provision for housing the operating mechanism behind a grille. Horns produce a minimum sound pressure level of 85 dB, measured 10 feet from the horn.
   2. Grille and device to be of weatherproof design and construction.
   3. Device to be complete with outlet box, mounting plate, mounting hardware, and terminal strip for wiring connections.

E. Visual Alarm Devices (Strobe Lights): Xenon strobe lights listed under UL 1971 with clear or nominal white polycarbonate lens. Mount lens on an aluminum faceplate. The word “FIRE” is engraved shall be engraved on the device.
   1. Rated Light Output: 75 candela (minimum), 110 candela in larger coverage spaces.
   2. Strobe Leads: Factory connected to screw terminals.

F. Audio/Visual Alarm Devices (Horn and Strobe Light): Combination audio and visual alarm devices consisting of the same devices indicated above for “Audio Alarm Devices (Horns)” and “Visual Alarm Devices (Strobe Lights)” provided as a single combination alarm device.

G. Voice/Tone Speakers:
   1. High-Range Units: Rated 2 to 5 W.
   2. Low-Range Units: Rated 1 to 2 W.
   3. Mounting: Flush, semi-recessed, surface, or surface-mounted; bidirectional as indicated.
   4. Matching Transformers: Tap range matched to the acoustical environment of the speaker location.

H. Audio Visual Devices (Voice/Tone Speakers and Strobe Lights): Combination voice/tone speakers and visual alarm devices consisting of the same devices indicated above for “Voice/Tone Speakers” and “Visual Alarm Devices (Strobe Lights)” provided as a single combination alarm device.

2.7 PREACTION SYSTEM

A. Initiate Presignal Alarm: This function shall cause an audible and visual alarm and indication to be provided at the FACP. Activation of an initiation device connected as part of a preaction system shall be annunciated at the FACP only, without activation of the general evacuation alarm.

2.8 REMOTE DEVICE LOCATION-INDICATING LIGHTS AND IDENTIFICATION PLATES

A. Description: LED indicating light near each smoke detector that may not be readily visible, and each sprinkler water-flow switch and valve-tamper switch. Light is connected to flash when the associated device is in an alarm or trouble mode. Lamp is flush mounted in a single gang wall plate. A red, laminated, phenolic-resin identification plate at the indicating light identifies, in engraved white letters, device initiating the signal and room where the smoke detector or valve is located. For water-flow switches, the identification plate also designates protected spaces downstream from the water-flow switch.

2.9 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching door plate.
   1. Electromagnet: Requires no more than 3 W to develop 25-lbf holding force.
   2. Wall-Mounted Units: Flush mounted, unless otherwise indicated.
   3. Rating: 24-V ac or dc.
   4. Rating: 120-V ac.

B. Material and Finish: Match door hardware.

C. Device to be complete with outlet box, mounting plate, mounting hardware, and terminal strip for wiring.

2.10 FIRE PROTECTION SYSTEMS WATERFLOW AND TAMPER SWITCHES

A. Switches are to be provided under Section “Fire Suppression Piping – Wet Pipe Sprinkler System” and/or Fire Suppression Piping Dry-Type Sprinkler System.”

B. Provide fire alarm zones for the fire protection system’s waterflow and tamper switches and make final connections of all fire protection systems waterflow and tamper switch alarm wiring to fire alarm panel. Provide all relays and accessories as a part of these connections.

2.11 REMOTE CONTROL RELAYS

A. Remote control relays for shutdown air handling units and operation of electrically controlled circuits from the fire alarm system shall be provided.

B. Provide relays for Fire Shutters, magnetic Locks, Door Holds and all other egress powered circuits.

C. Relays shall be UL listed, SPDT, DPDT, operating coil voltage appropriate for the fire alarm system and terminal strips for connection of input and output wiring.

D. Relays shall contain a red LED to indicate when the relay coil is energized.

E. These relays shall be employed where local contacts are required for system status, remote control of electrical loads, shutdown of air handling equipment, actuation of other systems or equipment, and any other general uses.

F. Device to be complete with outlet box, mounting plate, mounting hardware, and terminal strip for wiring connections.

2.12 CENTRAL FACP

A. Cabinet: Lockable steel enclosure. Arrange interior components so operations required for testing or for normal maintenance of the system are performed from the front of the enclosure. Provide 25% future expansion capacity.
   1. Identify each enclosure with an engraved, red, laminated, phenolic-resin nameplate with lettering not less than 1-inch high. Identify individual components and modules within cabinets with permanent labels.
   2. Mounting: Surface.

B. Alarm and Supervisory Systems: Separate and independent in the FACP. Alarm-initiating zone boards consist of plug-in cards. Construction requiring removal of field wiring for module replacement is unacceptable.

C. Control Modules: Include types and capacities required to perform all functions of fire alarm systems.

D. Indications: Local, visible, and audible signals announce alarm, supervisory, and trouble conditions. Each type of audible alarm has a different sound.

E. Indicating Lights and System Controls: Individual LED devices identify zones transmitting signals. Lights distinguish between alarm and trouble signals, and indicate the type of device originating the signal. Manual switches and push-to-test buttons do not require a key to operate. Controls include the following:
   1. Alarm acknowledge switch.
   2. Alarm silence switch.

3. System reset switch.
4. LED test switch.

F. Resetting Controls: Prevent the resetting of alarm, supervisory, or trouble signals while the alarm or trouble condition still exists.

G. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components, including annunciation, supervision, and control.
1. Display: A minimum of 80 characters; alarm, supervisory, and component status messages; and indicate control commands to be entered into the system for control of smoke detector sensitivity and other parameters.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

H. Voice Alarm: An emergency communication system includes central voice alarm system components complete with microphones, preamplifiers, amplifiers, and tone generators. Features include the following:
1. Two alarm channels permit simultaneous transmission of different announcements to different zones or floors automatically or by using the central control microphone. All announcements are made over dedicated, supervised communication lines.
2. Status annunciator indicates the status of various voice alarm speaker zones and the status of firefighters' two-way telephone communication zones.

I. Instructions: Printed or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.13 FIRE ALARM EXPANSION PANEL

A. Cabinet: Lockable steel enclosure. Arrange interior components so operations required for testing or for normal maintenance of the system are performed from the front of the enclosure.
1. Identify each enclosure with an engraved, red, laminated, phenolic-resin nameplate with lettering not less than 1 inch high. Identify individual components and modules within cabinets with permanent labels.
2. Mounting: Surface.

B. Alarm and Supervisory Systems: Alarm-initiating boards consist of plug-in cards. Construction requiring removal of field wiring for module replacement is unacceptable.

C. Control Modules: Include types and capacities required to perform all functions of fire alarm systems.

D. Indications: Local, visible, and audible signals announce alarm, supervisory, and trouble conditions. Each type of audible alarm has a different sound.

E. Indicating Lights and System Controls: LCD display mimics FACP signals. Manual switches and push-to-test buttons do not require a key to operate. Controls include the following:
1. Alarm acknowledge switch.
2. Alarm silence switch.
3. System reset switch.
4. LED test switch.

F. Resetting Controls: Prevent the resetting of alarm, supervisory, or trouble signals while the alarm or trouble condition still exists.

G. Instructions: Printed or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for

displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

H. Expansion panels shall be daisy chained with the main fire alarm control panel to operate as one complete system.

2.14 REMOTE ANNUNCIATOR

A. Description: Duplicate annunciator functions of the FACP for alarm, supervisory, and trouble indications. Also duplicate manual switching functions of the FACP, including acknowledging, silencing, reset, and test.
   1. Mounting: Flush cabinet, NEMA 250, Class 1.

B. Display Type and Functional Performance: Alphanumeric display same as the FACP. Controls with associated LEDs permit acknowledging, silencing, resetting, and testing functions for alarm, supervisory, and trouble signals identical to those in the FACP.

2.15 EMERGENCY POWER SUPPLY

A. General: Components include sealed maintenance free battery, charger, and an automatic transfer switch.
   1. Battery Nominal Life Expectancy: 20 years, minimum.

B. Battery Capacity: Comply with NFPA 72.
   1. Magnetic door holders are not served by emergency power. Magnetic door holders are released when normal power fails.

C. Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Provide capacity for 150 percent of the connected system load while maintaining batteries at full charge. If batteries are fully discharged, the charger recharges them completely within four hours. Charger output is supervised as part of system power supply supervision.

D. Integral Automatic Transfer Switch: Transfers the load to the battery without loss of signals or status indications when normal power fails.

2.16 AUXILLARY POWER MODULE (NAC)

A. Description: Intelligent power supply module with built in synchronization, AC power connection, battery charging circuit, and backup battery for 24 hours operation for all powered circuits. Programmable for auxiliary power, constant, resettable, or door holder operation
   1. Minimum 6 Amp notification power expander with switching mode
   2. Ground fault detector
   3. Notification/Aux Power Circuits: 2 Class A, 4 Class B
   4. Power input 120V

B. Communicates with main FACP SBUS with standard manufacturers 4 wire cabling up to 4000 feet.

C. AC loss of power delay option for shutting off power to door holders. (provide only on NAC panels with door holders on the fire alarm system)

D. Transmits all signals to the FACP

2.17 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module listed for use in providing a multiplex system address for listed fire and sprinkler alarm-initiating devices with normally open contacts.

2.18 WIRE TO FIBER CONVERTOR

A. Description: Fiber optic cabling to SBUS convertor on a single card mounted in the FA panel or in a remote enclosure and connected to the fire alarm panel.
   1. Range: Up to one mile
   2. Transfers all signals between panels
   3. Does not require TVSS or grounding
   4. Duplex connectors for the transmittance and receiving of signals
   5. Compatible with the FA system from the same manufacturer
   6. Powered from the FA panel locally 9-35 VDC

2.19 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Listed and labeled under UL 864 and NFPA 72.

B. Functional Performance: The FACP shall have a digital alarm communicator transmitter (DACT) module to transmit alarm signals to a Remote Central Monitoring station. The DACT shall support dual telephone lines. Unit receives an alarm, supervisory, or trouble signal from the FACP panel, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising two lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on either telephone lines, the local trouble signal is initiated.

C. The fire alarm system shall provide point identification reporting of alarm, trouble and supervisory conditions to the monitoring station. Group reporting will not be accepted.

D. The communicator shall automatically send restore signals to the central station when alarm, trouble or supervisory is cleared. Required on-premise restore is not acceptable.

E. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.

F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.20 GUARDS FOR PHYSICAL PROTECTION

A. Description: Size and shape for the manual station, smoke detector, gong, or other device requiring protection.
   1. Factory fabricated and furnished by the manufacturer of the device.
   2. Finish: Paint of color to match the protected device.
   3. Manual Pull Station – Clear Lexan.
   4. Smoke/Heat Detector – Wire Mesh.
   5. Gong – Wire Mesh.

2.21 WIRE

A. Non-Power-Limited Circuits: Red jacketed plenum rated solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation.
   1. Low-Voltage Circuits: No. 16 AWG, minimum.

2. Line-Voltage Circuits: No. 12 AWG, minimum.

B. Power-Limited Circuits: NFPA 70, Types FPL, FPLR, or FPLP, as recommended by manufacturer.

2.22 VOICE ALARM SYSTEM COMPONENTS

A. Voice/Alarm Signaling Service:
1. One-way, multichannel voice notification system incorporating at least eight distinct sounds selectable by user for tone signaling and incorporating a voice module for delivery of prerecorded messages.
2. Redundant microphones, preamplifiers, amplifiers, and tone generators provided in separate main and remote cabinets.
3. Voice notification system shall support facility public address paging.
4. Audible appliances shall produce a code 3 temporal tone for three cycles followed by a voice message that is repeated until the control panel is reset or silenced.
5. Automatic messages shall be broadcast through speakers throughout the building or facility.
6. When using microphones, live messages shall be broadcast throughout a selected floor or floors or all call.
7. Live voice message shall override automatic or recorded audible output through use of a microphone input at the main control panel or the remote cabinet.
8. Number of alarm channels shall be indicated for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone.
   a. Allow sending an evacuation signal to selected zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
   b. Programmable tone and message sequence selection.
   c. Standard digitally recorded messages for "Evacuation" and "All Clear."

B. Audible Notification System: Comply with the requirements of NFPA 72 and ISO 7240-16 for Emergency Voice/Alarm Communications System, except where more stringent requirements are specified. Voice intelligibility shall be evaluated according to IEC 60268-16.
1. Amplifiers:
   a. Comply with UL 1711.
   b. Audio output shall be selectable for line level. Minimum amplifier output shall be 100 W rms.
   c. Capable of operating all speakers at the same time.
   d. Loss of operating power, supervisory power, or any other malfunction that could render the voice module inoperative shall automatically cause the code 3 temporal tone to take over all functions assigned to the failed unit in the event an alarm is activated.
2. Audible Notification Devices:
   a. Handheld push-to-talk microphone shall be supervised and a key shall be required to enable remote microphone use.
   b. Microprocessor shall actively integrate circuitry, field wiring, and digital coding necessary for the immediate and accurate rebroadcasting of stored voice data into appropriate amplifier input.

C. Voice/Tone Notification Appliances:
1. Comply with UL 1480.
2. Indoor Speakers for Voice Notification:
   a. Construction: High-efficiency, sealed back; for maximum output at minimum power across a frequency range of 150 Hz to 10,000 Hz.
   b. Standard: UL 1480.
   c. Speaker Locations: Comply with NFPA 72, "Notification Appliances" and "Emergency Communications Systems" chapters.
   d. High-Range Units: Rated 2 to 15 W.
   e. Low-Range Units: Rated 1 to 2 W.

f. Mounting: Flush and Surface mounted and bidirectional per ceiling. Surface mount in exposed spaces.
g. Matching Transformers: Tap range matched to acoustical environment of speaker location.

3. Outdoor Speakers for Voice Notification:
a. High-powered, 1600-W speaker arrays with acoustic performance and intelligibility features complying with NFPA 72.
b. Control panel providing signal processing, amplification, gain control, battery backup, and antenna surge protection.
c. Pole designed for the speaker array with 110 mph (177 km/h) wind load.

D. Text Displays:
1. Programmable, digital text displays having a minimum of 4-inch (100-mm) high letters for hearing-impaired occupants displaying the content of the voice message being played.
2. Capable of sending static, flashing, or scrolling messages to textual visible appliances.
3. Mass notification control panel shall interface with and control the programmable display controller to activate the proper message.
4. Textual visible notification shall be primary notification when it is the only method used to convey emergency MNS information to the general public or to specific individuals.

E. Primary Power:
1. 24-V dc obtained from 120-V ac service and a power-supply module.
a. Power supplies shall be sized to furnish a minimum of 125% of the total connected load in a worst-case condition.
2. Devices Powered by 24-V dc:
a. Control panels.
b. Notification appliances.
c. Text displays.
d. Trouble signals.
e. Supervisory signals.
f. Supervisory and digital alarm communicator transmitters.
g. Digital alarm radio transmitters.

F. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
1. Batteries: Sealed lead calcium.
2. Batteries: Sealed, valve-regulated, recombinant lead acid.
3. Batteries: Sealed lead calcium, valve-regulated, recombinant lead acid.
4. Battery size shall be a minimum of 125% of the calculated requirement.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Connect the FACP with a disconnect switch with lockable handle or cover. Install smoke detectors above the FACP, all expansion panels, and all power supplies.

B. Connect devices to FACP, expansion panel, or NAC up to 300 feet from panel. Beyond 300 feet provide additional NAC panels.

C. Mount wire to fiber convertors in either the fire alarm panel with stand-offs or in remote cabinet adjacent to fire alarm panel. Provide conduit between remote cabinet and FA panel.

D. Manual Pull Stations: Mount semi-flush in recessed back boxes.

E. Water-Flow Detectors and Valve Supervisory Switches: Connect for each sprinkler valve station required to be supervised.

F. Ceiling-Mounted Smoke Detectors: Not less than 4 inches from a side wall to the near edge. For exposed solid-joist construction, mount detectors on the bottom of joists. On smooth ceilings, install not more than 30 feet apart in any direction.

G. Wall-Mounted Smoke Detectors: At least 4 inches, but not more than 12 inches, below the ceiling.

H. Smoke Detectors near Air Registers: Install no closer than 60 inches.

I. Duct Smoke Detectors: Comply with manufacturer's written instructions.
   1. Verify that each unit is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
   2. Install sampling tubes so they extend the full width of the duct.
   3. Install necessary relays and control modules to accomplish mechanical equipment operation upon detector activation.

J. Audible Alarm-Indicating Devices: Install so the top of the device is no less than 90 inches above finish floor and not less than 6 inches below the ceiling. Do not install higher than 120 inches unless directed. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Combine audible and visible alarms at the same location into a single unit.

K. Visible Alarm-Indicating Devices: Install so the top of the device is no less than 90 inches above finish floor and not less than 6 inches below the ceiling. Do not install higher than 120 inches unless directed.

L. Device Location-Indicating Lights: Locate in public space near the device they monitor.

M. FACP: Surface mount with tops of cabinets not more than 72 inches above the finished floor.

N. Annunciator: Install with the top of the panel not more than 72 inches above the finished floor.

O. Antenna for Radio Alarm Transmitter: Mount to building structure where indicated. Use mounting arrangement and substrate connection that will resist 100-mph wind load with a 1.3 gust factor without damage.

P. Auxiliary Power Module (NAC): Locate in accessible areas where batteries and associated equipment may be readily maintained. Provide 120-volt/1-phase power from a dedicated 120-volt 1-phase 20-amp circuit for alarm indicating devices.

3.2 WIRING INSTALLATION

A. Wiring Method: Install wiring in metal raceway according to specification section “Raceways and Boxes.” Conceal raceway and coordinate with structural for conduit routes.
   1. Exceptions:
      a. All wiring in mechanical/electrical/equipment rooms shall be in conduit.
      b. All wiring 9’ AFF and below or below ceilings shall be in conduit.

B. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by the manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

C. Wiring between panels or NAC panels:
   1. Within the building and conditioned spaces: Provide manufacturers plenum rated cabling between expansion panels and NAC panels within the building in conduit as per raceway and boxes schedule or as per the wiring installation method in this specification section. If the distance exceeds manufacturers copper cabling, provide plenum rated fiber optic cabling with a wire to fiber convertor.
   2. Outside the building or not within the conditioned space: Provide exterior rated plenum fiber optic cabling in conduit as per raceway and boxes schedule or as per the wiring installation method in this specification section. Provide a wire to fiber convertor either in the panel or in a remote mounting cabinet installed adjacent to the FA panel.
   3. Fiber Install:
      a. Fiber runs shall use long sweep elbows and be protected from damage.
      b. Provide manufacturer required number of strands. Polish and terminate fiber in connectors per wire to fiber convertor. Connect to the wire to fiber convertor and test for operation.
      c. Provide single or multi-mode; 50 or 62.5 micron fiber optic cabling per manufacturer convertor.

D. Cable Taps: Use numbered terminal strips in junction, pull and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.

E. Speakers: Plenum rated cable in conduit in exposed areas. Plenum cable above ceilings.

F. Color-Coding: Red fire alarm plenum rated conductors. Paint fire alarm system junction boxes and covers red.

G. Risers: Install at least two vertical cable risers to serve the fire alarm system. Separate risers in close proximity to each other with a minimum one-hour-rated wall, so the loss of one riser does not prevent the receipt or transmission of signal from other floors.

H. Wiring to Remote Alarm Transmitting Device: 1-inch conduit between the FACP and the transmitter. Install number of conductors and electrical supervision for connecting wiring as needed to suit monitoring function.

I. Provide TVSS and grounding for all devices connected to a FA or NAC panel, external to the building conditioned space.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals according to specification section Electrical Identification.

B. Install instructions frame in a location visible from the FACP.

C. Paint power-supply disconnect switch red and label FIRE ALARM.

3.4 GROUNDING

A. Ground cable shields and equipment according to system manufacturer's written instructions to eliminate shock hazard and to minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

B. Signal Ground Terminal: Locate at main equipment rack or cabinet. Isolate from power system and equipment grounding.

C. Install grounding electrodes of type, size, location, and quantity as indicated. Comply with installation requirements in Division 26 Section Grounding.

D. Ground equipment and conductor and cable shields. For audio circuits, minimize, to the greatest extent possible, ground loops, common-mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment location. Measure, record, and report ground resistance.

E. Ground radio alarm transmitter system and equipment as recommended by the manufacturer. Provide grounding for antenna to building ground.

3.5 APPLICATION SCHEDULE

A. General Application: Provide fire alarm devices where indicated on drawings or as scheduled below. Locations on drawings are approximate. Contractor shall coordinate exact locations with architectural drawings. Contractor shall submit locations of fire alarm devices to engineer/architect as part of fire alarm shop drawings. Locations shall be based upon ability to mount the device to building construction and coverage afforded the device.

B. Fire Alarm Panel: Panel shall be mounted in a continuously (during normal hours) occupied space. Provide dedicated smoke detector for fire alarm panel.

C. Fire Alarm Expansion Panel: Provide fire alarm expansion panel for either every 35 devices or to maintain no more than 15% voltage drop to the device. Provide dedicated smoke detector connected to fire alarm for fire alarm expansion panel.

D. Remote Annunciator: Provide remote annunciator at building address entrance. Location as shown on drawings is approximate and shall be coordinated with architectural.

E. Pull Station: Provide pull stations within 5 feet of all exits to building and second floor stairwell access.

F. Audio/Visuals and Visuals: Device locations indicated on the drawings are approximate. Coordinate with architectural for exact locations and install as per coverage criteria. Install devices in areas that are unobtrusive to room or space intent (e.g. do not install device at the back of the stage, but install stage device off to one side; or do not try to install device on glass block wall).

G. Control Modules and Relays:
   1. Provide control modules and relays at all smoke fire dampers, air handler duct smoke detectors, and equipment smoke detectors for shutdown.
   2. Fire alarm activated fire suppression equipment.
   3. module and relay for all HVLS fans to shut down in the event of fire alarm or water flow.

H. Provide relays for all door holds, mag locks and electronically operated doors in the path of egress.

I. Monitor Modules:
   1. Provide monitor modules for all devices to be monitored by the fire alarm system but not controlled.
   2. Provide monitor modules for all flow and tamper switches.
   3. Provide monitor modules for all dry pipe pressure switches.
   4. Provide fire control monitor module for Halon/FM-200 or similar systems that are locally activated.

J. Master/Slave Synchronization: Provide master synchronization module at fire alarm panel and slaves for every two (2) circuits. Provide notification at fire alarm panel for synchronization and low power or A/C loss.

K. Duct Smoke Detectors: Provide as shown on the drawings and as indicated below (applications may be redundant with drawings).
   1. Duct smoke detectors shall be provided within five feet, with no breaks in the ductwork, of all smoke fire dampers in the direction of airflow. Mount the duct smoke detectors to provide unrestricted access to the control section and for full removal of the sampling tubes.
   2. Duct smoke detectors shall be provided at the discharge to all air handling units and mounted in accordance with NFPA 72.

L. Weatherproof Horn/Strobe: Provide weatherproof horn/strobe for all interior courtyards.

M. Weatherproof Horn: Provide weatherproof horns to be mounted high on exterior wall (coordinate with architectural), audible from any entrance to the building.

3.6 VOICE EVACUATION SPEAKERS FOR AUDIBLE NOTIFICATION AUDIBILITY AND INTELLIGIBILITY DESIGN

A. Provide voice evacuation system with speakers located to provide code required audible notification intelligibility. Drawing locations are approximate. Contractor to submit calculated locations per shop drawings.

B. Acoustically Distinguishable Spaces (ADS) assignments shall be submitted for review and approval.
   1. Each ADS shall be identified as requiring or not requiring voice intelligibility.
   2. ADS measurement points shall be shown on plans or otherwise described in a way that permits future testing at the same locations.

C. Audible notification devices shall have the dB output for each speaker labeled adjacent to the speaker to substantiate the design and assist the installer in sizing amplifiers.

D. A minimum intelligibility level of 0.7 on the Common Intelligibility Scale (CIS) must be met in all areas that require voice intelligibility. If using the Speech Transmission Index (STI), a minimum score of 0.5 shall be achieved.

E. Acoustic properties of spaces and sound loss shall be considered and documented on shop drawings with respect to speaker selection and placement to ensure audibility and intelligibility requirements can be met.

F. Average Ambient Sound Level According to Location. The following sound levels shall be used for design purposes.
   1. Educational occupancies 45 dB.
   2. Places of assembly 55 dB.

3.7 MECHANICAL COORDINATION

A. See mechanical duct accessory specification for smoke fire dampers and mechanical drawings for sequences of operation. Provide control circuits, relays, monitor modules as required. Fire alarm system shall be capable of shutting down all dampers, HVLS fans, and air handlers during a fire alarm activation. Coordinate for sequencing as per duct accessories specification, mechanical specifications, and mechanical sequence of operation.

3.8 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect field-assembled components and connections and to supervise pretesting, testing, and adjustment of the system. Report results in writing.

B. Pretesting: After installation, align, adjust, and balance the system and perform complete pretesting. Determine, through pretesting, the compliance of the system with requirements of Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new ones, and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.

C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable, including the names and titles of witnesses to preliminary tests.

D. Final Test Notice: Provide a minimum of 10 days' notice in writing when the system is ready for final acceptance testing.

E. Minimum System Tests: Test the system according to procedures outlined in NFPA 72. Minimum required tests are as follows:
   1. Verify the absence of unwanted voltages between circuit conductors and ground.
   2. Test all conductors for short circuits using an insulation-testing device.
   3. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on record drawings.
   4. Verify that the control unit is in the normal condition as detailed in the manufacturer's operation and maintenance manual.
   5. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of initiating and indicating devices. Observe proper signal transmission according to class of wiring used.
   6. Test each initiating and indicating device for alarm operation and proper response at the control unit. Test smoke detectors with actual products of combustion.
   7. Test the system for all specified functions according to the approved operation and maintenance manual. Systematically initiate specified functional performance items at each station, including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications. Observe all voice audio for routing, clarity, quality, freedom from noise and distortion, and proper volume level.
   8. Test Both Primary and Secondary Power: Verify by test that the secondary power system is capable of operating the system for the period and in the manner specified.

F. Retesting: Correct deficiencies indicated by tests and completely retest work affected by such deficiencies. Verify by the system test that the total system meets Specifications and complies with applicable standards.

G. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log on the satisfactory completion of tests.

H. Tag all equipment, stations, and other components at which tests have been satisfactorily completed.

I. During system testing, actual sound level measurements and intelligibility measurements shall be taken by an approved independent third party or the installing contractor with expertise in audio engineering. These results shall be recorded and submitted for review. Where results differ sharply from the calculated theoretical value, investigate the reason for the deviation and provide justification for the deviation in the report.

J. All test equipment shall be calibrated annually and bear the mark of a certified third party firm testing firm indicating that the equipment has been calibrated within the past 365 days.

3.9 CLEANING AND ADJUSTING

A. Cleaning: Remove paint splatters and other spots, dirt, and debris. Touch up scratches and marred finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

3.10 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel as specified below:
   1. Train Owner's maintenance personnel on procedures and schedules for starting and stopping, troubleshooting, servicing, adjusting, and maintaining equipment and schedules. Provide a minimum of 8 hours' training.
   2. Training Aid: Use the approved final version of the operation and maintenance manual as a training aid.
   3. Schedule training with Owner, through Architect, with at least seven days' advance notice.

3.11 ON-SITE ASSISTANCE

A. Occupancy Adjustments: When requested within one year of date of Substantial Completion, provide on-site assistance in adjusting sound levels, controls, and sensitivities to suit actual occupied conditions. Provide up to three requested visits to Project site for this purpose.

END OF SECTION 283000

SECTION 313116

TERMITE CONTROL

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Below grade soil treatment for termite control.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
1. Application Procedures: Indicate locations for application, application rates, and application equipment.
2. Warranty: Sample warranty form.

B. Quality Control Submittals:
1. Current EPA approval listing.
2. Certificates of Compliance: Applicator’s certification that termiticide was applied at specified concentrations and using specified methods and materials.

1.3 QUALITY ASSURANCE

A. Applicator Qualifications: Licensed for termite control by authorities having jurisdiction.

1.4 DELIVERY, STORAGE AND HANDLING

A. Protect containers from accidental opening and use.

1.5 PROJECT CONDITIONS

A. Do not apply termiticide when surface water is present.

1.6 SEQUENCING

A. Apply termiticide:
1. After completion of excavating, backfilling, and compaction.
2. Prior to placing vapor retarder.

1.7 WARRANTIES

A. Provide manufacturer’s 5 year warranty against invasion or propagation of subterranean termites and damage to building or building contents caused by termites, including repairs to building and building contents.

PART 2 PRODUCTS

2.1 MATERIALS

A. Termiticide:
1. Approved for termite treatment by Environmental Protection Agency and other authorities having jurisdiction.
2. Water based solution, uniform in composition, synthetically dyed to permit visual identification of treated soil.

B. Signage: As required by authorities having jurisdiction.

2.2 MIXES

A. Mix materials in accordance with manufacturer’s instructions.

PART 3 EXECUTION

3.1 APPLICATION

A. Apply materials in accordance with manufacturer's instructions.

B. Apply treatment to following areas:
1. Outside and inside of building perimeter: Apply treatment to full depth of foundation or minimum 48 inches below grade as backfill is placed.
2. Floor slab penetrations: Apply treatment to full depth of penetration or minimum 48 inches below grade as backfill is placed.
3. Under floor slabs on grade: Apply treatment uniformly over prepared subgrade just prior to placement of vapor retarder.

C. Prevent spillage and runoff onto adjacent non treated areas.

D. Ensure complete coverage of treated areas.

E. Extend treatment onto adjacent construction and floor slab penetrations.

F. Reapply termiticide to treated soils that are disturbed after treatment.

G. Install signage as required by authorities having jurisdiction.

END OF SECTION

SECTION 321413

PRECAST CONCRETE UNIT PAVING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Precast concrete pavers and joint sand.
2. Bitumen setting bed.
3. Asphalt tack coat.

B. Related Sections:
1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. ASTM International (ASTM):
1. C 33 - Specification for Concrete Aggregates.
2. C 136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates.
3. C 140 - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units.
4. C144 - Standard Specification for Aggregate for Masonry Mortar.D946 - Standard Test Method for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
5. C 920 - Specification for Elastomeric Joint Sealants.
6. C936/C936M - Standard Specification for Solid Concrete Interlocking Paving Units.
7. D946 - Standard Test Method for Penetration-Graded Asphalt Cement for Use in Pavement Construction.
8. C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete.
9. D 977 - Standard Specification for Emulsified Asphalt
10. D1073 - Standard Specification for Fine Aggregate for Bituminous Paving Mixtures
11. C 1645 - Standard Test Method for Freeze-thaw and De-icing Salt Durability of Solid Concrete Interlocking Paving Units.
12. D 3381 - Standard Specification for Viscosity-Graded Asphalt Cement for Use in Pavement Construction.

1.3 SUBMITTALS

A. Submittals for Review:
1. Product Data: Descriptive data for pavers.
2. Samples: 12 x 12 inch samples showing colors and surface textures.
3. Mix Designs: Indicate composition of setting bed.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Minimum 2 years experience in work of this Section.

B. Obtain each stone from a single quarry and from the same area within the quarry.

C. Bituminous Setting Bed:
1. Perform work in accordance with AI MS-8.
2. Mixing plant: AI MS-3.

D. Mockups:
1. Size: Minimum 4 x 4 feet.
2. Show: Paver color and texture, maximum color range, and paver pattern.
3. Locate where directed.
4. Approved mockups may remain as part of the Work.

1.5 DELIVERY, STORAGE AND HANDLING

A. Store pavers off ground; prevent contact with materials that could cause staining or damage.

1.6 PROJECT CONDITIONS

A. Do not place setting bed when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

1.7 MAINTENANCE

A. Extra Materials: 4 square feet of each color paver.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by Keystone Hardscapes. (www.www.keystonehardscapes.com)

2.2 MATERIALS

A. Precast Concrete Pavers:
1. Source: Interlocking Concrete Paver Units, CityLock 4x12 units, #323, by Keystone Hardscapes, or approved substitute.
2. Physical requirements: Meet ASTM C936/C936M.
3. Coloring admixture: ASTM C979/C979M, pure mineral oxide, alkali resistant, colorfast, water insoluble, chemically inert, and weather resistant.
4. Average Compressive Strength (ASTM C 140): 8000 psi (55 MPa) with no individual unit under 7200 psi (50 Mpa).
5. Average Water Absorption (ASTM C 140): 5% with no unit greater than 7 percent.
6. Freeze/Thaw Resistance (ASTM C 1645): 28 freeze-thaw cycles with no greater loss than 225 g/m2 of paver surface area or no greater loss than 500 g/m2 of paver surface area after 49 freeze-thaw cycles. Freeze-thaw testing requirements shall be waived for applications not exposed to freezing conditions.
7. Color and surface finish: To be selected from manufacturers full range of selections.

B. Bitumen Setting Bed Materials:
1. Primer for base: Anionic asphalt emulsion SS-1h, per ASTM D 977.
2. Sand for asphalt bed
   a. Clean, non-plastic, free from deleterious or foreign matter, symmetrically shaped, natural or manufactured from crushed rock.
   b. Do not use limestone screenings, stone dust, or sand in the bedding material that does not conform to the grading requirements.
   c. Graded according to ASTM C 136.
   d. Bedding Sand Material Requirements: Conform to the grading requirements of ASTM C 33 with modifications as shown below:

SIEVE SIZE	PERCENT PASSING
No. 4	100
No. 8	85 to 100
No. 16	50 to 85
No. 30	25 to 60
No. 50	10 to 30
No. 100	2 to 10
No. 200	0 to 5

3. Asphalt cement: Meet ASTM D3381, viscosity grade AC-20; heated to 300 F, 7 percent asphalt mixed with 93 percent sand in batches 145 lbs. asphalt to 1,855 lbs. sand. Exact proportions to be determined by the Contractor.
4. Neoprene modified asphalt adhesive: Karnak 237 2 percent AF Neo-asphalt.

C. Polymer Modified Joint Sand:
1. ASTM C144, polymer modified joint sand produced specifically for placement in precast concrete paver joints.
2. Source: Joint-Lock Paver Finishing Sand by Package Pavement Co., Inc. (www.packagepavement.com) or approved substitute.
3. Color: To be selected from manufacturer's full color range.

2.3 ACCESSORIES

A. Cleaner, Sealers, and Joint Sand Stabilizers: Type recommended by paver manufacturer.

B. Sealant and backer materials: Refer to Section 079200.

PART 3 EXECUTION

3.1 PREPARATION

A. Concrete base preparation
1. Fill any cracks under 3/16 in. wide with mortar.
2. Sweep the surface clean.

3.2 INSTALLATION OF SETTING BED

A. Apply primer to contact surfaces of curbs and abutments at minimum rate of 1/3 gallon per square yard.

B. Place setting bed within 24 hours after applying primer.

C. Bituminous setting bed:
1. Place in panels between 3/4 in. high screed rails spaced approximately 12 ft. Rake and screed smooth with strike board.
2. Use screed rails to achieve a level setting bed conforming to elevations and slope shown on the drawings. After one panel is complete, advance screed rails to the next position in readiness for screeding adjacent panels with strike board. Fill depressions left from removed screed rails and smooth to height consistent with panel.
3. Place an area in size that will remain at least 270 degrees F during compaction.
4. Compact the setting bed with a powered roller compactor to an even, nominal thickness of 3/4 in. after compaction.
5. Re-heat, fill, and compact low areas with setting bed materials to conform to slope and elevation shown on the drawings.
6. Re-heat, remove, level, and compact setting bed in high areas to conform to slope and elevation shown on the drawings.
7. Irregularities or evenness in the grade of the concrete base surface may be corrected with setting bed materials only with approval by the Architect.

D. Neoprene modified asphalt adhesive: Apply to cold asphalt setting bed with a squeegee in a thickness not exceeding 1/16 in. Do not apply pavers to adhesive until dry skin forms on surface of adhesive.

3.3 INSTALLATION OF PAVERS

A. Concrete pavers:
1. Free from dust, dirt, and stains. Do not use soiled, cracked, or broken units.
2. Place paving units firmly onto adhesive with joints not to exceed 1/8 in. (3 mm), or as recommended in manufacturer's literature. Maintain straight pattern lines, joint lines and coursing per the drawings.

3. Cut pavers to fit edges with a masonry saw. No cut paver shall be smaller than 1/3 of a whole unit if exposed to vehicular traffic. Firmly place all edge units on adhesive.

B. Joint filler and sealant:
   1. Extend control and structural joints through full depth of paving units. Do not extend joints through bituminous bedding materials from joints in concrete base that control shrinkage cracking.
   2. Install joints at all building facades or other vertical surfaces.
   3. Install pre-molded joint filler as units are set in bituminous bed. Maintain top of filler 3/8 in. below exposed faces of paving units for insertion of sealant.
   4. Install joint sealant per manufacturer's recommendations.

C. Joint sand:
   1. After the pavers, joint filler, and sealant are installed, spread polymer modified joint sand and fill joints between the slabs in accordance with manufacturer’s instructions.
   2. Sweep surface clean.

3.4 FIELD QUALITY CONTROL

A. The final surface tolerance from grade elevations shall not deviate more than ±3/8 in. under a 10 ft straightedge.

B. Check final surface elevations for conformance to drawings.

C. The surface elevation of pavers shall be 1/8 in. to 1/4 in. above adjacent drainage inlets, concrete collars or channels.

D. Lippage: No greater than 1/8 in. difference in height between adjacent pavers.

3.5 CLEANING

A. Protect adjacent and underlying surfaces and plant materials.

B. Apply cleaner in accordance with manufacturer's instructions.

C. Thoroughly rinse surfaces with clean water after completion of cleaning; remove all traces of cleaning solution.

D. If recommended by manufacturer, apply sealer in accordance with manufacturer's instructions.

E. Apply joint sand stabilization materials between concrete pavers in accordance with the manufacturer's written recommendations.

END OF SECTION

SECTION 321500

AGGREGATE SURFACING

PART 1 GENERAL

1.1 SCOPE OF WORK

A. Work included in this section.

1. Decomposed granite or crushed 3/8” minus aggregate paving with Stabilizer binder additive.
2. Pea gravel groundcover for exterior mechanical areas

1.2 SYSTEM DESCRIPTION

A. Decomposed granite or crushed 3/8” minus aggregate paving with Stabilizer binder additive.

1.3 SUBMITTALS

A. Products; 5 (five) lb. sample of each color and sieve analysis for grading of decomposed granite or crushed 3/8” minus aggregate.

1.4 TESTS

A. Perform gradation of decomposed granite material or 3/8” minus crushed aggregate in accordance with ASTM C 136 — Method for Sieve Analysis for Fine and Course.

1.5 ENVIRONM ENTAL CONDITIONS

A. Do not install decomposed granite or crushed 3/8” minus aggregate paving during rainy conditions.

1.6 EXCESS MATERIALS

A. Provide owner’s authorized rep. with the following excess materials for use infuture decomposed granite or 3/8” crushed aggregate paving repair:

1. 40 — 50 lb. bags of the aggregate paving.
2. 1— 40 lb. bag of the Stabilizer additive.

PART 2 PRODUCTS

2.1 DECOMPOSED GRANITE OR 3/8” CRUSHED AGGREGATE SCREENINGS

A. Crushed Stone Sieve Analysis Percentage of Weight Passing a Square Mesh SieveAASHTO T11-82 and T27-82.

3/8" MINUS AGGREGATE GRADATION	
Sieve Size	% Passing
3/8 inch	100
No. 4	95-100
No. 8	75-80
No. 16	55-65

No. 30	40-50

3/8" MINUS AGGREGATE GRADATION	
Sieve Size	% Passing
No. 50	25-35
No. 100	20-25
No. 200	5-15

Note: Gradation based upon AASHTO T11-82 and T27-82

B. Decomposed granite or 3/8” crushed aggregate screenings are to be the followingcolor (color must be uniform):

1. Color to be selected by Architect.
2. Submit sample for approval by Owner.

C. Products from Minick Materials, Kafka Granite, LLC, Living Earth, Silver Creek Materials, or equivalent approved by Engineer.

2.2 STABILIZER BINDER

A. Patented, non-toxic, organic binder that is a colorless and odorless concentrated powder that binds decomposed granite or crushed 3/8” minus aggregate together to produce a firm surface.

B. Product from stabilizer solutions, Inc., Living Earth, TechniSoil, or equivalent approved by Engineer.

2.3 EDGE RESTRAINTS

A. Border King Steel Edging, galvanized finish:

1. 1/4" thick x 5" depth.
2. 15" tapered steel anchoring stakes with finish to match edging.

PART 3 EXECUTION

3.1 BLENDING STABILIZER

A. Blend 12-16 lbs. of Stabilizer per ton of decomposed granite or crushed 3/8”minus aggregate screenings. It is critical that Stabilizer be thoroughly and uniformly mixed throughout decomposed granite or crushed 3/8” minus aggregatescreenings.

3.2 PLACEMENT OF DECOMPOSED GRANITE SCREENINGS OR CRUSHED 3/8” MINUS AGGREGATE SCREENINGS

A. Upon thorough moisture penetration, compact aggregate screenings to 95% relative compaction by compaction equipment such as double drum roller (2-4 ton) or single drum roller (1000 lbs.) vibratory plate tamp. Do not begin compaction for 6 hours after placement and up to 48 hours.

B. Take care in compacting decomposed granite or crushed 3/8” minus aggregatescreenings when adjacent to existing trees, new planting and irrigation systems.

END OF SECTION

SECTION 32 84 00
PLANTING IRRIGATION

PART 1 - GENERAL

1.1 DESCRIPTION

A. Provide an underground irrigation system as shown and specified. The work includes:
1. Automatic irrigation system including piping, fittings, sprinkle heads, controller, and accessories.
2. Valves, backflow preventer, and fittings.
3. Testing.
4. Excavating and backfilling irrigation system work.
5. Associated exterior plumbing, and accessories to complete the system
6. Pipe sleeves.

B. Related Work:
1. Turf Grasses - Section 32 9200
2. Plants – Section 32 9300

1.2 QUALITY ASSURANCE

A. Installer's qualifications: Minimum of 3 years experience installing irrigation systems of comparable size. Contractor shall be a licensed and bonded Irrigator.

B. Materials, equipment, and methods of installation shall comply with the following codes and standards:
1. Texas Commission On Environmental Quality (TCEQ) Chapter 34, Texas Water Code; Chapter 344 Rules for Irrigators.
2. National Fire Protection Association, (NFPA): National Electrical Code.
3. American Society for Testing and Materials, (ASTM).
4. National Sanitation Foundation, (NSF).
5. City of Dripping Springs Applicable Plumbing Code
6. City of Dripping Springs Uniform Development Code

C. Excavating, backfilling, and compacting operations: Comply with requirements and as specified.

D. Obtain Owner's acceptance of installed and tested irrigation system prior to installing backfill materials.

1.3 SUBMITTAL

A. Submit for approval, manufacturer's product data for all equipment and materials specified herein or proposed for use on this project. Provide information for, but not limited to:
1. Sprinklers, spray and rotary.
2. Nozzles
3. Check Valves for all sprinklers. (Check valves are required for all sprinklers).
4. Piping
5. Pipe Fittings
6. Swing Joints
7. Pipe Cement
8. Controller

9. Wire
10. Wire Splice Kits
11. Remote Control Valves
12. Gate or Manual Valves
13. Quick Coupler Valves
14. Backflow Prevention Devices
15. Valve Boxes (Remote control valves, backflow prevention devices, quick coupler, wire splice location, gate/manual valves, etc.
16. And any other equipment or product necessary to properly complete the work as shown on the drawings and specified herein.

B. On each copy of the submittal, circle in red or highlight in yellow, each specific product proposed for use. COPIES NOT SO MARKED WILL BE REJECTED.

C. Upon irrigation system acceptance, submit written operating and maintenance instructions. Provide format and contents as directed by the Landscape Architect.

D. Provide irrigation system record "as-built" drawings:
1. During the course of installation, legibly mark all changes on drawings to record actual construction.
2. Upon completion of the installation, transfer the record data to a clean professional quality base drawing and submit to the Landscape Architect for approval. Provide CAD files if required by Owner.
    a. Indicate horizontal and vertical locations referenced to permanent surface improvements.
    b. Identify field changes of dimension and detail and changes made by Change Order.

E. Sustainable Design Submittals
1. Materials Reuse
2. Recycled Content Materials
3. Regional Materials
4. Low Emitting Materials

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver irrigation system components in manufacturer's original undamaged and unopened containers with labels intact and legible.
B. Deliver plastic piping in bundles, packaged to provide adequate protection of pipe ends, both threaded or plain.
C. Store and handle materials to prevent damage and deterioration. Do not store PVC pipe in direct sunlight for more than 48 hours.
D. To prevent installation delays provide secure locked storage for valves, sprinkler heads, and similar components that can not be immediately replaced.

1.5 PROJECT CONDITIONS

A. Known underground and surface utility lines are indicated on the utility survey. Verify locations of all known underground and surface utilities by contacting the appropriate utility companies.
B. Protect existing trees, plants, lawns, and other features designated to remain as part of the final landscape work.
C. Promptly repair damage to adjacent facilities caused by irrigation system work operations. Cost of repairs at contractor's expense.
D. Promptly notify the Owner of unexpected sub-surface conditions.
E. Irrigation system layout is diagrammatic. Exact locations of piping, sprinkler heads, valves, and other components shall be established by contractor in the field at time of installation. Proposed

piping layout within tree drip lines will be reviewed by Architect prior to installation. Obtain Architect's approval prior to installation.
1. Space sprinkler components as designed, not to exceed manufacturer recommendations.
2. Minor adjustments in system layout will be permitted to clear existing fixed obstructions. Final system layout shall be acceptable to the Architect and Owner.

E. Cutting and patching: (if necessary)
1. Cut through concrete and masonry with core drills. Jack hammers not permitted.
2. Material and finishes for patching shall match existing cut surface materials and finish. Exercise special care to provide patching at openings in exterior walls watertight.
3. Methods and materials used for cutting and patching shall be acceptable to the Owner.

1.6 WARRANTY AND GUARANTEE

A. Materials and workmanship shall be fully guaranteed for one (1) year after substantial completion.

B. Backfilling of all excavation shall be guaranteed for the one (1) year guarantee period. Repair trenches which have settled.

C. Raise or lower heads to compensate for settling of lawn areas.

D. Provide a one (1) year warranty against material, installation and operation defects. Repairs, adjustments and replacement of defective irrigation system materials, including materials which have been installed on the work during the warranty period shall be at Contractor's expense.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Manufacturer
1. Weathermatic
2. Rainbird
3. Conbraco
4. Hunter
5. Lasco
6. Nibco
7. Spears
8. NETAFIM
9. Leemco

B. If contractor chooses to install alternate equipment he shall submit to Architect for acceptance the following:
1. Equipment specifications and product literature
2. Pressure loss calculations including all lateral sections

2.2 MATERIALS

A. General:
1. Provide only new materials, without flaws or defects and of the highest quality of their specified class and kind and normally used in recycled water systems.
2. Comply with pipe sizes indicated. No substitution of smaller pipes will be permitted. Larger sizes may be used subject to acceptance of the Architect. Remove damaged and defective pipe.

B. Plastic pipe, fittings, and connections;

1. Polyvinyl chloride pipe: ASTM D2241, rigid, un-plasticized PVC, extruded from virgin parent material. Provide pipe homogenous throughout and free from visible cracks, holes, foreign materials, blisters, wrinkles, and dents.
2. Pressure Main Line:
   a. Pressure main line piping 4" and larger shall be Class 200 rubber gasket pipe and 3" and smaller shall be PVC Schedule 40 with solvent welded joints.
   b. Pipe shall be made from an NSF approved Type I, Grade I, PVC compound conform ing to ASTM resin specification D1785. All pipe must meet requirements as set forth in Federal Specification PS-22-70, with an appropriate standard dimension (S.D.R.) (Sol vent-weld Pipe).
3. PVC Non-Pressure Lateral Line Piping:
   a. Non-pressure buried lateral line piping shall be PVC class 200 with solvent-weld joints.
   b. Pipe shall be made from NSF approved, Type I, Grade II PVC compound conforming to ASTM resin specification D1784. All pipe must meet requirements set forth in Federal Specification PS-22-70 with an appropriate standard dimension ratio.
4. For mainline 4" and above: All changes of directions and reductions shall be mechanically restrained. Additional adjacent joints shall also be restrained as per manufactures recommendations. Joint Restraints shall be ductile iron and made in accordance with ASTM A-536, Grade 65-45-12 & AWWA C153. All Restraints shall have blunt cast serrations. Machine threaded restraints shall not be allowed. Optional Epoxy Coating shall be fusion bonded epoxy, 10-12 mil thickness. The epoxy coated restraints shall pass 90-Day immersion tests per CSA Z245.20-98. All Joint Restraints shall be manufactured by Leemco, Inc., U.S.A.
5. For fittings 4" and above: Fittings shall be ductile iron, slanted, deep bell, gasket style made in accordance with ASTM A-536, Grade 65-45-12 & AWWA C153.Fittings shall have four lugs to accommodate joint restraints and other fittings. Bell section shall allow 5-degree freedom of pipe deflection within the bell end. All gaskets shall be manufactured of high grade EPDM rubber and shall be rib-enforced "U-Cup" design to seal and assist in restraining pipe at all pressures. Epoxy Coating on interior & exterior surfaces of fittings shall be fusion bonded epoxy, 10-12 mil thickness. The epoxy coated fittings shall pass 90-Day immersion tests per CSA Z245.20-98. All DPS fittings shall have Epoxy Coating as standard finish. All fittings shall be manufactured by Leemco, Inc., U.S.A.

C. PVC pipe fittings: ASTM D2241 schedule 40 PVC molded fittings suitable for solvent weld or slip joint ring tight seal. For any threaded connections use only Sch 80 PVC. Fittings made of other materials are not permitted.
   1. Size slip fitting socket taper to permit a dry un-softened pipe end to be inserted no more than halfway into the socket. Saddle and cross fittings are not permitted.
   2. Schedule 80 PVC pipe may be threaded.
   3. Use PVC male adapters for plastic to metal connections. Hand-tighten male adapters plus one turn with a strap wrench.

D. Sprinkler heads, valves, and associated equipment.
   1. Refer to drawings for materials.
      a. Tree bubblers: Hunter PCN-50 Flood Bubbler on ProSpray PROS--06 where specified on plan.
      b. Remote control valves: Weathermatic Black Max Series
      c. Quick Coupler Valves: Rainbird 44LRC
      d. Underground Splices. 3M DBY
      e. Backflow Preventer required: Double Check Assembly.
      f. Netafim Drip Irrigation Components

E. Controls:
   1. Irrigation Controllers: Refer to drawing

F. Electric control wire:
1. Control wire shall be 14 AWG, UF Classification, UL approved for direct burial. Use two wire cabling recommended by controller manufacturer.
2. For runs longer than 5000 feet, larger cable may be used provided it conforms to controller manufacturer's specifications for both material specification and installation.
3. All wire splices shall be protected by a valve box. All wire splices shall be shown on "as-built" drawings. No splices will be allowed on runs of less than 500 feet.
4. Provide grounding as recommended by controller manufacturer.

2.3 ACCESSORIES

A. Drainage fill: No. 4 to 1/2-inch washed pea gravel.

B. Fill: Clean soil free of stones larger than 3/4-inch diameter, foreign matter, organic material, and debris.
1. Provide imported fill material as required to complete the work. Obtain rights and pay all costs for imported materials.
2. Suitable excavated materials removed to accommodate the irrigation system work may be used as fill material subject to the Landscape Architect's review and acceptance.

C. Clamps; Stainless steel, worm gear hose clamps with stainless steel screws or ear type clamps.

D. Low Voltage wire connectors: WC 014 splice by Wade Enterprises.

E. Valve access boxes: Tapered enclosure of rigid plastic material comprised of fibrous components chemically inert and unaffected by moisture corrosion and temperature changes. Provide lid of same material, black or green in color. Provide 10-inch Round Valve Box for remote control valves. Use valve box extensions as necessary to maintain proper level relative to grade. Provide 10-inch Valve Box for wire splices.

PART 3 EXECUTION

3.1 INSPECTION

A. Examine final grades and installation conditions. Do not start irrigation system work until unsatisfactory conditions are corrected.

B. This contractor to verify existing and proposed locations of all site utilities (i.e., gas, water, electric, telephone, sanitary and storm sewers, etc.) prior to any trenching and laying of pipe. In addition, this contractor shall coordinate all irrigation work with that of all other site work trades and contractors, as applicable.

3.2 PREPARATION

A. Lay out and stake the location of each sprinkler head and sprinkler valve. Obtain Architects acceptance of layout prior to excavating.
B. Remove existing paving for sleeve installation if required. Saw cut existing paving to provide uniform straight transition at new to existing paving.

3.2 INSTALLATION

A. Excavating and backfilling:
1. Excavation shall include all materials encountered, except materials that cannot be excavated by normal mechanical means.
2. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings as shown on Details.
3. Pulling method will not be allowed on this project. .
4. Excavate to depths required to provide earth fill or sand bedding for piping as shown on plans.
5. Fill to match adjacent grade elevations with approved earth fill material. Place and compact fill in layers not greater than 4-inch depth.
    a. Provide approved earth fill or sand to a point 4-inches above the top of pipe.
    b. Provide clean top soil fill free of rocks and debris for top 5-inches of fill.
6. Except as indicated, install irrigation mains with a minimum cover of 10 inches based on finished grades. Install irrigation laterals with a minimum cover of 8-inches based on finished grades.
7. Excavate trenches and install piping and fill during the same working day. Do not leave open trenches or partially filled trenches open overnight.
8. Replace paving of same materials, using joints and patterns to match existing adjoining paving surfaces. Removal of paving or wall material and replacement thereof shall only occur when it is determined by the Landscape Architect that the sleeves installed cannot be located and other methods (i.e., jacking under the construction or re-routing piping) are not able to be executed.

B. Plastic Pipe
1. Install plastic pipe in accordance with manufacturer's installation instructions. Provide for thermal expansion and contraction.
2. Saw cut plastic pipe larger than 2". Use a square-in sawing vice to insure a square cut. Remove burrs and shavings at cut ends prior to installation.
3. Make plastic to plastic joints with solvent weld joints or slip seal joints. Use only solvent recommended by the pipe manufacturer. Install plastic pipe fittings in accordance with pipe manufacturer's instructions. Contractor shall make arrangements with pipe manufacturer or distributor for all necessary field assistance.
4. Make plastic to metal joints with plastic male adapters.
5. Make solvent weld joints in accordance with manufacturer's recommendations.
6. Allow joints to set at least 24 hours before pressure is applied to the system.
7. Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable methods when pipe installation is not in progress.

C. Sprinkler, fittings, valves, and accessories:
1. Install fittings, valves, sprinkler heads, risers, and accessories in accordance with manufacturer's instructions, except as otherwise indicated.
2. Set sprinkler heads perpendicular to finished grades, except as otherwise indicated.
3. Provide pop-up spray heads (with internal check valve) with an adjustable swing joint riser assembled as shown on details.
    a. Pre-fabricated swing joint risers shall be schedule 80 rated.
4. Obtain Architect's review and acceptance of height for proposed sprinkler heads and valves prior to installation.
5. Locate sprinkler heads to assure proper coverage of indicated areas. Do not exceed sprinkler head spacing distances indicated.
6. Install backflow prevention valve, fittings, and accessories as shown or required to complete the system. Engineer to provide layout and details.
7. Install the specified controller in the location shown on the drawing, with lockable weatherproof controller housing. Controllers shall be pedestal mounted as directed by the owner. Install per manufacturer's recommendations.

a. Provide rigid conduit from controller down into grade to accommodate valve wires (see details).
b. This contractor shall pull valve wires, program controller by labeling station position for zones, and put controller in operation.

8. Install in-ground control valves in a valve access box as indicated.
9. Install valve access boxes on a suitable base of gravel to provide a level foundation at proper grade and to provide drainage of the access box. Factory valve box extensions shall be required to be used if necessary.
10. Seal threaded connections on pressure side of control valves with Teflon tape. Do not use pipe joint compound.

D. Control wiring
1. Install electric control cable in the mainline piping trenches wherever possible. Place wire in trench adjacent to pipe. Install wire with slack to allow for thermal expansion and contraction. Provide expansion joints at 100 foot intervals by making 5-6 turns around a piece of 1/2-inch pipe. Where necessary to run wire in a separate trench, provide a minimum cover of 12-inches. When more than one wire is placed in a trench the wire shall be taped together at intervals of 50 feet.
2. Provide sufficient slack (expansion coil consisting of 5-6 turns around a 1/2" piece of pipe) at remote control valves in control boxes, and at all wire splices to allow raising the valve bonnet or splice to the surface without disconnecting the wires when repair is required.
3. Connect remote control valve to one station of a controller only.
4. Make wire connections to remote control electric valves and splices of wire in the field, using wire connectors and in accordance with manufacturer's recommendations.

E. Sleeves:
1. Utilize existing sleeves if available for installation of the irrigation system.
2. Provide new sleeves for all locations where existing sleeves are not indicated. Install new sleeves prior to paving installation wherever possible.
3. Install pipe sleeves under existing concrete or asphalt surfaces where cutting is necessary. Obtain Owner's permission before cutting existing concrete and asphalt surfaces. Where piping is shown under paved areas which are adjacent to turf areas, install the piping in the turf areas.

F. Flushing, testing, and adjustment:
1. In the presence of the Landscape Architect or his Representative, hydrostatically test the mainline piping system in place, before backfilling. Test period shall be not less than four hours at 130 PSI. Test is acceptable if no leakage occurs during test period.
2. After sprinkler piping and risers are installed and before sprinkler heads are installed, open control valves and flush out the system with full head of water.
3. Perform system testing upon completion of each section. Make necessary repairs and retest repaired sections as required.
4. Adjust sprinklers after installation for proper and adequate distribution of water over the coverage pattern. Adjust for the proper arc of coverage.
5. Tighten nozzles on spray type sprinklers after installation. Adjust nozzle-adjusting screw on sprinklers as required for proper radius. Interchange nozzle patterns as directed by the Architect, to give best arc of coverage.
6. Adjust all electric remote control valve flow control stems for system balance and optimum performance.
7. Test and demonstrate the controller by operating appropriate day, hour, and station selection features as required to automatically start and shut down irrigation cycles to accommodate plant requirements and weather conditions.
8. Backflow device, shall be tested and certified before substantial completion will be issued.

3.3 SPARE PARTS

A. Provide the Owner additional parts as noted.
   1. 2 extra sprinkler head(s) of each size and type.
   2. 1 extra valve(s) of each size.
   3. 2 extra valve access boxes of each size.
   4. 2 C100 quick coupling keys and 2 #10 hose swivels.

3.4 DISPOSAL OF WASTE MATERIAL

A. Stockpile, haul from site, and legally dispose of waste materials, including unsuitable excavated materials, rock, and debris.

B. Maintain disposal route clear, clean, and free of debris.

3.5 SUBSTANTIAL COMPLETION

A. An inspection of the irrigation system will be made by the Landscape Architect upon request for Application of Substantial Completion by the Contractor. The irrigation system must be sufficiently complete so that all plant material can be sustained by the system.

B. Contractor will be required to train maintenance personnel on the use and basic upkeep of this system. If this responsibility is not fulfilled, the cost of obtaining this training by the Owner shall be shown as a deduction in the final payment.

C. The Contractor shall attach a reduced scale of the area controlled by the controller on the inside of the controller door identifying the location of the valves and the station assigned to each.

3.6 FINAL COMPLETION

A. An inspection of the irrigation system will be made by the landscape architect upon request for Final Completion by the Contractor. Provide notification of at least ten (10) working days before requested inspection date.

3.7 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from site all excess materials, soil, debris, and equipment. Repair damage resulting from irrigation system installation.

END OF SECTION

SECTION 32 9300
PLANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plants.
2. Planting soil
3. Mulch
4. Compost
5. Fertilzers

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1.2 DEFINITIONS

A. Backfill: The earth used to replace or the act of replacing earth in an excavation.

B. Duff Layer: The surface layer of native topsoil that is composed of mostly decayed leaves, twigs, and detritus.

C. Finish Grade: Elevation of finished surface of planting soil.

D. Manufactured Topsoil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

E. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. This includes insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. It also includes substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.

F. Pests: Living organisms that occur where they are not desired, or that cause damage to plants, animals, or people. These include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.

G. Planting Soil: Standardized topsoil; existing, native surface topsoil; existing, in-place surface soil; imported topsoil; or manufactured topsoil that is modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.

H. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.

I. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

J. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.

K. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

1.3 SUBMITTALS

A. Submittals for Review

1. Provide certificates of inspection accompanying the invoice for each shipment of plants as may be required by law for transportation. File certificates with the Landscape Architect prior to acceptance of the material. Inspection by federal or state authorities at the place of growth does not preclude rejection of the plants at the site.

2. Manufacturers data for each type of product indicated, including soils.

3. Soils samples: submit samples of all topsoil, soil mixes, mulches and organic materials. Samples shall weigh 2 lbs. and be packaged in plastic bags. Samples shall be typical of the lot of material to be delivered to the site and provide accurate indication of color, texture, and organic make-up of the material.

4. Plant photographs: submit color photographs of representative specimens of each type of tree, shrub, and groundcover on the plant list. Photos shall be 3x5 in. taken from an angle that depicts the size and condition of the typical plant to be furnished. A scale rod or other measuring device shall be included in the photograph.

5. Nursery sources: submit a list of all nurseries that will supply plants, along with a list of the plants they will provide and the location of the nursery.

a. For groundcovers and shrubs in large quantities, the Contractor shall verify in writing one year in advance of installation that quantities can be acquired at the designated installation time. If quantities are not available, the Contractor shall provide a proposed contract for acquiring, growing and maintaining the required quantity of plants within the required lead time to meet the installation date. The Contractor shall notify the Landscape Architect and Owner of required lead times and cost for growing plants specified plants for the Owner's and Landscape Architect's consideration/approval.

6. Soil Test: Submit soil test analysis report for each sample of topsoil and planting mix from a soil testing laboratory approved by the Landscape Architect.

7. Provide a particle size analysis, including the following gradient of mineral content:

USDA Designation	Size in mm
Gravel	+2 mm
Very course sand	1-2 mm
Coarse sand	0.5 -1 mm
Medium sand	0.25-0.5 mm
Fine sand	0.1-0.25 mm
Very fine sand	0.05-0.1 mm
Silt	0.002-0.05 mm
Clay	smaller than 0.002 mm

8. Provide a chemical analysis, including the following:

a. pH and buffer pH

b. Percentage of organic content by oven-dried weight.

c. Nutrient levels by parts per million, including phosphorus, potassium magnesium, manganese, iron, zinc, and calcium. Nutrient test shall include the testing laboratory recommendations for supplemental additions to the soil based on the requirements of horticultural plants.

d. Soluble salt by electrical conductivity of a 1:2, soil: water, sample measured in millimho per cm.

e. Cation exchange capacity (CEC).

9. Material Testing: Submit the manufacturer's particle size analysis, and the pH analysis and provide a description and source location for the content material of all organic materials.

C. Close-out submittals:

1. Maintenance Instructions: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Instructions shall be submitted to the Landscape Architect for review and approval prior to submission to the Owner for review/approval.

2. During Maintenance Period, maintain a log of maintenance activity and submit a monthly report to the Owner containing all maintenance activities. Following the Maintenance period, compile a summary of activities that have taken place during the Maintenance Period.

1.4 QUALITY ASSURANCE

A. Landscape planting and related work shall be performed by a firm with a minimum of five years experience specializing in this type of work.

B. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when work is in progress.

1. Pesticide Applicator: State licensed, commercial.

C. Soil Analysis: For each unamended soil type, furnish soil analysis and a written report by a qualified soil-testing laboratory.

1. The soil-testing laboratory shall oversee soil sampling.
2. Report suitability of tested soil for plant growth.

a. State recommendations for nitrogen, phosphorus, and potash nutrients and soil amendments to be added to produce satisfactory planting soil suitable for healthy, viable plants.
b. Report presence of problem salts, minerals, or heavy metals; if present, provide additional recommendations for corrective action.
c. Report presence of soil compaction and recommendations for corrective action.

D. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.

E. Pre-installation Conference: Conduct conference at job trailer at least three weeks in advance of installation.

1.5 PROJECT CONDITIONS

A. Planting shall be done within the following dates:

1. Trees, shrubs and groundcover: January to June and October to December.

2. Variance: if special conditions exist that warrant a variance in the above planting dates, a written request shall be submitted to the Landscape Architect stating the special conditions and the proposed variance. Permission for the variance will be given if warranted in the opinion of the Landscape Architect. Any variance in the planting season will not affect the guarantee period.

B. Utility verification

1. The Contractor shall contact the local utility companies for verification of the location of all underground utility lines in the area of work. The Contractor shall be responsible for all damage resulting from neglect or failure to comply with this requirement.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Should the roots be dried out, large branches broken, balls of earth broken or loosened, or areas of bark torn, the Landscape Architect may reject the injured tree(s)and order them replaced at no additional cost to the Owner. Provide protective covering of plants during shipping and delivery including tarpaulin or canvas. Loads that are not protected shall be rejected. Do not drop plants during delivery and handling.

B. Handle planting stock by the root ball and using belts or lifting harnesses of sufficient width to support the soil ball to avoid damaging it. In no instance shall the tree trunk be used to lift or handle the trees.

C. Deliver plants after preparations for planting have been completed and install immediately. If planting is delayed more than six hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.

1.7 WARRANTIES

A. Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.

1. Failures include, but are not limited to, the following:
   a. Death and unsatisfactory growth, except for defects resulting from abuse incidents that are beyond Contractor's control.
   b. Structural failures including plantings falling or blowing over.

2. Warranty Periods from Date of Planting Completion.
   a. Trees, Shrubs, Vines, and Ornamental Grasses:12 months.
   b. Ground Covers, Biennials, Perennials, and Other Plants: 12 months.
   c. Annuals: 12 months.

1.8 MAINTENANCE SERVICE

A. Initial Maintenance Service: Provide maintenance by skilled employees of landscape Installer. Maintain as required in Part 3. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established but for not less than maintenance period below.

1. Maintenance Period for Trees and Shrubs: 90 days from date of substantial completion.
2. Maintenance Period for Ground Cover and Other Plants: 90 days from date of planting completion.

PART 2 - PRODUCTS

2.1 NURSERY SOURCES:

A. Acceptable Sources for Large and Small Trees:

1. Everde, Glen Flora TX, 1 Tree Town Rd. 77443, 979-677-9400
2. Native Texas Nursery, Austin, 512-276-9801
3. Rancho Encino993 County Road 207, Bay City, TX 77414979-245-8992
4. Approved substitute

B. Acceptable Sources for Shrubs, Groundcovers Vines

1. McNeal Growers, Austin, 512) 280-2233 (particularly for Sedges)
2.. Native Texas Nursery; Austin, 512-276-9801
3. Approved substitute

2.2 PLANT MATERIAL

A. Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant Schedule or Plant Legend shown on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, root girdling abrasions, and disfigurement.

1. Trees with multiple leaders, unless specified, will be rejected. Trees with a damaged or crooked leader, bark abrasions, sunscald, disfiguring knots, insect damage, root girdling or cuts of limbs over ¾” in diameter that are not completely closed will be rejected.

B. Plants shall conform to the measurements specified, except that plants larger than those specified may be used if approved by the Landscape Architect. Use of larger plants shall not increase the contract price. If larger plants are approved, the root ball shall be increased in proportion to the size of the plant.

1. Caliper measurements shall be taken on the trunk 6” above the natural ground line for trees up to and including 4 inches in caliper and 12 inches above the natural ground line for trees over 4 inches in caliper. Height and spread dimensions specified refer to the main body of the plant and not from branch tip to branch tip. Plants shall be measured when branches are in their normal position. If a range of sizes is given, no plant shall be less than the minimum size, and no less than 50 percent of the plants shall be as large as the maximum size specified. Measurements specified are minimum sizes acceptable after pruning, where pruning is required. Plants that meet measurements but do not possess a standard relationship between height and spread, according to ANSI Z60.1

2. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of the root ball, which shall begin at root flare according to ANSI Z60.1. Root flare shall be visible before planting. Any plants with girdling roots shall be rejected.

C. Substitutions of plant materials will not be permitted unless authorized in writing by the Landscape Architect. If proof is submitted in writing that a plant specified is not obtainable, consideration will be given to the nearest available size or similar variety, with a corresponding adjustment of the contract price.

D. The Plant Schedule as shown in the drawings is for the Contractor’s information only, and no guarantee is expressed or implied that quantities therein are correct or that the list is complete. The Contractor shall ensure that all plant materials shown on the drawings are included in his or her bid.

E. All plants shall be labeled by plant name. Labels shall be attached securely to all plants, bundles, and containers of plant materials when delivered. Plant labels shall be durable and legible, with information given in weather-resistant ink or embossed process lettering.

F. Selection and Tagging:

1. Tree tagging: the Landscape Architect shall tag all trees at the Nursery prior to shipping. Prior to tagging, the Contractor shall submit photographs from three Nursery sources according to Section 1.3 E These photographs shall be

submitted two weeks in advance of the tagging trip. Based on the submitted photographs, a Nursery shall be selected for tree tagging. The Nursery shall confirm in writing, one week in advance of the tree tagging trip, that it has the required quantities and qualities of trees representative of those shown in the photograph submittals in terms of species, form, height, and spread as noted in the Planting Schedule. Any proposed substitutions from those requirements noted in the Plant Schedule shall be supplied in writing one week prior to the tree tagging trip. Only those trees approved and tagged by the Landscape Architect shall be shipped to the site for installation. Any trees that have not been previously tagged will be returned to the Nursery at the Contractor's expense. Any additional trips required due to the Contractor's not adhering to the above requirements, will be at the Contractor's expense.

2. Shrubs/Vines and Groundcover: all plants shall be subject to inspection for conformity to specification requirements and approval by the Landscape Architect at their place of growth and upon delivery. Such approval shall not impair the right of inspection and rejection during progress of the work. A written request for the inspection of plant material at their place of growth shall be submitted to the Landscape Architect at least ten calendar days prior to digging. This request shall state the place of growth and the quantity of plants to be inspected. The Landscape Architect may refuse inspection at this time if, in his or her judgment, sufficient quantities of plants are not available for inspection.

G. Container Plants:

1. Plants grown in containers shall be of appropriate size for the container as specified in the most recent addition of ANSI Z60.1 and shall be free of circling roots on the exterior and interior of the root ball.

2. Container plants shall have been grown in the container long enough to have established roots throughout the growing medium.

2.3 PLANTING SOILS

A. Planting Soil:

1. Planting soil shall meet the following criteria. Soil shall be a mixture of 30% Compost, 10% Mineral Sand, and 60% Native Soil.

2. Native soil shall meet be locally available and meet the following criteria:
   a. free of trash, weeds, deleterious materials, rocks and debris.
   b. 100% shall pass through a 1.5-inch (38-mm) screen.
   c. Native soil shall be loamy material that meets the following textural criteria in accordance with the USDA textural triangle.

Textural Class	Minimum	Maximum
Clay	10%	15%
Silt	25%	35%
Sand	50%	60%

   d. PH range 7.3 to 7.9
   e. Organic Matter Content: 3-6% dry weight basis

f. Moisture Content: 30-60%
g. Soluble salt concentrations shall not exceed 1.5 dS/m
h. Sodium adsorption ratio (SAR) shall be <5
i. Sufficient structure to give good tilth and aeration
j. An infiltration rate of 3 inches per hour
k. Soil shall not be compacted beyond the maximum allowable bulk density of 1.60 g/cm^3 or 75 - 82 percent Standard Proctor.

2.2 SUBSOILS

A. Subsoils – Existing subsoils shall be scarified and or amended with gravel if needed to have an infiltration rate of 0.3 inches per hour.

2.3. COMPOST

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:

1. Compost shall come from local feedstock manufactured within 50 miles of the project site.

2. Feedstock: leaf and yard waste

3. Reaction: pH 5.5 to 8.0

4. Soluble-Salt Concentration: Shall not exceed 1.5 mS/cm

5. Organic-Matter Content: The organic material shall contain at least 40% organic matter (dry basis) and shall have 100% passing a ½ inch or smaller screen. Debris particles such as metal, glass, plastic, wood, asphalt, or masonry shall not exceed 10 mm jn size and shall not total more than 2% dry weight.
6. The carbon to nitrogen ration shall be between 11/1 and 22/1.
7. Maturity shall be greater than or equal to 6 “curing compost and very stable” as measured in a colormetric based maturity test (Woods End Research Laboratory, or equivalent).
8. The composed material shall not produce any unpleasant residual odor such as hydrogen sulfide, ammonia, or others.
9. The material shall contain some nitrogen, phosphorus, potassium, calcium, magnesium, sodium, and micronutrients including iron, copper, boron, manganese and molybdenum so that heavy applications of fertilizer are not required to sustain growth.
10. Concentrations of zinc, mercury, cadmium, lead, nickel, chromium, and copper must be below EPA and Texas Commission on Environmental Quality standards for applications to soils with human activity.

2.4 MULCHES

A.Organic Mulch: Shredded Texas Native Hardwood Mulch

1. Gardenville 1-888-655-6115

2.5 PESTICIDES

A. Pesticide registered and approved by EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application.

2.6 FERTILIZERS

A. Develop a list of organic or slow-release fertilizer products for use on the project site. Submit the list to the Owner's Designated Representative for approval prior to use.

B. Only organic fertilizers shall be used. All fertilizers shall be certified by Organic Material Review Institute (OMRI).

C. Composition: Macro and micro soil nutrients in amounts recommended in soil reports from a qualified testing agency.

D. Chelated Iron: In amounts recommended in soil reports from a qualified testing agency. Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 TESTING

A. Permeability of the subgrade shall be tested, for at least three locations within each defined planting area. The Landscape Architect shall specify locations and numbers of tests based on the complexity of each planting area. Subgrade permeability is to be tested using a double ring infiltrometer and should be conducted by a soil scientist or geotechnical engineer.

3.2 PLANTING AREA ESTABLISHMENT

A. Mark utilities prior to start of work.

B. Loosen subgrade or scarify base material under planting areas to a minimum depth of 2 inches. Remove stones larger than 1 inch in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.

C. Spread planting soil to a minimum depth of 12 inches for shrubs & groundcover but not less than required to meet finish grades after natural settlement. Do not spread if planting soil or subgrade is frozen, muddy, or excessively wet.

D. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

E. Finish Grading: Grade planting areas to a smooth, uniform surface plane with loose, uniformly fine texture. Grade the surface of all planted to meet finish grade. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.3 EXCAVATION FOR TREES AND SHRUBS

A. Locations for plants and/or outlines of areas to be planted are to be staked out at the site. Locate and mark all subsurface utility lines. Approval of stakeout by the Landscape Architect is required before excavation begins.

B. Planting Pits and Trenches: Excavate circular planting pits with sides sloping inward at a 45-degree angle. Excavations with vertical sides are not acceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

1. Excavate approximately five times as wide as ball diameter.
2. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball. If the planting area under any tree is initially dug too deep, the soil added to bring it up to the correct level should be thoroughly tamped.

C. Subsoil and topsoil removed from excavations may not be used as planting soil.

D. Detrimental soil conditions: the Landscape Architect is to be notified, in writing, of soil conditions encountered, including poor drainage, that are detrimental to the growth of plant material. When detrimental conditions are uncovered, planting shall be discontinued until instructions to resolve the conditions are received from the Landscape Architect.

E. Obstructions: if rock, underground construction work, utilities, tree roots, or other obstructions are encountered in the excavation of planting areas, alternate locations for any planting shall be determined by the Landscape Architect.

3.4 TREE, SHRUB, AND VINE PLANTING

A. Before planting, verify that root flare is visible at top of root ball according to ANSI Z60.1.

B. Remove injured roots by cutting cleanly; do not break.

C. Set stock plumb and in center of planting pit or trench with root flare 2 inches above adjacent finish grades.

1. Use specified planting soil for backfill.
2. Container-Grown: Carefully remove root ball from container without damaging root ball or plant.
3. Set plants on flat-tamped or unexcavated pads. Plants must be set plumb and braced in position until planting soil has been placed and tamped around the base of the root ball. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately one-half filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed. Note: Improper compacting of the soil around

the root ball may result in the tree settling or leaning. Plants shall be set so that they will be at the same depth and so that the root ball does not shift or move laterally one year later.

4. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

E. Remove any excess soil, debris, and planting material from the job site at the end of each workday.

F. Form watering saucers 4" high immediately outside the area of the root ball of each tree as indicated in the drawings.

3.5 STAKING AND GUYING

A. Stake or guy a tree only when necessary for the specific conditions encountered and with the approval of the Landscape Architect. Trees that settle out of plumb due to inadequate soil compaction either under or adjacent to the root ball shall be excavated and reset. In no case shall trees that have settled out of plumb be pulled upright using guy wires.

B. When required, staking and guying methods shall be approved by the Landscape Architect. If no staking or guying requirements appear on the drawings, submit for approval a drawing of the staking or guying method to be used. Stakes, anchors, and wires shall be of sufficient strength to maintain the tree in an upright position that overcomes the particular circumstances that initiated the need for staking and guying. Guy wires shall be galvanized, multi-strand, twisted wire.

C. Where guy wires are attached around the tree, the trunk shall be protected with 3/4" rubber hose, black in color, and of sufficient length to extend past the trunk by more than 6 inches.

D. Stakes and guys shall be installed immediately upon approval of the planting, and shall be removed at the end of the first growing season. Any tree that is not stable at the end of this time shall be rejected.

3.6 TREE, SHRUB, AND VINE PRUNING

A. Remove only dead, dying, or broken branches. Do not prune for shape. Healthy lower branches and interior small twigs should not be removed except as necessary to clear walks and roads. In no case should more than one quarter of the branching structure be removed. Retain the normal and natural shape of the plant.

B. All pruning shall be completed using clean, sharp tools. All cuts shall be clean smooth, with the bark intact with no rough edges or tears.

C. Except in circumstances dictated by the needs of specific pruning practices for specific tree species, tree paint shall not be used unless approved by the Landscape Architect.

Tree paint, where required, shall be paint specifically formulated and manufacturing for horticultural use.

D. Pruning of large trees shall be done from a hydraulic man-lift such that it is not necessary to climb the tree.

3.7 GROUND COVER PLANTING

A. Set out and space ground cover and plants other than trees, shrubs, and vines as indicated in drawings in even rows with triangular spacing.

B. Use planting soil as specified for backfill.

C. Dig holes large enough to allow spreading of roots.

D. Work soil around roots to eliminate air pockets and leave a slight saucer indentation around plants to hold water.

E. Water thoroughly after planting, taking care not to cover plant crowns with wet soil.

F. Protect plants from hot sun and wind; remove protection if plants show evidence of recovery from transplanting shock.

G. Do not plant groundcover within the root ball area of newly planted trees. For groundcover within the dripline of formerly transplanted trees, the Contractor shall acquire written approval from the Landscape Architect before proceeding with plantings within the dripline area to assure that transplanted trees are deemed healthy and well-established prior to planting.

3.8 PLANTING AREA MULCHING

A. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees and Tree-like Shrubs in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 36-inch radius around trunks or stems. Do not place mulch within 6 inches of trunks or stems.
2. Organic Mulch in Planting Areas: Apply 3-inch average thickness of mulch extending 12 inches beyond edge of individual planting pit or trench and over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.9 ACCEPTANCE

A. The Landscape Architect shall inspect all work for acceptance upon written request of the Contractor. The request shall be received at least ten calendar days before the anticipated date of inspection. Acceptance of plant material shall be for general conformance to specified size, character, and quality and shall not relieve the Contractor of responsibility for full conformance to the Contract Documents, including correct species. Upon completion and re-inspection of all repairs or renewals necessary in the

judgment of the Landscape Architect, the Landscape Architect shall verify in writing that the work has been accepted.

3.10 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings. Spray or treat as required to keep trees and shrubs free of insects and disease in accordance with the Specification.

B. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.

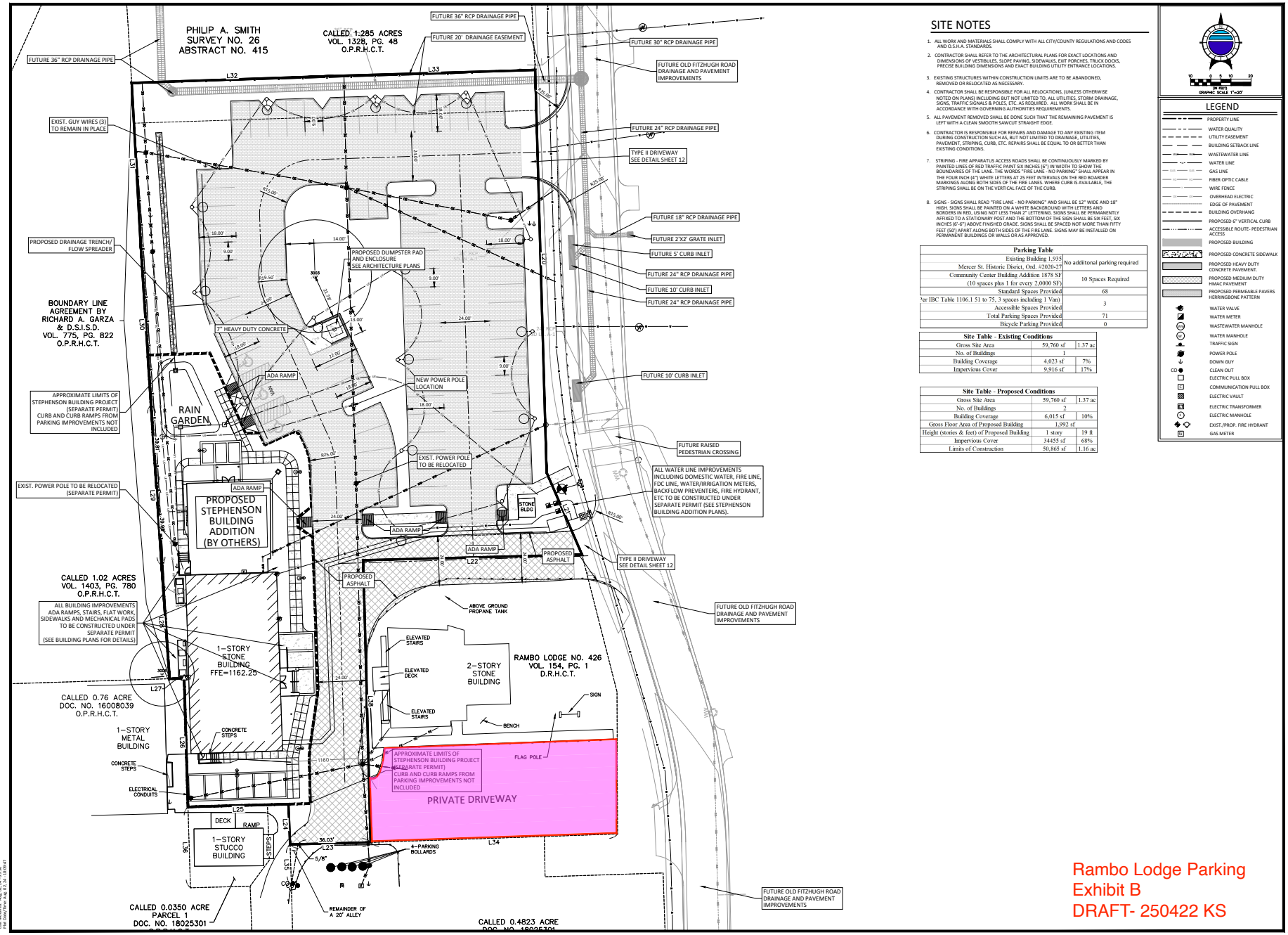
C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use practices to minimize the use of pesticides.

D. Apply pesticides and other chemical products and biological control agents in accordance with authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.

E. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.

END OF SECTION 32 9300

Rambo Lodge Parking - Add Alternate "B"



SITE NOTES

1. ALL WORK AND MATERIALS SHALL COMPLY WITH ALL CITY/COUNTY REGULATIONS AND CODES AND O.S.H.A. STANDARDS.
2. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF VESTIBULES, SLOPE PAVING, SIDEWALKS, EXIT PORCHES, TRUCK DOCKS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.
3. EXISTING STRUCTURES WITHIN CONSTRUCTION LIMITS ARE TO BE ABANDONED, REMOVED OR RELOCATED AS NECESSARY.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS, (UNLESS OTHERWISE NOTED ON PLANS) INCLUDING BUT NOT LIMITED TO, ALL UTILITIES, STORM DRAINAGE, SIGNS, TRAFFIC SIGNALS & POLES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH GOVERNING AUTHORITIES REQUIREMENTS.
5. ALL PAVEMENT REMOVED SHALL BE DONE SUCH THAT THE REMAINING PAVEMENT IS LEFT WITH A CLEAN SMOOTH SAWCUT STRAIGHT EDGE.
6. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND DAMAGE TO ANY EXISTING ITEM DURING CONSTRUCTION SUCH AS, BUT NOT LIMITED TO DRAINAGE, UTILITIES, PAVEMENT, STRIPING, CURB, ETC. REPAIRS SHALL BE EQUAL TO OR BETTER THAN EXISTING CONDITIONS.
7. STRIPING - FIRE APPARATUS ACCESS ROADS SHALL BE CONTINUOUSLY MARKED BY PAINTED LINES OF RED TRAFFIC PAINT SIX INCHES (6") IN WIDTH TO SHOW THE BOUNDARIES OF THE LANE. THE WORDS "FIRE LANE - NO PARKING" SHALL APPEAR IN THE FOUR INCH (4") WHITE LETTERS AT 25 FEET INTERVALS ON THE RED BOARDER MARKINGS ALONG BOTH SIDES OF THE FIRE LANES. WHERE CURB IS AVAILABLE, THE STRIPING SHALL BE ON THE VERTICAL FACE OF THE CURB.
8. SIGNS - SIGNS SHALL READ "FIRE LANE - NO PARKING" AND SHALL BE 12" WIDE AND 18" HIGH. SIGNS SHALL BE PAINTED ON A WHITE BACKGROUND WITH LETTERS AND BORDERS IN RED, USING NOT LESS THAN 2" LETTERING. SIGNS SHALL BE PERMANENTLY AFFIXED TO A STATIONARY POST AND THE BOTTOM OF THE SIGN SHALL BE SIX FEET, SIX INCHES (6'-6") ABOVE FINISHED GRADE. SIGNS SHALL BE SPACED NOT MORE THAN FIFTY FEET (50') APART ALONG BOTH SIDES OF THE FIRE LANE. SIGNS MAY BE INSTALLED ON PERMANENT BUILDINGS OR WALLS OR AS APPROVED.

Parking Table	
Existing Building 1,935 Mercer St. Historic Distrct, Ord. #2020-27	No additonal parking required
Community Center Building Addition 1878 SF (10 spaces plus 1 for every 2,0000 SF)	10 Spaces Required
Standard Spaces Provided	68
Per IBC Table 1106.1.51 to 75, 3 spaces including 1 Van) Accessible Spaces Provided	3
Total Parking Spaces Provided	71
Bicycle Parking Provided	0

Site Table - Existing Conditions		
Gross Site Area	59,760 sf	1.37 ac
No. of Buildings	1	
Building Coverage	4,023 sf	7%
Impervious Cover	9,916 sf	17%

Site Table - Proposed Conditions		
Gross Site Area	59,760 sf	1.37 ac
No. of Buildings	2	
Building Coverage	6,015 sf	10%
Gross Floor Area of Proposed Building	1,992 sf	
Height (stories & feet) of Proposed Building	1 story	19 ft
Impervious Cover	34455 sf	68%
Limits of Construction	50,865 sf	1.16 ac

GRAPHIC SCALE 1"=20'

LEGEND

- PROPERTY LINE
- WATER QUALITY
- UTILITY EASEMENT
- BUILDING SETBACK LINE
- WASTEWATER LINE
- WATER LINE
- GAS LINE
- FIBER OPTIC CABLE
- WIRE FENCE
- OVERHEAD ELECTRIC
- EDGE OF PAVEMENT
- BUILDING OVERHANG
- PROPOSED 6" VERTICAL CURB
- ACCESSIBLE ROUTE- PEDESTRIAN ACCESS
- PROPOSED BUILDING
- PROPOSED CONCRETE SIDEWALK
- PROPOSED HEAVY DUTY CONCRETE PAVEMENT.
- PROPOSED MEDIUM DUTY HMAC PAVEMENT
- PROPOSED PERMEABLE PAVERS HERRINGBONE PATTERN
- WATER VALVE
- WATER METER
- WASTEWATER MANHOLE
- WATER MANHOLE
- TRAFFIC SIGN
- POWER POLE
- DOWN GUY
- CLEAN OUT
- ELECTRIC PULL BOX
- COMMUNICATION PULL BOX
- ELECTRIC VAULT
- ELECTRIC TRANSFORMER
- ELECTRIC MANHOLE
- EXIST./PROP. FIRE HYDRANT
- GAS METER

Rambo Lodge Parking
Exhibit B
DRAFT- 250422 KS

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W, Ste. 160
Austin, Texas 78735 (512) 583-2600
www.doucetengineers.com
TBPE Firm Number: 3137
TBPELS Firm Number: 10105800

SITE PLAN

STEPHENSON BUILDING
PARKING IMPROVEMENTS
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 8/2/24, FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF AUSTIN.

STATE OF TEXAS
JOE GRASSO
73285
REGISTERED
PROFESSIONAL ENGINEER
8-2-24

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	8/2/24

SHEET
6
OF 26

Project No.:
1577-009C
SP-YEAR-XXXXX

ADDENDUM NO. 3

Project: **STEPHENSON SCHOOL BUILDING & PARKING IMPROVEMENTS**
Owner: **City of Dripping Springs, Texas**
311 Old Fitzhugh Rd
Dripping Springs, Texas 78620
Architect: **Architexas**
1023 Springdale Rd
Bldg 11, Suite E
Austin, Texas 78721
512.444.4220
Engineer: **Doucet**
Date: **July 18, 2025**



07/18/2025

Respondents are hereby notified of the following revisions and/or clarifications to the construction plans, contract documents and specifications. This Addendum forms a part of the Contract and clarifies, corrects, or modifies original Proposal Documents.

BEGIN REVISIONS

Bidder Questions

1. Question: Is structured cabling by owner?

   Response: Structured cabling scope of work will be added to the Work as a future Proposal Request/Change order. Structured cabling will be by contractor.

2. Question: Is structured cabling system to be Cat 6 or Cat 6A rated? Is there a preferred solution/manufacturer (Panduit, Commscope, Leviton, Hubble, Belden, Ortronics, Systimax)?

   Response: Cat 6A system. No preferred manufacturer.

3. Question: What are the requirements for AV/IT Room equipment support (wall cabinet, floor rack)?

   Response: Refer to 27 41 15 Performance Sound Reinforcement Systems 2.04 Equipment Racks and Power Distribution for AV racks. Location to be coordinated with owner prior to install.

4. Question: Are there any access points or camera locations required?

   Response: Access points or camera locations may be added to the Work as a future Proposal Request/Change order.

5. Question: Parking Improvements - are there any camera or wireless access point locations at light poles? Recommend home run pathways for any poles to have noted devices.

   Response: Access points or camera locations may be added to the Work as a future Proposal Request/Change order.

6. Question: Will Knox Box be surface mounted or recessed? Will it require a tamper switch?

   Response: Knox Box to be surface mounted to minimize damage to the limestone. . Refer to the specification for knox box requirements. Any additional requests by the fire marshal will be handled as a change order during construction.

7. Question: Is a specification for the permeable paver available?

   Response: Provide Keystone Eco-CityLock 5x10 80mm paver, color to be selected from full color range.

8. Question: Confirm the locations of louver blinds, roller shades and window film.

   Response: All windows are to receive blinds. Horizontal louver blinds is the typical blind with the multi-purpose room being the exception. Windows 101 & 102 are to receive roller shades. Refer to the window schedule on sheet A5.11, key note 4 indicates windows to receive UV glazing film. This product is intended for existing windows to be restored with single pane glass. Refer to spec section 08 80 00 Glazing for "Glazing Film" for the specified product.

Substitution Request

1. 07 25 00 Fluid Applied Weather Barrier Vapor Permeable
   Product: TK-AirMax 2104 Vapor Permeable
   Product substitution not accepted.

Specification Revisions

None

Drawing Revisions

None

END REVISIONS

RESPONDANTS MUST ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THEIR PROPOSAL RESPONSE TO HAVE THEIR PROPOSALS RECOGNIZED.

Stephenson School Building & Parking Improvements
City of Dripping Springs, Texas ADDENDUM NO. 3

Approved for Distribution by:

Garrett Osborne - City Inspector

APPENDIX

Stephenson School Building
Rehabilitation & Addition
Dripping Springs, Texas

Geotechnical Solutions

2922 NW Loop 410, Ste. 105
San Antonio, Texas 78230 • 210. 209. 4472 : geotechsltns@gmail.com
Firm No. F-19672

Mr. Larry Irsik, AIA **July 24, 2023**
Architexas |Create+Conserve **No.: 23-257 (Page 1 of 8)**
Lirsik@architexas.com

RE: Geotechnical Study (Proposed Addition to Stephenson School Bldg.)
103 Old Fitzhugh Road
Dripping Springs, Texas 78620

Sir:

Pursuant to your request, a representative of Geotechnical Solutions traveled to the above referenced location on July 19, 2023, to obtain soil samples **(by means of 2 borings,)** for the purposes of determining the Atterberg Limits (PI), soil classification/s, allowable bearing capacities, potential soil vertical movement estimations, and to provide foundation design parameters for a proposed building, which will have a slab surface of at least 1000 square feet. **Pavement design parameters** were also provided. The laboratory test results and our findings are summarized herein. **Representative Site Photos are attached.**

Typical Stratigraphy & Atterberg Limits (PI)

Depth / Interval	*Soil Classification*	*Symbol*	LL, %	PL, %	PI
½"	**7"** Light brown, Clayey-Silt, with gravel, stone fragments & cobbles		35	12	**23**
	Tan, Cobbly/Stony-soil stratum;		26	9	**17**
2.7'	**overlying** weathered stone / limestone stratum, semi-moist, dense to very dense		--	--	--
5.5'	***(Boring B-1)***				
½"	**13"** Light brown, Clayey-Silt, with gravel, stone fragments & cobbles		41	14	**27**
	Tan, Cobbly/Stony-soil stratum;		22	8	**14**
2.7'	**overlying** weathered stone/limestone stratum, semi-moist, desne to very dense		--	--	--
5.5'	***(Boring B-2)***				

Overall Effective PI: 15 - 17 ; PVR/PVM: -1-1/2" to +1-1/4" (at soil surface)
Allowable q_a: 1700 psf at minimum depth of 10" below existing elevation

103 Old Fitzhugh Road: Proposed Addition

Reinforced Beam-and-Slab-on-Grade Foundation

A slab-on-grade foundation may be considered for the proposed building. Geotechnical and pertinent PTI design parameters, based on general design analysis methods in Chapters 3 and 4 PTI - 2004 Edition, along with the 2008 Supplement, were evaluated and are summarized in the following table. **BRAB-WRI** parameters are also provided.

(OPTION 1 – Select Fill Method)

CRITERIA BASED ON PVR/PVM OF APPROX.: -3/4" to +3/4"

(Design PI: 25)

Thornthwaite Moisture Index	**-15 to -14**
Allowable Bearing Capacity	**3500 psf**
BRAB-WRI: C_w & Climatic Rating Factor:	**0.88 ; 0.12**
Edge Moisture Variation Distance (Em)	**5.9' (c)**
	2.8' (e)
Differential Vertical Soil Movement (Ym)	**0.95" (c)**
	1.25" (e)
Site Slope Correction Coefficient, C_s	**Slope to Grade**
Minimum Perimeter Grade Beam Penetration into Compacted Granular, Select Fill:	**12 in.**
Minimum (") Existing Soil to Remove and Replace with Granular, Select Fill:	**1-1/4 ft.**

The above design parameters assume that the granular Select Fill has a PI range of (7 – 22); and that the subgrade soil will be scarified to a depth of 6 inches and moistened within optimal soil-moisture range, prior to densely compacting; and that the moist-condition granular select fill will be introduced in loose lifts (not thicker than 9") prior to compacting. Compaction Method ASTM D698 is recommended to verify in-place density of subgrade clay-soil and compacted select fill.

OPTION 2: AS IS (Beam-and-Slab-on Grade)

CRITERIA BASED ON PVR/PVM OF APPROX.: *-1.5" to +1.5"*

(Design PI: 27)

Thornthwaite Moisture Index	**-15 to -14**
Allowable Bearing Capacity	**2300 psf**
Edge Moisture Variation Distance (Em)	**6.6' (center)**
	3.5' (edge)
Differential Vertical Soil Movement (Ym)	**1.36" (center)**
	1.76" (edge)
BRAB-WRI: C_w and Climatic Rating Factor:	**0.87 ; 0.13**
Minimum Perimeter Grade Beam Penetration into the existing Gravelly/Stony Soil, After Achieving Subgrade Elevation:	**16 in.**

The above design parameters assume that vertical moisture barrier (perimeter beam) is designed to extend to the recommended embedment depth and that **subgrade soil / fill soil** and excavated grade beam trenches are free of roots and loose soil and should be in a **moist and dense / well-compacted condition**, prior to concrete discharge. **Voids created by the removal of trees, boulders or previously existing flatwork/structures,** should be **backfilled** with moistened, low PI, sandy/gravelly soil and densely compacted.

The PTI method of predicting soil movement is mostly applicable when site moisture conditions are controlled by climatic conditions. Of course, foundation performance can be significantly influenced by adding perimeter pavement/s, yard drainage and yard maintenance, flower beds adjacent to foundation, rain gutters, utility line leaks, trees before and after construction, post construction subsurface or surface alterations near the foundation perimeter; and exceptional dry/wet prolonged conditions. The above criterion also assumes that proper irrigation methods and drainage **will be maintained after construction.** ***If proper drainage / irrigation is not maintained, potential vertical movements greater than that anticipated may occur.***

The use of **sacked fill** between the beams should be at the discretion of the structural engineer. In this case, the structural engineer should provide anticipated foundation performance information if sacked fill is incorporated in the overall foundation specifications/details.

Recommended Rigid Pavement Design

The pavement design analysis was generally based on the design procedures developed by *ACI Manual of Concrete Practice*.

Traffic Type	Concrete (JRCP)	Compacted Flexible Base Course (in.)	Moist, Firm Subgrade Soil
Light Duty	***5" (min. 3500 psi)***	***8"***	***6"***
Heavy Duty Traffic	***6" to 7" (min. 3500 psi)***	***10"***	***6"***

Compacted Gravel Road Specifications:

*Prepared Subgrade: **8"** (Scarified, Moistened & Recompacted)*

*Compacted Base Course: **8"** (Moistened & Compacted*****)*

******Moistened & Compacted per ASTM D698 Compaction Test Method)*

Flexible Pavement Design Recommendations

The (flexible, HMAC) pavement design analysis was generally based on the design procedures developed by *AASHTO Guide of Pavement Structures*.

Summary of Estimated Serviceability over a 20 year period:

- Moderate Traffic: ***100,000 (18-kip) ESALs***
- Dumpster Pad / Heavy Duty Traffic: ***2,000,000 (18-kip) ESALs***

ASPHALT PAVEMENT PARAMETERS

Traffic Type	Type "D" Hot-Mix (in.)	Compacted Flexible Base Course (in.)	Moist, Firm Subgrade Soil
Light Duty	***1-3/4 – 2-1/4***	***6" (2 lifts)***	***6"***
Heavy Duty Traffic	***3"***	***10" (2 lifts)***	***6"***

- Organics, soft or excessively wet soils or unsuitable soils encountered should be removed prior to proofrolling activities. The proofrolling process is typically implemented in order to identify localized soft-soil areas and should be performed with construction equipment weighing at least **12 tons**. Voids created by the removal of trees should be backfilled with moist, A-1 or A-2 crushed limestone or gravelly soil which has a PI range of **8 to 22,** and then densely compacted in place.

- Moisture content of Subgrade should be maintained between -1 to +3 percent of optimum moisture content, and compacted to at least 95 percent of the maximum dry density as determined by Proctor method ASTM D-698. A slightly moist condition should be maintained prior to installation and compaction of moistened flexible base course material.

- Flexible base material should meet the grading and **PI** requirements as illustrated in TxDot Item 247: *Type A, Grade 1 or 2*.

- A **prime coat** should be applied on the finished base course section; and Type "D" section degree of compaction should be between **92 and 96 percent** of Max. Theoretical Density.

- The flexible base course section should extend horizontally at least **12 inches** beyond the outside edge of the proposed curbline.

- **Flexible Base Course** section should be compacted to a minimum of 97 percent of the maximum dry density as determined by proctor method TEX-113-E, with in-place moisture content maintained between -1 to +2 percent of the proctor optimum moisture value.

- A minimum of **one (1)** in-place density test per 5000 square feet should be performed.

- **Final pavement surface grades** should be established by the project civil engineer.

Common Causes of Premature Asphalt Pavement Failure

1) Absence of deepened curbs and/or moisture barriers which can lead to water entering the permeable base materials, saturating the base and underlying subgrade soils;
2) Soft/wet subgrade conditions;
3) Inadequately compacted base course / inadequately compacted subgrade soil;
4) Subgrade that is not well drained and not of uniform bearing capacity;
5) Not utilizing Proof rolling techniques to help identify soft spots or areas of unstable soils;
6) A finished pavement that does not provide a uniform, well-draining surface;
7) Failure to allow proper curing time of newly placed asphalt pavement prior to traffic loads;
8) Inadequate asphalt pavement thickness;
9) Failure to provide positive drainage at perimeter edge of pavement which can lead to negative drainage under the pavement; and
10) Repetitive load magnitudes that exceeds design traffic loads.

The asphalt design criteria illustrated above along with a properly prepared stabilized subgrade and base course section should adequately handle anticipated traffic loads; however, the pavement thickness cannot always counter the detrimental shrink-swell effects of the underlying expansive soils or the effects of future excessive traffic loads. Successful long-term performance may depend in part on the implementation of **good construction practices, proper subgrade/base preparation, and good surface drainage.**

GENERAL SUPPLEMENT INFORMATION FOR PROPOSED STRUCTURE

Grading & Drainage Considerations

Positive drainage during and after foundation construction, is particularly important to the long-term performance of the proposed structure. We suggest the following information be considered for perimeter drainage:

- The building pad/s should be elevated above grade to prevent surface water from entering the structure. Where possible extend paved surfaces up to the building line to serve as a barrier to water infiltration and evaporation. These surfaces should slope away from the building.
- Provide proper grading and drainage around foundations to prevent ponding and to facilitate the surface runoff away from foundation edges to minimize water infiltration to the soils below the foundation.
- Outlets for gutter systems should discharge water onto surfaces which quickly direct the water away from the perimeter of the buildings.
- Final grades within 10 feet of the buildings should be adjusted to slope away, preferably at a minimum slope of 3 percent.
- Planters located adjacent to structures should be self-contained, and sprinkler mains should be located a minimum of 5 feet from the building edge.
- Planter boxes placed/installed adjacent to the building should be configured so that concentrations of water are not available to underlying clay soils.
- Large trees/shrubs should not be allowed closer to foundations than a horizontal distance equal to their height due to their significant moisture demand as they mature.

LIMITATIONS OF GEOTECHNICAL STUDY
Proposed Addition to Stephenson School Building
103 Old Fitzhugh Road
Dripping Springs, Texas 78620

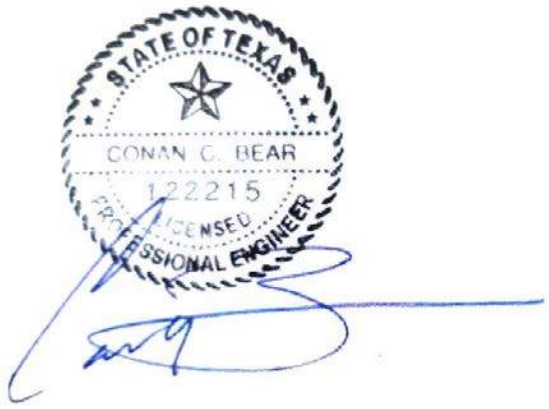
The analysis and recommendations contained in this report were based on the data from two (2) test borings, the laboratory test results, the observations associated with this site and our experience in the area. This report may not reflect precise variations of the soil conditions across the site. If different subsurface conditions are encountered at the time of construction/excavations, we should be contacted to evaluate the conditions encountered.

This report was prepared for this project exclusively for the use of *Architexas | Create+Conserve and their design team, and the builder / foundation contractor.*

Thank you for the opportunity to be of service
Geotechnical Solutions (F-19672)

Alan J. Vasquez
Geotechnical Consultant

Conan C. Bear, P.E.
Engineering Consultant



7/ 24/ 23

Representative Site Photos

103 Old Fitzhugh Road



Location of Proposed Addition



LIMITED LEAD BASED PAINT INSPECTION REPORT

Stephenson Building
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

Project #23-1730

Prepared for:

Michelle Fischer
City Administrator
City of Dripping Springs
511 Mercer Street
Dripping Springs, Texas 78620

October 11, 2023

LIMITED LEAD INSPECTION REPORT

Stephenson Building
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

Prepared by:



Cole Allen
Lead Inspector / Risk Assessor
Certificate No. 2071247

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EXECUTIVE SUMMARY[1]

Champion Environmental Consulting, Inc. (CECI) was retained by **City of Dripping Springs** (hereinafter the Client) to conduct a lead-based paint inspection of the **Stephenson Building, 101 Old Fitzhugh Road, Dripping Springs, Texas** (hereinafter the Site). CECI's approach to this assessment was to inspect the designated areas of the Site, for lead-based paint (LBP) by physically accessing the painted substrates throughout the selected areas of the Site and to verify the uniformity (homogeneity) of the paints used in the construction of the Site.

During the sampling event a total of **50 assay points**, including calibration and standardizing samples, of suspect paints from areas throughout the interior of the Site were analyzed for determination of lead content. An x-ray fluorescence (XRF) analyzer was utilized for LBP detection for this project. All operators of the XRF analyzer are certified for proper use by CECI.

LBP is defined as any homogeneous paint that detects lead content at 1.0 milligrams per square centimeter (mg/cm^2) or greater by the XRF Analyzer. ***LBP was identified in the following painted substrates analyzed at the Site:***

Room/Location	Substrate	Location
Exterior	Shiplap Ceiling White Wood	East Side Main Entrance
Exterior	Door Frames Brown Wood	East Side Main Entrance
Interior	Window Frames Multi Colors Wood	Room A, B, D, East Side Restroom and Room C West Wall
Interior	Front of Stage Green Wood	Room C

[1]This is a summary of the contents of this report. Please refer to the full text for a complete explanation and supporting information.

1.0 INTRODUCTION

Champion Environmental Consulting, Inc. (CECI) was retained by the Client to conduct a lead-based paint inspection of the Site. CECI's approach to this assessment was to inspect the designated areas of the Site, for lead-based paint (LBP) by physically accessing the painted substrates throughout the selected areas of the Site and to verify the uniformity (homogeneity) of the paints used in the construction of the Site.

CECI conducted its sampling program at the Site utilizing an X-Ray Fluorescence (XRF) Analyzer. LBP is identified as those paints that were analyzed to have lead content at ***1.0 milligram per square centimeter (mg/cm^2)*** or greater.

1.1 Standard of Care and Limitations

This report was prepared for the exclusive use of the Client named herein to aid in the identification and management of LBP at the Site. CECI performed its services in a manner consistent with the level of care and expertise exercised by environmental professionals performing the same or similar services at the same time and in the same geographic area.

Samples for this LBP sampling program were collected from discrete sample locations associated with the areas specifically identified herein (i.e., Target Areas). While attempts were made to obtain representative samples most likely to contain LBP, findings and conclusions herein are necessarily limited by the number of samples taken and access provided for sampling activities. Conclusions and recommendations herein represent the professional opinions of the CECI personnel involved with the project. CECI assumes no responsibility or liability for errors in information or data provided by third party sources.

2.0 BUILDING SURVEY

2.1 General

The LBP sampling inspection was of the designated substrates of the site for the identification of homogeneous areas accessible at the time of the site visits. Copies of CECI's certifications and licenses are in Appendix A of this report.

2.2 Lead-Based Paint Analysis

The LBP sampling and analysis involved the physical inspection of the Site, a sampling program for suspect LBP, and field analysis utilizing a Viken Pb200i XRF Analyzer to determine the lead content of each painted surface. Locations of components tested are designated as room locations (e.g., Room Numbers) and location within each room (e.g., North [N], East [E], South [S], West [W]). CECI identified substrates with homogeneous areas of suspect LBP that, based on historical uses, have the potential of containing lead. ***LBP was identified in the following painted substrates analyzed at the Site:***

Room/Location	Substrate	Location
Exterior	Shiplap Ceiling White Wood	East Side Main Entrance
Exterior	Door Frames Brown Wood	East Side Main Entrance
Interior	Window Frames Multi Colors Wood	Room A, B, D, East Side Restroom and Room C West Wall
Interior	Front of Stage Green Wood	Room C

All paints that contain any level of lead are regulated by the OSHA Lead in Construction Standard 29CFR 1926.62. Construction work covered by this standard includes demolition or salvage of structures where lead-containing materials are present; removal or encapsulation of lead-containing materials; renovation of structures, substrates, or portions thereof that have lead-containing materials; installation of materials containing lead; lead contamination cleanup; transportation, storage, and disposal of lead-containing materials; and maintenance operations associated with these construction activities.

In performing these activities, OSHA requires an initial determination that the construction activities used at the job site do not create airborne emissions of lead above the Action Level of 30 $\mu g/m^3$ (i.e., negative exposure assessment). This exposure assessment may include initial exposure monitoring, historical data that meet certain requirements, or objective data demonstrating that a product or material containing lead, or a specific process cannot result in employee exposures to lead above the Action Level.

During the exposure assessment, the workers must be protected in the assumption that the work process is going to create airborne concentrations above the Permissible Exposure Level (PEL)

of 50 μg/m^3. This requires medical monitoring (blood test) for blood lead levels, personal protective equipment (PPE), respiratory protection, a Hazard Communication Program, and a written Compliance Program. If a negative initial determination is achieved during a certain work process, no further monitoring is required. Additional exposure assessment and monitoring is required with any change in process, equipment, controls, or environmental conditions. Employers subject to these work conditions should refer to the OSHA Lead Standard for complete compliance.

APPENDIX A
ACCREDITATION

Department of State Health Services certifies that

COLE H ALLEN

is certified as a

Lead Risk Assessor

Certification No: 2071247

Control No: 8102

Expires: 4/27/2025

Jennifer A. Shuford M.D., M.P.H
Commissioner of Health

Texas Department of State Health Services

BE IT KNOWN THAT

COLE H ALLEN

is certified to perform as a

Lead Risk Assessor

in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1955 and Title 25, Texas Administrative Code, Chapter 295 relating to Texas Environmental Lead Reduction, as long as this license is not suspended or revoked.

Certification Number: 2071247

Expiration Date: 04/27/2025

Jennifer Shuford, MD, MPH, Commissioner of Health

Control Number: 8102

(Void After Expiration Date)

VOID IF ALTERED NON-TRANSFERABLE

SEE BACK

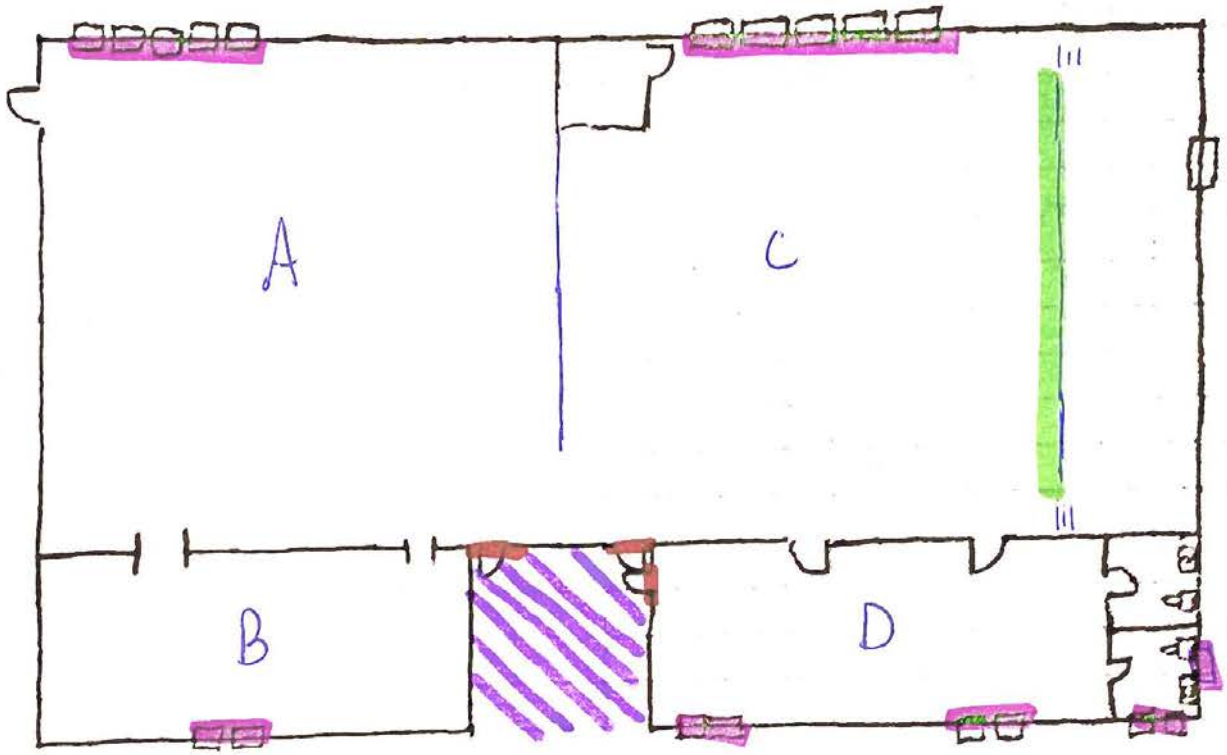
APPENDIX B
ANALYTICAL RESULTS

Lead-Based Paint XRF Survey
Stephenson Building
Inspection Date(s) October 4, 2023
Project # 23-1730

Reading #	Con.	Result	Room	Structure	Substrate	Location	Color
1	1.1	Positive	CALIBRATE				
2	1	Positive	CALIBRATE				
3	1	Positive	CALIBRATE				
4	0	Negative	Entry to A	Door	Wood	West	White
5	**4.1**	**Positive**	**Entry to A**	**Door Frame**	**Wood**	**South**	**Brown**
6	0.2	Negative	Room A	Wall	Plaster	West	White
7	0.2	Negative	Room A	Wall	Plaster	East	Purple
8	0	Negative	Room A	Wall	Plaster	South	Green
9	0.2	Negative	Room A	Window Frame	Wood	Center	White
10	**3**	**Positive**	**Room A**	**Window Frame**	**Wood**	**East**	**White**
11	**1.5**	**Positive**	**Room A**	**Window Frame**	**Wood**	**East**	**White**
12	**3.1**	**Positive**	**Room A**	**Window Frame**	**Wood**	**East**	**Purple**
13	0.1	Negative	Room A	Floor	Wood	Center	Green
14	0.2	Negative	Room A	Floor	Wood	Center	Green
15	0	Negative	Room A	Door	Metal	North	White
16	0.5	Negative	Room A	Door Frame	Metal	West	Brown
17	**3.2**	**Positive**	**Room A**	**Sliding Door**	**Wood**	**South**	**Brown**
18	**3.1**	**Positive**	**Room A**	**Sliding Door**	**Wood**	**South**	**Brown**
19	**6.5**	**Positive**	**Room A**	**Sliding Door Frame**	**Wood**	**South**	**Brown**
20	0.2	Negative	Room B	Wall	Plaster	West	White
21	0	Negative	Room B	Wall	Dry Wall	East	White
22	0	Negative	Room B	Wall	Plaster	East	Green
23	0.2	Negative	Room B	Window Frame	Wood	West	White
24	**2.3**	**Positive**	**Room B**	**Window Frame**	**Wood**	**West**	**White**
25	0.1	Negative	Entry to C	Door	Wood	West	White
26	**5**	**Positive**	**Entry to C**	**Door Frame**	**Wood**	**North**	**White**
27	**2.2**	**Positive**	**Room C**	**Sliding Door**	**Wood**	**North**	**Red**
28	0	Negative	Room C	Wall	Plaster	East	White
29	0	Negative	Room C	Wall	Plaster	West	White
30	0	Negative	Room C	Wall	Plaster	South	Green
31	**3.8**	**Positive**	**Room C**	**Stage**	**Wood**	**South**	**Green**
32	0	Negative	Room C	Stage Floor	Wood	Center	Green
33	0.3	Negative	Room C	Stage Stairs	Wood	Center	Green
34	**1.8**	**Positive**	**Room C**	**Window Frame**	**Wood**	**East**	**White**
35	0.1	Negative	Room D	Door	Wood	South	Natural
36	0.1	Negative	Room D	Door Frame	Metal	North	Brown
37	0	Negative	Room D	Wall	Dry Wall	East	White
38	**3**	**Positive**	**Room D**	**Window Frame**	**Wood**	**West**	**White**
39	0	Negative	Room D	Wall	Plaster	East	White
40	**1.2**	**Positive**	**Exterior Front Entry**	**Ceiling**	**Wood**	**Center**	**White**
41	**1.5**	**Positive**	**Exterior Front Entry**	**Ceiling**	**Wood**	**Center**	**White**
42	**1.7**	**Positive**	**Exterior Front Entry**	**Ceiling**	**Wood**	**Center**	**White**
43	0.6	Negative	Exterior	Soffit	Wood	Center	Maroon
44	0.5	Negative	Exterior	Soffit	Wood	Center	Maroon
45	**4.4**	**Positive**	**Exterior Entry to D**	**Door Frame**	**Wood**	**South**	**Brown**
46	0	Negative	Exterior	Window Frame	Wood	East	Brown
47	0.1	Negative	Exterior	Window Frame	Wood	East	Brown
48	1.1	Positive	CALIBRATE				
49	1.1	Positive	CALIBRATE				
50	1.1	Positive	CALIBRATE				

APPENDIX C
REFERENCE DRAWING(S)

Stephenson Building 23-1730
101 Old Fitzhugh Rd, Dripping Springs
Lead Location Plans



Front of Stage Wood
Green paint ~ 70 SF

Exterior Door Frames Wood
~ 3 Brown Door Frames

Window Frames Interior Multi Colors
Wood
~ 29 windows

Exterior Shiplap Ceiling Wood
White
~ 120 SF

October 11, 2023

Michelle Fischer
City Administrator
City of Dripping Springs
511 Mercer Street
Dripping Springs, Texas 78620

RE: Limited Asbestos Survey of Target Areas at the Site Related to Proposed Demolition/Renovation
Stephenson Building
101 Old Fitzhugh Road, Dripping Springs, Texas 78620
Project #23-1730

Dear Ms. Fischer:

Champion Environmental Consulting Inc. (Champion Environmental) was retained by **City of Dripping Springs** (Hereinafter, the Client) to conduct a limited asbestos survey at the Site within the following Target Areas as identified by the Client.

Stephenson Building – Dripping Springs, TX

The attached report summarizes these services in accordance with our discussion. **Regulated amounts of asbestos were detected in the following materials and in the approximate quantities**

Sample #(s)	Location	Material	Result – Asbestos %	APPROXIMATE Quantity
19-21	All Exterior Windows except the one on the North Side Northwest corner	Window Glazing	2% Chrysotile	29 Windows

The laboratory analytical results are attached in Appendix A of this report. Licenses are attached in Appendix B of this report. The Sample Location Drawing is attached in Appendix C of this report. If you have any questions on this report or any other matter, please do not hesitate to call me at (512) 992-5383.

Sincerely,

Champion Environmental Consulting, Inc.

Wade Champion
Individual Asbestos Consultant
DSHS License No. 10-5410
Expiration Date 8/25/25

1.0 Services

Table I Services Summary	
Client	City of Dripping Springs 511 Mercer Street Dripping Springs, Texas 78620
Site Address	101 Old Fitzhugh Road, Dripping Springs, Texas 78620
Target Areas identified by Client	Stephenson Building – Dripping Springs, TX
Scope of Work 1. Conduct a preliminary visual reconnaissance of the renovation /demolition Target Areas identified by the client to visually determine the presence of suspect ACM 2. In the event suspect ACM is identified, visually assess suspect ACM for variations in color, texture, thickness, and other characteristics useful in determining the material's uniformity and homogenous area 3. In the event suspect ACM is identified, evaluate current physical condition, friability and potential for damage, assign hazard ratings and estimate quantities 4. Collect samples of identified and reasonably accessible suspect ACM within Target Areas 5. Send suspect ACM samples to laboratory for analysis of asbestos content, if any 6. Prepare report summarizing results	
Sample Date(s)	October 4, 2022
Inspector(s) DSHS License #	Cole Allen 603654
Samples Collected:	A total of 24 samples of suspect asbestos-containing materials were collected, as agreed with the Client, within reasonably accessible portions of the Target Areas
Analytical Lab:	CA Labs, LLC asbestos laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) through the National Institute for Standards and Technology (ID Code No 200772-0) and licensed as a DSHS licensed asbestos bulk laboratory (License No. 30-0370)
No. of Samples Analyzed	24
Analyzed Date:	October 6, 2022
Report Number:	CBR23107716
Analytical Method:	Polarized Light Microscopy (PLM) using the Environmental Protection Agency (EPA) "Interim Method for Determination of Asbestos in Bulk Insulation Samples" [40 CFR Chapter 1 (1-1-87 Edition) Part 763, Subpart F, Attachment III]
General Information about Suspect ACM Asbestos has historically been a component of a wide variety of building materials. These types of building materials, which may potentially contain asbestos, are termed suspect asbestos-containing materials" or suspect ACM). Suspect ACM may or may not contain asbestos. The actual asbestos content of a suspect material can be determined only through proper sampling and analysis performed by a qualified building inspector and laboratory. Pursuant to the National Emission Standards for Hazardous Air Pollutants (NESHAP) asbestos regulations (40 CFR§61:141, et seq) ACM can be classified into two categories; friable ACM which can be reduced to powder or crumbled under light hand pressure (e.g. ceiling textures and thermal system insulation) and non-friable ACM, which are materials that cannot be easily crumbled (e.g. floor tile and floor tile mastic). Regulated asbestos containing materials (RACM) which are those materials containing over 1% asbestos as defined under asbestos NESHAP.	

2.0 Standard of Care and Limitations:

This report was prepared for the exclusive use of the Client named herein to aid in the identification and management of ACM and RACM in the renovation/demolition Target Areas identified by the Client. Champion Environmental performed its service in a manner consistent with the level of care and expertise exercised by asbestos professional performing the same or similar services at the same time and in the same geographic area.

Samples for this asbestos survey were collected from discrete sample location within the rooms and areas specifically identified herein (i.e., Target Areas). While attempts were made to obtain representative samples most likely to contain asbestos, finding and conclusions herein are necessarily limited by the number of samples taken and access provided for sampling activities. *The results herein cannot guarantee that no asbestos is present in any area not sampled*. This asbestos survey *was not intended to be a comprehensive asbestos inspection of the site*, nor was it intended to be used for evaluation of worker health and safety conditions. To determine whether regulated ACM is present at other locations not sampled herein, *a comprehensive asbestos inspection of the site* would be necessary.

Conclusions and recommendations herein represent the professional opinions of the Champion Environmental Consulting personnel involved with the project. The results of this report should not be considered as legal interpretation of existing federal, state or local environmental, health and safety laws or regulations. Champion Environmental Consulting, Inc., assumes no responsibility or liability for errors in information or data provided by third party sources.

3.0 Report Use and Reliance:

This report represents Champion Environmental's services as of the sampling date. As our final document, it may not be altered after final issuance. This study and report were prepared on behalf of and for the exclusive use of the Client solely its use and reliance in determining the presence of FACM in identified Target Areas of the site. The Client was the only party to which Champion Environmental explained the risks and was solely involved in shaping the scope of the services. Accordingly, reliance on this report by any other party may involve assumptions leading to an unintended interpretation of findings and opinions. With the consent of Champion Environmental and the Client, Champion Environmental may offer reliance to third parties or contract with other parties to develop findings and opinions related to such party's unique risk management concerns. Notwithstanding the foregoing, any and all third party reliance upon this Report shall be limited to the fair market value of services undertaken to perform this Report as of the report date.

4.0 Methodologies:

4.1 Sampling

This limited inspection was guided by the Texas Asbestos Health Protection Rules (TAHPR) (see 25 TAC §296) and generally in accord with AHERA (the Asbestos Hazard Emergency Response Act of 1986, Public law 99-519) sampling protocols (see 40 CFR §§ 763.86 and 763.88). The AHERA sampling protocols are statistically-based and were originally developed to implement AHERA which amends the Federal Toxic Substances Control Act (see 15 USC, §2641, et seq). These rules are often followed by the OSHA, and the Department of State Healthy Services (DSHS). Champion Environmental generally followed these sampling protocols to in an effort to collect representative samples of the various suspect building materials in the Target Areas.

Suspect ACM samples were collected by physically removing a small portion (approximately one square inch) of the suspect material using a sharp instrument. All layers of the material samples were penetrated and registered as separate samples. Disturbance of adjacent material was minimized during the sampling activities. Each sample was place into a separate container and then sealed. Each sample was labeled with the sample number and collected location, and a chain-of-custody form was completed. The sampling instrument was cleaned between each sample collected to mitigate potential cross contamination between samples collected.

4.2 Analytical Procedures

If the results of the bulk laboratory analysis reveal asbestos, the percentage of asbestos contained within the sample is compared with the criteria outlined in the EPA definition of asbestos-containing material (and which value is also followed by OSHA and DSHS). If a concentration of greater than one percent (1%) asbestos is reported, it is defined by the Asbestos NESHAP as a positive identification and the material could be considered RACM depending upon the nature of the ACM and its coverage.

The Asbestos NESHAP states the RACM (as defined in 40 CFR §61.141) containing less than 10% asbestos should be verified by point counting. If bulk sampling analysis determines that asbestos content of a friable asbestos sample is less than 10%, the building owner may;(i) elect to assume the asbestos content to be greater than 1% and treat the material as RACM, or (ii) require verification of asbestos content by point counting. If a result obtained by point counting is different from a result obtained by visual estimation, the point count result is used.

5.0 Recommendations:

Based upon the forgoing results, **if applicable,** Champion Environmental Consulting, Inc. offers the recommendations presented below. Such recommendations should be implemented prior to the commencement of any renovation or demolition activities or any other activities that would potentially disturb the identified ACM or RACM at the site.

- Identified ACM. Including non-friable ACM *that will be disturbed by renovation or demolition activities* should be removed as soon as feasibly possible by appropriately licensed personnel and in accordance with applicable laws and regulations.

- Identified ACM which *will not be disturbed by renovation or demolition activities but which is damaged* should be repaired or encapsulated (by appropriately licensed personnel and in accordance with applicable laws and regulations) to prevent future damage.

- *ACM to remain* in place should be enclosed in airtight impermeable barrier or encapsulated to prevent damage.

- An *Asbestos Operation and Maintenance Program* should be implemented to manage existing ACM in place.

In the event renovation or demolition activities are slated for portions of the site outside of the Target Areas, an asbestos survey should be performed for those portions of the site –prior to the initiation of renovation or demolition activities.

APPENDIX A

Laboratory Results

Limited Asbestos Survey of Target Areas at the Site Related to Proposed Demolition/Renovation

Stephenson Building – Dripping Springs, TX

Project #23-1730

Laboratory Analytical Results Summary

Sample #(s)	Location	Material	Result – Asbestos %	APPROXIMATE Quantity
19-21	All Exterior Windows except the one on the North Side Northwest corner	Window Glazing	2% Chrysotile	29 Windows

Note: Refer to attached laboratory report for details

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Fax 225-751-5634

NVLAP #200772-0
TDSHS #300370
CDPHE #AL-18111
LELAP #03069

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Champion Environmental
109 W 7th St, Suite 210
Georgetown, TX 78626

Attn: Wade Champion
Customer Project: Stephenson Building-Dripping Springs
Reference #: CBR23107776 Date: 10/6/2023

Analysis and Method

Summary of polarizing light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of stereomicroscopy. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated of asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may have trace amounts of actinolite-tremolite, where not found be PLM should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may even contain a related asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Quantification of <1% will actually be reported as <=1% (allowable variance close to 1% is high). Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos and the "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). All analysts have a college degree in a natural science (geology, biology, or environmental science) or are recognized by a state professional board in one these disciplines .Extensive in-house training programs are used to augment education background of the analyst. The group leader of polarized light has received supplemental McCrone Research training for asbestos identification. This report is not covered by the scope of AIHA accreditation. Analysis performed at CA Labs, LLC 12232 Industriplex, Suite 32 Baton Rouge, LA 70809.

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NVLAP #200772-0
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CDPHE #AL-18111
LELAP #03069

Overview of Project Sample Material Containing Asbestos

Customer Project: Stephenson Building-Dripping Springs **CA Labs Project #:** CBR23107776

Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
				White Sealant
19	***19-1***	***White Sealant***	***2% Chrysotile***	
20	***20-1***	***White Sealant***	***2% Chrysotile***	
21	***21-1***	***White Sealant***	***2% Chrysotile***	

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

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NVLAP #200772-0
TDSHS #300370
CDPHE #AL-18111
LELAP #03069

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Wade Champion
Champion Environmental
109 W 7th St, Suite 210
Georgetown, TX 78626

Phone # 512-992-5383
Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
1		***1-1***	***White Textured Surfacing***	***N***	***None Detected***		100% qu, mi, bi, ca
		1-2	***White Drywall with Paper***	***N***	***None Detected***	10% ce	90% qu, gy
2		***2-1***	***White Textured Surfacing***	***N***	***None Detected***		100% qu, mi, bi, ca
		2-2	***White Drywall with Paper***	***N***	***None Detected***	10% ce	90% qu, gy
3		***3-1***	***White Compound***	***Y***	***None Detected***		100% qu, mi, ca
		3-2	***White Drywall with Paper***	***N***	***None Detected***	10% ce	90% qu, gy
4		***4-1***	***White Textured Surfacing***	***N***	***None Detected***		100% qu, mi, bi, ca

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Zo Andriampenomanana
Analyst

Senior Analyst
Alicia Stretz

Laboratory Director
Chris Williams

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
5		***5-1***	***White Textured Surfacing***	***N***	***None Detected***		100% qu, mi, bi, ca
		5-2	***White Drywall with Paper***	***N***	***None Detected***	10% ce	90% qu, gy
6		***6-1***	***White Compound***	***Y***	***None Detected***		100% qu, mi, ca
7		***7-1***	***Tan Surfaced Gray Plaster***	***N***	***None Detected***		100% qu, ma, bi, ca
8		***8-1***	***Tan Surfaced Gray Plaster***	***N***	***None Detected***		100% qu, ma, bi, ca
9		***9-1***	***Tan Surfaced Gray Plaster***	***N***	***None Detected***		100% qu, ma, bi, ca
10		***10-1***	***White Sealant on Wrap***	***N***	***None Detected***	10% fg 40% ce	50% qu, ma, ot

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Zo Andriampenomanana
Analyst

Senior Analyst
Alicia Stretz

Laboratory Director
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9. < 1% Result point counted positive
10. TEM analysis suggested

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Phone # 512-992-5383
Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
11		***11-1***	***White Sealant on Wrap***	***N***	***None Detected***	10% fg 40% ce	50% qu, ma, ot
12		***12-1***	***White Sealant on Wrap***	***N***	***None Detected***	10% fg 40% ce	50% qu, ma, ot
13		***13-1***	***Black Cove Base***	***Y***	***None Detected***		100% qu, ma
		13-2	***Yellow and Brown Mastic***	***N***	***None Detected***		100% qu, bi
14		***14-1***	***Black Cove Base***	***Y***	***None Detected***		100% qu, ma
		14-2	***Yellow and Brown Mastic***	***N***	***None Detected***		100% qu, bi
15		***15-1***	***Black Cove Base***	***Y***	***None Detected***		100% qu, ma

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

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Phone # 512-992-5383
Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
		15-2	***Yellow and Brown Mastic***	***N***	***None Detected***		100% qu, bi
16		***16-1***	***Yellow Mastic***	***Y***	***None Detected***		100% qu, bi
17		***17-1***	***Yellow Mastic***	***Y***	***None Detected***		100% qu, bi
18		***18-1***	***Yellow Mastic***	***Y***	***None Detected***		100% qu, bi
19		***19-1***	***White Sealant***	***Y***	***2% Chrysotile***		98% qu, ma, ca
20		***20-1***	***White Sealant***	***Y***	***2% Chrysotile***		98% qu, ma, ca
21		***21-1***	***White Sealant***	***Y***	***2% Chrysotile***		98% qu, ma, ca

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
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Polarized Light Asbestiform Materials Characterization

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Georgetown, TX 78626

Phone # 512-992-5383
Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
22		***22-1***	***Gray Mortar***	***Y***	***None Detected***		100% qu, ma, ca
23		***23-1***	***Gray Mortar***	***Y***	***None Detected***		100% qu, ma, ca
24		***24-1***	***Gray Mortar***	***Y***	***None Detected***		100% qu, ma, ca

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

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Baton Rouge, LA 70809

Phone: 225-751-5632
Fax: 225-751-5634
Mobile: 225-993-3471

Chain of Custody

Client Name:	Champion Environmental Consulting	**CA Labs job #**	**CBR23107776**
Client Address:	109 W 7th St.	Billing Address:	Same
	Suite 210	(if different)	
	Georgetown TX 78626		
phone number:	512 992 5383		
fax number:	N/A	Send Reports to:	wchampion@c-eci.com
Project Number:	23-1730	Project Name:	Stephenson Building - Dripping Springs
Contact:	Wade Champion	**Reports Results VIA:**	**EMAIL** X **FAX** ____ **VERBAL** ____

Total # Samples Submitted:	**Total # Samples to be Analyzed:**	**Material Matrix:**
24	24	Air / (Bulk) / Water

Asbestos: *please call ahead for availability of all rush and/or after hours samples.*

TEM	**TA Time**	**PLM**	**TA Time**	**Optical / IAQ**	**TA Time**
Circle analysis and TA time		*Circle analysis and TA time*	*2 hour*	**Allergen Particle:**	*2 hour*
AHERA	*4 hour*	Improved	4 hour	tape/bulk/swab	4 hour
EPA Level II	8 hour	Interim	8 hour	Cyclex-d cassettes	8 hour
Drinking Water	16 hour		16 hour	Air-o-cell cassettes	16 hour
Wipe	24 hour	AHERA	24 hour	Anderson cultures	24 hour
Micro-vac	2 days		2 days	Bulk/swab cultures	2 days
NIOSH 7402	3 days	Point Count -	3 days	Bacteria cultures	3 days
Chatfield Bulk	5 days	(NESHAPS)	5 days	**PCM**: NIOSH 7400	5-10 days

Lead: *Circle analysis and TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater	TCLP
TA Time:	***8 hour***	1 day	2 days	3 days	5 days	6-10 days

Sample Information:

Sample Number:	**Sample Location:**	**Sample Date/Time:**	**Sample Volume (L)**
1	WT/DW - Restrooms	10-4-23	
2	↓ ↓	↓	
3	↓ Room B	↓	
4	3C Restrooms	✓	
5	↓ ↓		

Custody Information:

Samples relinquished: [signature] 10-4-23/1800 — Signature / Date / Time

Samples received: Carli Brane 9:40 10/6/23 — Signature / Date / Time

Samples relinquished: _____ — Signature / Date / Time

Samples received: _____ — Signature / Date / Time

CA Labs

12232 Industriplex
Suite 32
Baton Rouge, LA 70809

Phone: 225-751-5632
Fax: 225-751-5634
After hours Mobile: 225-993-3471

Client Name: Champion Environmental Consulting

Client Address: 109 W 7th St. Suite 210
Georgetown TX 78626

phone number: 512 992 5383

fax number: N/A

Project Number: 23-1730

Contact: Wade Champion

CA Labs job # **CBR** 23107776

Billing Address: Same
(if different)

Send Reports to: wchampion@c-eci.com

Project Name: Stephenson Building - Dripping Springs

Reports Results
VIA: EMAIL X **FAX**____ **VERBAL**___

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L)
6	JC - Room B	10-4-23	
7	Plaster Texture	↓	
8	↓	↓	
9	↓	↓	
10	Duct Mastic	↓	
11	↓	↓	
12	↓	↓	
13	CBM	↓	
14	↓	↓	
15	↓	↓	
16	Residual Mastic on Duct Frame	↓	
17	↓	↓	
18	↓	↓	
19	Window Glazing	↓	
20	↓	↓	
21	↓	↓	
22	Ext Stone Mortar	↓	
23	↓	↓	
24	↓	↓	
		↓	
		↓	
		↓	
		↓	

Pg 1 of 2

For internal use:
Any initial changes regarding project (indicate yes by checking line)_____

Custody Information:
Samples relinquished: [signature] 10-4-23 1500
Signature / Date / Time

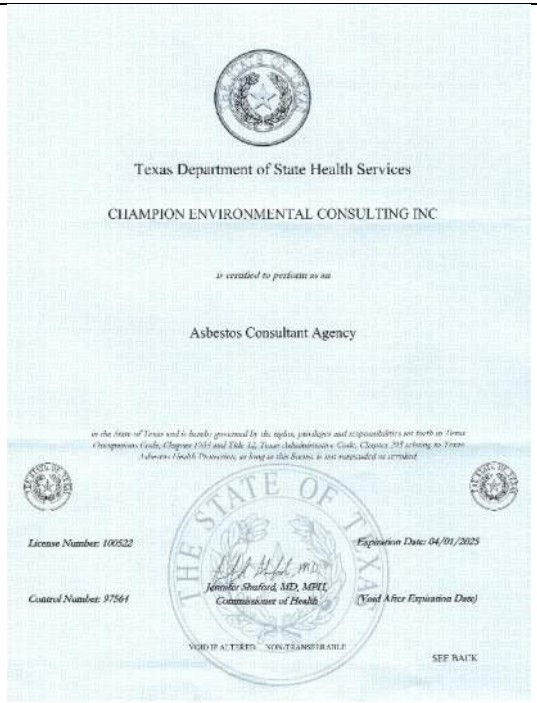
Samples received: Carli Brauer 9:40 10/6/23
Signature / Date / Time

Samples relinquished: _____
Signature / Date / Time

Samples received: _____
Signature / Date / Time

APPENDIX B

Licenses



Texas Department of State Health Services

CHAMPION ENVIRONMENTAL CONSULTING INC

is certified to pursuant as an

Asbestos Consultant Agency

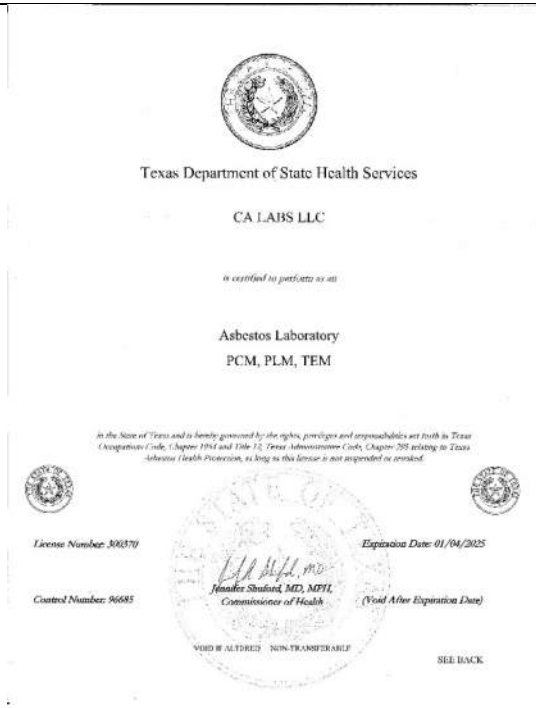
in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 25, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 100522 Expiration Date: 04/01/2025

Control Number: 97564 Jennifer Shuford, MD, MPH, Commissioner of Health (Void After Expiration Date)

VOID IF ALTERED NON-TRANSFERABLE

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Texas Department of State Health Services

CA LABS LLC

is certified to pursuant as an

Asbestos Laboratory
PCM, PLM, TEM

in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 25, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 300370 Expiration Date: 01/04/2025

Control Number: 96685 Jennifer Shuford, MD, MPH, Commissioner of Health (Void After Expiration Date)

VOID IF ALTERED NON-TRANSFERABLE

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Texas Department of State Health Services

Asbestos Individual Consultant

WADE E CHAMPION

License No. 105410

Control No. 98246

Expiration Date: 25-Aug-2025



Texas Department of State Health Services

Asbestos Inspector

COLE H ALLEN

License No. 603654

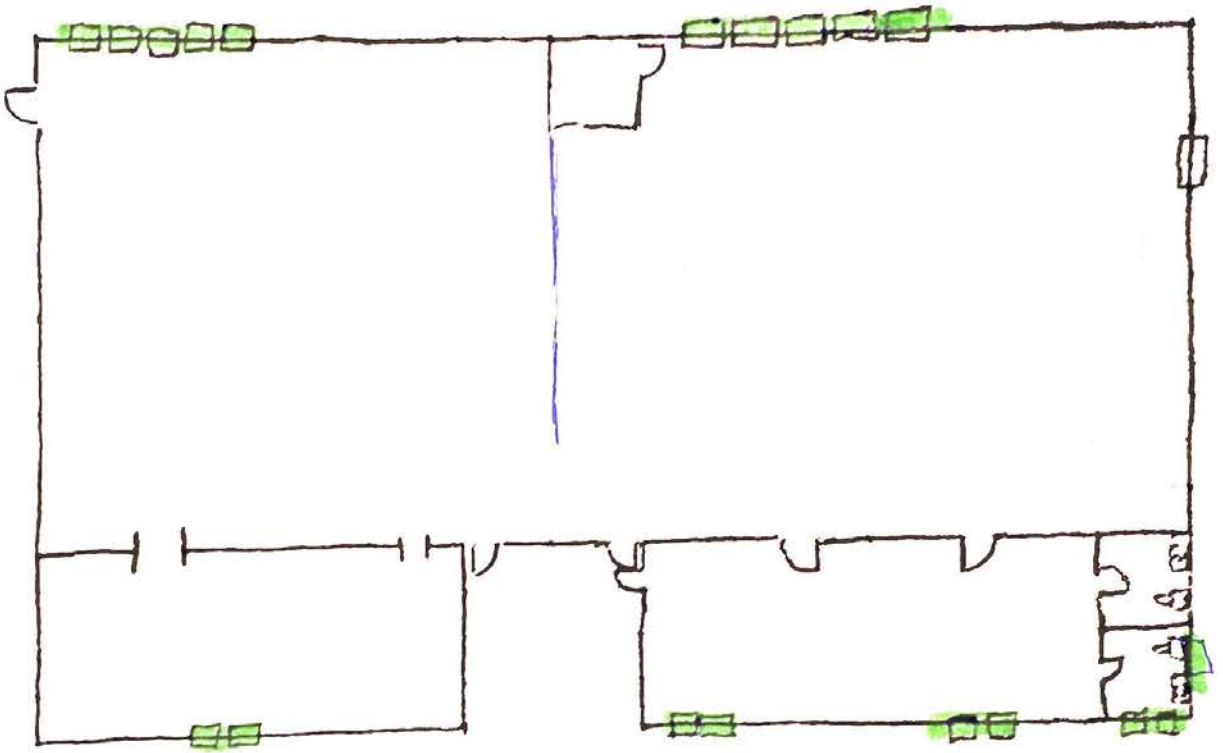
Control No. 100198

Expiration Date: 10-Jan-2024

APPENDIX C

Sample Location Drawing(s)

Stephenson Building
101 old Fitzhugh Rd, Dripping Springs
Asbestos Location Plan 23-1730

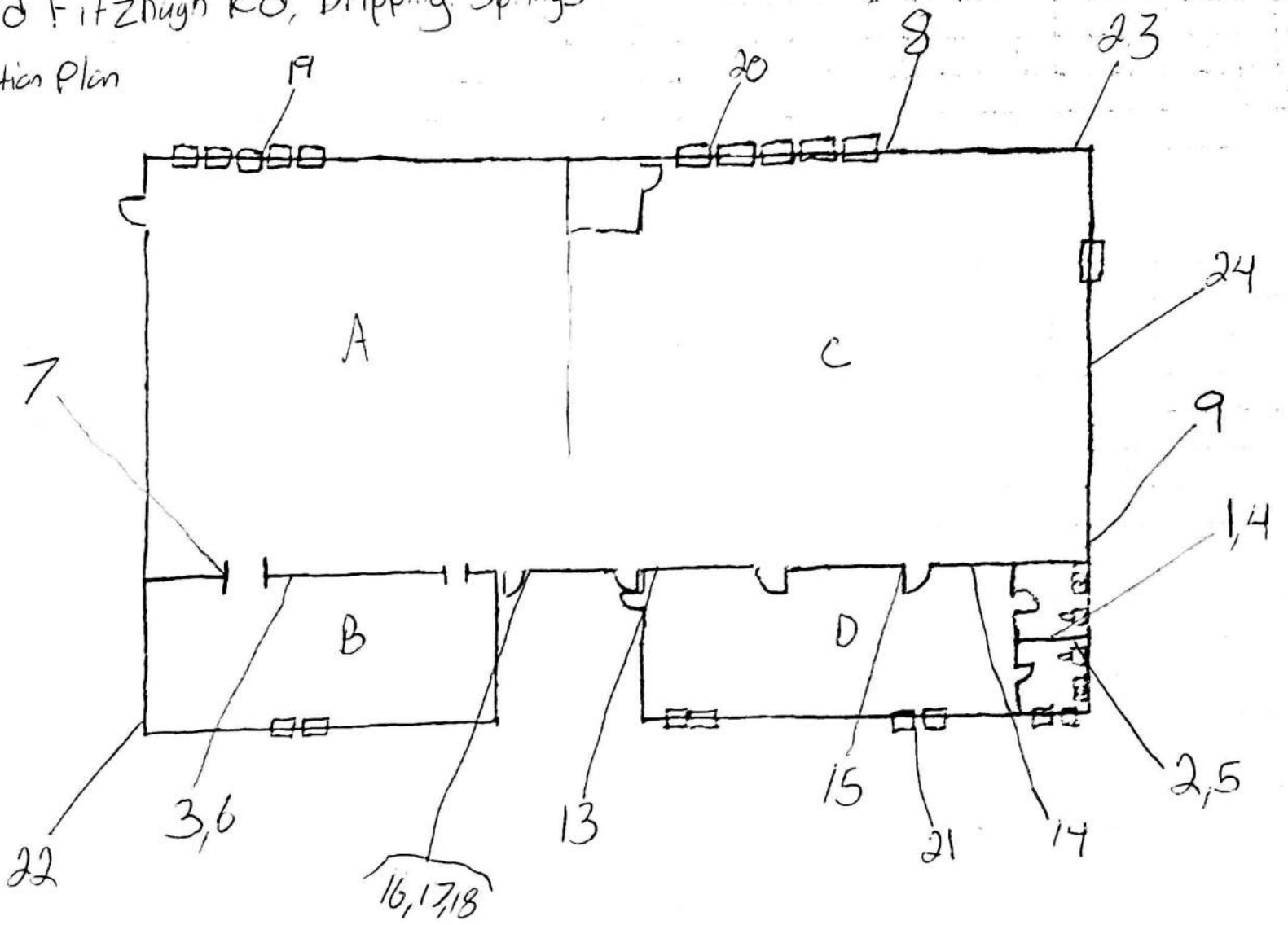


Exterior Window Glazing
~ 29 windows
Sample # 19-21

Stephenson Building
101 Old Fitzhugh Rd, Dripping Springs

23-1730

Sample Location Plan



October 11, 2023

Michelle Fischer
City Administrator
City of Dripping Springs
511 Mercer Street
Dripping Springs, Texas 78620

RE: Limited Asbestos Survey of Target Areas at the Site Related to Proposed Demolition/Renovation
Stephenson Building
101 Old Fitzhugh Road, Dripping Springs, Texas 78620
Project #23-1730

Dear Ms. Fischer:

Champion Environmental Consulting Inc. (Champion Environmental) was retained by **City of Dripping Springs** (Hereinafter, the Client) to conduct a limited asbestos survey at the Site within the following Target Areas as identified by the Client.

Stephenson Building – Dripping Springs, TX

The attached report summarizes these services in accordance with our discussion. **Regulated amounts of asbestos were detected in the following materials and in the approximate quantities**

Sample #(s)	Location	Material	Result – Asbestos %	APPROXIMATE Quantity
19-21	All Exterior Windows except the one on the North Side Northwest corner	Window Glazing	2% Chrysotile	29 Windows

The laboratory analytical results are attached in Appendix A of this report. Licenses are attached in Appendix B of this report. The Sample Location Drawing is attached in Appendix C of this report. If you have any questions on this report or any other matter, please do not hesitate to call me at (512) 992-5383.

Sincerely,

Champion Environmental Consulting, Inc.

Wade Champion
Individual Asbestos Consultant
DSHS License No. 10-5410
Expiration Date 8/25/25

1.0 Services

Table I Services Summary	
Client	City of Dripping Springs 511 Mercer Street Dripping Springs, Texas 78620
Site Address	101 Old Fitzhugh Road, Dripping Springs, Texas 78620
Target Areas identified by Client	Stephenson Building – Dripping Springs, TX
Scope of Work 1. Conduct a preliminary visual reconnaissance of the renovation /demolition Target Areas identified by the client to visually determine the presence of suspect ACM 2. In the event suspect ACM is identified, visually assess suspect ACM for variations in color, texture, thickness, and other characteristics useful in determining the material's uniformity and homogenous area 3. In the event suspect ACM is identified, evaluate current physical condition, friability and potential for damage, assign hazard ratings and estimate quantities 4. Collect samples of identified and reasonably accessible suspect ACM within Target Areas 5. Send suspect ACM samples to laboratory for analysis of asbestos content, if any 6. Prepare report summarizing results	
Sample Date(s)	October 4, 2022
Inspector(s) DSHS License #	Cole Allen 603654
Samples Collected:	A total of 24 samples of suspect asbestos-containing materials were collected, as agreed with the Client, within reasonably accessible portions of the Target Areas
Analytical Lab:	CA Labs, LLC asbestos laboratory is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP) through the National Institute for Standards and Technology (ID Code No 200772-0) and licensed as a DSHS licensed asbestos bulk laboratory (License No. 30-0370)
No. of Samples Analyzed	24
Analyzed Date:	October 6, 2022
Report Number:	CBR23107716
Analytical Method:	Polarized Light Microscopy (PLM) using the Environmental Protection Agency (EPA) "Interim Method for Determination of Asbestos in Bulk Insulation Samples" [40 CFR Chapter 1 (1-1-87 Edition) Part 763, Subpart F, Attachment III]
General Information about Suspect ACM Asbestos has historically been a component of a wide variety of building materials. These types of building materials, which may potentially contain asbestos, are termed suspect asbestos-containing materials" or suspect ACM). Suspect ACM may or may not contain asbestos. The actual asbestos content of a suspect material can be determined only through proper sampling and analysis performed by a qualified building inspector and laboratory. Pursuant to the National Emission Standards for Hazardous Air Pollutants (NESHAP) asbestos regulations (40 CFR§61:141, et seq) ACM can be classified into two categories; friable ACM which can be reduced to powder or crumbled under light hand pressure (e.g. ceiling textures and thermal system insulation) and non-friable ACM, which are materials that cannot be easily crumbled (e.g. floor tile and floor tile mastic). Regulated asbestos containing materials (RACM) which are those materials containing over 1% asbestos as defined under asbestos NESHAP.	

2.0 Standard of Care and Limitations:

This report was prepared for the exclusive use of the Client named herein to aid in the identification and management of ACM and RACM in the renovation/demolition Target Areas identified by the Client. Champion Environmental performed its service in a manner consistent with the level of care and expertise exercised by asbestos professional performing the same or similar services at the same time and in the same geographic area.

Samples for this asbestos survey were collected from discrete sample location within the rooms and areas specifically identified herein (i.e., Target Areas). While attempts were made to obtain representative samples most likely to contain asbestos, finding and conclusions herein are necessarily limited by the number of samples taken and access provided for sampling activities. *The results herein cannot guarantee that no asbestos is present in any area not sampled*. This asbestos survey *was not intended to be a comprehensive asbestos inspection of the site*, nor was it intended to be used for evaluation of worker health and safety conditions. To determine whether regulated ACM is present at other locations not sampled herein, *a comprehensive asbestos inspection of the site* would be necessary.

Conclusions and recommendations herein represent the professional opinions of the Champion Environmental Consulting personnel involved with the project. The results of this report should not be considered as legal interpretation of existing federal, state or local environmental, health and safety laws or regulations. Champion Environmental Consulting, Inc., assumes no responsibility or liability for errors in information or data provided by third party sources.

3.0 Report Use and Reliance:

This report represents Champion Environmental's services as of the sampling date. As our final document, it may not be altered after final issuance. This study and report were prepared on behalf of and for the exclusive use of the Client solely its use and reliance in determining the presence of FACM in identified Target Areas of the site. The Client was the only party to which Champion Environmental explained the risks and was solely involved in shaping the scope of the services. Accordingly, reliance on this report by any other party may involve assumptions leading to an unintended interpretation of findings and opinions. With the consent of Champion Environmental and the Client, Champion Environmental may offer reliance to third parties or contract with other parties to develop findings and opinions related to such party's unique risk management concerns. Notwithstanding the foregoing, any and all third party reliance upon this Report shall be limited to the fair market value of services undertaken to perform this Report as of the report date.

4.0 Methodologies:

4.1 Sampling

This limited inspection was guided by the Texas Asbestos Health Protection Rules (TAHPR) (see 25 TAC §296) and generally in accord with AHERA (the Asbestos Hazard Emergency Response Act of 1986, Public law 99-519) sampling protocols (see 40 CFR §§ 763.86 and 763.88). The AHERA sampling protocols are statistically-based and were originally developed to implement AHERA which amends the Federal Toxic Substances Control Act (see 15 USC, §2641, et seq). These rules are often followed by the OSHA, and the Department of State Healthy Services (DSHS). Champion Environmental generally followed these sampling protocols to in an effort to collect representative samples of the various suspect building materials in the Target Areas.

Suspect ACM samples were collected by physically removing a small portion (approximately one square inch) of the suspect material using a sharp instrument. All layers of the material samples were penetrated and registered as separate samples. Disturbance of adjacent material was minimized during the sampling activities. Each sample was place into a separate container and then sealed. Each sample was labeled with the sample number and collected location, and a chain-of-custody form was completed. The sampling instrument was cleaned between each sample collected to mitigate potential cross contamination between samples collected.

4.2 Analytical Procedures

If the results of the bulk laboratory analysis reveal asbestos, the percentage of asbestos contained within the sample is compared with the criteria outlined in the EPA definition of asbestos-containing material (and which value is also followed by OSHA and DSHS). If a concentration of greater than one percent (1%) asbestos is reported, it is defined by the Asbestos NESHAP as a positive identification and the material could be considered RACM depending upon the nature of the ACM and its coverage.

The Asbestos NESHAP states the RACM (as defined in 40 CFR §61.141) containing less than 10% asbestos should be verified by point counting. If bulk sampling analysis determines that asbestos content of a friable asbestos sample is less than 10%, the building owner may;(i) elect to assume the asbestos content to be greater than 1% and treat the material as RACM, or (ii) require verification of asbestos content by point counting. If a result obtained by point counting is different from a result obtained by visual estimation, the point count result is used.

5.0 Recommendations:

Based upon the forgoing results, **if applicable,** Champion Environmental Consulting, Inc. offers the recommendations presented below. Such recommendations should be implemented prior to the commencement of any renovation or demolition activities or any other activities that would potentially disturb the identified ACM or RACM at the site.

- Identified ACM. Including non-friable ACM *that will be disturbed by renovation or demolition activities* should be removed as soon as feasibly possible by appropriately licensed personnel and in accordance with applicable laws and regulations.

- Identified ACM which *will not be disturbed by renovation or demolition activities but which is damaged* should be repaired or encapsulated (by appropriately licensed personnel and in accordance with applicable laws and regulations) to prevent future damage.

- *ACM to remain* in place should be enclosed in airtight impermeable barrier or encapsulated to prevent damage.

- An *Asbestos Operation and Maintenance Program* should be implemented to manage existing ACM in place.

In the event renovation or demolition activities are slated for portions of the site outside of the Target Areas, an asbestos survey should be performed for those portions of the site –prior to the initiation of renovation or demolition activities.

APPENDIX A

Laboratory Results

Limited Asbestos Survey of Target Areas at the Site Related to Proposed Demolition/Renovation

Stephenson Building – Dripping Springs, TX

Project #23-1730

Laboratory Analytical Results Summary

Sample #(s)	Location	Material	Result – Asbestos %	APPROXIMATE Quantity
19-21	All Exterior Windows except the one on the North Side Northwest corner	Window Glazing	2% Chrysotile	29 Windows

Note: Refer to attached laboratory report for details

CA Labs
Dedicated to Quality

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Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

NVLAP #200772-0
TDSHS #300370
CDPHE #AL-18111
LELAP #03069

Materials Characterization - Bulk Asbestos Analysis

Laboratory Analysis Report - Polarized Light

Champion Environmental
109 W 7th St, Suite 210
Georgetown, TX 78626

Attn: Wade Champion
Customer Project: Stephenson Building-Dripping Springs
Reference #: CBR23107776 Date: 10/6/2023

Analysis and Method

Summary of polarizing light microscopy (PLM / Stereomicroscopy bulk asbestos analysis) using the methods described in 40CFR Part 763 Appendix E to Subpart E (Interim and EPA 600 / R-93 / 116 (Improved). The sample is first viewed with the aid of stereomicroscopy. Numerous liquid slide preparations are created for analysis under the polarized microscope where identifications and quantifications are preformed. Calibrated liquid refractive oils are used as liquid mouting medium. These oils are used for identification (dispersion staining). A calibrated visual estimation is reported, should any asbestiform mineral be present. Other techniques such as acid washing are used in conjugation with refractive oils for detection of smaller quantities of asbestos. All asbestos percentages are based on calibrated visual estimation traceable to NIST standards for regulated of asbestos. Traceability to measurement and calibration is achieved by using known amounts and types of asbestos from standards where analyst and laboratory accuracy are measured. As little as 0.001% asbestos can be detected in favorable samples, while detection in unfavorable samples may approach the detection limit of 0.50% (well above the laboratory definition of trace).

Discussion

Vermiculite containing samples may have trace amounts of actinolite-tremolite, where not found be PLM should be analyzed using TEM methods and / or water separation techniques. Suspected actinolite/vermiculite presence will be indicated through the sample comment section of this report.

Fibrous talc containing samples may even contain a related asbestos fiber known as anthophyllite. Under certain conditions the same fiber may actually contain both talc and anthophyllite (a phenomenon called intergrowth). Again, TEM detection methods are recommended. CA Labs PLM report comments will denote suspected amounts of asbestiform anthophyllite with talc, where further analysis is recommended.

Some samples (floor tiles, surfacings, etc.) may contain fibers too small to be detectable by PLM analysis and should be analyzed by TEM bulk protocols.

A "trace asbestos" will be reported if the analyst observes far less than 1% asbestos. CA Labs defines "trace asbestos" as a few fibers detected by the analyst in several preparations and will indicate as such under these circumstances.

Quantification of <1% will actually be reported as <=1% (allowable variance close to 1% is high). Such results are ideal for point counting, and the technique is mandatory for friable samples (NESHAP, Nov. 1990 and clarification letter 8 May 1991) under 1% percent asbestos and the "trace asbestos". **In order to make all initial PLM reports issued from CA Labs NESHAP compliant, all <1% asbestos results (except floor tiles) will be point counted at no additional charge.**

Qualifications

CA Labs is accredited by the National Voluntary Accreditation Program (NVLAP) for selected test methods for airborne fiber analysis (TEM), and for bulk asbestos fiber analysis (PLM). All analysts have a college degree in a natural science (geology, biology, or environmental science) or are recognized by a state professional board in one these disciplines .Extensive in-house training programs are used to augment education background of the analyst. The group leader of polarized light has received supplemental McCrone Research training for asbestos identification. This report is not covered by the scope of AIHA accreditation. Analysis performed at CA Labs, LLC 12232 Industriplex, Suite 32 Baton Rouge, LA 70809.

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NVLAP #200772-0
TDSHS #300370
CDPHE #AL-18111
LELAP #03069

Overview of Project Sample Material Containing Asbestos

Customer Project: Stephenson Building-Dripping Springs **CA Labs Project #:** CBR23107776

Sample #	Layer #	Analysts Physical Description of Subsample	Asbestos type / calibrated visual estimate percent	List of Affected Building Material Types
				White Sealant
19	***19-1***	***White Sealant***	***2% Chrysotile***	
20	***20-1***	***White Sealant***	***2% Chrysotile***	
21	***21-1***	***White Sealant***	***2% Chrysotile***	

Glossary of abbreviations (non-asbestos fibers and non-fibrous minerals):

ca - carbonate
gypsum - gypsum
bi - binder
or - organic
ma - matrix
mi - mica
ve - vermiculite
ot - other
pe - perlite
qu - quartz
fg - fiberglass
mw - mineral wool
wo - wollastinite
ta - talc
sy - synthetic
ce - cellulose
br - brucite
ka - kaolin (clay)
pa - palygorskite (clay)

This report relates to the items tested. This report is not to be used by the customer to claim product certification, approval or endorsement by NVLAP, NIST, AIHA LAP, LLC, or any other agency of the federal government. This report may not be reproduced except in full without written permission from CA Labs. These results are submitted pursuant to CA Labs' current terms and sale, condition of sale, including the company's standard warranty and limitations of liability provisions and no responsibility or liability is assumed for the manner in which the results are used or interpreted. Unless notified in writing to return the samples covered by this report, CA Labs will store the samples for a period of ninety (90) days before discarding. A shipping or handling fee may be assessed for the return of any samples.

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NVLAP #200772-0
TDSHS #300370
CDPHE #AL-18111
LELAP #03069

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Wade Champion
Champion Environmental
109 W 7th St, Suite 210
Georgetown, TX 78626

Phone # 512-992-5383
Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
1		***1-1***	***White Textured Surfacing***	***N***	***None Detected***		100% qu, mi, bi, ca
		1-2	***White Drywall with Paper***	***N***	***None Detected***	10% ce	90% qu, gy
2		***2-1***	***White Textured Surfacing***	***N***	***None Detected***		100% qu, mi, bi, ca
		2-2	***White Drywall with Paper***	***N***	***None Detected***	10% ce	90% qu, gy
3		***3-1***	***White Compound***	***Y***	***None Detected***		100% qu, mi, ca
		3-2	***White Drywall with Paper***	***N***	***None Detected***	10% ce	90% qu, gy
4		***4-1***	***White Textured Surfacing***	***N***	***None Detected***		100% qu, mi, bi, ca

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Zo Andriampenomanana
Analyst

Senior Analyst
Alicia Stretz

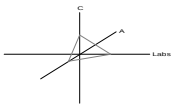
Laboratory Director
Chris Williams

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Fax 225-751-5634



NVLAP #200772-0
TDSHS #300370
CDPHE #AL-18111
LELAP #03069

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Wade Champion
Champion Environmental
109 W 7th St, Suite 210
Georgetown, TX 78626

Phone # 512-992-5383
Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
5		***5-1***	***White Textured Surfacing***	***N***	***None Detected***		100% qu, mi, bi, ca
		5-2	***White Drywall with Paper***	***N***	***None Detected***	10% ce	90% qu, gy
6		***6-1***	***White Compound***	***Y***	***None Detected***		100% qu, mi, ca
7		***7-1***	***Tan Surfaced Gray Plaster***	***N***	***None Detected***		100% qu, ma, bi, ca
8		***8-1***	***Tan Surfaced Gray Plaster***	***N***	***None Detected***		100% qu, ma, bi, ca
9		***9-1***	***Tan Surfaced Gray Plaster***	***N***	***None Detected***		100% qu, ma, bi, ca
10		***10-1***	***White Sealant on Wrap***	***N***	***None Detected***	10% fg 40% ce	50% qu, ma, ot

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Zo Andriampenomanana
Analyst

Senior Analyst
Alicia Stretz

Laboratory Director
Chris Williams

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6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

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Polarized Light Asbestiform Materials Characterization

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Phone # 512-992-5383
Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
11		***11-1***	***White Sealant on Wrap***	***N***	***None Detected***	10% fg 40% ce	50% qu, ma, ot
12		***12-1***	***White Sealant on Wrap***	***N***	***None Detected***	10% fg 40% ce	50% qu, ma, ot
13		***13-1***	***Black Cove Base***	***Y***	***None Detected***		100% qu, ma
		13-2	***Yellow and Brown Mastic***	***N***	***None Detected***		100% qu, bi
14		***14-1***	***Black Cove Base***	***Y***	***None Detected***		100% qu, ma
		14-2	***Yellow and Brown Mastic***	***N***	***None Detected***		100% qu, bi
15		***15-1***	***Black Cove Base***	***Y***	***None Detected***		100% qu, ma

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Zo Andriampenomanana
Analyst

Senior Analyst
Alicia Stretz

Laboratory Director
Chris Williams

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Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
		15-2	***Yellow and Brown Mastic***	***N***	***None Detected***		100% qu, bi
16		***16-1***	***Yellow Mastic***	***Y***	***None Detected***		100% qu, bi
17		***17-1***	***Yellow Mastic***	***Y***	***None Detected***		100% qu, bi
18		***18-1***	***Yellow Mastic***	***Y***	***None Detected***		100% qu, bi
19		***19-1***	***White Sealant***	***Y***	***2% Chrysotile***		98% qu, ma, ca
20		***20-1***	***White Sealant***	***Y***	***2% Chrysotile***		98% qu, ma, ca
21		***21-1***	***White Sealant***	***Y***	***2% Chrysotile***		98% qu, ma, ca

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
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7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs
Dedicated to Quality

CA Labs, L.L.C.
12232 Industriplex, Suite 32
Baton Rouge, LA 70809
Phone 225-751-5632
Fax 225-751-5634

NVLAP #200772-0
TDSHS #300370
CDPHE #AL-18111
LELAP #03069

Polarized Light Asbestiform Materials Characterization

Customer Info: **Attn:** Wade Champion
Champion Environmental
109 W 7th St, Suite 210
Georgetown, TX 78626

Phone # 512-992-5383
Fax # 512-597-8787

Customer Project: Stephenson Building-Dripping Springs

Turnaround Time: 24 hr

CA Labs Project #: CBR23107776

Date: 10/6/2023
Samples Received: 10/6/2023
Date Of Sampling: 10/4/2023
Purchase Order #: 23-1730

Sample #	Comment	Layer #	Analysts Physical Description of Subsample	Homogeneous (Y/N)	Asbestos type / calibrated visual estimate percent	Non-asbestos fiber type / percent	Non-fibrous type / percent
22		***22-1***	***Gray Mortar***	***Y***	***None Detected***		100% qu, ma, ca
23		***23-1***	***Gray Mortar***	***Y***	***None Detected***		100% qu, ma, ca
24		***24-1***	***Gray Mortar***	***Y***	***None Detected***		100% qu, ma, ca

Analysis Method: Interim (40CFR Part 763 Appendix E to Subpart E) / Improved (EPA-600 / R-93/116)
Preparation Method: HCL acid washing for carbonate based samples, chemical reduction for organically bound components, oil immersion for identification of asbestos types by dispersion attaining / becke line method.

ca - carbonate	mi - mica	fg - fiberglass	ce - cellulose
gypsum - gypsum	ve - vermiculite	mw - mineral wool	br - brucite
bi - binder	ot -other	wo - wollastinite	ka - kaolin (clay)
or - organic	pe - perlite	ta - talc	pa - palygorskite (clay)
ma - matrix	qu - quartz	sy - synthetic	

Approved Signatories:

Zo Andriampenomanana
Analyst

Senior Analyst
Alicia Stretz

Laboratory Director
Chris Williams

1. Fire Damage significant fiber damage - reported percentages reflect unaltered fibers
2. Fire Damage no significant fiber damages effecting fibrous percentages
3. Actinolite in association with Vermiculite
4. Layer not analyzed - attached to previous positive layer and contamination is suspected
5. Not enough sample to analyze
6. Anthophyllite in association with Fibrous Talc
7. Contamination suspected from other building materials
8. Favorable scenario for water separation on vermiculite for possible analysis by another method
9. < 1% Result point counted positive
10. TEM analysis suggested

CA Labs

C.A. Labs, LLC.
12232 Industriplex
Suite 32
Baton Rouge, LA 70809

Phone: 225-751-5632
Fax: 225-751-5634
Mobile: 225-993-3471

Chain of Custody

Client Name:	Champion Environmental Consulting	**CA Labs job #**	**CBR23107776**
Client Address:	109 W 7th St.	Billing Address:	Same
	Suite 210	(if different)	
	Georgetown TX 78626		
phone number:	512 992 5383		
fax number:	N/A	Send Reports to:	wchampion@c-eci.com
Project Number:	23-1730	Project Name:	Stephenson Building - Dripping Springs
Contact:	Wade Champion	**Reports Results VIA:**	**EMAIL** X **FAX** ___ **VERBAL** ___

Total # Samples Submitted:	**Total # Samples to be Analyzed:**	**Material Matrix:**
24	24	Air / (Bulk) / Water

Asbestos: *please call ahead for availability of all rush and/or after hours samples.*

TEM	**TA Time**	**PLM**	**TA Time**	**Optical / IAQ**	**TA Time**
Circle analysis and TA time		*Circle analysis and TA time*	*2 hour*	**Allergen Particle:**	*2 hour*
AHERA	*4 hour*	Improved	4 hour	tape/bulk/swab	4 hour
EPA Level II	8 hour	Interim	8 hour	Cyclex-d cassettes	8 hour
Drinking Water	16 hour		16 hour	Air-o-cell cassettes	16 hour
Wipe	24 hour	AHERA	24 hour	Anderson cultures	24 hour
Micro-vac	2 days		2 days	Bulk/swab cultures	2 days
NIOSH 7402	3 days	Point Count -	3 days	Bacteria cultures	3 days
Chatfield Bulk	5 days	(NESHAPS)	5 days	**PCM**: NIOSH 7400	5-10 days

Lead: *Circle analysis and TA time*

Matrix:	Paint Chips	Soil	Air	Wipes	Wastewater	TCLP
TA Time:	***8 hour***	1 day	2 days	3 days	5 days	6-10 days

Sample Information:

Sample Number:	**Sample Location:**	**Sample Date/Time:**	**Sample Volume (L)**
1	WT/DW - Restrooms	10-4-23	
2	↓ ↓	↓	
3	↓ Room B	↓	
4	3C Restrooms	↓	
5	↓ ↓		

Custody Information:

Samples relinquished: [signature] 10-4-23/1500 — Signature / Date / Time

Samples received: Carli Brane 9:40 10/6/23 — Signature / Date / Time

Samples relinquished: _____ — Signature / Date / Time

Samples received: _____ — Signature / Date / Time

CA Labs

12232 Industriplex
Suite 32
Baton Rouge, LA 70809

Phone: 225-751-5632
Fax: 225-751-5634
After hours Mobile: 225-993-3471

Client Name: Champion Environmental Consulting

Client Address: 109 W 7th St. Suite 210
Georgetown TX 78626

phone number: 512 992 5383

fax number: N/A

Project Number: 23-1730

Contact: Wade Champion

CA Labs job # CBR 23107776

Billing Address: Same
(if different)

Send Reports to: wchampion@c-eci.com

Project Name: Stephenson Building - Dripping Springs

Reports Results
VIA: EMAIL X **FAX**____ **VERBAL**____

Sample Number:	Sample Location:	Sample Date/Time:	Sample Volume (L)
6	JC - Room B	10-4-23	
7	Plaster Texture	↓	
8	↓	↓	
9	↓	↓	
10	Duct Mastic	↓	
11	↓	↓	
12	↓	↓	
13	CBM	↓	
14	↓	↓	
15	↓	↓	
16	Residual Mastic on Door Frame	↓	
17	↓	↓	
18	↓	↓	
19	Window Glazing	↓	
20	↓	↓	
21	↓	↓	
22	Ext Stone Mortar	↓	
23	↓	↓	
24	↓	↓	
		↓	
		↓	
		↓	
		↓	
		↓	

For internal use:
Any initial changes regarding project (indicate yes by checking line)_____

Custody Information:
Samples relinquished: 10-4-23 1500
Signature / Date / Time

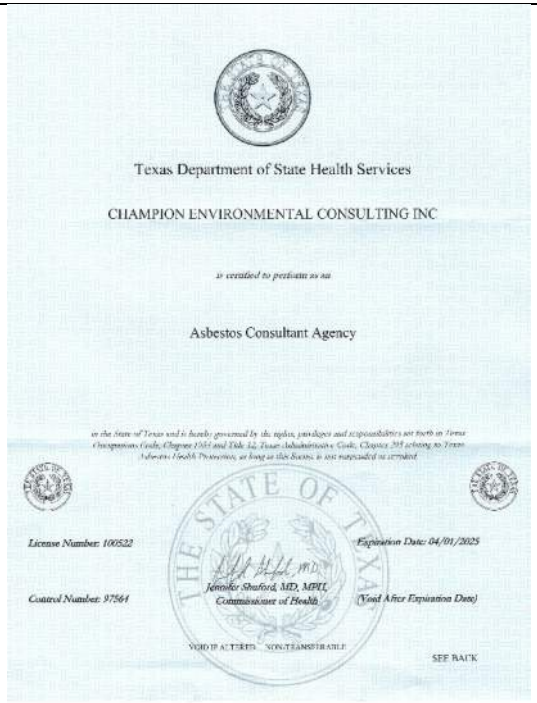
Samples received: 9:40 10/6/23
Signature / Date / Time

Samples relinquished:
Signature / Date / Time

Samples received:
Signature / Date / Time

APPENDIX B

Licenses



Texas Department of State Health Services

CHAMPION ENVIRONMENTAL CONSULTING INC

is certified to pursuant as an

Asbestos Consultant Agency

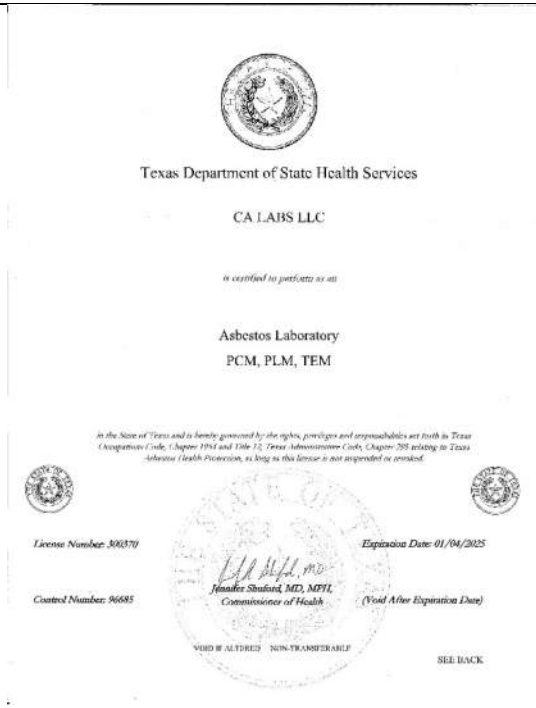
in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 25, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 100522 Expiration Date: 04/01/2025

Control Number: 97564 Jennifer Shuford, MD, MPH, Commissioner of Health (Void After Expiration Date)

VOID IF ALTERED NON-TRANSFERABLE

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Texas Department of State Health Services

CA LABS LLC

is certified to pursuant as an

Asbestos Laboratory
PCM, PLM, TEM

in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 25, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 300370 Expiration Date: 01/04/2025

Control Number: 96685 Jennifer Shuford, MD, MPH, Commissioner of Health (Void After Expiration Date)

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Texas Department of State Health Services

Asbestos Individual Consultant

WADE E CHAMPION

License No. 105410

Control No. 98246

Expiration Date: 25-Aug-2025



Texas Department of State Health Services

Asbestos Inspector

COLE H ALLEN

License No. 603654

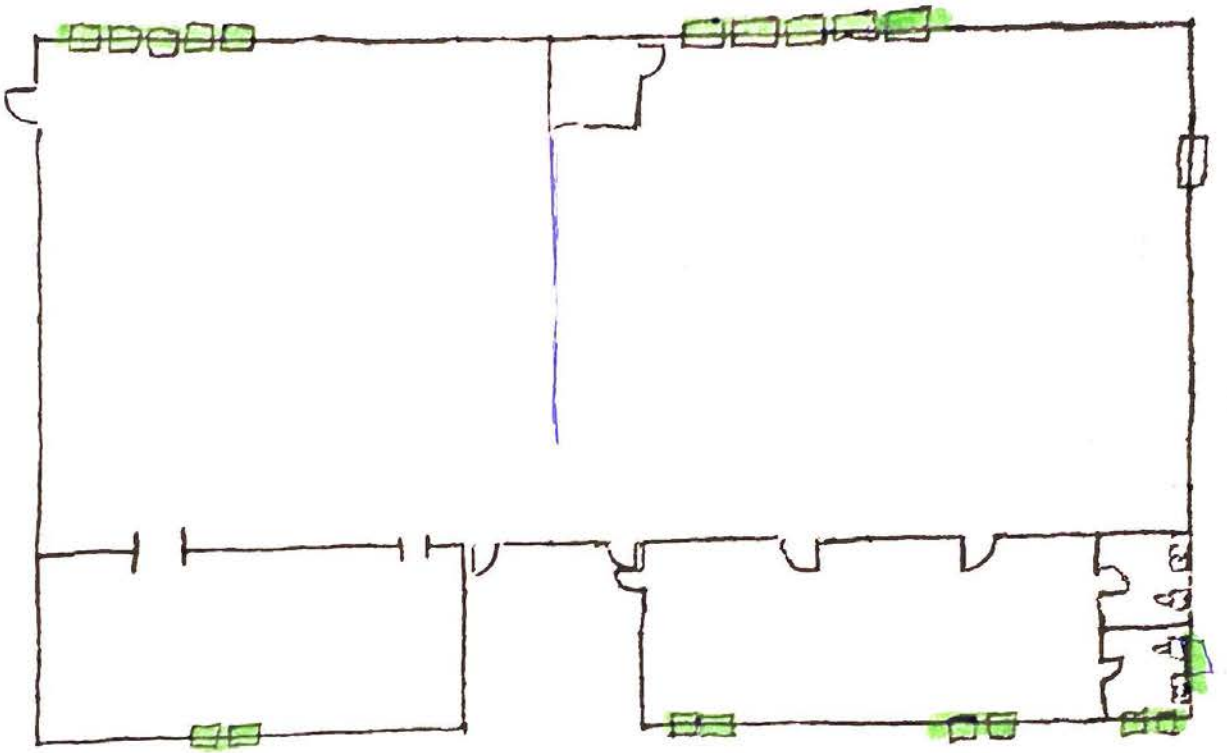
Control No. 100198

Expiration Date: 10-Jan-2024

APPENDIX C

Sample Location Drawing(s)

Stephenson Building
101 old Fitzhugh Rd, Dripping Springs
Asbestos Location Plan 23-1730

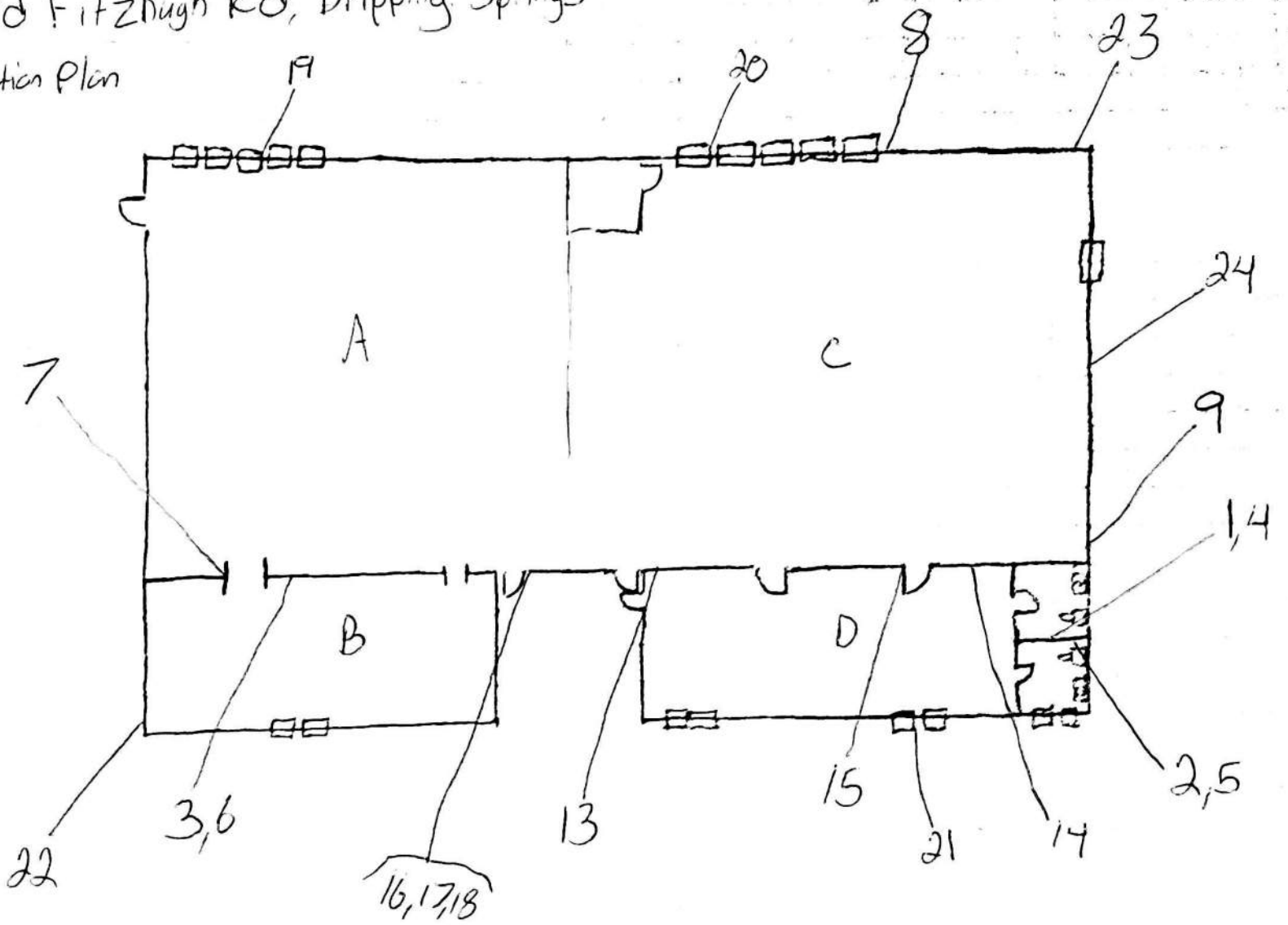


Exterior Window Glazing
~ 29 windows
Sample # 19-21

Stephenson Building
101 Old Fitzhugh Rd, Dripping Springs

23-1730

Sample Location Plan



ASBESTOS ABATEMENT PROJECT DESIGN

Stephenson Building
Window Sashes
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

CEC PROJECT NUMBER 23-1730

October 18, 2024

Champion Environmental Consulting, Inc.
109 W 7th St, Suite 210, Georgetown, TX 78626 *main* (512) 992-5383

SITE: Stephenson Building
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

CONTRACTOR: TBD
Texas Licensed Asbestos Abatement Contractor

1.0 SCOPE OF ASBESTOS ABATEMENT PROJECT

The Scope of the asbestos abatement project consists of removal of the following:

Material/Area		APPROX Quantity
Window Glazing All exterior windows except the one on the North Side Northwest corner (Remove and dispose of sashes only - frames to remain in place for LBP removal)		29 Windows

Refer to attached sketch/drawing(s)

Contractor shall abate window/exterior materials utilizing NESHAP Methods and properly dispose of the aforementioned building materials as asbestos containing material (ACM) or asbestos contaminated materials for this project.

This project will be completed under the guidelines of all federal, state, and local regulations regarding the removal of asbestos containing materials as well as this project specification. Final clearance for this project will utilize Phase Contrast Microscopy (PCM) and aggressive sampling techniques. OSHA Compliance Air Monitoring will be the responsibility of the contractor. **It is the Contractor's responsibility to verify the quantities of all materials.**

Wade Champion, IAC
DSHS License Number 10-5410
Expiration Date 08/25/2025

Wade Champion
License No. 10-5410
Expires 08/25/2025

PART 1 – GENERAL

1.01 REGULATIONS:

A. Comply with the requirements of the Environmental Protection Agency (EPA) regulations. National Emission Standards for Hazardous Air Pollutants (Asbestos NESHAP), U. S. Department of Labor, Occupational Safety and Health Administration (OSHA) regulations on asbestos, Respiratory Protection, Toxic Air Pollutants and License to Remove or Encapsulate Asbestos, Texas Department of Health (*Texas Asbestos Health Protection Rules)* as revised July 8, 2021, and any applicable local government regulations which are incorporated by reference.

1.02 SCOPE OF WORK:

A. The Contractor shall furnish all labor, materials, services, insurance, and equipment necessary to carry out the asbestos abatement of ACM in accordance with all current and applicable Federal Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and Texas Department of Health (*Texas Asbestos Health Protection Rules)* as revised July 8, 2021.
B. Remove material, which is Asbestos Containing Building Materials (ACBM) (See Drawings Appendix C).
C. Dispose of all ACBM materials in accordance with all applicable Federal and State of Texas regulations and these specifications at an approved disposal site. The Contractor shall be responsible for obtaining approval for disposal of all asbestos contaminated material generated by the abatement project, prior to start, at an EPA approved landfill in compliance with all federal, state, and local regulations.

1.03 ON-SITE DOCUMENTATION

A. The Contractor shall post all applicable permits and regulations.
B. The Contractor shall maintain at the job site all Federal, EPA, OSHA, State of Texas, and city notifications and regulations (as applicable).
C. The Contractor shall maintain at the job site all employee medical asbestos physicals indicating medical clearance to wear a respirator; respirator fit tests, employee roster sign-in sheets, and SDS sheet for products used.

1.04 CONTRACTOR QUALIFICATIONS

A. The Contractor must be able to comply with all requirements of this solicitation and specification.
B. The Contractor must comply to the following requirements for the project:
1. Document to CONSULTANT, the Asbestos Consultant, that all employees who will come into contact with the ACBM or be responsible for the asbestos work are medically qualified to wear a respirator and have a current asbestos physical. CONSULTANT will supervise and perform respirator fit tests for all of the Contractor employees who will come into contact with ACBM.
2. Demonstrate prior experience on jobs of similar nature and scope.

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Expires 08/25/2025

1.05 SUBMITTALS

A. Items shall be submitted to and approved by CONSULTANT in this section prior to commencing work involving asbestos materials.
B. Landfill: Submit written evidence that the landfill for disposal is licensed for asbestos disposal by the USEPA and state or local regulatory agency(s) and is in accordance with all other terms and conditions for landfills addressed in other paragraphs of this specification.
C. Submit documentation that each employee has received an asbestos physical and has received medical clearance to wear a respirator; submit certificates signed by each employee that the employee understands the health implications and risks involved, including illnesses possible from exposure to airborne asbestos fibers, understands the use and limits of the respiratory equipment to be used, and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment.
D. Properly completed notification(s) to the Texas Department of Health Toxic Substance Control Division, and any other City or local departments required by this specification.
E. Copies of all Federal, EPA, OSHA, State of Texas, or any other necessary regulations to be maintained at the job site.

1.06 AIR MONITORING

A. Air monitoring will be performed during the entire removal, as specified, or as deemed necessary by CONSULTANT.

1.07 UTILITIES

A. The Owner shall provide electrical power for the project from available power outlets. The Contractor shall furnish all extension cords and construction type ground fault protected power outlet assemblies.
B. The Owner shall furnish water for the project from readily available hose bibs. The Contractor shall furnish all water hoses and devices.

1.08 ASBESTOS REMOVAL LOCATIONS

A. The asbestos abatement work shall generally include the following:
1. *EXTERIOR Window materials* (See Appendix C – REFERENCE DRAWING(S)).

1.09 PROJECT AND AREA CLEANUP

A. On a daily basis, the Contractor shall clean the asbestos work area immediately upon completion of the removal procedures. The Contractor shall also police the entire building perimeter grounds for ACBM and properly dispose of any loose ACBM debris on a daily basis.
B. At the end of each day, prior to leaving the job site, the Contractor shall thoroughly clean the entire job site in a manner acceptable to CONSULTANT.

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Expires 08/25/2025

PART 2 – PRODUCTS

1.01 GENERAL

A. Products and materials required for the project shall be new, of best quality and grade of standard manufacturer, and shall conform to the requirements of the asbestos abatement industry.

B. Typical products required for the project are listed below:
   1. Full-bodied protective coveralls including hood and boots;
   2. Half-face, full-face or powered air purifying respirators. All respirators shall be NIOSH approved;
   3. High efficiency particulate air (HEPA) filters (P100 or equivalent) for respirators;
   4. True six (6) mil asbestos disposal bags pre-labeled with the dangers related to asbestos;
   5. Danger signs and barrier tape;
   6. Surfactant (Wetting Agent): Mixture consisting of 50% poly-oxyethylene ether and 50% poly-glycol ether, or equivalent, and shall be mixed with water to provide “amended water” with a concentration of one ounce of surfactant to five (5) gallons of water; and
   7. Sealing tape.

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall perform the asbestos abatement and disposal according to the requirements stipulated and outlined in these specifications.

3.02 METHOD OF REMOVAL

A. Workers shall wear approved, properly fitted, and fit-tested National Institute for Occupational Safety and Health (NIOSH) respirators equipped with high efficiency particulate air (P100 or equivalent) filters approved for asbestos removal. CONSULTANT shall perform and document the fit testing of the employees as previously stated. Workers shall wear disposable, full-bodied coveralls with head covers and footwear at the work areas. These will be disposed of in asbestos disposal bags at the end of each asbestos removal work period.

B. Provide danger signs at all approaches to asbestos regulated areas. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos. Signs and labels shall be in accordance with 29 CFR 1926.1101 OSHA Asbestos Standard. Ensure that roof level heating and ventilation air intake sources are shut down. Seal all openings with true weight six (6) mil polyethylene.

C. For the entire project the air will be monitored both personally for workers and environmentally to ensure that the Contractor meets EPA Clean Air Standards. The air monitoring will be conducted by CONSULTANT. During the time the air is being monitored, the Contractor must ensure that all workers directly involved with the ACBM removal procedures wear full-bodied protective clothing and at a minimum half face dual cartridge air purifying respirators with High Efficiency Particulate Air (HEPA) filters (P100 or equivalent).

D. ACBM removal shall be consistent with the OSHA Asbestos Standard (29 CFR 1926.1101), August 1994, as corrected June 29, 1995, Section (g) Method of Compliance, Paragraph 8(ii), as outlined below:

Wade Champion
License No. 10-5410
Expires 08/25/2025



1. For removing material which contains ACBM, the employer shall ensure that the following work practices are followed:
   a. material shall be removed in an intact state to the extent feasible.
   b. Wet methods shall be used to remove materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards.
   c. The wetted ACBM shall be double bagged in approved true weight six (6) mil polyethylene labeled bags. At the end of each removal operation, the bags shall be placed in an enclosed dumpster/trailer, contained and pad locked. All asbestos contaminated articles such as suits, gloves, filters, etc. shall also be disposed of in double six (6) mil labeled polyethylene bags. Bags shall not be damaged in any way. To ensure that the bags do not become damaged, the Contractor may elect to place the bags in sealed and labeled fiber drums. CONSULTANT will determine the integrity of the sealed asbestos labeled bags and instruct the Contractor accordingly. All polyethylene bags utilized for the ACBM must be pre-labeled from the factory with the appropriate asbestos label. In addition, the Contractor must label the top bag of each double bagged ACBM with the appropriate generator information.
   d. The asbestos materials shall be transported from the work areas to the enclosed container in a method that protects the integrity of the bags or drums from asbestos fiber release and/or spreading of asbestos debris. Through discussion with the Contractor, CONSULTANT will determine the safest method to accomplish this procedure:

1. Refer to OSHA Asbestos Standard (29 CFR 1926.1101), August 1994 as corrected June 29, 1995, listed below:

a. Asbestos containing material that has been removed *shall not be dropped or thrown to the ground*. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust tight chute, crane, or hoist:

1.) Any ACBM that is not intact shall be lowered to the ground as soon as it is practicable, but in any event no later than the end of the work shifts. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.

2.) Intact ACBM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.

b. Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.

c. Roof level heating and ventilation air intake sources shall be isolated, or the ventilation system shall be shut down.

E. Transporting of the ACBM to an EPA approved landfill must be accomplished by an approved and Texas Department of Health licensed asbestos transporting company. The asbestos shall be properly labeled. It is the Contractor's responsibility to ensure that the ACBM reaches the approved landfill in an acceptable condition. Final disposal of asbestos-containing waste material shall be within 30 days of the project completion or when receiving container is full, whichever is sooner.

F. No later than thirty (30) days after completion of the ACBM removal, the Contractor shall furnish CONSULTANT three (3) copies of project documentation which shall include at a minimum, waste shipment records (manifest), employee physicals, employee respirator clearances, employee certificates of understanding regarding the handling of asbestos, typed daily project details, notifications, insurance certificates, SDS sheets, and all other relevant documents as determined by CONSULTANT.

Wade Champion
License No. 10-5410
Expires 08/25/2025



TECHNICAL SPECIFICATION USE AND RELIANCE

The technical specifications presented herein are an instrument of professional service developed by Champion Environmental Consulting, Inc. (CEC) in contemplation of a wide array of project-specific variables, including how the documents will be used, by whom and under what project management scheme. Because CEC may be liable for the adequacy of these technical specifications and any unauthorized reuse could result in misuse of CEC's findings, recommendations or other service elements for which CEC cannot anticipate risk and liability, use of these technical specifications (including reliance, duplication, copying, quoting or excerpting) is limited to CEC, as project manager of the above-referenced project for the client named herein. Any other party, including contractors or consultants, wishing to use, rely upon, excerpt, copy, duplicate or otherwise reproduce these specifications must apply to CEC for written authorization to do so with such approval in the sole discretion of CEC.

Wade Champion
License No. 10-5410
Expires 08/25/2025



APPENDIX A
LICENSES



Texas Department of State Health Services

CHAMPION ENVIRONMENTAL CONSULTING INC

is certified to perform as an

Asbestos Consultant Agency

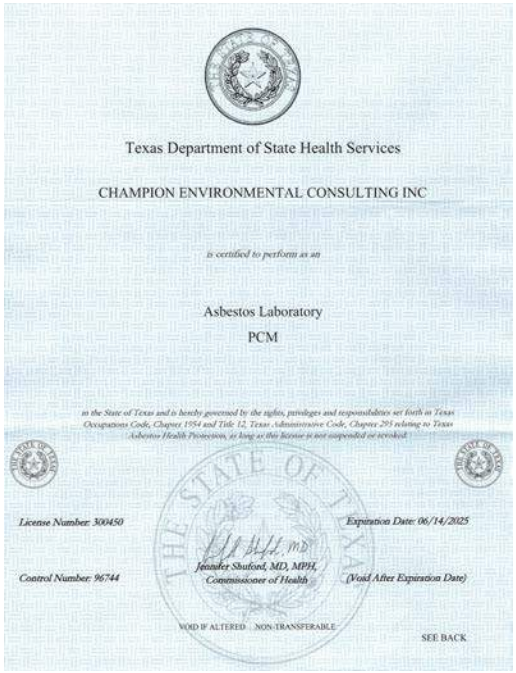
in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 12, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 100522 — Expiration Date: 04/01/2025

Control Number: 97564 — Jennifer Shuford, MD, MPH, Commissioner of Health — (Void After Expiration Date)

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Texas Department of State Health Services

CHAMPION ENVIRONMENTAL CONSULTING INC

is certified to perform as an

Asbestos Laboratory

PCM

in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 12, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 300450 — Expiration Date: 06/14/2025

Control Number: 96744 — Jennifer Shuford, MD, MPH, Commissioner of Health — (Void After Expiration Date)

VOID IF ALTERED - NON-TRANSFERABLE

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Texas Department of State Health Services

Asbestos Individual Consultant

WADE E CHAMPION

License No. 105410

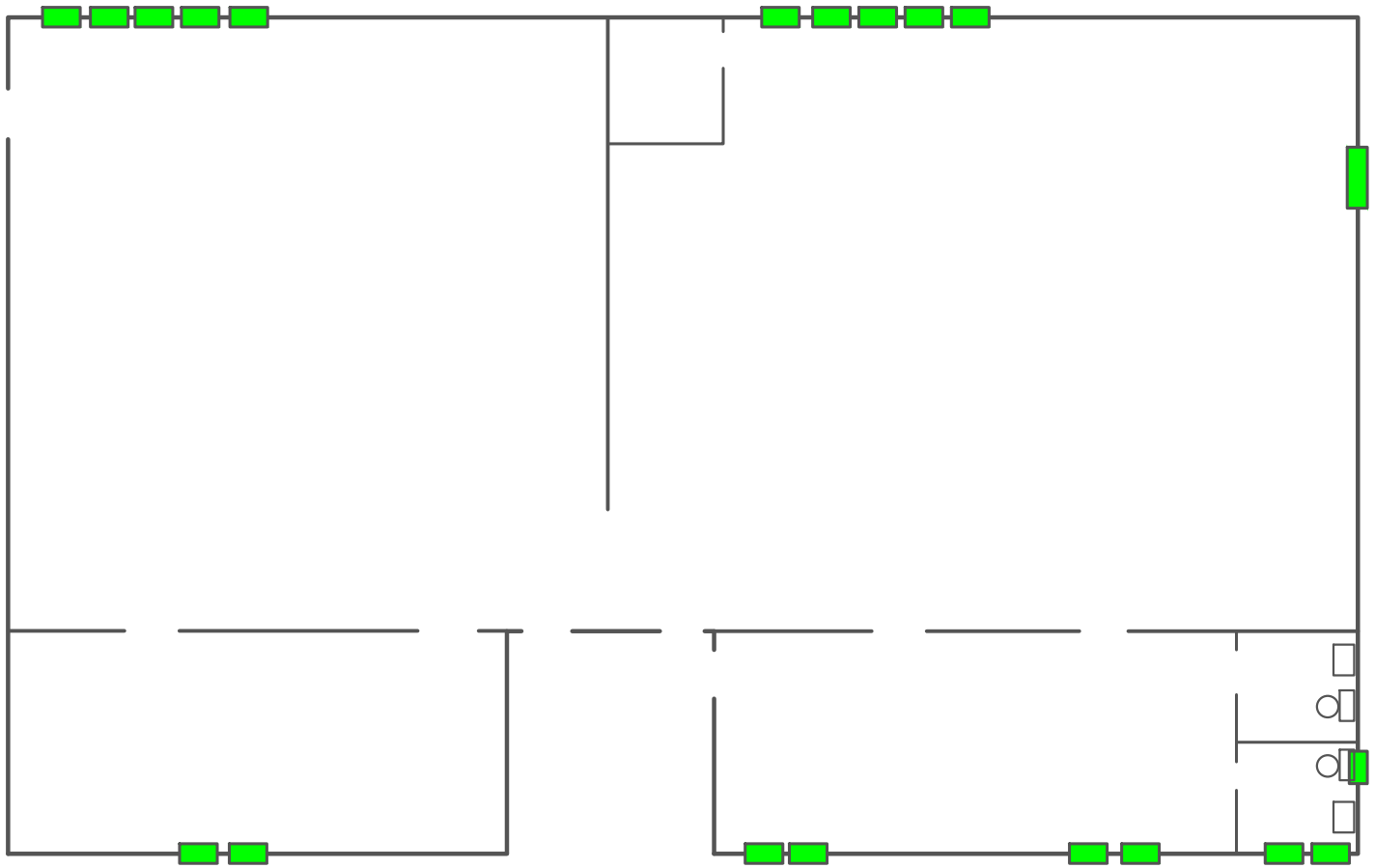
Control No. 98246

Expiration Date: 25-Aug-2025

APPENDIX B
NOTIFICATION(S)

(As Submitted By Licensed Abatement Contractor)

APPENDIX C
REFERENCE DRAWING(S)



Exterior Window Glazing (~29 Windows)
Remove and dispose of sashes only
Frames to remain in place for LBP removal

Wade Champion
Asbestos Individual Consultant
TDSHS License No. 10-5410
Expiration Date 8/25/2025

CHAMPION environmental consultants
109 West 7th Street
Suite 210
Georgetown, Texas 786

CLIENT:
CITY OF DRIPPING SPRINGS

511 Mercer Street
Cripping Springs, Texas 78620

SITE: STEPHENSON BUILDING
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

C-ECI Project No. 23-1730
By: N Hackney
Approved By: W Champion
Submitted: 4/4/2024
Not To Scale

Asbestos Abatement Plan

ASBESTOS ABATEMENT PROJECT DESIGN

Stephenson Building
Window Sashes
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

CEC PROJECT NUMBER 23-1730

October 18, 2024

Champion Environmental Consulting, Inc.
109 W 7th St, Suite 210, Georgetown, TX 78626 *main* (512) 992-5383

SITE: Stephenson Building
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

CONTRACTOR: TBD
Texas Licensed Asbestos Abatement Contractor

1.0 SCOPE OF ASBESTOS ABATEMENT PROJECT

The Scope of the asbestos abatement project consists of removal of the following:

Material/Area		APPROX Quantity
Window Glazing All exterior windows except the one on the North Side Northwest corner (Remove and dispose of sashes only - frames to remain in place for LBP removal)		29 Windows

Refer to attached sketch/drawing(s)

Contractor shall abate window/exterior materials utilizing NESHAP Methods and properly dispose of the aforementioned building materials as asbestos containing material (ACM) or asbestos contaminated materials for this project.

This project will be completed under the guidelines of all federal, state, and local regulations regarding the removal of asbestos containing materials as well as this project specification. Final clearance for this project will utilize Phase Contrast Microscopy (PCM) and aggressive sampling techniques. OSHA Compliance Air Monitoring will be the responsibility of the contractor. **It is the Contractor's responsibility to verify the quantities of all materials.**

Wade Champion, IAC
DSHS License Number 10-5410
Expiration Date 08/25/2025

Wade Champion
License No. 10-5410
Expires 08/25/2025

PART 1 – GENERAL

1.01 REGULATIONS:

A. Comply with the requirements of the Environmental Protection Agency (EPA) regulations. National Emission Standards for Hazardous Air Pollutants (Asbestos NESHAP), U. S. Department of Labor, Occupational Safety and Health Administration (OSHA) regulations on asbestos, Respiratory Protection, Toxic Air Pollutants and License to Remove or Encapsulate Asbestos, Texas Department of Health (*Texas Asbestos Health Protection Rules)* as revised July 8, 2021, and any applicable local government regulations which are incorporated by reference.

1.02 SCOPE OF WORK:

A. The Contractor shall furnish all labor, materials, services, insurance, and equipment necessary to carry out the asbestos abatement of ACM in accordance with all current and applicable Federal Environmental Protection Agency (EPA), Occupational Safety and Health Administration (OSHA), and Texas Department of Health (*Texas Asbestos Health Protection Rules)* as revised July 8, 2021.
B. Remove material, which is Asbestos Containing Building Materials (ACBM) (See Drawings Appendix C).
C. Dispose of all ACBM materials in accordance with all applicable Federal and State of Texas regulations and these specifications at an approved disposal site. The Contractor shall be responsible for obtaining approval for disposal of all asbestos contaminated material generated by the abatement project, prior to start, at an EPA approved landfill in compliance with all federal, state, and local regulations.

1.03 ON-SITE DOCUMENTATION

A. The Contractor shall post all applicable permits and regulations.
B. The Contractor shall maintain at the job site all Federal, EPA, OSHA, State of Texas, and city notifications and regulations (as applicable).
C. The Contractor shall maintain at the job site all employee medical asbestos physicals indicating medical clearance to wear a respirator; respirator fit tests, employee roster sign-in sheets, and SDS sheet for products used.

1.04 CONTRACTOR QUALIFICATIONS

A. The Contractor must be able to comply with all requirements of this solicitation and specification.
B. The Contractor must comply to the following requirements for the project:
1. Document to CONSULTANT, the Asbestos Consultant, that all employees who will come into contact with the ACBM or be responsible for the asbestos work are medically qualified to wear a respirator and have a current asbestos physical. CONSULTANT will supervise and perform respirator fit tests for all of the Contractor employees who will come into contact with ACBM.
2. Demonstrate prior experience on jobs of similar nature and scope.

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1.05 SUBMITTALS

A. Items shall be submitted to and approved by CONSULTANT in this section prior to commencing work involving asbestos materials.
B. Landfill: Submit written evidence that the landfill for disposal is licensed for asbestos disposal by the USEPA and state or local regulatory agency(s) and is in accordance with all other terms and conditions for landfills addressed in other paragraphs of this specification.
C. Submit documentation that each employee has received an asbestos physical and has received medical clearance to wear a respirator; submit certificates signed by each employee that the employee understands the health implications and risks involved, including illnesses possible from exposure to airborne asbestos fibers, understands the use and limits of the respiratory equipment to be used, and understands the results of monitoring of airborne quantities of asbestos as related to health and respiratory equipment.
D. Properly completed notification(s) to the Texas Department of Health Toxic Substance Control Division, and any other City or local departments required by this specification.
E. Copies of all Federal, EPA, OSHA, State of Texas, or any other necessary regulations to be maintained at the job site.

1.06 AIR MONITORING

A. Air monitoring will be performed during the entire removal, as specified, or as deemed necessary by CONSULTANT.

1.07 UTILITIES

A. The Owner shall provide electrical power for the project from available power outlets. The Contractor shall furnish all extension cords and construction type ground fault protected power outlet assemblies.
B. The Owner shall furnish water for the project from readily available hose bibs. The Contractor shall furnish all water hoses and devices.

1.08 ASBESTOS REMOVAL LOCATIONS

A. The asbestos abatement work shall generally include the following:
1. *EXTERIOR Window materials* (See Appendix C – REFERENCE DRAWING(S)).

1.09 PROJECT AND AREA CLEANUP

A. On a daily basis, the Contractor shall clean the asbestos work area immediately upon completion of the removal procedures. The Contractor shall also police the entire building perimeter grounds for ACBM and properly dispose of any loose ACBM debris on a daily basis.
B. At the end of each day, prior to leaving the job site, the Contractor shall thoroughly clean the entire job site in a manner acceptable to CONSULTANT.

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PART 2 – PRODUCTS

1.01 GENERAL

A. Products and materials required for the project shall be new, of best quality and grade of standard manufacturer, and shall conform to the requirements of the asbestos abatement industry.

B. Typical products required for the project are listed below:
   1. Full-bodied protective coveralls including hood and boots;
   2. Half-face, full-face or powered air purifying respirators. All respirators shall be NIOSH approved;
   3. High efficiency particulate air (HEPA) filters (P100 or equivalent) for respirators;
   4. True six (6) mil asbestos disposal bags pre-labeled with the dangers related to asbestos;
   5. Danger signs and barrier tape;
   6. Surfactant (Wetting Agent): Mixture consisting of 50% poly-oxyethylene ether and 50% poly-glycol ether, or equivalent, and shall be mixed with water to provide “amended water” with a concentration of one ounce of surfactant to five (5) gallons of water; and
   7. Sealing tape.

PART 3 – EXECUTION

3.01 GENERAL

A. The Contractor shall perform the asbestos abatement and disposal according to the requirements stipulated and outlined in these specifications.

3.02 METHOD OF REMOVAL

A. Workers shall wear approved, properly fitted, and fit-tested National Institute for Occupational Safety and Health (NIOSH) respirators equipped with high efficiency particulate air (P100 or equivalent) filters approved for asbestos removal. CONSULTANT shall perform and document the fit testing of the employees as previously stated. Workers shall wear disposable, full-bodied coveralls with head covers and footwear at the work areas. These will be disposed of in asbestos disposal bags at the end of each asbestos removal work period.

B. Provide danger signs at all approaches to asbestos regulated areas. Locate signs at such a distance that personnel may read the sign and take the necessary protective steps required before entering the area. Provide labels and affix to all asbestos materials, scrap, waste, debris, and other products contaminated with asbestos. Signs and labels shall be in accordance with 29 CFR 1926.1101 OSHA Asbestos Standard. Ensure that roof level heating and ventilation air intake sources are shut down. Seal all openings with true weight six (6) mil polyethylene.

C. For the entire project the air will be monitored both personally for workers and environmentally to ensure that the Contractor meets EPA Clean Air Standards. The air monitoring will be conducted by CONSULTANT. During the time the air is being monitored, the Contractor must ensure that all workers directly involved with the ACBM removal procedures wear full-bodied protective clothing and at a minimum half face dual cartridge air purifying respirators with High Efficiency Particulate Air (HEPA) filters (P100 or equivalent).

D. ACBM removal shall be consistent with the OSHA Asbestos Standard (29 CFR 1926.1101), August 1994, as corrected June 29, 1995, Section (g) Method of Compliance, Paragraph 8(ii), as outlined below:

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1. For removing material which contains ACBM, the employer shall ensure that the following work practices are followed:
   a. material shall be removed in an intact state to the extent feasible.
   b. Wet methods shall be used to remove materials that are not intact, or that will be rendered not intact during removal, unless such wet methods are not feasible or will create safety hazards.
   c. The wetted ACBM shall be double bagged in approved true weight six (6) mil polyethylene labeled bags. At the end of each removal operation, the bags shall be placed in an enclosed dumpster/trailer, contained and pad locked. All asbestos contaminated articles such as suits, gloves, filters, etc. shall also be disposed of in double six (6) mil labeled polyethylene bags. Bags shall not be damaged in any way. To ensure that the bags do not become damaged, the Contractor may elect to place the bags in sealed and labeled fiber drums. CONSULTANT will determine the integrity of the sealed asbestos labeled bags and instruct the Contractor accordingly. All polyethylene bags utilized for the ACBM must be pre-labeled from the factory with the appropriate asbestos label. In addition, the Contractor must label the top bag of each double bagged ACBM with the appropriate generator information.
   d. The asbestos materials shall be transported from the work areas to the enclosed container in a method that protects the integrity of the bags or drums from asbestos fiber release and/or spreading of asbestos debris. Through discussion with the Contractor, CONSULTANT will determine the safest method to accomplish this procedure:

1. Refer to OSHA Asbestos Standard (29 CFR 1926.1101), August 1994 as corrected June 29, 1995, listed below:

a. Asbestos containing material that has been removed *shall not be dropped or thrown to the ground*. Unless the material is carried or passed to the ground by hand, it shall be lowered to the ground via covered, dust tight chute, crane, or hoist:

1.) Any ACBM that is not intact shall be lowered to the ground as soon as it is practicable, but in any event no later than the end of the work shifts. While the material remains on the roof it shall either be kept wet, placed in an impermeable waste bag, or wrapped in plastic sheeting.

2.) Intact ACBM shall be lowered to the ground as soon as is practicable, but in any event no later than the end of the work shift.

b. Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner so as to preclude the dispersion of dust.

c. Roof level heating and ventilation air intake sources shall be isolated, or the ventilation system shall be shut down.

E. Transporting of the ACBM to an EPA approved landfill must be accomplished by an approved and Texas Department of Health licensed asbestos transporting company. The asbestos shall be properly labeled. It is the Contractor's responsibility to ensure that the ACBM reaches the approved landfill in an acceptable condition. Final disposal of asbestos-containing waste material shall be within 30 days of the project completion or when receiving container is full, whichever is sooner.

F. No later than thirty (30) days after completion of the ACBM removal, the Contractor shall furnish CONSULTANT three (3) copies of project documentation which shall include at a minimum, waste shipment records (manifest), employee physicals, employee respirator clearances, employee certificates of understanding regarding the handling of asbestos, typed daily project details, notifications, insurance certificates, SDS sheets, and all other relevant documents as determined by CONSULTANT.

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TECHNICAL SPECIFICATION USE AND RELIANCE

The technical specifications presented herein are an instrument of professional service developed by Champion Environmental Consulting, Inc. (CEC) in contemplation of a wide array of project-specific variables, including how the documents will be used, by whom and under what project management scheme. Because CEC may be liable for the adequacy of these technical specifications and any unauthorized reuse could result in misuse of CEC's findings, recommendations or other service elements for which CEC cannot anticipate risk and liability, use of these technical specifications (including reliance, duplication, copying, quoting or excerpting) is limited to CEC, as project manager of the above-referenced project for the client named herein. Any other party, including contractors or consultants, wishing to use, rely upon, excerpt, copy, duplicate or otherwise reproduce these specifications must apply to CEC for written authorization to do so with such approval in the sole discretion of CEC.

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APPENDIX A
LICENSES



Texas Department of State Health Services

CHAMPION ENVIRONMENTAL CONSULTING INC

is certified to perform as an

Asbestos Consultant Agency

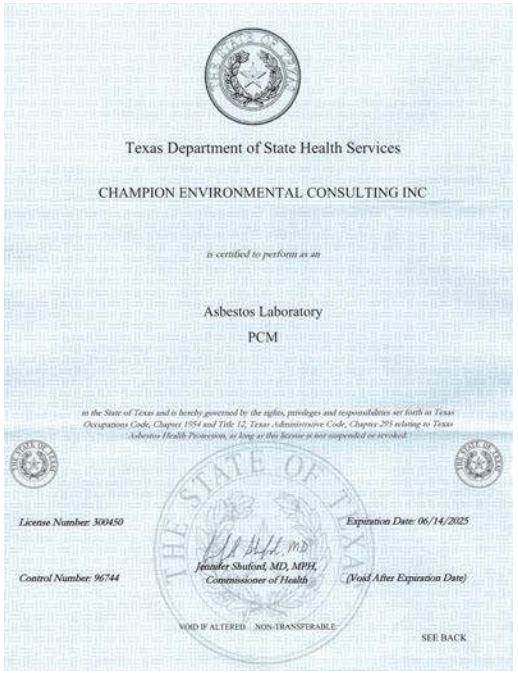
in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 12, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 100522 — Expiration Date: 04/01/2025

Control Number: 97564 — Jennifer Shuford, MD, MPH, Commissioner of Health — (Void After Expiration Date)

VOID IF ALTERED - NON-TRANSFERABLE

SEE BACK



Texas Department of State Health Services

CHAMPION ENVIRONMENTAL CONSULTING INC

is certified to perform as an

Asbestos Laboratory

PCM

in the State of Texas and is hereby governed by the rights, privileges and responsibilities set forth in Texas Occupations Code, Chapter 1954 and Title 12, Texas Administrative Code, Chapter 295 relating to Texas Asbestos Health Protection, as long as this license is not suspended or revoked.

License Number: 300450 — Expiration Date: 06/14/2025

Control Number: 96744 — Jennifer Shuford, MD, MPH, Commissioner of Health — (Void After Expiration Date)

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Texas Department of State Health Services

Asbestos Individual Consultant

WADE E CHAMPION

License No. 105410

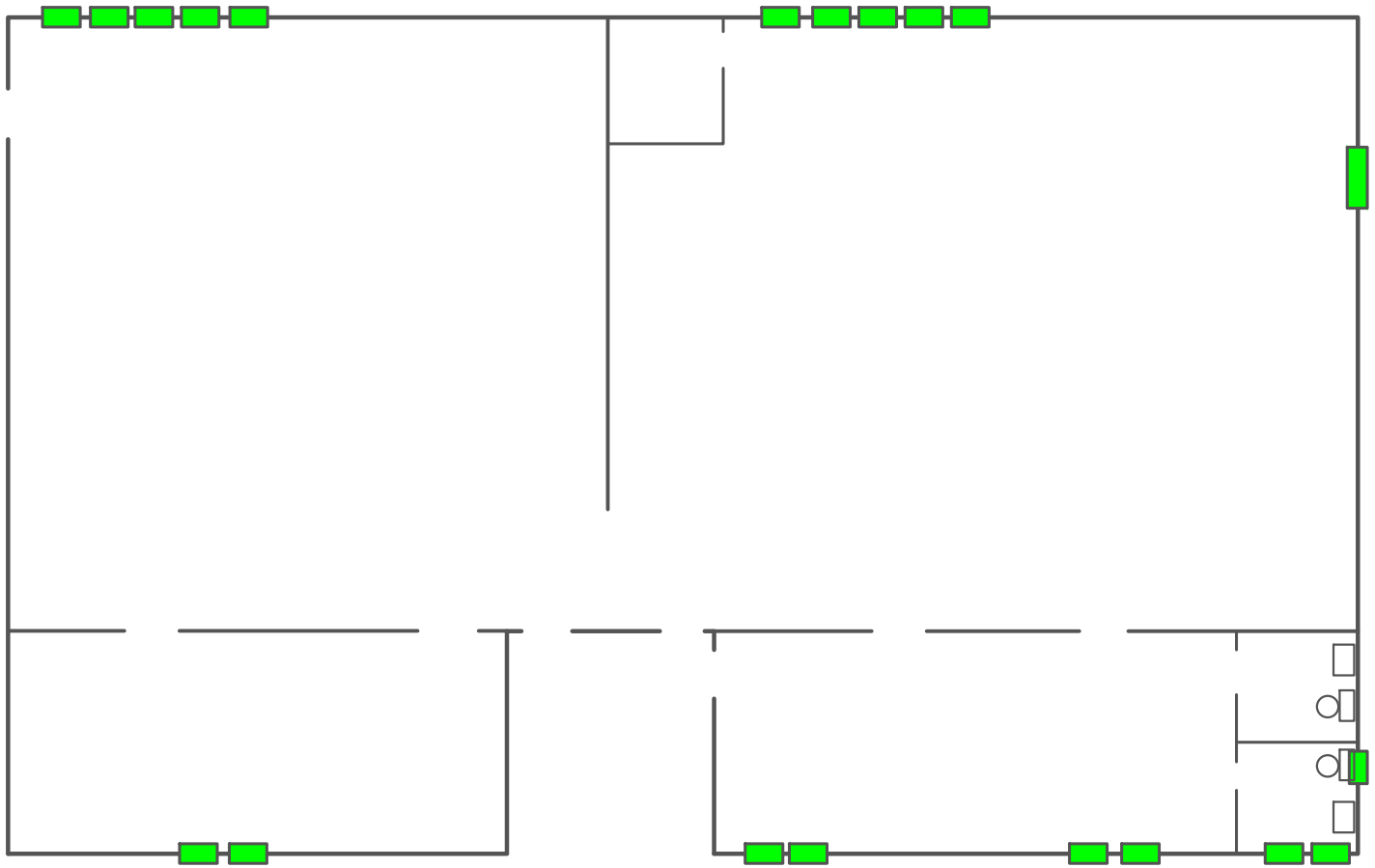
Control No. 98246

Expiration Date: 25-Aug-2025

APPENDIX B
NOTIFICATION(S)

(As Submitted By Licensed Abatement Contractor)

APPENDIX C
REFERENCE DRAWING(S)



Exterior Window Glazing (~29 Windows)
Remove and dispose of sashes only
Frames to remain in place for LBP removal

Wade Champion
Asbestos Individual Consultant
TDSHS License No. 10-5410
Expiration Date 8/25/2025

CHAMPION environmental consultants
109 West 7th Street
Suite 210
Georgetown, Texas 78626

CLIENT:
CITY OF DRIPPING SPRINGS

511 Mercer Street
Cripping Springs, Texas 78620

SITE: STEPHENSON BUILDING
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

C-ECI Project No. 23-1730
By: N Hackney
Approved By: W Champion
Submitted: 4/4/2024
Not To Scale

Asbestos Abatement Plan

LEAD PAINT REMOVAL WORKPLAN

Stephenson Building
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

October 18, 2024

Project No. 23-1730

Prepared for:
City of Dripping Springs
511 Mercer Street
Dripping Springs, Texas 78620

And

Architexas
1023 Springdale Rd., Bldg. 11, Suite E
Austin, Texas 78721

Prepared by:



Wade Champion
Project Manager
TDLR Lead Inspector/Risk Assessor 2070357

LEAD BASED PAINT WORKPLAN

DIVISION 1 – GENERAL REQUIREMENTS

01014 Summary of the Work

DIVISION 2 – SITE WORK

Section 02064 - Removal of Lead-Based Paint Substrates

Section 02065 - Removal of Loose and Flaking Lead-Based Paint

Section 02066 - Chemical Stripping of Lead-Based Paint

Section 02067 - Disposal of Lead-Based Paint Waste Material

SECTION 01014 - SUMMARY OF THE WORK

PART 1 - GENERAL

The project name is "**Stephenson Building** Renovation Areas Lead Based Paint Workplan" as shown on the Contract Documents prepared by Owner. The workplan is dated **October 18, 2024**

All phases of the Work shall be executed by skilled craftsmen experienced in their respective trades. This section includes a general scope of work, while Division 2 includes a description of procedures for work procedures in each work area.

1.1 RELATED DOCUMENTS

General provisions of the Contract, including the General and Supplementary Conditions and other Division 1 General Requirements, apply to work of this section. Additional sections include:

Division 2 - Site Work

Section 02064 - Removal of Lead-Based Paint Substrates
Section 02065 - Removal of Loose and Flaking Lead-Based Paint
Section 02066 - Chemical Stripping of Lead-Based Paint
Section 02067 - Disposal of Lead-Based Paint Waste Material

1.2 SUMMARY OF WORK

The Work includes the removal or partial removal of lead-based paint or lead-based paint substrates identified in the designated areas of the Project which include.

Refer to the guidance herein: Work consists of stripping LBP from painted substrates.

Room/ Location	Substrate	Location	Approx. Quantity
Exterior	Shiplap Ceiling White Wood	East Side Main Entrance	120 SF
Exterior	Door Frames Brown Wood	East Side Main Entrance	3 Door Frames
Interior	Window Frames Multi Colors Wood	Room A, B, D, East Side Restroom and Room C West Wall	29 Windows
Interior	Front of Stage Green Wood	Room C	70 SF

The Work at the project shall commence on the date established by the Notice to Proceed and shall be completed within the time specified on the proposal form. The Work shall be performed in accordance with the requirements of all applicable sections of these Workplans. Contractor shall perform the Work in a manner that minimizes disruption to construction operations.

The Work includes the removal and disposal of lead-based paint, lead-based paint contaminated building materials according to the requirements of the following workplan sections in the sequence indicated:

Work:

Contractor will comply with applicable Codes, Regulations, and Standards. governmental agencies before start of work.

Contractor will provide Air Monitoring - Test Laboratory Services to demonstrate to the Owner so that the building areas beyond the work areas will remain uncontaminated. Air monitoring to determine required respiratory protection is the responsibility of Contractor.

Contractor will provide Worker Protection. Contractor will provide the equipment and procedures for protecting workers against lead contamination and other workplace hazards.

Work Procedures:

Section 02064 - Removal of Lead-Based Paint Substrates
Section 02065 - Removal of Loose and Flaking Lead-Based Paint
Section 02066 - Chemical Stripping of Lead-Based Paint
Section 02067 - Disposal of Lead-Based Paint Waste Material

1.3 WORK PLAN

Submit detailed plans of the procedures proposed for use in complying with the requirements of these Workplans. Include in the plans the locations and layouts of decontamination areas; the sequencing of lead work; the interface of trades involved in the performance of work; methods to be used to assure the safety of building occupants and visitors to the site; the disposal plan, including location of approved disposal site; and a detailed description of the methods to be employed to control pollution. Expand upon the use of the portable high-efficiency particulate air (HEPA) ventilation system, closing out of the building's heating, ventilation, and air conditioning (HVAC) system, method of removal to prevent visible emissions in work areas, and bagging of removed lead debris. The plan must be approved by the Consultant prior to commencement of work.

1.4 INSPECTION

Prior to commencement of work, inspect areas in which work will be performed. List damage to structure, surfaces, equipment, or surrounding properties noted during the inspection that could be misconstrued as damage resulting from the Work. Submit to Consultant prior to starting work.

1.5 POTENTIAL LEAD HAZARD

The disturbance or dislocation of lead-based painted materials may cause lead dust to be released into the building's atmosphere, thereby creating a potential health hazard to workers and building occupants. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the hazard and of proper work procedures, which must be followed.

Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified lead-based paint, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to lead dust. Such measures shall

include the procedures and methods described herein, and compliance with regulations and guidelines of applicable federal, state, and local agencies.

1.6 STOP WORK

If Owner or Consultant presents a written Stop Work Order, immediately and automatically stop all work. Do not re-commence work until authorized by Consultant.

1.7 CONTRACTOR USE OF PREMISES

Limit use of the premises to the Work indicated, so as to allow for Owner occupancy and use by other trades required in the buildings. Confine operations at the site to the areas permitted under the Contract.

Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the Work while engaged in project construction.

Keep existing driveways and entrances serving the premises clear and available to Owner and his employees at all times. Do not use these areas for parking or storage of materials.

Do not encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas designated by Owner. If additional storage is necessary, obtain and pay for such storage off-site.

Lock automotive-type vehicles, such as passenger cars and trucks, and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place or accessible to unauthorized persons.

Maintain existing buildings in a safe and weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the buildings and their occupants during the construction period.

Keep public areas such as hallways, stairs, elevator lobbies, and toilet rooms free from accumulation of waste, rubbish, or construction debris.

Smoking or open fires will not be permitted within any of the buildings on the premises.

Except for toilet rooms designated by Owner for use by Contractor's personnel, use of existing toilets within the buildings, by Contractor and his personnel, will not be permitted.

1.8 LOADS AND STRESSES

Contractor shall have full responsibility for preventing overstresses of any structure or any part or member of the structure during the Work. Contractor shall fully check the effect of the operation in this regard and shall provide all support necessary.

1.9 VERIFICATION OF QUANTITIES

It is the responsibility of Contractor to verify all LBP locations and quantities of LBP in each work area. Contractor shall fully inform himself of the conditions relating to construction of the Work and employment of labor thereon. Failure to do so will not relieve a successful Offeror of his

obligation to furnish all material, equipment, and labor necessary to carry out the provisions of the Contract.

1.10 OWNER OCCUPANCY

Separate Contract: Owner has been awarded a separate contract for performance of certain construction operations at the site. Those operations will be conducted simultaneously with work under this Contract and Contractor shall work in cooperation with the other trades performing said operations.

Owner reserves the right to place and install equipment as necessary in areas of the building in which all lead removal and project decontamination procedures have been completed and to occupy such completed areas prior to substantial completion, provided that such occupancy does not substantially interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the Work or any part of the Work.

1.11 SUBMITTALS

Submit all required documents, identified in Section 01301 - Submittals, to Consultant for review prior to the start of work in any given work area. Do not begin work until these submittals are returned, approved by Owner and Consultant.

1.12 PROJECT SCHEDULE

The project is scheduled to begin on the date established in the Notice to Proceed and shall be completed as specified on the Proposal Form and in these Contract Documents. Contractor shall submit his work schedule to the Owner for approval. Work schedule shall be coordinated based on the availability of the work area and whether or not the building is occupied. Work hours will initially be scheduled as outlined in paragraph 1.2 of this Section.

Removal of lead-containing waste material from temporary storage inside containment to waste dumpsters shall be approved by the Owner or shall be conducted as otherwise specifically approved in writing. During transportation of all waste materials, the lead bags, dumpsters, and warning labels will be visually obscured from public view.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01014

SECTION 02064 - REMOVAL OF LEAD-BASED PAINTED SUBSTRATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Workplan sections, apply to work of this section.

1.2 SUMMARY OF WORK

Work of this section includes the removal and off-site disposal of the following lead-based painted substrates

Not Applicable: components coated with LBP will be chemically stripped and prepared for repainting per section 02066

1.3. EXISTING CONDITIONS

Existing conditions are reflected accurately to the best of Owner's knowledge. Should minor conditions be encountered that are not exactly as indicated, modification to the Work shall be made as required at no additional expense to Owner. Contractor is responsible for thoroughly familiarizing himself with all conditions and requirements of the Work, including Lead-Based Paint (LBP) locations and quantities, prior to submittal of a Proposal. Contractor shall refer to the attached tables, hereby listed in Appendix B of the Contract Documents for assistance in identifying LBP locations.

PART 2 - PRODUCTS

2.1 DISPOSAL BAGS/PLASTIC SHEETING

Provide 6 mil polyethylene disposal bags or wrap substrates to be disposed of in 6-mil polyethylene, sealed with duct tape.

2.2 WET DETERGENT WASH

Provide detergent with a high phosphate content (at least 5%) trisodium phosphate (TSP). Follow dilution ratio recommended by the manufacturer's instructions.

Wet Detergent Wash: Provide detergent or cleaning agent formulated to be effective in removing lead dust. Follow dilution ratio recommended by the manufacturer's instructions.

PART 3 - EXECUTION

Prior to initiating Work, Contractor shall ensure compliance with Section 01555 - Worker Protection - Lead Based Paint

3.1 SECURING WORK AREA:

Secure work area from access by occupants, staff or users of the building. Accomplish this where possible, by locking doors, windows, or other means of access to the area.

3.2 DEMARCATION OF REGULATED AREA:

Demarcate each exterior regulated area with a sheet plastic drop sheet and barricade fence. Provide barricade fence with support posts four feet (4') on center. Provide barrier-warning tape at perimeter with the following legend "Caution Lead Hazard - Do Not Enter Work Area Unless Authorized." Barricade fence shall be securely fastened and no closer than twelve feet (12') radius from the work.

3.3 EXTERIOR RENOVATION GENERAL PROCEDURES

The following precautions and procedures have application to the work of this section. Workers must exercise caution to avoid the release of lead dust into the air and to contain lead dust and debris on drop sheet.

Before start of work comply with requirement for worker protection and respiratory requirements as specified in the Contract Documents.

Do not allow eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics in the regulated area.

Provide one layer of 6-mil polyethylene sheeting as close to foundation as possible. Extend the sheeting out from the foundation a distance of 3 feet per story being abated or a minimum of 6 feet and a maximum of 15 feet. Weight the sheeting at the foundation and along edges and seams. Erect vertical shrouds or suspend work if constant wind speed exceeds 20 mph or there is visible movement of debris beyond ground sheeting.

On a daily basis, collect dust and debris by HEPA vacuuming the surface and by wet sweeping. At the end of each workday, remove polyethylene sheeting and place in 6 mil disposal bags. Visually examine the immediate area to ensure that no lead debris has escaped containment. Wet sweep or rake up any debris found and place in 6 mil disposal bags. Securely store with other waste.

Suspend work activities during inclement weather; including but not limited to rain, snow, ice, and hail.

3.4 GENERAL

Score paint at edges, corners etc. to reduce chipping of paint. Carefully remove by wet scraping loose and flaking paint prior to removal of substrate in accordance with the following procedure:

- Fine mist the painted surface with wet wash detergent or water using plant mister or garden sprayer and carefully scrape loose and flaking material.
- Clean up paint chips and flakes by HEPA vacuuming or wet wiping with wet towels. Care shall be taken to avoid damage to adjacent areas during the removal of substrates.
- Using wet-demolition techniques, remove substrate from building framing or structural members by tooling the substrate from the structural members. Substrates coated with LBP

shall be kept wet at all times during the removal, cleanup, and containerizing of the substrates. Under no circumstances shall the contractor let the removed substrate drop more than six feet from its location to the floor or ground.

- Carefully remove the lead based painted substrates to minimize the disturbance of lead-based paint and the generation of lead dust.
- HEPA vacuum and/or wet wipe to remove all paint chips, debris and dust generated during the work. Do not allow dust or debris to accumulate.
- Substrates that are removed shall be wrapped, labeled and disposed of or disposed of in accordance with section 02067 - Disposal of Waste Materials - Lead-Based-Paint.

END OF SECTION 02064

SECTION 02065 - REMOVAL OF LOOSE AND FLAKING LEAD-BASED PAINT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

General provisions of the Contract, including General and Supplementary Conditions and other Division-1 Workplan sections, apply to work of this section.

1.2 SUMMARY OF WORK

Work of this section includes the removal and off-site disposal of lead-based paint from the following substrates.

Not Applicable: components coated with LBP will be chemically stripped and prepared for repainting per section 02066

The Architect/ Engineer or their designated representative, will be responsible for final inspection on completeness of preparation of the work surface

PART 2 - PRODUCTS

2.1 DISPOSAL BAGS/PLASTIC SHEETING: Provide 6 mil polyethylene disposal bags or wrap substrates to be disposed of in 6-mil polyethylene, sealed with duct tape.

2.2 Wet Detergent Wash: Provide detergent with a high phosphate content (at least 5%) trisodium phosphate (TSP). Follow dilution ratio recommended by the manufacturer's instructions.

PART 3 - EXECUTION

3.1 GENERAL

Carefully remove by wet scraping and/or sanding all loose and flaking paint in accordance with the procedures set forth in this section.

3.2 CRITICAL BARRIERS

Remove all removable furniture that has been designated uncontaminated by the Work Procedures or Consultant's Project Manager. Also remove uncontaminated equipment and/or supplies from the work area before commencing work, or completely cover with two (2) layers of polyethylene sheet at least 6 mil in thickness, securely taped in place with duct tape. Such furniture and equipment shall be considered outside the work area unless covering plastic or seal is breached.

Completely separate the work area from other portions of the building and the outside environment by closing all openings with sheet plastic barriers at least 6 mil in thickness or by sealing cracks with spray-foam, poly sheeting, and/or duct tape.

Individually seal all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, convector casings, spandrel panels, and speakers, and other openings into the work area polyethylene sheeting at least 6 mil in thickness, taped securely in place with duct tape. Maintain seal until all work, including project decontamination, is completed. Take care in sealing off lighting fixtures to avoid melting or burning the sheeting.

Clean all contaminated furniture, equipment, and/or supplies, prior to moving or covering, with a HEPA-filtered vacuum cleaner or by wet cleaning. All equipment or furniture is to be deemed contaminated unless specifically declared uncontaminated in writing by Consultant's Project Manager. Clean all surfaces in the work area with a HEPA-filtered vacuum or by wet wiping prior to installing the primary barrier.

Provide sheet plastic barriers at least 6 mil in thickness as required to completely seal openings from the work area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape or spray cement. Erect the entire assembly so that it hangs vertically without a "shelf" upon which debris could collect.

Provide a pressure differential system per Title 0900, Section 01513 - Temporary Pressure Differential and Air Circulation System.

3.3 PRIMARY BARRIER

Cover floors and other building surfaces not scheduled for removal with a primary barrier, as described below to protect these surfaces from water damage and high humidity and from contamination by lead dust.

Cover the floor of the work area with two individual layers of clear polyethylene sheeting, each at least 6 mil in thickness, lapped up on the walls at least 12 inches. Plastic shall be sized to minimize seams.

Form a sharp right-angle bend at the juncture of floor and wall so that there is no area of the sheeting that, if stepped on, would cause the wall attachment to be pulled loose.

3.4 SECONDARY BARRIER

Install as a drop cloth, a clear 6-mil sheet plastic in all areas where LBP removal work is to be carried out. Completely cover the floor with sheet plastic. Secure the sheet plastic in place with duct tape so that debris cannot filter behind it. Provide cross-strips of duct tape at the floor supports as necessary to support the sheet plastic and prevent its displacement during removal operations.

Install the secondary barrier at the beginning of each work shift. Install only sufficient plastic for work of that shift. Remove the secondary barrier at the end of each work shift or as work in an area is completed. Fold the plastic toward the center of the sheet and pack into disposal bags. Keep the material on the sheet continually wet until bagged.

3.5 REMOVAL OF LOOSE AND FLAKING PAINT

Apply a fine mist surface with wet wash detergent using plant mister or garden sprayer. Score the damaged paint at edges and corners to reduce chipping of paint. Carefully scrape loose and flaking material.

Where identified in the Reference Drawings, wet sanding will be required to prepare the substrate for repainting. Lightly sand with a moist sanding sponge or wet sandpaper to obtain a smooth transition edge between the remaining paint and the substrate.

HEPA vacuum and/or wet wipe to remove all paint chips, debris and dust generated during the work. Do not allow dust or debris to accumulate. Clean up paint chips and flakes by wet sweeping, HEPA vacuuming, or collecting in wet towels. Care shall be taken to avoid damage to adjacent areas during the removal of the loose and flaking paints.

At the end of each work shift, remove any paint chips, dust, and debris that collects on the sheeting and other surfaces by using a HEPA vacuum and by spraying with wet wash solution, collect debris with wet paper towels, place in disposal bags while still wet, and clean surface of sheeting and surfaces with wet cloths.

Empty HEPA vacuum and place contents into disposal bags. Place all rags, wet towels, and other disposable items used during the project into disposal bags. Tape the disposal bags shut with duct tape and wet wipe the exterior surfaces of all disposal bags and place in 55-gallon drums prior to exiting the work areas.

At the completion of work activities in each work area, wet wipe all surfaces, including floor sheeting with a wet detergent wash. Provide detergent with a high phosphate content (at least 5%) trisodium phosphate (TSP). Follow dilution ratio recommended by the manufacturer's instructions.

3.6 PRIMING AND SEALING

After complete drying, prepare the substrate and seal all surfaces where the loose and flaking lead-based paint was removed with a primer or encapsulant that is compatible with the substrate.

3.7 DAMAGES

Protect areas adjacent to substrates that are removed for replacement from damage caused by this work. Damages to non-protected areas or from lack of care shall be repaired or replaced at the Contractor's expense.

END OF SECTION 02065

SECTION 02066 - CHEMICAL STRIPPING OF LEAD-BASED PAINT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Workplan sections, apply to work of this section.

1.2 GENERAL

The following is a list of prohibited lead hazard removal methods:

- Open flame burning;
- Chemical stripping with methylene chloride-based paint strippers;
- Uncontained abrasive blasting;
- Uncontained power washing;
- Dry sanding or scraping;
- Power sanding;
- Sanding of wood after chemical stripping.

1.3 SUMMARY OF WORK

Work of this section includes the removal and off-site disposal of lead-based paint from the following substrates.

Room/ Location	Substrate	Location	Approx. Quantity
Exterior	Shiplap Ceiling White Wood	East Side Main Entrance	120 SF
Exterior	Door Frames Brown Wood	East Side Main Entrance	3 Door Frames
Interior	Window Frames Multi Colors Wood	Room A, B, D, East Side Restroom and Room C West Wall	29 Windows
Interior	Front of Stage Green Wood	Room C	70 SF

NOTE: LBP Remediation will be conducted in conjunction with asbestos abatement activities. If a conflict between the asbestos and LBP guidance occurs, the more stringent will be followed.

1.4 SUBMITTALS

Before start of work: Submit the following to the Consultant for review. Do not start work until these submittals are returned with Consultant approval indicating that the submittal is returned for unrestricted use.

1.4.1 Chemical Stripping Removers and Neutralizers

Submit product data, use instructions and recommendations from manufacturer for use intended. Include data substantiating that material complies with requirements.

1.4.2 Material Safety Data Sheet

Submit material safety data sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for each chemical stripper and neutralizer, include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

PART 2 - PRODUCTS

2.1 Chemical Stripping Removers

Shall contain no methylene chloride products. Chemical removers shall be compatible with, and not harmful to, the substrate to which they are applied. The contractor shall comply with the manufacturer's recommendations for use of the product supplied.

2.2 Chemical Stripping Agent Neutralizer

Provide chemical agent neutralizer in accordance with manufacturer's recommendations. Neutralizers shall be compatible with and not harmful to the substrate. Neutralizers shall also be compatible with the stripping agent used.

2.3 Wet Detergent Wash

Provide detergent with a high phosphate content (at least 5%) trisodium phosphate (TSP). Follow dilution ratio recommended by the manufacturer's instructions.

PART 3 - EXECUTION

3.1 CHEMICAL LEAD-BASED PAINT REMOVAL ON-SITE

Chemical Stripping Agents and neutralizers shall be applied in accordance with the recommendations of the manufacturer.

3.2 Caustic Stripper Neutralization

Caustic strippers shall be neutralized in accordance with manufacturer's recommendations. Provide workers with proper protective equipment, including but not limited to; protective clothing (non-paper), chemically resistant gloves, eye protection and respiratory protection with filters selected for the hazards to be encountered.

3.3 Remove Stripper Sludge

Place lead containing stripper sludge in corrosion-proof containers and place in a secure waste storage area. The surface from which lead-based paint has been removed shall be thoroughly scrubbed, while still damp from the stripper, in accordance with the manufacturer's recommendation. Monitor pH of the neutralizing solution to ensure it has not become neutralized in the process. If the pH exceeds 6.5, or the solution becomes overly soiled, change solution. Solution may be classified as hazardous waste. Place in 55-gallon drums and test in accordance with Section 02067- Disposal of Waste Materials - Lead-Based Paint. The surface shall be tested with litmus paper following this process. If the litmus paper turns pink, the acid has effectively neutralized the alkali. If litmus turns blue continue scrubbing until satisfactory results are achieved.

3.4 Final Cleaning Of Surfaces

Prepare wet detergent wash. Workers must wear eye shields and chemically resistant gloves when working with this solution. Thoroughly scrub stripped surface to remove as much remaining lead residue as possible. The wash solution may also be hazardous waste, treat in accordance with Section 02067- Disposal of Waste Materials - Lead-Based Paint. Following wet detergent wash, perform a final wash with clear water to remove any traces of detergent. Sponges used in the clean-up process may not be reused and must be placed in double 4 mil or single 6 mil plastic bags, which will be sealed, labeled, and placed in the secure waste storage area. Surfaces must be allowed to dry thoroughly before repainting. A grayish film indicates that significant lead residues remain, and the cleaning process must be repeated. If a white powder appears, the surface is Alkaline and requires further neutralization.

3.4 Painting and Sealing

After complete drying, prepare the substrate and seal all surfaces where lead-based paint was removed with a primer or encapsulant that is compatible with the substrate.

END OF SECTION 02066

SECTION 02067 - DISPOSAL OF WASTE MATERIALS - LEAD-BASED PAINT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Workplan Sections, apply to work of this section.

1.2 DESCRIPTION OF THE WORK

This section describes the disposal of lead-containing or lead contaminated waste materials. Disposal includes packaging of waste materials.

1.3 SUBMITTALS:

Before the start of work, Contractor shall submit the following to the Owner's Consultant for review. Do not start work until these submittals are returned with Owner's Consultant action stamp indicating that the submittal is returned for unrestricted use.

- Contractor must ascertain that the facility owner is registered with the U.S. EPA as a generator of hazardous waste. If there is no generator status established, the contractor shall assist the owner in obtaining generator identification numbers.
- Copy of state or local license for waste hauler.
- U.S. EPA identification number of waste hauler.
- Name and address of waste disposal facility where hazardous waste materials are to be disposed. Include contact person and telephone number. Copy of state license and permit. Provide disposal facility permits.
- Copy of EPA "uniform hazardous waste manifest" form.
- Copy of EPA "notification of hazardous waste activity" form.
- Copy of forms required by state or local agencies.
- Sample disposal bag and labels to be used.

Submit copies of all manifests and disposal site receipts to Owner's Consultant

PART 2 - PRODUCTS

Disposal Bags: Provide 6 mil thick leak tight polyethylene bags or wrap components in 6 mil polyethylene sheeting and seal with duct tape. "Label with specific Hazardous Waste Label:"

For wrapped materials provide stick-on labels.

PART 3 - EXECUTION

3.1 GENERAL

All lead-based paint and lead-contaminated paint shall be treated as hazardous waste unless testing identifies the waste stream otherwise:

It shall be the responsibility of the Contractor to have each waste stream evaluated for determination of hazardous waste. Testing of waste shall be performed by a laboratory accredited by either the American Industrial Hygiene Association (AIHA) or the American Association of Laboratory Accreditation (AALA) retained by the contractor. Contractor shall include the cost of testing in the contract sum and supply all test results to the owner.

Sample analysis of each waste stream generated at the Site be performed by a qualified laboratory for Toxicity Characteristic Leaching Procedure (TCLP). The contractor shall pay for all samples obtained at the site for his use.

Waste steams tested that results in a lead content in the TCLP of greater than or equal to five parts per million (5ppm) is to be considered hazardous and shall be handled and disposed according to local, city, state, and federal regulations.

Place all waste generated during the project in a minimum of a single 6-mil disposal bags (or wrap in 6-mil polyethylene sheeting), place bag in DOT Approved 55-gallon steel drum and store in the designated storage area or in an enclosed dumpster.

Properly store and secure waste at all times. Do not leave debris in uncovered or unlocked trucks or dumpsters. Do not incinerate debris or use an unauthorized dumpster. Do not introduce lead contaminated water into storm or sanitary sewers. Do not permit recycling of building components coated with Lead-Based Paint.

3.2 DISPOSAL OF HAZARDOUS LIQUID OR SOLID WASTES

Comply with RCRA, DOT, STATE, and local regulations. Comply with DOT and STATE regulations for containers. The most stringent regulation shall apply.

Apply for an EPA identification number from the appropriate regional office if more than 100 kg of hazardous waste is generated from the lead hazard reduction process during any calendar month.

All waste is to be hauled by a licensed waste hauler with all required licenses from all state and local authorities with jurisdiction. Load all waste material into properly labeled disposal bags, polyethylene sheeting and leak-tight drums. All materials are to be contained as follows:

- One 6 mil layer of sheet polyethylene (duct tape all seams) or One 6 mil disposal bag; and
- Sealed steel drum

Protect interior of truck or dumpster with two layers of 6 mil polyethylene sheeting with all seams sealed with duct tape.

Carefully load containerized waste in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to ensure that no unauthorized persons have access to the material.

Do not store containerized materials outside of the Work Area. Take containers from the Work Area directly to the designated storage area, sealed truck, or dumpster,

Retain all documents from the disposal or treatment facility. At completion of hauling and disposal of each load submit copy of Uniform Hazardous Waste Manifest, to Owner's Project Monitor.

3.5 BACKCHARGES

Where Contractor fails to fulfill packaging, handling, or disposal requirements as outlined herein, Owner will charge back to Contractor all costs associated with insuring that hazardous wastes are packaged and segregated in accordance with EPA and DOT regulations.

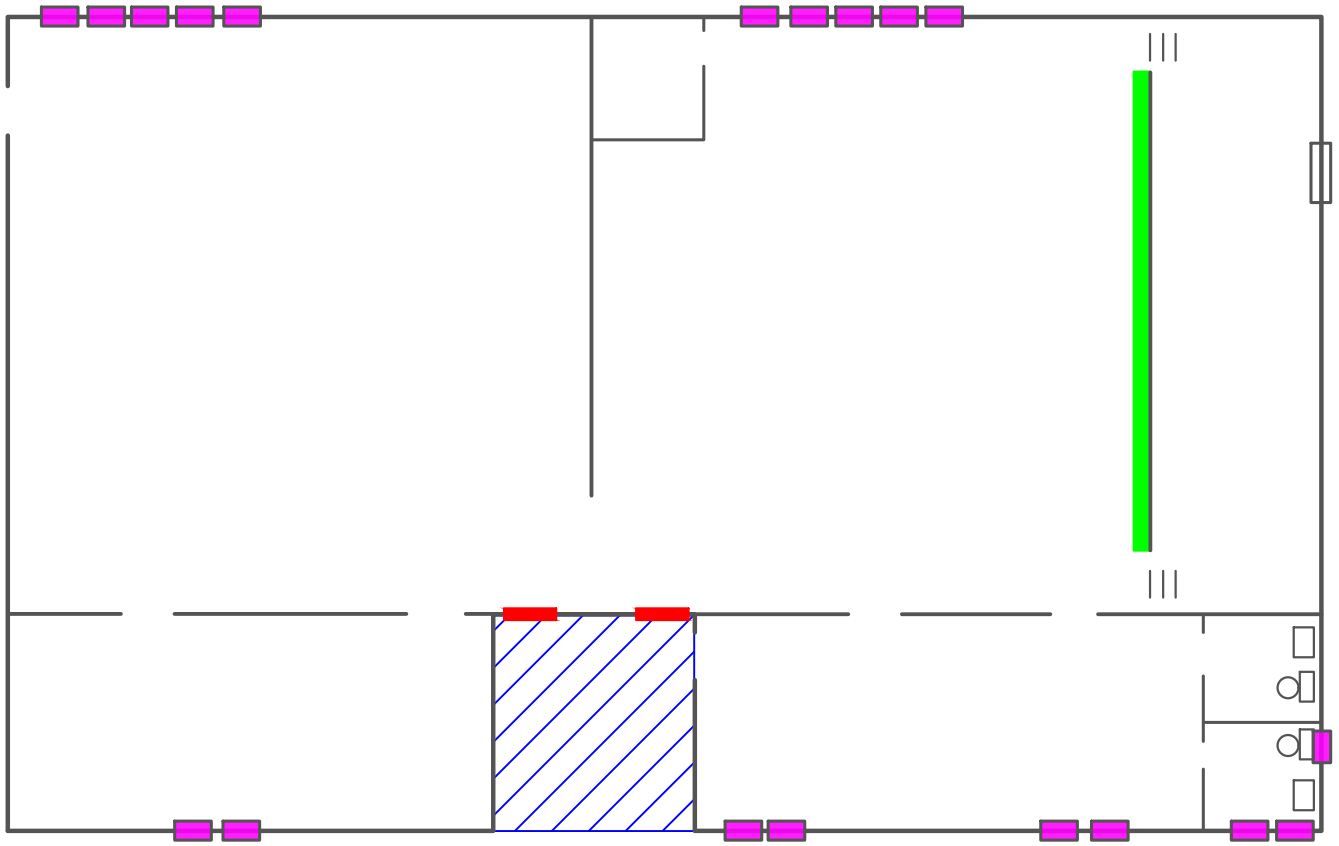
Environmental pollution of Owner's property resulting from Contractor's hazardous waste management activities shall be promptly remediated under Owner direction, to the Owner's sole satisfaction, and at the Contractor's sole expense.

Contractor agrees to either reimburse the Owner or reduce the Contract amount by change order to cover all costs associated with waste repackaging, waste re-segregation, or pollution remediation efforts.

END OF SECTION - 02067

APPENDIX A

REFERENCE DRAWING



Exterior Shiplap Ceiling Wood, White (~120 SQ FT)
Front of Stage Wood Paint, Green (~70 SQ FT)
Interior Wood Window Frames, Multi-colored (~29 Windows)
Exterior Wood Door Frames, Brown (~3 EA)

CHAMPION environmental consultants
109 West 7th Street
Suite 210
Georgetown, Texas 78626

CLIENT:
CITY OF DRIPPING SPRINGS
511 Mercer Street
Cripping Springs, Texas 78620

SITE: STEPHENSON BUILDING
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

C-ECI Project No. 23-1730
By: N Hackney
Approved By: W Champion
Submitted: 4/4/2024
Not To Scale

Lead-Based Paint Location Plan

LEAD PAINT REMOVAL WORKPLAN

Stephenson Building
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

October 18, 2024

Project No. 23-1730

Prepared for:
City of Dripping Springs
511 Mercer Street
Dripping Springs, Texas 78620

And

Architexas
1023 Springdale Rd., Bldg. 11, Suite E
Austin, Texas 78721

Prepared by:



Wade Champion
Project Manager
TDLR Lead Inspector/Risk Assessor 2070357

LEAD BASED PAINT WORKPLAN

DIVISION 1 – GENERAL REQUIREMENTS

01014 Summary of the Work

DIVISION 2 – SITE WORK

Section 02064 - Removal of Lead-Based Paint Substrates

Section 02065 - Removal of Loose and Flaking Lead-Based Paint

Section 02066 - Chemical Stripping of Lead-Based Paint

Section 02067 - Disposal of Lead-Based Paint Waste Material

SECTION 01014 - SUMMARY OF THE WORK

PART 1 - GENERAL

The project name is "**Stephenson Building** Renovation Areas Lead Based Paint Workplan" as shown on the Contract Documents prepared by Owner. The workplan is dated **October 18, 2024**

All phases of the Work shall be executed by skilled craftsmen experienced in their respective trades. This section includes a general scope of work, while Division 2 includes a description of procedures for work procedures in each work area.

1.1 RELATED DOCUMENTS

General provisions of the Contract, including the General and Supplementary Conditions and other Division 1 General Requirements, apply to work of this section. Additional sections include:

Division 2 - Site Work

Section 02064 - Removal of Lead-Based Paint Substrates
Section 02065 - Removal of Loose and Flaking Lead-Based Paint
Section 02066 - Chemical Stripping of Lead-Based Paint
Section 02067 - Disposal of Lead-Based Paint Waste Material

1.2 SUMMARY OF WORK

The Work includes the removal or partial removal of lead-based paint or lead-based paint substrates identified in the designated areas of the Project which include.

Refer to the guidance herein: Work consists of stripping LBP from painted substrates.

Room/ Location	Substrate	Location	Approx. Quantity
Exterior	Shiplap Ceiling White Wood	East Side Main Entrance	120 SF
Exterior	Door Frames Brown Wood	East Side Main Entrance	3 Door Frames
Interior	Window Frames Multi Colors Wood	Room A, B, D, East Side Restroom and Room C West Wall	29 Windows
Interior	Front of Stage Green Wood	Room C	70 SF

The Work at the project shall commence on the date established by the Notice to Proceed and shall be completed within the time specified on the proposal form. The Work shall be performed in accordance with the requirements of all applicable sections of these Workplans. Contractor shall perform the Work in a manner that minimizes disruption to construction operations.

The Work includes the removal and disposal of lead-based paint, lead-based paint contaminated building materials according to the requirements of the following workplan sections in the sequence indicated:

Work:

Contractor will comply with applicable Codes, Regulations, and Standards. governmental agencies before start of work.

Contractor will provide Air Monitoring - Test Laboratory Services to demonstrate to the Owner so that the building areas beyond the work areas will remain uncontaminated. Air monitoring to determine required respiratory protection is the responsibility of Contractor.

Contractor will provide Worker Protection. Contractor will provide the equipment and procedures for protecting workers against lead contamination and other workplace hazards.

Work Procedures:

Section 02064 - Removal of Lead-Based Paint Substrates
Section 02065 - Removal of Loose and Flaking Lead-Based Paint
Section 02066 - Chemical Stripping of Lead-Based Paint
Section 02067 - Disposal of Lead-Based Paint Waste Material

1.3 WORK PLAN

Submit detailed plans of the procedures proposed for use in complying with the requirements of these Workplans. Include in the plans the locations and layouts of decontamination areas; the sequencing of lead work; the interface of trades involved in the performance of work; methods to be used to assure the safety of building occupants and visitors to the site; the disposal plan, including location of approved disposal site; and a detailed description of the methods to be employed to control pollution. Expand upon the use of the portable high-efficiency particulate air (HEPA) ventilation system, closing out of the building's heating, ventilation, and air conditioning (HVAC) system, method of removal to prevent visible emissions in work areas, and bagging of removed lead debris. The plan must be approved by the Consultant prior to commencement of work.

1.4 INSPECTION

Prior to commencement of work, inspect areas in which work will be performed. List damage to structure, surfaces, equipment, or surrounding properties noted during the inspection that could be misconstrued as damage resulting from the Work. Submit to Consultant prior to starting work.

1.5 POTENTIAL LEAD HAZARD

The disturbance or dislocation of lead-based painted materials may cause lead dust to be released into the building's atmosphere, thereby creating a potential health hazard to workers and building occupants. Apprise all workers, supervisory personnel, subcontractors and consultants who will be at the job site of the seriousness of the hazard and of proper work procedures, which must be followed.

Where in the performance of the work, workers, supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of any identified lead-based paint, take appropriate continuous measures as necessary to protect all building occupants from the potential hazard of exposure to lead dust. Such measures shall

include the procedures and methods described herein, and compliance with regulations and guidelines of applicable federal, state, and local agencies.

1.6 STOP WORK

If Owner or Consultant presents a written Stop Work Order, immediately and automatically stop all work. Do not re-commence work until authorized by Consultant.

1.7 CONTRACTOR USE OF PREMISES

Limit use of the premises to the Work indicated, so as to allow for Owner occupancy and use by other trades required in the buildings. Confine operations at the site to the areas permitted under the Contract.

Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to site rules and regulations affecting the Work while engaged in project construction.

Keep existing driveways and entrances serving the premises clear and available to Owner and his employees at all times. Do not use these areas for parking or storage of materials.

Do not encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds to the areas designated by Owner. If additional storage is necessary, obtain and pay for such storage off-site.

Lock automotive-type vehicles, such as passenger cars and trucks, and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place or accessible to unauthorized persons.

Maintain existing buildings in a safe and weather tight condition throughout the construction period. Repair damage caused by construction operations. Take all precautions necessary to protect the buildings and their occupants during the construction period.

Keep public areas such as hallways, stairs, elevator lobbies, and toilet rooms free from accumulation of waste, rubbish, or construction debris.

Smoking or open fires will not be permitted within any of the buildings on the premises.

Except for toilet rooms designated by Owner for use by Contractor's personnel, use of existing toilets within the buildings, by Contractor and his personnel, will not be permitted.

1.8 LOADS AND STRESSES

Contractor shall have full responsibility for preventing overstresses of any structure or any part or member of the structure during the Work. Contractor shall fully check the effect of the operation in this regard and shall provide all support necessary.

1.9 VERIFICATION OF QUANTITIES

It is the responsibility of Contractor to verify all LBP locations and quantities of LBP in each work area. Contractor shall fully inform himself of the conditions relating to construction of the Work and employment of labor thereon. Failure to do so will not relieve a successful Offeror of his

obligation to furnish all material, equipment, and labor necessary to carry out the provisions of the Contract.

1.10 OWNER OCCUPANCY

Separate Contract: Owner has been awarded a separate contract for performance of certain construction operations at the site. Those operations will be conducted simultaneously with work under this Contract and Contractor shall work in cooperation with the other trades performing said operations.

Owner reserves the right to place and install equipment as necessary in areas of the building in which all lead removal and project decontamination procedures have been completed and to occupy such completed areas prior to substantial completion, provided that such occupancy does not substantially interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the Work or any part of the Work.

1.11 SUBMITTALS

Submit all required documents, identified in Section 01301 - Submittals, to Consultant for review prior to the start of work in any given work area. Do not begin work until these submittals are returned, approved by Owner and Consultant.

1.12 PROJECT SCHEDULE

The project is scheduled to begin on the date established in the Notice to Proceed and shall be completed as specified on the Proposal Form and in these Contract Documents. Contractor shall submit his work schedule to the Owner for approval. Work schedule shall be coordinated based on the availability of the work area and whether or not the building is occupied. Work hours will initially be scheduled as outlined in paragraph 1.2 of this Section.

Removal of lead-containing waste material from temporary storage inside containment to waste dumpsters shall be approved by the Owner or shall be conducted as otherwise specifically approved in writing. During transportation of all waste materials, the lead bags, dumpsters, and warning labels will be visually obscured from public view.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01014

SECTION 02064 - REMOVAL OF LEAD-BASED PAINTED SUBSTRATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Workplan sections, apply to work of this section.

1.2 SUMMARY OF WORK

Work of this section includes the removal and off-site disposal of the following lead-based painted substrates

Not Applicable: components coated with LBP will be chemically stripped and prepared for repainting per section 02066

1.3. EXISTING CONDITIONS

Existing conditions are reflected accurately to the best of Owner's knowledge. Should minor conditions be encountered that are not exactly as indicated, modification to the Work shall be made as required at no additional expense to Owner. Contractor is responsible for thoroughly familiarizing himself with all conditions and requirements of the Work, including Lead-Based Paint (LBP) locations and quantities, prior to submittal of a Proposal. Contractor shall refer to the attached tables, hereby listed in Appendix B of the Contract Documents for assistance in identifying LBP locations.

PART 2 - PRODUCTS

2.1 DISPOSAL BAGS/PLASTIC SHEETING

Provide 6 mil polyethylene disposal bags or wrap substrates to be disposed of in 6-mil polyethylene, sealed with duct tape.

2.2 WET DETERGENT WASH

Provide detergent with a high phosphate content (at least 5%) trisodium phosphate (TSP). Follow dilution ratio recommended by the manufacturer's instructions.

Wet Detergent Wash: Provide detergent or cleaning agent formulated to be effective in removing lead dust. Follow dilution ratio recommended by the manufacturer's instructions.

PART 3 - EXECUTION

Prior to initiating Work, Contractor shall ensure compliance with Section 01555 - Worker Protection - Lead Based Paint

3.1 SECURING WORK AREA:

Secure work area from access by occupants, staff or users of the building. Accomplish this where possible, by locking doors, windows, or other means of access to the area.

3.2 DEMARCATION OF REGULATED AREA:

Demarcate each exterior regulated area with a sheet plastic drop sheet and barricade fence. Provide barricade fence with support posts four feet (4') on center. Provide barrier-warning tape at perimeter with the following legend "Caution Lead Hazard - Do Not Enter Work Area Unless Authorized." Barricade fence shall be securely fastened and no closer than twelve feet (12') radius from the work.

3.3 EXTERIOR RENOVATION GENERAL PROCEDURES

The following precautions and procedures have application to the work of this section. Workers must exercise caution to avoid the release of lead dust into the air and to contain lead dust and debris on drop sheet.

Before start of work comply with requirement for worker protection and respiratory requirements as specified in the Contract Documents.

Do not allow eating, drinking, smoking, chewing tobacco or gum, or applying cosmetics in the regulated area.

Provide one layer of 6-mil polyethylene sheeting as close to foundation as possible. Extend the sheeting out from the foundation a distance of 3 feet per story being abated or a minimum of 6 feet and a maximum of 15 feet. Weight the sheeting at the foundation and along edges and seams. Erect vertical shrouds or suspend work if constant wind speed exceeds 20 mph or there is visible movement of debris beyond ground sheeting.

On a daily basis, collect dust and debris by HEPA vacuuming the surface and by wet sweeping. At the end of each workday, remove polyethylene sheeting and place in 6 mil disposal bags. Visually examine the immediate area to ensure that no lead debris has escaped containment. Wet sweep or rake up any debris found and place in 6 mil disposal bags. Securely store with other waste.

Suspend work activities during inclement weather; including but not limited to rain, snow, ice, and hail.

3.4 GENERAL

Score paint at edges, corners etc. to reduce chipping of paint. Carefully remove by wet scraping loose and flaking paint prior to removal of substrate in accordance with the following procedure:

- Fine mist the painted surface with wet wash detergent or water using plant mister or garden sprayer and carefully scrape loose and flaking material.
- Clean up paint chips and flakes by HEPA vacuuming or wet wiping with wet towels. Care shall be taken to avoid damage to adjacent areas during the removal of substrates.
- Using wet-demolition techniques, remove substrate from building framing or structural members by tooling the substrate from the structural members. Substrates coated with LBP

shall be kept wet at all times during the removal, cleanup, and containerizing of the substrates. Under no circumstances shall the contractor let the removed substrate drop more than six feet from its location to the floor or ground.

- Carefully remove the lead based painted substrates to minimize the disturbance of lead-based paint and the generation of lead dust.
- HEPA vacuum and/or wet wipe to remove all paint chips, debris and dust generated during the work. Do not allow dust or debris to accumulate.
- Substrates that are removed shall be wrapped, labeled and disposed of or disposed of in accordance with section 02067 - Disposal of Waste Materials - Lead-Based-Paint.

END OF SECTION 02064

SECTION 02065 - REMOVAL OF LOOSE AND FLAKING LEAD-BASED PAINT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

General provisions of the Contract, including General and Supplementary Conditions and other Division-1 Workplan sections, apply to work of this section.

1.2 SUMMARY OF WORK

Work of this section includes the removal and off-site disposal of lead-based paint from the following substrates.

Not Applicable: components coated with LBP will be chemically stripped and prepared for repainting per section 02066

The Architect/ Engineer or their designated representative, will be responsible for final inspection on completeness of preparation of the work surface

PART 2 - PRODUCTS

2.1 DISPOSAL BAGS/PLASTIC SHEETING: Provide 6 mil polyethylene disposal bags or wrap substrates to be disposed of in 6-mil polyethylene, sealed with duct tape.

2.2 Wet Detergent Wash: Provide detergent with a high phosphate content (at least 5%) trisodium phosphate (TSP). Follow dilution ratio recommended by the manufacturer's instructions.

PART 3 - EXECUTION

3.1 GENERAL

Carefully remove by wet scraping and/or sanding all loose and flaking paint in accordance with the procedures set forth in this section.

3.2 CRITICAL BARRIERS

Remove all removable furniture that has been designated uncontaminated by the Work Procedures or Consultant's Project Manager. Also remove uncontaminated equipment and/or supplies from the work area before commencing work, or completely cover with two (2) layers of polyethylene sheet at least 6 mil in thickness, securely taped in place with duct tape. Such furniture and equipment shall be considered outside the work area unless covering plastic or seal is breached.

Completely separate the work area from other portions of the building and the outside environment by closing all openings with sheet plastic barriers at least 6 mil in thickness or by sealing cracks with spray-foam, poly sheeting, and/or duct tape.

Individually seal all ventilation openings (supply and exhaust), lighting fixtures, clocks, doorways, windows, convector casings, spandrel panels, and speakers, and other openings into the work area polyethylene sheeting at least 6 mil in thickness, taped securely in place with duct tape. Maintain seal until all work, including project decontamination, is completed. Take care in sealing off lighting fixtures to avoid melting or burning the sheeting.

Clean all contaminated furniture, equipment, and/or supplies, prior to moving or covering, with a HEPA-filtered vacuum cleaner or by wet cleaning. All equipment or furniture is to be deemed contaminated unless specifically declared uncontaminated in writing by Consultant's Project Manager. Clean all surfaces in the work area with a HEPA-filtered vacuum or by wet wiping prior to installing the primary barrier.

Provide sheet plastic barriers at least 6 mil in thickness as required to completely seal openings from the work area into adjacent areas. Seal the perimeter of all sheet plastic barriers with duct tape or spray cement. Erect the entire assembly so that it hangs vertically without a "shelf" upon which debris could collect.

Provide a pressure differential system per Title 0900, Section 01513 - Temporary Pressure Differential and Air Circulation System.

3.3 PRIMARY BARRIER

Cover floors and other building surfaces not scheduled for removal with a primary barrier, as described below to protect these surfaces from water damage and high humidity and from contamination by lead dust.

Cover the floor of the work area with two individual layers of clear polyethylene sheeting, each at least 6 mil in thickness, lapped up on the walls at least 12 inches. Plastic shall be sized to minimize seams.

Form a sharp right-angle bend at the juncture of floor and wall so that there is no area of the sheeting that, if stepped on, would cause the wall attachment to be pulled loose.

3.4 SECONDARY BARRIER

Install as a drop cloth, a clear 6-mil sheet plastic in all areas where LBP removal work is to be carried out. Completely cover the floor with sheet plastic. Secure the sheet plastic in place with duct tape so that debris cannot filter behind it. Provide cross-strips of duct tape at the floor supports as necessary to support the sheet plastic and prevent its displacement during removal operations.

Install the secondary barrier at the beginning of each work shift. Install only sufficient plastic for work of that shift. Remove the secondary barrier at the end of each work shift or as work in an area is completed. Fold the plastic toward the center of the sheet and pack into disposal bags. Keep the material on the sheet continually wet until bagged.

3.5 REMOVAL OF LOOSE AND FLAKING PAINT

Apply a fine mist surface with wet wash detergent using plant mister or garden sprayer. Score the damaged paint at edges and corners to reduce chipping of paint. Carefully scrape loose and flaking material.

Where identified in the Reference Drawings, wet sanding will be required to prepare the substrate for repainting. Lightly sand with a moist sanding sponge or wet sandpaper to obtain a smooth transition edge between the remaining paint and the substrate.

HEPA vacuum and/or wet wipe to remove all paint chips, debris and dust generated during the work. Do not allow dust or debris to accumulate. Clean up paint chips and flakes by wet sweeping, HEPA vacuuming, or collecting in wet towels. Care shall be taken to avoid damage to adjacent areas during the removal of the loose and flaking paints.

At the end of each work shift, remove any paint chips, dust, and debris that collects on the sheeting and other surfaces by using a HEPA vacuum and by spraying with wet wash solution, collect debris with wet paper towels, place in disposal bags while still wet, and clean surface of sheeting and surfaces with wet cloths.

Empty HEPA vacuum and place contents into disposal bags. Place all rags, wet towels, and other disposable items used during the project into disposal bags. Tape the disposal bags shut with duct tape and wet wipe the exterior surfaces of all disposal bags and place in 55-gallon drums prior to exiting the work areas.

At the completion of work activities in each work area, wet wipe all surfaces, including floor sheeting with a wet detergent wash. Provide detergent with a high phosphate content (at least 5%) trisodium phosphate (TSP). Follow dilution ratio recommended by the manufacturer's instructions.

3.6 PRIMING AND SEALING

After complete drying, prepare the substrate and seal all surfaces where the loose and flaking lead-based paint was removed with a primer or encapsulant that is compatible with the substrate.

3.7 DAMAGES

Protect areas adjacent to substrates that are removed for replacement from damage caused by this work. Damages to non-protected areas or from lack of care shall be repaired or replaced at the Contractor's expense.

END OF SECTION 02065

SECTION 02066 - CHEMICAL STRIPPING OF LEAD-BASED PAINT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division-1 Workplan sections, apply to work of this section.

1.2 GENERAL

The following is a list of prohibited lead hazard removal methods:

- Open flame burning;
- Chemical stripping with methylene chloride-based paint strippers;
- Uncontained abrasive blasting;
- Uncontained power washing;
- Dry sanding or scraping;
- Power sanding;
- Sanding of wood after chemical stripping.

1.3 SUMMARY OF WORK

Work of this section includes the removal and off-site disposal of lead-based paint from the following substrates.

Room/ Location	Substrate	Location	Approx. Quantity
Exterior	Shiplap Ceiling White Wood	East Side Main Entrance	120 SF
Exterior	Door Frames Brown Wood	East Side Main Entrance	3 Door Frames
Interior	Window Frames Multi Colors Wood	Room A, B, D, East Side Restroom and Room C West Wall	29 Windows
Interior	Front of Stage Green Wood	Room C	70 SF

NOTE: LBP Remediation will be conducted in conjunction with asbestos abatement activities. If a conflict between the asbestos and LBP guidance occurs, the more stringent will be followed.

1.4 SUBMITTALS

Before start of work: Submit the following to the Consultant for review. Do not start work until these submittals are returned with Consultant approval indicating that the submittal is returned for unrestricted use.

1.4.1 Chemical Stripping Removers and Neutralizers

Submit product data, use instructions and recommendations from manufacturer for use intended. Include data substantiating that material complies with requirements.

1.4.2 Material Safety Data Sheet

Submit material safety data sheet, or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for each chemical stripper and neutralizer, include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated.

PART 2 - PRODUCTS

2.1 Chemical Stripping Removers

Shall contain no methylene chloride products. Chemical removers shall be compatible with, and not harmful to, the substrate to which they are applied. The contractor shall comply with the manufacturer's recommendations for use of the product supplied.

2.2 Chemical Stripping Agent Neutralizer

Provide chemical agent neutralizer in accordance with manufacturer's recommendations. Neutralizers shall be compatible with and not harmful to the substrate. Neutralizers shall also be compatible with the stripping agent used.

2.3 Wet Detergent Wash

Provide detergent with a high phosphate content (at least 5%) trisodium phosphate (TSP). Follow dilution ratio recommended by the manufacturer's instructions.

PART 3 - EXECUTION

3.1 CHEMICAL LEAD-BASED PAINT REMOVAL ON-SITE

Chemical Stripping Agents and neutralizers shall be applied in accordance with the recommendations of the manufacturer.

3.2 Caustic Stripper Neutralization

Caustic strippers shall be neutralized in accordance with manufacturer's recommendations. Provide workers with proper protective equipment, including but not limited to; protective clothing (non-paper), chemically resistant gloves, eye protection and respiratory protection with filters selected for the hazards to be encountered.

3.3 Remove Stripper Sludge

Place lead containing stripper sludge in corrosion-proof containers and place in a secure waste storage area. The surface from which lead-based paint has been removed shall be thoroughly scrubbed, while still damp from the stripper, in accordance with the manufacturer's recommendation. Monitor pH of the neutralizing solution to ensure it has not become neutralized in the process. If the pH exceeds 6.5, or the solution becomes overly soiled, change solution. Solution may be classified as hazardous waste. Place in 55-gallon drums and test in accordance with Section 02067- Disposal of Waste Materials - Lead-Based Paint. The surface shall be tested with litmus paper following this process. If the litmus paper turns pink, the acid has effectively neutralized the alkali. If litmus turns blue continue scrubbing until satisfactory results are achieved.

3.4 Final Cleaning Of Surfaces

Prepare wet detergent wash. Workers must wear eye shields and chemically resistant gloves when working with this solution. Thoroughly scrub stripped surface to remove as much remaining lead residue as possible. The wash solution may also be hazardous waste, treat in accordance with Section 02067- Disposal of Waste Materials - Lead-Based Paint. Following wet detergent wash, perform a final wash with clear water to remove any traces of detergent. Sponges used in the clean-up process may not be reused and must be placed in double 4 mil or single 6 mil plastic bags, which will be sealed, labeled, and placed in the secure waste storage area. Surfaces must be allowed to dry thoroughly before repainting. A grayish film indicates that significant lead residues remain, and the cleaning process must be repeated. If a white powder appears, the surface is Alkaline and requires further neutralization.

3.4 Painting and Sealing

After complete drying, prepare the substrate and seal all surfaces where lead-based paint was removed with a primer or encapsulant that is compatible with the substrate.

END OF SECTION 02066

SECTION 02067 - DISPOSAL OF WASTE MATERIALS - LEAD-BASED PAINT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Workplan Sections, apply to work of this section.

1.2 DESCRIPTION OF THE WORK

This section describes the disposal of lead-containing or lead contaminated waste materials. Disposal includes packaging of waste materials.

1.3 SUBMITTALS:

Before the start of work, Contractor shall submit the following to the Owner's Consultant for review. Do not start work until these submittals are returned with Owner's Consultant action stamp indicating that the submittal is returned for unrestricted use.

- Contractor must ascertain that the facility owner is registered with the U.S. EPA as a generator of hazardous waste. If there is no generator status established, the contractor shall assist the owner in obtaining generator identification numbers.
- Copy of state or local license for waste hauler.
- U.S. EPA identification number of waste hauler.
- Name and address of waste disposal facility where hazardous waste materials are to be disposed. Include contact person and telephone number. Copy of state license and permit. Provide disposal facility permits.
- Copy of EPA "uniform hazardous waste manifest" form.
- Copy of EPA "notification of hazardous waste activity" form.
- Copy of forms required by state or local agencies.
- Sample disposal bag and labels to be used.

Submit copies of all manifests and disposal site receipts to Owner's Consultant

PART 2 - PRODUCTS

Disposal Bags: Provide 6 mil thick leak tight polyethylene bags or wrap components in 6 mil polyethylene sheeting and seal with duct tape. "Label with specific Hazardous Waste Label:"

For wrapped materials provide stick-on labels.

PART 3 - EXECUTION

3.1 GENERAL

All lead-based paint and lead-contaminated paint shall be treated as hazardous waste unless testing identifies the waste stream otherwise:

It shall be the responsibility of the Contractor to have each waste stream evaluated for determination of hazardous waste. Testing of waste shall be performed by a laboratory accredited by either the American Industrial Hygiene Association (AIHA) or the American Association of Laboratory Accreditation (AALA) retained by the contractor. Contractor shall include the cost of testing in the contract sum and supply all test results to the owner.

Sample analysis of each waste stream generated at the Site be performed by a qualified laboratory for Toxicity Characteristic Leaching Procedure (TCLP). The contractor shall pay for all samples obtained at the site for his use.

Waste steams tested that results in a lead content in the TCLP of greater than or equal to five parts per million (5ppm) is to be considered hazardous and shall be handled and disposed according to local, city, state, and federal regulations.

Place all waste generated during the project in a minimum of a single 6-mil disposal bags (or wrap in 6-mil polyethylene sheeting), place bag in DOT Approved 55-gallon steel drum and store in the designated storage area or in an enclosed dumpster.

Properly store and secure waste at all times. Do not leave debris in uncovered or unlocked trucks or dumpsters. Do not incinerate debris or use an unauthorized dumpster. Do not introduce lead contaminated water into storm or sanitary sewers. Do not permit recycling of building components coated with Lead-Based Paint.

3.2 DISPOSAL OF HAZARDOUS LIQUID OR SOLID WASTES

Comply with RCRA, DOT, STATE, and local regulations. Comply with DOT and STATE regulations for containers. The most stringent regulation shall apply.

Apply for an EPA identification number from the appropriate regional office if more than 100 kg of hazardous waste is generated from the lead hazard reduction process during any calendar month.

All waste is to be hauled by a licensed waste hauler with all required licenses from all state and local authorities with jurisdiction. Load all waste material into properly labeled disposal bags, polyethylene sheeting and leak-tight drums. All materials are to be contained as follows:

- One 6 mil layer of sheet polyethylene (duct tape all seams) or One 6 mil disposal bag; and
- Sealed steel drum

Protect interior of truck or dumpster with two layers of 6 mil polyethylene sheeting with all seams sealed with duct tape.

Carefully load containerized waste in fully enclosed dumpsters, trucks or other appropriate vehicles for transport. Exercise care before and during transport, to ensure that no unauthorized persons have access to the material.

Do not store containerized materials outside of the Work Area. Take containers from the Work Area directly to the designated storage area, sealed truck, or dumpster,

Retain all documents from the disposal or treatment facility. At completion of hauling and disposal of each load submit copy of Uniform Hazardous Waste Manifest, to Owner's Project Monitor.

3.5 BACKCHARGES

Where Contractor fails to fulfill packaging, handling, or disposal requirements as outlined herein, Owner will charge back to Contractor all costs associated with insuring that hazardous wastes are packaged and segregated in accordance with EPA and DOT regulations.

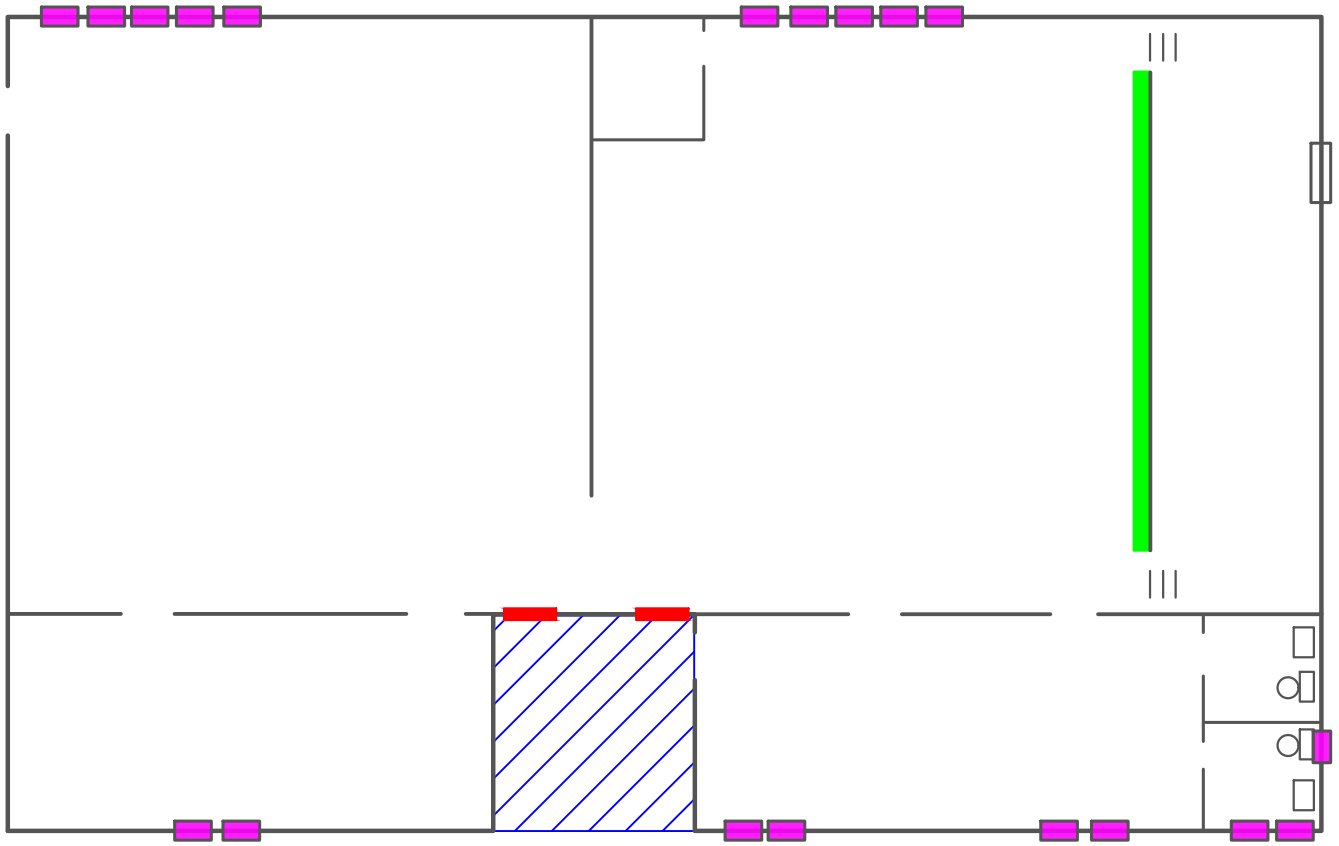
Environmental pollution of Owner's property resulting from Contractor's hazardous waste management activities shall be promptly remediated under Owner direction, to the Owner's sole satisfaction, and at the Contractor's sole expense.

Contractor agrees to either reimburse the Owner or reduce the Contract amount by change order to cover all costs associated with waste repackaging, waste re-segregation, or pollution remediation efforts.

END OF SECTION - 02067

APPENDIX A

REFERENCE DRAWING



Exterior Shiplap Ceiling Wood, White (~120 SQ FT)
Front of Stage Wood Paint, Green (~70 SQ FT)
Interior Wood Window Frames, Multi-colored (~29 Windows)
Exterior Wood Door Frames, Brown (~3 EA)

CHAMPION environmental consultants
109 West 7th Street
Suite 210
Georgetown, Texas 78626

CLIENT:
CITY OF DRIPPING SPRINGS
511 Mercer Street
Cripping Springs, Texas 78620

SITE: STEPHENSON BUILDING
101 Old Fitzhugh Road
Dripping Springs, Texas 78620

C-ECI Project No. 23-1730
By: N Hackney
Approved By: W Champion
Submitted: 4/4/2024
Not To Scale

Lead-Based Paint Location Plan

Figure 1

ADDENDUM NO. 2

Project: **STEPHENSON SCHOOL BUILDING & PARKING IMPROVEMENTS**
Owner: **City of Dripping Springs, Texas**
311 Old Fitzhugh Rd
Dripping Springs, Texas 78620
Architect: **Architexas**
1023 Springdale Rd
Bldg 11, Suite E
Austin, Texas 78721
512.444.4220
Engineer: **Doucet**
Date: **July 11, 2025**



07/11/2025

Respondents are hereby notified of the following revisions and/or clarifications to the construction plans, contract documents and specifications. This Addendum forms a part of the Contract and clarifies, corrects, or modifies original Proposal Documents.

Responses to questions related to IT will be issued in a future addendum.

BEGIN REVISIONS

NOTE OPEN BUILDING & SITE VISIT DATE: The building will be available and open on Thursday July 17, 2025 from 10 AM through 4 PM.

NOTE RFI QUESTIONS ACCEPTED UNTIL FRIDAY JULY 18, 2025 AT 5 P.M.

NOTE BID DUE DATE EXTENDED: The bid due date will be extended to Thursday July 24, 2025 at 2:00 p.m.

Bidder Questions

1. Question: Specs 10 28 13 – Toilet Accessory schedule list two different toilet tissue dispensers, recessed and surface mount. Please advise which one is correct.

   Response: Provide Fixture A Surface Mounted Toilet Tissue Dispenser, Delete Fixture A Semi-Recessed Toilet Tissue Dispenser.

2. Question: Is structured cabling system to be Cat 6 or Cat 6A rated? Is there a preferred solution/manufacturer (Panduit, Commscope, Leviton, Hubble, Belden, Ortronics, Systimax)?

   Response: CAT6a, additional information to be provided in a future addendum.

3. Question: Anticipated Project start and completion date.

   Response: The project will contract as soon as possible. Contract time is stated as 365 days

4. Question: Is it possible to receive the civil AutoCAD (.dwg file) for this project that includes the existing and proposed grading and drainage contours, spot elevations and grades, building footprint, and paving limits?

Response: Civil dwg files will be available after the award to the General Contractor. Open source digital files will not be sent to prospective bidders. If there are specific Site Grading Plan issues or quanitiy questions, please send a separate RFI.

5. Question: Are there required fire sprinkler or fire alarm subs?

   Response: No specific company is required.

6. Question: Will Knox Box be surface mounted or recessed? Will it require a tamper switch?

   Response: Knox box will be surface mounted. Scope to be confirmed with Fire Marshal.

7. Question: Please confirm if a 2 year warranty period is required?

   Response: Yes

8. Question: Please confirm flag pole height.

   Response: Please refer to spec section 10 75 00 Flagpoles 2.2.A. Pole will be 25 feet.

9. Question: Will testing and special inspections, including associated fees, be handled by the owner?

   Response: Testing and special inspections will be contracted and paid for by the owner. The contractor will be responsible to notify and schedule the inspector.

10. Question: Will there be a public bid opening?

    Response: No, bids will be reviewed by an evaluation committee. The "Best Value" will be selected per the weighted review scale outlined in A-2.

11. Question: Does this project include hazardous material abatement?

    Response: Please refer to the Specifications Appendix for the hazardous materials testing and abatement specifications.

12. Question: After the NTP has been issued, how many calendar days will be allowed to complete the project?

    Response: Contract time is stated as 365 days

13. Question: Is it possible to reschedule the bid due date to Thursday, July 24? This will benefit the owner by increasing GC and Subcontractor participation.

    Response: Yes

14. Question: Is it possible to have the building accessible on Thursday, July 17 to allow subcontractors to inspect the building?

Response: Yes

15. Question: Is it possible to extend the RFI deadline to Friday, July 18, to allow subcontractors to request information after they inspect the building?

    Response: Yes

16. Question: Section B-1 Cost Proposal lists the project duration as 60 days. I suggest calendar 270 days.

    Response: Section B-1 Cost Proposal to be updated to 365 days.

17. Question: The elevations are not very clear as to how many louvers are being replaced. Can you please verify the louver replacement count?

    Additionally, the spec lists multiple accessories (blankoff panels, hinged frames, security bars, bird, and insect screens). Are all these accessories required? Detail 13/A513 show a sill with end dams but no other accessories.

    Response: One mechanical louver is shown in 4/A4.01 and included in spec section 08 91 00 Louvers. Provide an insect screen and extended sill as called out in the spec section.

    Crawlspace openings are noted on the elevations and shown in section 13/A513. The crawlspace opening do not receive a louver but instead receive a metal wire insect screen within a metal frame.

Specification Revisions

Section B-1 Cost Proposal Form

REPLACE – No. 2 Remove and replace reach Substantial Completion of the Work within "~~sixty (60)~~" calendar days thereafter with "**three hundred sixty five (365)**".

Spec Section 10 14 23 – Interior Panel Signs

REPLACE – Add to 3.3 Schedule "Assisted Listening Device Available" sign w/ graphic & braille, type C, 8" x 6", quantity 2.

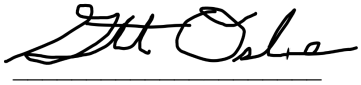
Spec Section 10 28 13 – Toilet Accessories

REPLACE – Delete " A-Semi-Recessed Twin Hide A Roll Toilet Tissue Dispenser"

END REVISIONS

RESPONDANTS MUST ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THEIR PROPOSAL RESPONSE TO HAVE THEIR PROPOSALS RECOGNIZED.

Approved for Distribution by:



Garrett Osborne
City Inspector

SECTION 101423

INTERIOR PANEL SIGNS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior panel signs.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Shop Drawings: Include sign locations, sizes, mounting heights, and content.
   2. Samples:
      a. 3 x 3 inch sign samples showing available colors.
      b. After color selection, submit typical sign illustrating pictograms, characters, and Braille indications.

1.3 QUALITY ASSURANCE

A. Provide signage as required by Authorities Having Jurisdiction.

B. Conform to applicable accessibility code for sign design, construction, location, and mounting height.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on 1000 ADA System products by Mohawk Sign Systems, Inc. (www.mohawksign.com)

B. Other Acceptable Manufacturers:
   1. APCO Graphics, Inc. (www.apcosigns.com)
   2. Best Sign Systems, Inc. (www.bestsigns.com)
   3. 290 Signs by Mohawk Sign Systems, Inc. (www.mohawksign.com)

C. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Signage: 1000 ADA System by Mohawk Sign Systems, Inc., or approved substitute.

B. Graphic Process:
   1. All signs shall be manufactured using Graphic Process Series 200A - Sand Carved® using Format D.
      a. Tactile characters shall be raised the required 1/32" inches from sign face. Glue-on letters or etched backgrounds are not acceptable.
      b. All text shall be accompanied by Grade 2 braille. Braille shall be separated 1/2" from the corresponding raised characters or symbols. Grade 2 braille translation to be provided by signage manufacturer.
      c. All letters, numbers and/or symbols shall contrast with their background, either light characters on a dark background or dark characters on a light background. Characters and background shall have a non-glare finish.
   2. Plaque material: Special Purpose SP125 decorative thermosetting high pressure laminate. Material to be 1/8” thick laminate with a melamine resin surface and a phenolic resin core

which provides resistance to abrasion, stains, alcohol, solvents, boiling water, and heat. The material shall be NEMA rated and have flammability and smoke values that meet the standards for flammability of interior materials.

3. Background color as selected by architect from manufacturer's actual color samples.
4. Letterform: Gill Sans upper case letters and numbers.
5. Size of letters and numbers:
   a. Room numbers shall be 1".
   b. Lettering for room ID signs shall be 5/8" or as noted.
   c. Symbol size shall be 4".
   d. Standard Grade 2 braille shall be 1/2" below copy.
   e. Corners: 1/2" radius
6. Copy position: CC (centered/centered), or as indicated on Drawings.

2.3 ACCESSORIES

A. Mounting: Vinyl tape and silastic adhesive. Provide mechanical mounting for larger signs as recommended by manufacturer.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean surfaces of loose and foreign matter.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions and approved Shop Drawings.

B. Locate signs on wall adjacent to scheduled doors.

3.3 SCHEDULE

Room No.	Quantity	Inscription	Type	Size (H x W)
9	1	Restroom Note: Include 4” international symbol for accessibility	C	8” x 6”
10	1	Janitor	A	3” x 6”
11	1	Storage	A	3” x 6”
7	1	Catering	A	3” x 6”
6	1	AV/IT	A	3” x 6”
14	1	Women’s Restroom Note: Include 4” international symbol for accessibility and gender symbol	C	8” x 6”
15	1	Men’s Restroom Note: Include 4” international symbol for accessibility and gender symbol	C	8” x 6”
16	1	Dressing Room	A	6” x 6”
17	1	Restroom Note: Include 4” international symbol for accessibility	C	8” x 6”
18	1	Mechanical	A	3” x 6”
19	1	Restroom Note: Include 4” international symbol for accessibility	C	8” x 6”
21	1	Office	B	6” x 6”
22	1	Office	B	6” x 6”
2, 3	2	Maximum Occupancy Signs (TBD)		Size per local code official

1	**2**	**Assisted Listening Device Available**	**C**	**8” x 6”**

END OF SECTION

SECTION 102813

TOILET ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Toilet accessories.

B. Related Sections:
   1. Division 01: Administrative, procedural, and temporary work requirements.

1.2 SUBMITTALS

A. Submittals for Review:
   1. Product Data:
      a. Schedule accessories by room; show plans and elevations, and identify room name and number, type and quantity of accessories, and mounting heights.
      b. Include manufacturer's brochures showing sizes, details of function, finishes, and attachment methods.
   2. Samples: One of each accessory, if requested.
   3. Warranty: Sample warranty form.

1.3 QUALITY ASSURANCE

A. Locate accessories at heights indicated in the Drawings.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Contract documents are based on products by American Specialties. (www.americanspecialties.com)

B. Substitutions: Under provisions of Division 01.

2.2 MATERIALS

A. Toilet Accessories: As scheduled at the end of the Section, or approved substitute. Refer to Drawings for locations.

B. Stainless Steel:
   1. Sheet: ASTM A666, Type 304, rollable temper.
   2. Tubing: ASTM A269.

C. Galvanized Steel: ASTM A1008/1008M.

2.3 ACCESSORIES

A. Fasteners: Stainless steel where exposed, hot dip galvanized where concealed; type best suited to substrate conditions.

2.4 FABRICATION

A. Use stainless steel for exposed surfaces; galvanized steel may be used in concealed locations.

B. Form exposed surfaces from single sheet of stock, free from joints, and flat, without distortion.

C. Weld joints of fabricated components and grind smooth.

D. Fabricate grab bars of tubing, free of visible joints, return to wall with end attachment flanges.

E. Fabricate soap dispensers to operate with less than 5 pound force.

F. Provide hangers, adapters, anchor plates, and accessories required for installation.

G. Key locks alike; furnish six keys.

H. Shop assemble units and package complete with anchors and fittings.

2.5 FINISHES

A. Stainless Steel: No. 4 satin.

B. Galvanizing: ASTM A123/A123M to 1.25 ounces per square foot.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Set plumb, level, square, and rigid.

3.2 SCHEDULE

MARK	DESCRIPTION	MANUFACTURER	MODEL NO.
D	Surface Mounted Paper Towel Dispenser & Waste Receptacle	American Specialties	0467-9
G	Surface Mounted Paper Towel Dispenser	American Specialties	0210
~~A~~	~~Semi-Recessed Twin Hide-A-Roll Toilet Tissue Dispenser~~	~~American Specialties~~	~~0031~~
A	Surface Mounted Twin Hide-A-Roll Toilet Tissue Dispenser	American Specialties	0030
F	Inter-Lok Stainless Steel Framed Mirror	American Specialties	0600, 24" x 36"
P	Surface Mounted Vertical Soap Dispenser	American Specialties	0359
E	Surface Mounted Sanitary Napkin Receptacle	American Specialties	0852
B, C	1" Diameter Stainless Steel Grab Bars w/ Concealed Mounting	American Specialties	3000 Series x lengths indicated on the Drawings
J	Surface Mounted Stainless Steel Baby Changing Station	American Specialties	9013-9
I	Robe Hook (Single) - Surface Mounted	American Specialties	7340-S

END OF SECTION

ADDENDUM NO. 4

Project: **STEPHENSON SCHOOL BUILDING & PARKING IMPROVEMENTS**
Owner: **City of Dripping Springs, Texas**
311 Old Fitzhugh Rd
Dripping Springs, Texas 78620
Architect: **Architexas**
1023 Springdale Rd
Bldg 11, Suite E
Austin, Texas 78721
512.444.4220
Engineer: **Doucet**
Date: **July 22, 2025**



07/22/2025

Respondents are hereby notified of the following revisions and/or clarifications to the construction plans, contract documents and specifications. This Addendum forms a part of the Contract and clarifies, corrects, or modifies original Proposal Documents.

BEGIN REVISIONS

Bidder Questions

1. Question: Sheet S2.01 – Has note at the ramp referencing detail 6/S3.03. Sheet S3.03 does not show detail 6, please advise.

   Response: The reference detail is incorrect. Please refer to 3/S3.10.

2. Question: Sheet C6 – Sheet Note states to demo 1,125 SY of existing paving. Sheet D1.01 – Sheet notes states existing paving is to remain. Please advise.

   Response: Refer to the civil sheets for scope of work outside of the project boundary for the building. Delete note on D1.01 located outside of the Project Boundary "EXIST. ASPHALT TO REMAIN, TYP".

3. Question: Sheet A1.01/SheetA1.03 Detail 9 – 3" OD PVC Pipe is shown per row of pavers. Please advise pipe termination. Does this tie into storm drainage?

   Response: Delete 3" OD PVC pipe from paver paving at building as shown in 9/A1.03.

4. Question: Sheet A1.01 – Owner Furnished Benches, Please confirm owner furnished benches are also owner installed.

   Response: Owner Furnished Benches to be installed by the owner.

5. Question: Sheet C10 – Shows the edge of pavement for the existing Old Fitshugh Rd as well as the future Old Fitzhugh Rd. Please advise which edge of pavement we are to tie into.

   Response: Recommended to the Future Old Fitzhugh Rd.

6. Question: The Specifications (2.04 H.1) call for (2) 12RU equipment racks, but the drawings (AV6-01 #13) show (1) 24RU rack. Please advise which is preferred?

   Response: One rack, as per drawings.

7. Question: Sheet AV0-00 - In the AV Legend, the "ALS" symbol is labeled as a Wi-Fi Access Point, and the "AP" symbol is labeled as the Assisted Listening Device Antenna. It appears these descriptions were swapped. Can you confirm if the quantities plotted on the drawings for these symbols are correct, despite the potential label discrepancy?

   Response: Quantities are correct, as per one line diagram on sheet AV6-02. Both devices have the same conduit type routed between them and the rack, and the devices are located proximate to one another.

8. Question: We contacted Ivie Technologies regarding the IR-3D Infrared sensor system (Spec: 2.05.N.4) and were informed that this product is no longer available. Do you have a preferred substitute?

   Response: Any IR or photocell sensor with a switch will work. A garage door IR sensor could conceivably be used. The intent is that this senses the state of the operable partition (open or closed) and the AV system use state follows based on logic programmed into the digital signal processor. (I.e., when the wall is closed dividing the room, one IR sensor switch condition signals the processor to divide the rooms' AV; when open, the switch signals combining the rooms' AV.)

9. Question: Sheet A6.03 / Detail 6 – Drinking Fountain Backsplash is labeled as "N". Please confirm material.

   Response: Please refer to the ADA legend on A6.01 for the mounting heights of the drinking foundation labeled as "N". The fixture is schedule on sheet P301.

10. Question: DV Wall Plate – Spec sheet calls for (3) Visionary Encoders but there are only (2) on the drawing. Which QTY should we spec?

    Response: Wall plate encoders in DV plate: use qty. 2. Other encoders are non-wall-plate-type.

11. Question: QSC License – Should we include the license fees? Dante; QSYS?

    Response: Yes – any licenses required for functionality of the system. Note - just in the wireless mics there are 8 channels of Dante audio, so a larger channel count will be needed (so the license upgrade will be necessary).

Specification Revisions

None

Drawing Revisions

Sheet A0.01 – COVER SHEET
UPDATE – Sheet revision dates

Sheet A1.03 – SITE DETAILS
UPDATE – Update detail 9/A1.03 – Remove PVC pipe drain from detail.

Sheet A6.01 – Enlarged Plans - Restrooms
UPDATE – Update ADA legend dimension for fixture A & Lav centerline dimension for RR 9.

Sheet A6.02 – SITE DETAILS
UPDATE – Update LAV centerline dimension for RR 17 & RR 19. Re: 1/A6.02.

END REVISIONS

RESPONDANTS MUST ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THEIR PROPOSAL RESPONSE TO HAVE THEIR PROPOSALS RECOGNIZED.

Approved for Distribution by:

Garrett Osborne
City Inspector

STEPHENSON SCHOOL BUILDING

Rehabilitation and Addition

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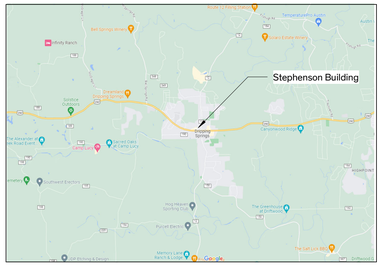
LANDSCAPE
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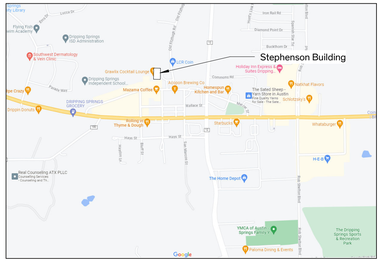
VICINITY MAP

CITY OF DRIPPING SPRINGS



STREET MAP

CITY OF DRIPPING SPRINGS





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GENERAL NOTES

GENERAL DEMOLITION NOTES

1. THE MAXIMUM ALLOWABLE LOADING ON THE EXISTING FLOOR STRUCTURES SHALL BE CONFIRMED WITH STRUCTURAL ENGINEER. AREAS OF THE BUILDING WHICH MAY HAVE GREATER LOADING IMPOSED ON IT BY THE CONTRACTOR'S DEMOLITION PROCEDURE SHALL BE SHORED. COORDINATE WITH STRUCTURAL.
2. EXISTING STRUCTURE SHALL BE SHORED PRIOR TO COMMENCEMENT OF DEMOLITION. SECTIONS OF STRUCTURE BEING DEMOLISHED SHALL NOT BE ALLOWED TO DROP ONTO FLOOR STRUCTURE BELOW.
3. SHORING SHALL TRANSFER LOADING DIRECTLY TO EXISTING LOAD BEARING MASONRY WALLS. SHORING SHALL BE DESIGNED TO SUPPORT THE FULL ANTICIPATED LOADING WITH NO BENEFIT FROM THE EXISTING STRUCTURAL FRAMING.
4. EXISTING CONSTRUCTION SHOWN TO REMAIN SHALL NOT BE DAMAGED DURING THE DEMOLITION PROCESS. PROVIDE ALL NECESSARY TEMPORARY PROTECTION.

GENERAL CONSTRUCTION NOTES

1. THE WORK SHALL CONFORM WITH THE CURRENT EDITION OF THE FOLLOWING REGULATIONS AS ADOPTED BY THE CITY OF DRIPPING SPRINGS:
   - -2018 INTERNATIONAL BUILDING CODE
   - -2018 INTERNATIONAL EXISTING BUILDING CODE
   - -2018 INTERNATIONAL FIRE CODE
   - -2018 INTERNATIONAL PLUMBING CODE
   - -2018 INTERNATIONAL MECHANICAL CODE
   - -2017 NATIONAL ELECTRICAL CODE
   - -2018 INTERNAL ENERGY CONSERVATION CODE
   - -2012 TEXAS ACCESSIBILITY STANDARDS
   - -U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
2. THE CONTRACTOR SHALL VISIT THE SITE TO REVIEW AND SURVEY EXISTING CONDITIONS TO FULLY UNDERSTAND SCOPE OF WORK.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND INSPECTIONS AND PAY ALL APPLICATION FEES.
4. IF THE CONTRACTOR PERFORMS OR PROCEEDS WITH ANY WORK, CONTRARY TO APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS WITHOUT GIVING PRIOR WRITTEN NOTICE TO THE ARCHITECT, HE/SHE SHALL ASSUME FULL RESPONSIBILITY THEREFORE AND SHALL BEAR ALL COST ATTRIBUTABLE.
5. THE CONTRACTOR SHALL CAREFULLY STUDY THE CONTRACT DOCUMENTS PRIOR TO CONSTRUCTION AND SHALL REPORT TO THE ARCHITECT ANY ERROR, INCONSISTENCY OR OMISSION DISCOVERED AND SHALL NOT PROCEED WITH THE WORK UNTIL THE INTENT OF THE DOCUMENTS IS VERIFIED BY THE ARCHITECT.
6. ALL DRAWINGS AND SPECIFICATIONS FORMING PART OF THE CONSTRUCTION DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS CALLED FOR BY ONE WILL BE BINDING AS IF CALLED FOR BY ALL; ANY WORK SHOWN OR REFERRED TO ON ANY ONE DOCUMENT SHALL BE PROVIDED AS THOUGH SHOWN ON ALL DOCUMENTS.
7. THE CONTRACT DOCUMENTS SHALL BE INTERPRETED WITH THE FOLLOWING ORDER OF PRECEDENCE: SPECIFICATIONS, DETAILS, ENLARGEMENTS, OVERALL DRAWINGS, AND SUBSEQUENT CLARIFICATIONS. ADDENDA SHALL OVERRIDE THE AFFECTED COMPONENTS IN ALL OF THE ABOVE. ALL VERBAL CLARIFICATIONS ARE TO BE RECORDED BY THE CONTRACTOR AND SENT TO THE ARCHITECT WITHIN SEVEN DAYS OF THE OCCURRENCE.
8. THE CIVIL, STRUCTURAL, MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, LANDSCAPING, AND AUDIO/VISUAL DOCUMENTS ARE SUPPLEMENTARY TO THE ARCHITECTURAL DOCUMENTS. SHOULD THERE BE A DISCREPANCY BETWEEN THE ARCHITECTURAL DOCUMENTS AND THE STRUCTURAL, MECHANICAL, PLUMBING, ELECTRICAL, LANDSCAPING, AND AUDIO/VISUAL DOCUMENTS, SUCH DISCREPANCY IS TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. THE CONTRACTOR SHALL RECEIVE INSTRUCTIONS PRIOR TO INSTALLATION OR PERFORMANCE OF SAID WORK. ANY WORK PERFORMED OR INSTALLED IN CONFLICT WITH THE DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
9. INFORMATION CONTAINED ON THESE DRAWINGS WITH REGARD TO EXISTING CONDITIONS OF CONSTRUCTION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR EXECUTING THE WORK. EVERY ATTEMPT HAS BEEN MADE TO PROVIDE COMPLETE AND ACCURATE REPRESENTATIONS OF SUCH EXISTING CONDITIONS. THIS INTERPRETATION HAS BEEN TAKEN BY FIELD MEASUREMENT AND OBSERVATION. THE ARCHITECT HAS ENDEAVORED TO IDENTIFY AS COMPLETELY AS POSSIBLE IN THE CONSTRUCTION DOCUMENTS, EXISTING ITEMS OF EQUIPMENT AND CONSTRUCTION THAT ARE REQUIRED TO BE REMOVED OR OTHERWISE DEMOLISHED. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR AND IS IN NO WAY INTENDED TO MEAN THAT DEMOLITION IS LIMITED ONLY TO THOSE ITEMS SPECIFICALLY IDENTIFIED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXECUTE DEMOLITION WORK AS REQUIRED TO REMOVE ELEMENTS AND SYSTEMS IDENTIFIED IN THE CONSTRUCTION DOCUMENTS, ALONG WITH THEIR ASSOCIATED PARTS.
10. ALL AREAS AND ITEMS INDICATING CONTRACT LIMITS AND LINES OF DEMARCATION ARE SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR AND ARE NOT TO BE TAKEN LITERALLY. ACTUAL CONTRACT LIMITS ARE TO BE DETERMINED PRIOR TO CONSTRUCTION BY FIELD VERIFICATION.
11. EXISTING CONSTRUCTION SHOWN TO REMAIN SHALL NOT BE DAMAGED DURING THE DEMOLITION PROCESS. PROVIDE ALL NECESSARY TEMPORARY PROTECTION.
12. CONTRACTOR TO ASSIST THE ARCHITECT IN MAKING THEIR EVALUATIONS AND RECOMMENDATIONS BY PROVIDING IN A TIMELY MANNER, AT NO ADDITIONAL COST TO THE OWNER, ACCURATE AND COMPLETE DRAWINGS, SKETCHES, AND PHOTOGRAPHS, SUFFICIENT TO CLEARLY DESCRIBE DISCREPANCIES, CONFLICTS, AND CONCEALED OR OTHERWISE UNANTICIPATED CONDITIONS AFFECTING NEW CONSTRUCTION.
13. SCAFFOLDING AND SHORING CANNOT BE SECURED TO EXISTING HISTORIC MATERIALS, OR CAUSE DAMAGE TO EXISTING MATERIALS.
14. REINSTALL EACH ELEMENT IN ITS ORIGINAL LOCATION UNLESS NOTED OTHERWISE.
15. SIZE NOTED IN CONSTRUCTION DOCUMENTS FOR ORIGINAL MATERIALS ARE APPROXIMATE AND ARE TO BE FIELD VERIFIED PRIOR TO SUBMITTAL OF SHOP DRAWINGS. MATCH EXACT SIZES AND PROFILES OF ORIGINAL ELEMENTS.
16. FIELD VERIFICATIONS OF EXISTING CONDITIONS RELATED TO SPECIFIC PORTIONS OF THE WORK SHALL BE UNDERTAKEN IN ADVANCE TO ALLOW FOR THE TIMELY IDENTIFICATION OF EXISTING CONDITIONS THAT MAY AFFECT THE SCHEDULED INSTALLATION OF NEW WORK AS DESIGNED AND DETAILED, AND TO AVOID UNDUE AND UNREASONABLE DELAYS TO THE PROJECT SHOULD SUCH CONDITIONS BE DISCOVERED. TIMELY IDENTIFICATION OF SUCH CONDITIONS SHALL PROVIDE FOR A MINIMUM PERIOD OF 10 (TEN) WORKING DAYS DURING WHICH TIME THE ARCHITECT WILL EVALUATE THE CONDITION AND MAKE RECOMMENDATIONS FOR ACCOMMODATING NEW WORK.
17. CONTRACTOR IS TO PROVIDE AND INSTALL ALL ACCESS PANELS, RATED OR OTHERWISE, SIZE AS REQUIRED, AT ALL CONCEALED MECHANICAL AND PLUMBING ITEMS WHICH REQUIRE SERVICE OR ACCESS (VALVES, FIE DAMPERS, DUCT HEATERS, ETC.). ACCESS PANELS IN RATED CEILINGS AND PARTITIONS SHALL HAVE THE APPROPRIATE UL LABELS.
18. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL EQUIPMENT MANUFACTURER'S ROUGH-IN REQUIREMENTS.
19. EXISTING UTILITY SERVICES ARE TO REMAIN, BE PROTECTED, AND/OR TO BE OPERATIONAL DURING DEMOLITION AND CONSTRUCTION. REFERENCE RELEVANT CIVIL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS. CONTRACTOR TO BE RESPONSIBLE FOR PROTECTION OF AND RESTORATION OF SERVICES, AS WELL AS PROVISION OF TEMPORARY UTILITY SERVICES.
20. NOTIFY CITY OF DRIPPING SPRINGS WHEN IT IS NECESSARY TO AFFECT UTILITIES BEFORE PROCEEDING WITH THE WORK. ALL EXISTING UTILITIES MUST BE CHECKED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF DEMOLITION WORK. ANY DAMAGES RESULTING FROM LACK OF COMPLIANCE WITH THE PROVISIONS SHOULD BE CORRECTED BY THE CONTRACTOR AT HIS OR HER OWN EXPENSE.

NEW FASTENERS

1. ATTACHMENTS TO MASONRY I.E.: CONDUIT, WOOD FRAMING, ETC. MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURES UNLESS NOTED OTHERWISE.

CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS AND CEILINGS:

1. CONDUIT, WIRING, AND PIPING, IS TO BE CONCEALED BEHIND FINISH FACE OF GYPSUM BOARD AND PLASTER WALLS UNLESS NOTED OTHERWISE.
2. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
3. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE OF THE WALL.

PENETRATIONS AT MASONRY WALLS:

1. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENT, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION OF OPERATION OF ELECTRICAL, MECHANICAL, AND PLUMBING SYSTEMS. RE: STRUCTURAL FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

EXISTING BUILDING:
1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

ABBREVIATIONS

±	PLUS/MINUS
DIAM.	DIAMETER
A/C	AIR CONDITIONER
ACM	ASBESTOS CONTAINING
AHU	AIR HANDLING UNIT
CABS.	CABINETS
CLG.	CEILING
CONC.	CONCRETE
DN.	DOWN
ELEV.	ELEVATOR
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
FIXT.	FIXTURES
FLR.	FLOOR
F.R.	FIRE RATED
GYP.	GYPSUM
HIST.	HISTORIC
MECH.	MECHANICAL
MIN	MINIMAL
MISC.	MISCELLANEOUS
MTL.	METAL
MFR	MANUFACTURER
NIC	NOT IN CONTRACT
OC	ON CENTER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OPNG	OPENING
ORIG.	ORIGINAL
PTD.	PAINTED
PTN.	PARTITION
QTR.	QUARTER
REF.	REFERENCE
REQ'D	REQUIRED
SSTL	STAINLESS STEEL
STRUCT.	STRUCTURAL
T.B.D.	TO BE DETERMINED
TRTD	TREATED
TYP.	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
W/	WITH
WD.	WOOD

NOTE: CONTRACTOR SHALL VERIFY WITH ARCHITECT FOR ANY ABBREVIATION NOT LISTED.

SYMBOL LEGEND

- 1 / A101 SIM — BROKEN SECTION
- FLOOR LEVEL CHANGE
- 1 / A101 SIM — WALL SECTION
- CENTER LINE
- 1 / A101 SIM — DETAIL SECTION
- 101 — DOOR TYPE
- DETAIL KEY
- 1t — WINDOW TYPE
- DETAIL KEY
- 1l — WALL TYPE
- 1 / A101 SIM — BUILDING ELEVATION KEY
- Room name / 101 / 150 SF — ROOM NAME, NUMBER, & SQUARE FOOTAGE
- 0 — COLUMN CENTER LINE
- BREAK LINE

MATERIAL LEGEND

- EARTH/COMPACT FILL
- GRAVEL FILL
- SAND FILL
- CAST-IN-PLACE CONC.
- LIGHTWEIGHT CONC.
- FACE BRICK
- COMMON BRICK
- CMU
- CAST STONE
- GLASS
- STEEL
- ALUMINUM
- SHEET METAL
- FRT ROUGH WOOD
- FRT BLOCKING
- FINISH WOOD
- PLYWOOD
- RIGID INSULATION
- THERMAL/ ACOUSTIC BATT INSULATION
- SPRAYED INSULATION
- SPRAYED FIRE INSULATION
- CERAMIC TILE
- TYPE 'X' GYP. BOARD
- METAL LATH & PLASTER
- CARPET
- HOLLOW CLAY TILE

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City of Dripping Springs
STEPHENSON SCHOOL BUILDING,
REHABILITATION AND ADDITION

311 Old Fitzhugh Rd.
Dripping Springs, TX 78620

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REVISION HISTORY

1	07/08/2025	Addendum 1
2	07/22/2025	Addendum 4

Issued for Permit and Construction

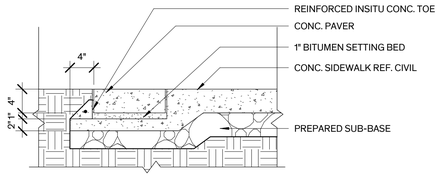
REGISTERED ARCHITECT — ALEXIS M. MCKINNEY — 22892 — STATE OF TEXAS

#22892 07/22/2025

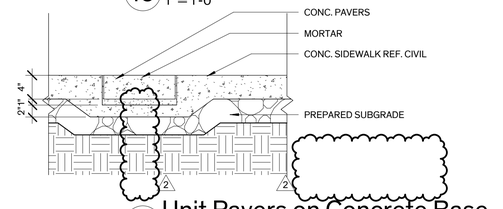
Architexas No. 2314
Date January 17, 2025

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Cover Sheet

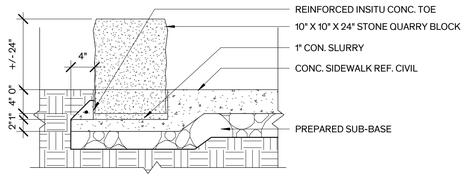
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A0.01



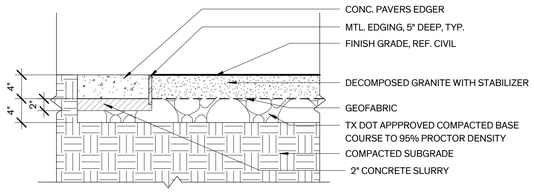
10 Unit Paver Edge
1" = 1'-0"

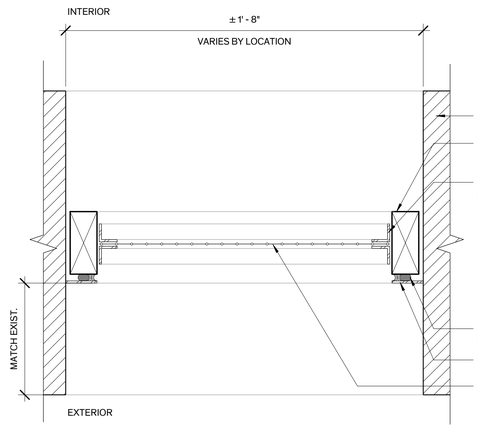


9 Unit Pavers on Concrete Base
1" = 1'-0"

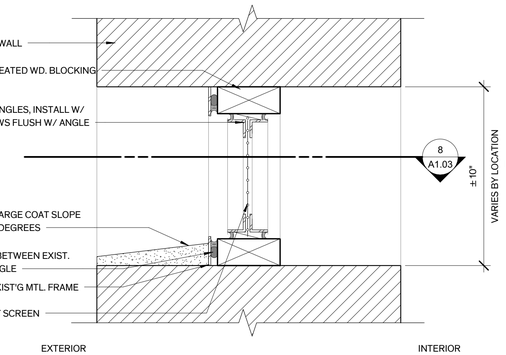


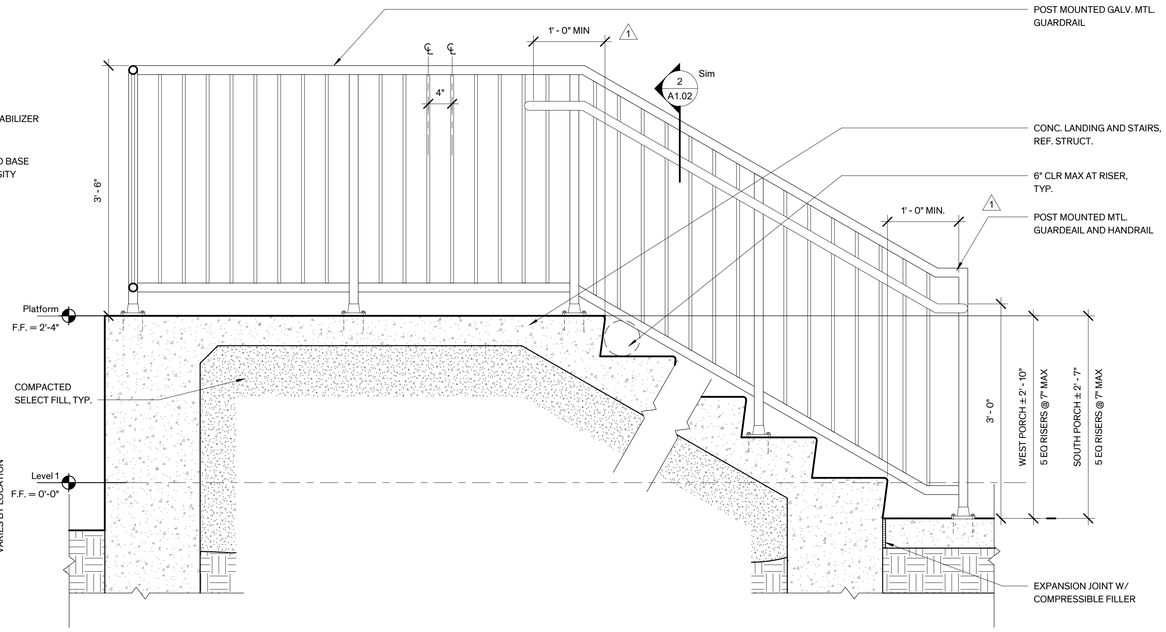
6 QUARRY BLOCK
1" = 1'-0"



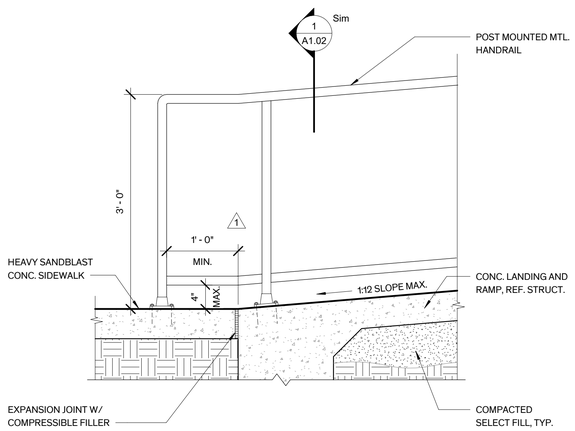


5 Stabilized Decomposed Granite
1" = 1'-0"

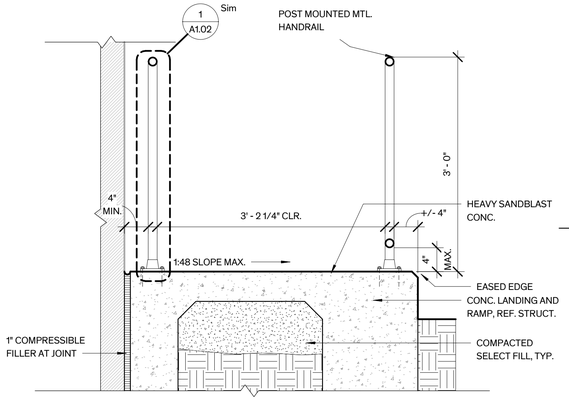




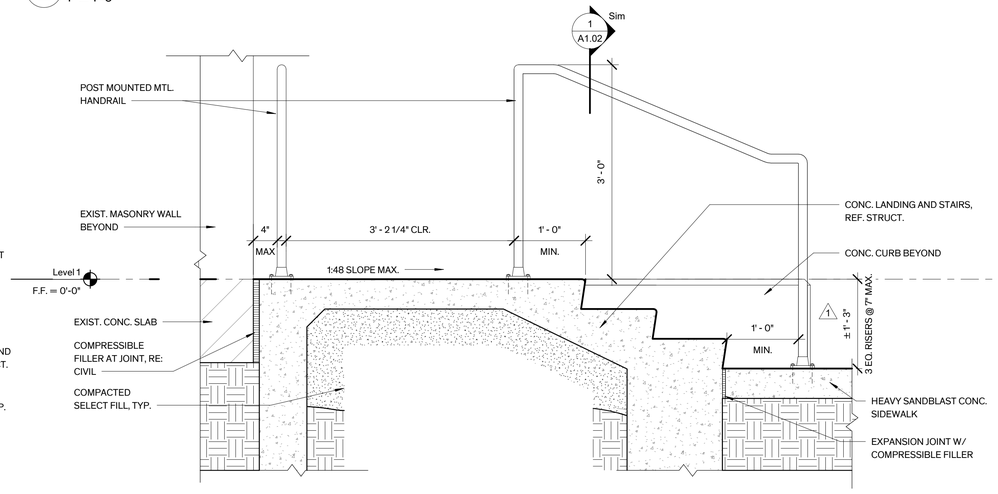
8 Crawlspace Vent Grill Plan
3" = 1'-0"



4 Crawlspace Vent Grill Section
3" = 1'-0"



2 West Stair Detail Section
1" = 1'-0"



7 Detail at Bottom of Ramp
1" = 1'-0"

3 East Ramp Detail Section
1" = 1'-0"

1 East Stair Detail Section
1" = 1'-0"

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City of Dripping Springs
STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION

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REVISION HISTORY

1	07/08/2025	Addendum 1
2	07/22/2025	Addendum 4

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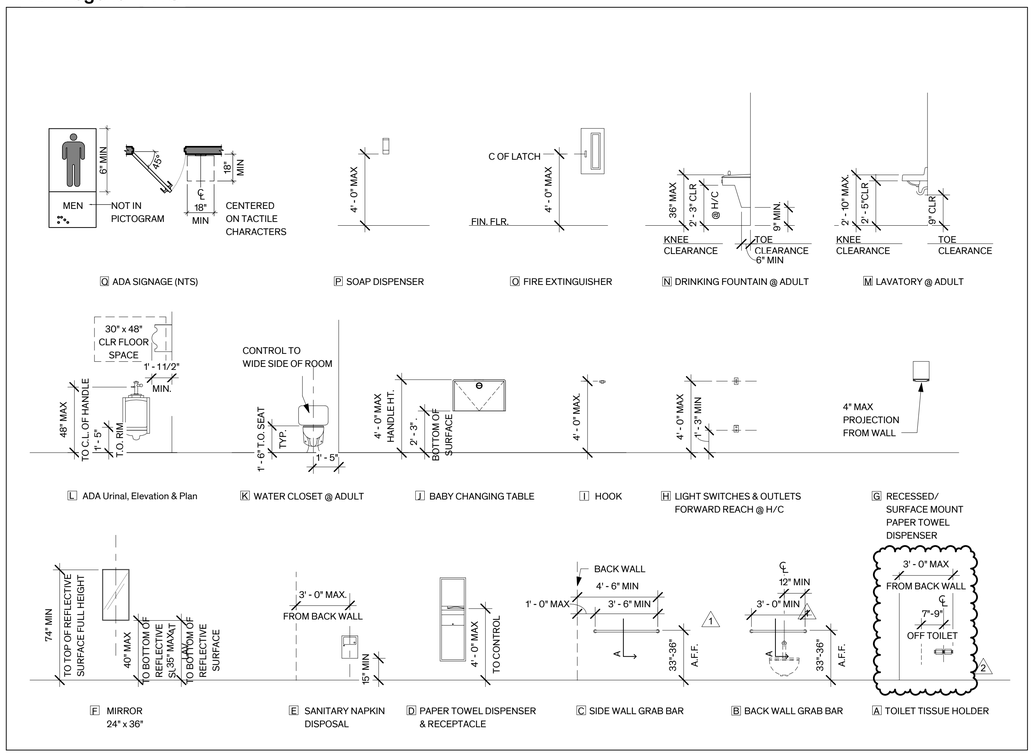
#22892 07/22/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
Site Details

Sheet Number
A1.03

ADA Legend - NTS.



LEGEND - ENLARGED PLAN

- NEW WALL
- EXIST'G WALL
- FEC — FIRE EXTINGUISHER SEMI-RECESSED CABINET

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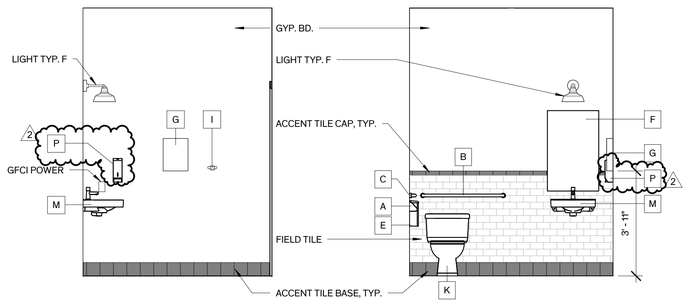
REGISTERED ARCHITECT ALEXIS M. MCKINNEY 22892 STATE OF TEXAS

#22892 07/22/2025

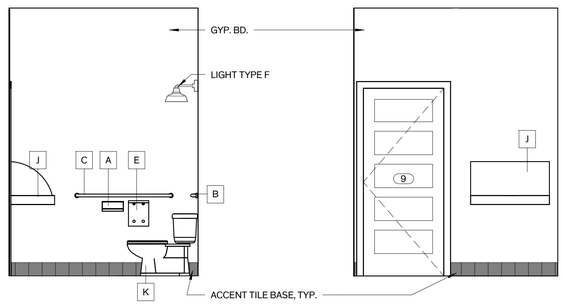
Architexas No. 2314
Date January 17, 2025

Sheet Name
Enlarged Plans - Restrooms

Sheet Number
A6.0



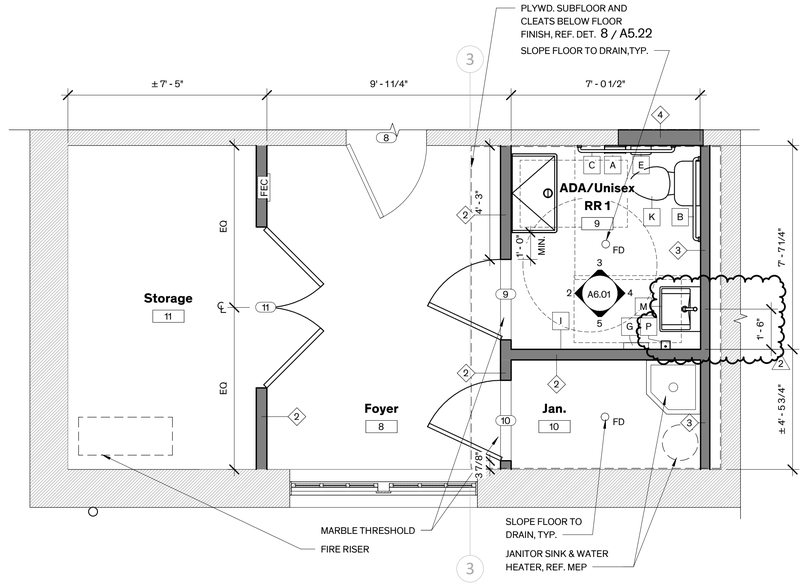
5 ADA/Unisex RR 1 - East
3/8" = 1'-0"



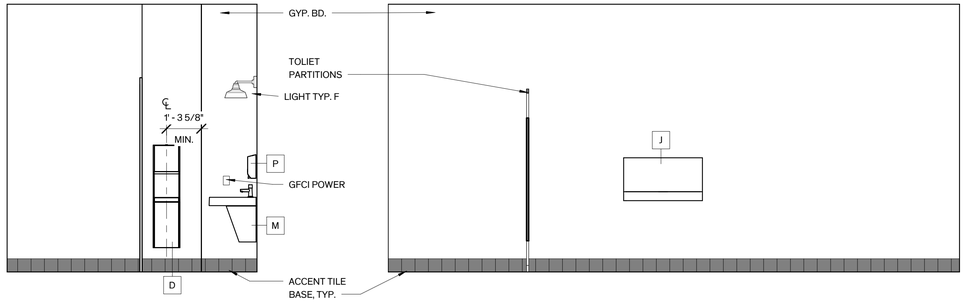
4 ADA/Unisex RR 1 - North
3/8" = 1'-0"

3 ADA/Unisex RR 1 - West
3/8" = 1'-0"

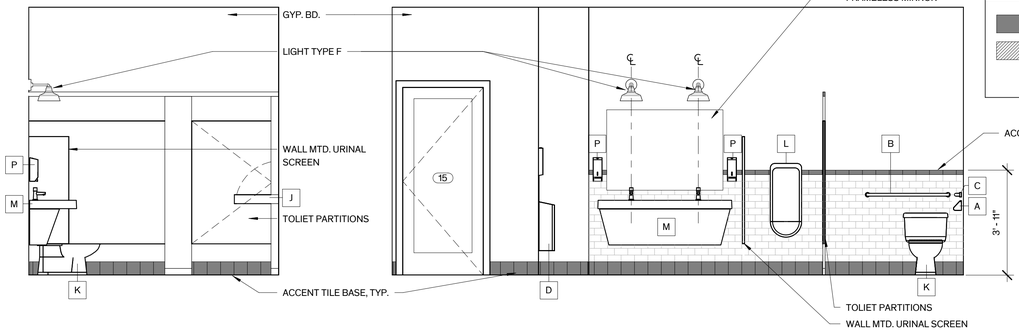
2 ADA/Unisex RR 1 - South
3/8" = 1'-0"



1 HC RR 1 Enlarged Plan
3/8" = 1'-0"



17 Men's RR - East
3/8" = 1'-0"



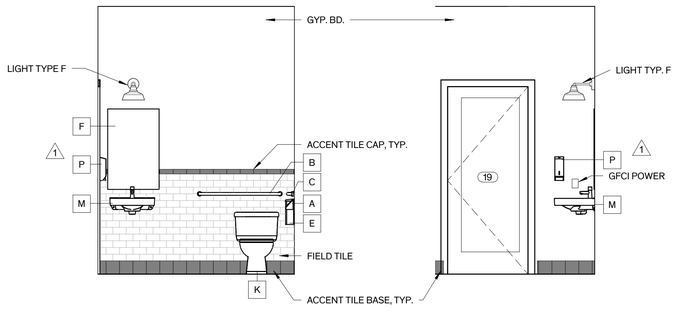
16 Men's RR - North
3/8" = 1'-0"

15 Men's RR - West
3/8" = 1'-0"

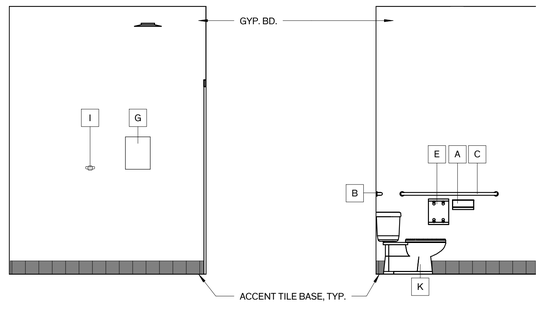
14 Men's RR - South
3/8" = 1'-0"

LEGEND - ENLARGED PLAN

- NEW WALL
- EXIST'G WALL
- FEC — FIRE EXTINGUISHER SEMI-RECESSED CABINET



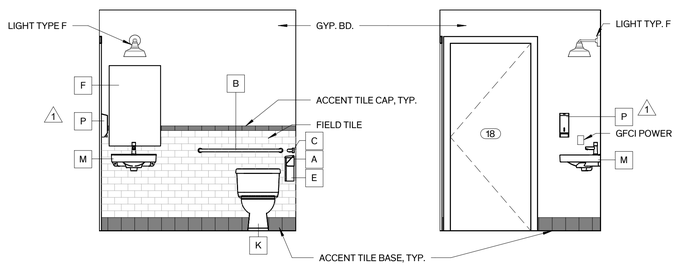
13 ADA/Unisex RR 3 - East
3/8" = 1'-0"



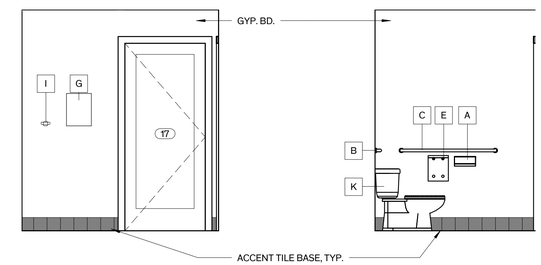
12 ADA/Unisex RR 3 - North
3/8" = 1'-0"

11 ADA/Unisex RR 3 - West
3/8" = 1'-0"

10 ADA/Unisex RR 3 - South
3/8" = 1'-0"



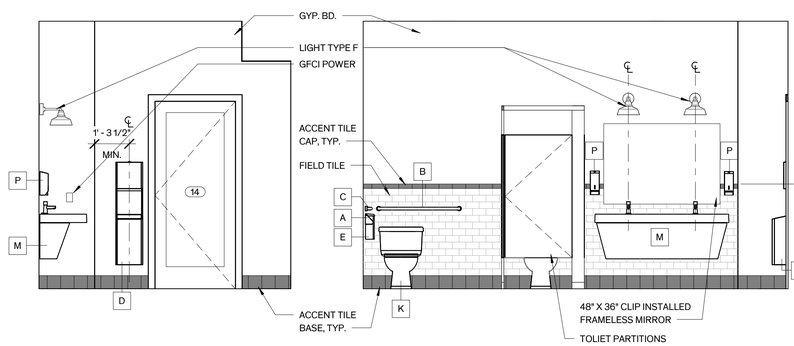
9 ADA/Unisex RR2 - East
3/8" = 1'-0"



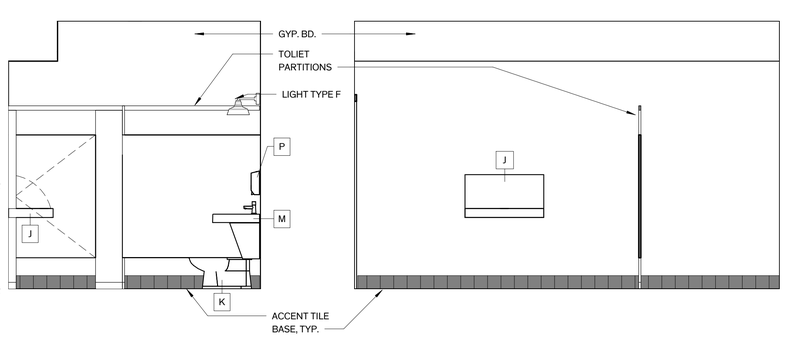
8 ADA/Unisex RR2 - North
3/8" = 1'-0"

7 ADA/Unisex RR2 - West
3/8" = 1'-0"

6 ADA/Unisex RR2 - South
3/8" = 1'-0"



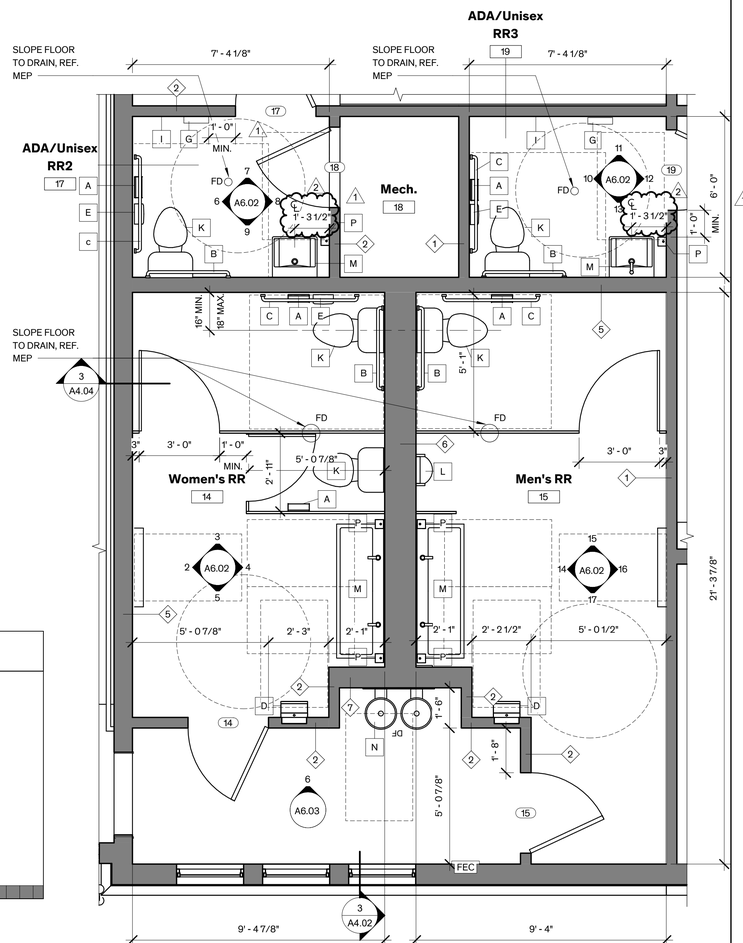
5 Women's RR - East
3/8" = 1'-0"



4 Women's RR - North
3/8" = 1'-0"

3 Women's RR - West
3/8" = 1'-0"

2 Women's RR - South
3/8" = 1'-0"



1 Addition Restrooms Enlarged Plan
3/8" = 1'-0"

PLAN NORTH

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City of Dripping Springs
1 STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION

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Issued for Permit and Construction

REGISTERED ARCHITECT ALEXIS M. McKINNEY 22892 STATE OF TEXAS

#22892 07/22/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
Enlarged Plans - Restrooms

Sheet Number
A6.0

ADDENDUM NO. 1

Project: **STEPHENSON SCHOOL BUILDING & PARKING IMPROVEMENTS**
Owner: **City of Dripping Springs, Texas**
311 Old Fitzhugh Rd
Dripping Springs, Texas 78620
Architect: **Architexas**
1023 Springdale Rd
Bldg 11, Suite E
Austin, Texas 78721
512.444.4220
Engineer: **Doucet**
Date: **July 8, 2025**



7/9/2025

Respondents are hereby notified of the following revisions and/or clarifications to the construction plans, contract documents and specifications. This Addendum forms a part of the Contract and clarifies, corrects, or modifies original Proposal Documents.

BEGIN REVISIONS

NOTE OPEN BUILDING & SITE VISIT DATE: The building will be available and open on Thursday July 10, 2025 from 10 AM through 4 PM.

Bidder Questions

1. Question: Is a geotechnical report and hazardous material testing and abatement specification available.

   Response: Refer to the specification appendix for both the geotechnical and environmental testing and abatement specification.

2. Question: Has the project been permitted? Have the permit fees been paid?

   Response: The project has received its permit from the City of Dripping Springs and is available for pick up. The permit fee has been paid.

3. Question: Please share the Pre-bid attendance sign-in sheet.

   Response: Pre-bid attendance sign-in sheet is attached.

Specification Revisions

Section B-1 Cost Proposal Form

REPLACE – Cost proposal form in its entirety with updated version that includes building alternates and unit prices.

08 71 00 – Door Hardware

REPLACE – Change of door stop product at specific door locations included in door hardware schedule.

Drawing Revisions

Sheet A0.01 – COVER SHEET
UPDATE – Update Sheet List

Sheet A0.02 - LIFE SAFETY
UPDATE – Update room name for Green Room – Room 16.

Sheet A1.02 – SITE DETAILS
UPDATE – Update handrail dimensioning to show 12 inch extension to back of railing.

Sheet A1.03 - SITE DETAILS
UPDATE – Update handrail dimensioning to show 12 inch extension to back of railing.

Sheet A2.01 – FLOOR PLAN & REFLECTED CEILING PLAN
UPDATE – Update room name for Green Room – Room 16.

Sheet A5.01 – FINISH SCHEDULE
UPDATE – Update room name for Green Room – Room 16.

Sheet A6.01 – ENLARGED PLANS – RESTROOMS
UPDATE – Provide TAS handrail mounting height range in ADA legend.

Sheet A6.02 – ENLARGED PLANS – RESTROOMS
UPDATE – Relocate soap dispenser in accessible restrooms 17 & 19 for TAS compliance. Provide additional dimensions for TAS compliance at room 19.

Sheet A6.04 – ENLARGED PLANS & INTERIOR ELEVATIONS
UPDATE – Update room name for Green Room – Room 16.

Sheet A7.11 – MILLWORK DETAILS
UPDATE – Update room name for Green Room – Room 16.

END REVISIONS

RESPONDANTS MUST ACKNOWLEDGE RECEIPT OF THIS ADDENDUM ON THEIR BID PROPOSAL RESPONSE TO HAVE THEIR PROPOSALS RECOGNIZED.

Approved for Distribution By:

Garrett W. Osborne
City Inspector

DRIPPING SPRINGS
Texas

City of Dripping Springs / Stephenson Building and Parking Improvements

Pre-Bid Conference @ Site

July 2, 2025- 1:00 pm

Sign-In Sheet:

Firm	Attendee	Contact Info
Braun & Butler Const.	Tommy McDow	estimating@braun-butler.com
Trifecta Services	John Flynn	jflynn@trifecta
LEE EVANS/PREMIER COMMERCIAL GROUP		Levans@premier-cg.com
Sisk-Robb, Inc	Esteban Zuniga	Jstafford@sisk-robb.com
ASD Consultant inc	Farid wahidy	officeeng2018@gmail.com
DEHARO RAMIREZ GP TX	Mario Albini	mario@dhrg-gc.com
QA CONSTRUCTION	MICHAEL LINFORD	MICHAEL.LINFORD@QACSI.COM
Sadie Burche	Robert Guerrero	oscar@sadieburche.com
ASD Consultants inc	Vidhi Fouzdar	estimatingconst@gmail.com
G Creek Construction	John Haralson	john@gcreek.com
AirCraft inc	Jose Segura	jose@aircraftinc.net
Doucet	Joe Grasso	jgrasso@kleinfelder.com
CE Contracting	Steve Gola	cecontracting@rocketmail.com
ARC Abatement	Pedro Meza	Pedrogarza@Arcabatement.com
Architexas	Alexis McKinney	amckinney@architexas.com

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City of Dripping Springs / Stephenson Building and Parking Improvements
Bid Tabulation Summary- References

Bidder's Firm Name:

Bid Item	Project Element	Reference	Scope of Work / Remarks	Bid Amount
1	Stephenson Building- Adaptive Re-Use & Addition- "Base Bid"	Architexas Plans, Specs & Bid Docs Pkg.	Adaptive Re-Use of existing Historic Building, with an attached Addition of New Construction- Building Permit Case #2025-1075	$
2	Stephenson Parking Improvements (excluding Alternate "A" Parking Lot Power)	HDR / Doucet (Kleinfelder) Plans, Specs & Bid Docs Pkg	Parking Lot with associated Site Improvements- Site Development Permit Case #SD 2024-022	$
-		**Bid Items 1+2**	**Subtotal- Building and Parking Improvements:**	**$**
3	Add Alternate "A" Parking Lot Power & Electrical Service	E103, E502, E602 HDR / Doucet set	Add: Convenience Outlets and associated enabling Electrical Service to facilitate use of Parking Lot during City authorized events	$
4	Add Alternate "B" Rambo Lodge (offsite) Supplemental Paving	Rambo Lodge Easement Exhibit B	Add: Paving Mill & Overlay all deteriorated paving in Rambo Lodge parking area, per Agreement	$
Bid Recap	**Total Project (All Elements, including Add Alternates)**	**Bid Items 1+2+3+4**	**Total Bid Summary:**	**$**

DRIPPING SPRINGS
Texas

City of Dripping Springs / Stephenson Building and Parking Improvements
Bid Tabulation Summary- References

Bidder's Firm Name:

Bid Item	Project Element	Reference	Scope of Work / Remarks	Bid Amount
5	Stephenson Building- Alternate No. 1: Replace Windows at Existing Building:	Architexas Plans, Specs & Bid Docs Pkg.	1. Base Bid: Restore wood frames and replace sashes as indicated in Drawings and Section 080283. 2. Alternate Bid: Remove existing windows and frames throughout and replace with Mahogany Marvin Ultimate Wood Single Hung or Marvin Ultimate Wood Single Hung Magnum windows and frames with insulating glazing. Match original windows in style and muntin patterning. Customize as required for height of west elevation windows.	Alternate No. 1: Replace Windows at Existing Building: $_____
6	Stephenson Building- Alternate No. 2: Roof Thermal and Acoustic Insulation at Existing Building:	Architexas Plans, Specs & Bid Docs Pkg.	1. Base Bid: 5 1/2" rigid insulation between existing 2x6 rafters, 1/2" gypsum wallboard thermal barrier at underside of rafters, 2" spray applied acoustic insulation ceiling finish. 2. Alternate Bid: 5 1/2" batt insulation between existing 2x6 rafters, 2" black acoustic board at underside of rafters.	Alternate No. 2: Roof Thermal and Acoustic Insulation at Existing Building: $_____
7	Stephenson Building- Alternate No. 3: Under-platform Storage at Existing Building:	Architexas Plans, Specs & Bid Docs Pkg.	1. Base Bid: Provide wood framed storage space below existing platform in Multi-Use B. Scope includes additional wood framing, reinforcement of existing framing, storage room floor and walls, and hinged access doors. Refer to drawings S2.01, A4.21, A6.05, and A6.11. 2. Alternate Bid: Omit all work associated with under-platform storage.	Alternate No. 3: Under-platform Storage at Existing Building: $_____

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8	Stephenson Building- UNIT PRICE SCHEDULE: Unit Price No. 1 – Stone Repairs	Architexas Plans, Specs & Bid Docs Pkg.	1. Limestone Removal and Replacement a. Unit of Measurement: Per square foot. 2. Limestone Re-pointing a. Unit of Measurement: Per lineal foot. 3. Limestone Patching Repair a. Unit of Measurement: Per location (not to exceed 6-inch x 6-inch by 1-inch deep). 4. Limestone Crack Repair a. Unit of measurement: Per location (not to exceed 18-inches long).	8.1. Limestone Removal and Replacement $_____/sf 8.2. Limestone Re-pointing $_____/lf 8.3. Limestone Patching Repair $_____/loc. 8.4. Limestone Crack Repair $_____/loc.
9	Stephenson Building- UNIT PRICE SCHEDULE: Unit Price No. 2 – Window Repairs	Architexas Plans, Specs & Bid Docs Pkg.	1. Brick Mold Replacement a. Unit of Measurement: Per window unit. 2. Wood Sill Replacement a. Unit of Measurement: Per window unit. 3. Wood Dutchman Repair at Frame or Blind Stop a. Unit of Measurement: Per location. 4. Frame or Blind Stop Replacement in Lieu of Wood Dutchman Repair a. Unit of Measurement: Per Location. 5. Replace Mullion Cover Board. a. Unit of Measurement: Per location.	9.1. Brick Mold Replacement $_____/unit 9.2. Wood Sill Replacement $_____/loc. 9.3. Wood Dutchman Repair at Frame or Blind Stop $_____/loc.

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				9.4. Frame or Blind Stop Replacement in Lieu of Wood Dutchman Repair $_____/loc. 9.5. Replace Mullion Cover Board. $_____/loc.
10	Stephenson Building- UNIT PRICE SCHEDULE: Unit Price No. 3 – Plaster Repair / Replacement	Architexas Plans, Specs & Bid Docs Pkg.	1. Plaster Finish Repair / Replacement. a. Unit of Measurement: Per square foot.	10. Plaster Finish Repair / Replacement $_____/sf
11	Stephenson Building- UNIT PRICE SCHEDULE: Unit Price No. 4 – Baseboard Replacement	Architexas Plans, Specs & Bid Docs Pkg.	1. Wood Baseboard Replacement a. Unit of Measurement: Per lineal foot.	11. Baseboard Replacement $_____/lf
12	Stephenson Building- UNIT PRICE SCHEDULE: Unit Price No. 5 – Exterior Wood Trim Replacement	Architexas Plans, Specs & Bid Docs Pkg.	1. Wood Fascia Board Replacement a. Unit of Measurement: Per lineal foot. 2. Wood Roof Eave Soffit Board Replacement: Per lineal foot. 3. Wood Rafter Tail Replacement a. Unit of measurement: Per lineal foot.	12.1. Wood Fascia Board Replacement $_____/lf 12.2. Wood Roof Eave Soffit Board Replacement $_____/lf

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				12.3. Wood Fascia Board Replacement $_____/lf
13	Stephenson Building- UNIT PRICE SCHEDULE: Unit Price No. 6 – Wood Floor Restoration	Architexas Plans, Specs & Bid Docs Pkg.	1. Wood Floorboard Replacement a. Unit of Measurement: Per lineal foot.	13. Wood Floorboard Replacement $_____/lf

END

* * *

SECTION 087100

DOOR HARDWARE

PART 1 – GENERAL:

1.01 SUMMARY:

A. Section includes the supply and installation of the Finish Hardware.
   1. Include the termination of all Electrified Hardware.
   2. Include field verification of any existing doors, frames, or hardware.

B. Related Sections
   1. Division 1
   2. Sealants – Division 7 / Division 7
   3. Openings – Division 8 / Division 8
   4. Finishes – Division 9 / Division 9
   5. Fire Alarm – Division 13/ Division 28
   6. Electrical – Division 16 / Division 26
   7. Security – Division 16 / Division 28

1.02 REFERENCES:

A. Documents and Institutes that shall be used in estimating, detailing, and installing the items specified.
   1. International Building Code – Current/Adopted Edition
   2. ICC/ANSI A117.1 – Accessible and Usable Building and Facilities - Current/Adopted Edition
   3. NFPA 70 – Current/Adopted Edition
   4. NFPA80 –Standards for Fire Doors and Fire Windows–Current/Adopted Edition
   5. NFPA101 – Life Safety Code – Current/Adopted Edition
   6. NFPA105 – Installation of Smoke-Control Door Assemblies – Current/Adopted Edition.
   7. ANSI - American National Standards Institute
   8. BHMA – Builders Hardware Manufacturers Association
   9. UL – Underwriters Laboratory
   10. DHI – Door and Hardware Institute
   11. Texas Accessibility Standards – Current Adopted Edition
   12. Local Building Codes

1.03 SUBMITTALS

A. Comply with pertinent provisions of Division 01.

B. Finish Hardware Schedule to be in vertical format to include:
   1. Heading #/Hardware Set
   2. Door #, Location, Hand, Degree of Opening, Door Size and Type, Frame Size and Type, Fire Rating
   3. Quantity, type, style, function, product, product number, size, fasteners, finish, and manufacturer of each hardware item.
   4. Location of hardware set cross-referenced to indications on Drawings both on floor plans and in door and frame schedule.
   5. Keying schedule

6. Title Sheet, Index, Abbreviations, Manufacturers List, Template List and Templates.
7. Mounting locations for hardware.
8. Explanation of abbreviations, symbols, and codes contained in schedule. Date of the Finish Hardware Specification and Drawing / Door Schedule used in completing the Finish Hardware Schedule.
9. In Name, Company and Date of Field Verification if required.
10. Door Index; include door number, heading number, and hardware group.
11. Name and phone number for local manufacturer's representative for each product.
12. Submit in conjunction with Door and Frame Submittal.
13. Operation Description of openings with electrified hardware.

C. LEED Submittals:
1. Refer to Division 1 for any LEED submittal requirements.

D. Product Data: Provide product data in the form of a binder, manufacturer's technical product fact sheets for each item of hardware. Include whatever information may be necessary to show compliance with requirements, including instructions for installation and for maintenance of operating parts and finish.

E. Wiring Diagrams: Provide Riser/Elevation and Point to Point Wiring Diagrams for all openings with electrified hardware. Include all information that is necessary for coordination with other trades.

F. Samples: Provide samples as requested by Owner or Architect with Heading # and Door# marked on boxes. All samples will be returned to the contractor and used on doors for which they were marked.

G. Templates: Provide templates of finish hardware items to each fabricator of doors, frames and other work to be factory or shop prepared for the installation of hardware.

H. Keying Schedule: After meeting with the Owner, a keying schedule shall be submitted using keyset symbols referenced in DHI manual "Keying Systems and Nomenclature." The keying schedule shall be indexed by door number, keyset, hardware heading number, cross keying instructions and special key stamping instructions.

I. Operations and maintenance data: At the completion of the job, provide to the Owner one hard copies or one electronic copy of an Owner's operation and maintenance manual. The manual shall consist of a labeled hardcover three ring binder with the following technical information:
1. Title page containing: Project name, address, and phone numbers. Supplier's name, address, and phone numbers.
2. Table of Contents.
3. Copy of final (file and field use/as-installed) Finish Hardware Schedule.
4. Final Keying Schedule.
5. Maintenance instruction, adjustment, and preservation of finishes for each item of hardware.
6. Catalog pages for each item of hardware.
7. Installation Instructions for each item of hardware
8. Parts List for each item of hardware.
9. As installed point to point wiring diagrams for electrified hardware.
10. Warranties include Order #.

1.04 QUALITY ASSURANCES

Substitutions: Request for substitutions shall not be accepted within this project. Architect, Owner and Finish Hardware Consultant have selected one (1) specified and two (2) equals listed hereinafter in the Hardware Schedule. By this selection process they have established three (3) equal products for competitive pricing, while insuring no unnecessary delays by a substitution process. If any specified product is listed as a “No Substitution” product, this product will be supplied as specified, with no alteration or request of substitution. The reason for this is to comply with the uniformity established at this project. Parts and supplies are inventoried for these particular products for ease and standardization of replacement.

A. Supplier Qualifications: Supplier shall be recognized architectural finish hardware supplier, with warehousing facilities, who have been furnishing hardware in the project vicinity for a period of not less than 2 year and who is or employs a DHI Certified AHC, DHC, DHSC or person with a minimum of 10 years of experience as a hardware supplier. This person shall be available at reasonable times during the course of the work for consultation about products hardware requirements, to the Owner, Architect and General Contractor.

B. Installer Qualifications (Mechanical Hardware): All finish hardware shall be installed by the Finish Hardware Installer with a minimum of at least two (2) years documented experience. Installer shall attend a pre-installation meeting between the General Contractor, Finish Hardware Supplier/s, hardware manufacturer’s representative for locks, closers and exit devices, and all door / frame suppliers. The Finish Hardware Installer shall be responsible for the proper installation and function of all doors and hardware.

C. Installer Qualifications (Electrified Hardware): All electrified finish hardware (power source, electrified locking or control device, switching device, through wire device and monitoring device) shall be installed by an Electronic Access Control Installer licensed by the Texas Department of Public Safety. The Electrified Finish Hardware Installer shall have a minimum of at least two (2) years of documented experience. Installer shall attend a pre-installation meeting between the General Contractor, Finish Hardware Supplier/s, Electrical Contractor, Fire Alarm Contractor, Security Contractor, hardware manufacturer’s representative for electrified hardware, all door / frame suppliers. The Electrified Finish Hardware Installer shall be responsible for the proper installation, termination, and function of all opening with electrified hardware. Installation shall include termination of all electrified products (including the required wire to the power supply and/or junction box).

1.05 DELIVERY, STORAGE AND HANDLING

A. Marking and packaging: Mark each item or package separately, with identification related to hardware set number, door number and keyset symbol.

B. Delivery:
1. Deliver individually packaged and properly marked finish hardware at the proper time and location to avoid any delays in construction or installation.
2 At time of delivery, inventory hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.

C. Storage: Store hardware in enclosed, dry, and locked area.

1.06 WARRANTY

A. All finish hardware products shall be covered by a 1-year factory warranty from the date of substantial completion of the project.

B. Supply warranty verification to the owner for all products that provide factory warranty. Warranty should include Factory Order # and date.

1.07 MAINTENANCE:

A. Maintenance Service
1. None

B. Extra Materials:
1. All extra screws, fasteners, and all special installation tools furnished with the hardware shall be turned over to the owner at the completion of the job.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Screws and Fasteners:
1. All closers and exit devices provided for exterior doors, hollow metal doors, and all other required shall be provided with thru-bolts.
2 All finish hardware shall be installed to manufacturer's recommendations, using screws, attachments and installation tools provided with the hardware. No other screws or attachments are acceptable.

B. Hinges:
1. Template: Provide templated units only.
2 Exterior: All exterior hinges shall be stainless steel base with stainless steel pin and stainless-steel finish.
3. Interior: All interior hinges steel based.
4. Interior corrosive: All interior hinges at corrosive areas shall be stainless steel base with stainless still pin and stainless-steel finish.
5. All hinges on doors over 36" wide, with exit devices, or with push/pull shall be heavy weight.
6. Electric Hinge: Provide minimum 8 wire.
7. Provide non-removable pins for out swinging doors that are locked or are lockable.
8. All hinges on doors with door closers shall be ball bearing.
9. All hinges shall be full mortise.
10. Size: Provide 4 ½ x 4 ½ hinges on doors up to 3'0" in width. Provide 5 x 4 ½ hinges over 3'0" to 4'0" in width. Reference manufacturers catalog for all other sizes.
11. Number of Hinges: Provide number of hinges indicated but not less than 3 hinges for door leaf for doors 90" or less in height and one additional hinge for each 30" of additional height.
12. Adjust hinge width as required for door, frame, trim and wall conditions to allow proper degree of opening.
13. Provide hinges conforming to ANSI/BHMA A156.1.

14. Provide spring hinges where specified. Provide two spring hinges and one bearing hinge per door leaf for doors 90 inches (2286 mm) or less in height. Provide one additional bearing hinge for each 30 inches (762 mm) of additional door height.
15. Supply from the following list of manufacturers:
    Ives IVE
    Mckinney MCK
    Bommer BOM
16. Supply ball tips where indicated in finish to match.

C. Continuous Hinges
1. Continuous hinges to be manufactured of6063-T6aluminum.
2 Continuous hinge shall be certified to ANSI 156.26, Grade 1
3 Continuous hinge should be tested an approvedUL10C.
4 Electrified – Provide minimum 8 wire with removable panel.
5 Provide hinges 1 inch shorter in length than nominal height of door, unless otherwise noted.
6 Provide reinforcing for doors weighing over 450 pounds and up to 600 pounds.
7. Supply from the following list of manufacturers:
    Ives IVE
    Select SEL
    Stanley STA

D. Mortise Locks
1. All locks on this project should be manufactured by the same manufacturer.
2 Mortise locksets shall meet ANSI/BHMA A156.13, Series 1000, Grade 1 Operational with all standard trims and conventional mortise cylinders.
3 All mortise locks shall be UL Listed for 3-hourfire door. Review lock for any height restriction.
4 Provide locks with a standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latch bolt. Provide deadbolt with full 1 inch (25 mm) throw, constructed of stainless steel.
5 Provide dust box.
6 Supply from the following list of manufacturers:
    Schlage SCH
    Falcon FAL
    Best BES

E. Cylindrical Locks
1. All locks on this project should be manufacturer by the same manufacturer.
2 All locks shall meet the new ANSI/BHMA A156.2, Series 4000, Grade 1.
3 All cylindrical locks shall be UL Listed for 3-hour fire door. Review lock for any height restriction.
4 Provide locks with standard 2-3/4 inches (70 mm) backset, unless noted otherwise, with a 1/2-inch (13 mm) latch throw. Provide proper latch throw for UL listing at pairs.
5 Provide standard ASA strikes unless extended lip strike is necessary for frame/trim or 7/8” lip strike is necessary at pair with overlapping astragal.
6 Provide dust box.
7. Lockset shall adjust to fit door thickness from 1 ¾” to 2 1/8”.

8. Supply from the following list of manufacturers:
9. Schlage SCH
   Falcon FAL
   Best BES

F. Exit Devices
1. All exit device types on this project should be manufactured by the same manufacturer.
2. Exit devices are to be architectural grade touch bar type. Touchpad to extend one half of door width.
3. Mechanism case to be smooth.
4. Exit devices shall meet ANSI A156.3, Grade 1.
5. All exit devices are UL listed Panic Exit or Fire Exit Hardware.
6. All lever trim to match lock trim in design and finish.
7. Dogging: Non-rated devices are to be provided with dogging. Less dogging where shown in Hardware Sets (some exterior, electrical rooms, electrified) Cylinder dogging as shown in hardware sets.
8. Exit devices are to be supplied and installed with thru-bolts for exterior, hollow metal doors, or as required for application.
9. Provide proper power supply for exit devices as required. Coordinate with Fire Alarm, Electrical and Security Contractor.
10. Push pads shall be metal, no plastic inserts allowed.
11. Exit devices shall have a flush endcap.
12. Exit devices shall be ordered with the correct strike for application.
13. Exit devices shall be order in the proper length to meet door width.
14. Exit devices shall have dead latching.
15. Exit device shall be provided in width/height required based on door size.
16. Install exit devices with fasteners supplied by exit device manufacturer.
17. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits as required.
18. Provide proper concealed vertical rods for wood or hollow metal doors as required.
19. Factory or field drill weep holes for exit devices used in full exterior applications, highly corrosive areas, and where noted in the hardware sets.
20. Supply from the following list of manufacturers:
    Von Duprin VON 35/98 Series
    Falcon FAL
    Detex DET

G. Flush Bolts
1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.
2. Supply from the following list of manufacturers:
   Ives IVE
   Trimco TRI
   Rockwood ROC

H. Coordinators

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers and surface vertical rod exit device strikes. Factory-prep coordinators for vertical rod devices and hardware as required.
3. Supply from the following list of manufacturers:

Ives	IVE
Trimco	TRI
Rockwood	ROCPull Plates/Pulls/Push Plate

4. Pull and Push Plates to meet ANSI 156.6 for .050" thickness.
5. Pull and Push Plate size to 4" x 16".
6. Pull Plate to have 10" center and 1" round on pull plate with concealed fasteners.
7. Provide straight and offset pulls with fasteners as required.
8. Provide concealed fasteners for all applications.
9. Prep plate for cylinder/lock as required.
10. Supply from the following list of manufacturers

Ives	IVE
Trimco	TRI
Rockwood	ROC

I. Door Closers

1. All door closers on this project should be manufactured by the same manufacturer.
2. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
3. Door closers shall be furnished with standard cover. Provide full cover as shown in hardware sets.
4. Size in accordance with the manufacturer's recommendations for door size and condition.
5. Door closers shall be furnished with delayed action, hold-open as listed in the Hardware Sets.
6. Door closers shall be mounted out of the line of sight wherever possible (i.e., room side of corridor doors, etc.) with parallel arm mounting on out swinging doors.
7. All closer installation shall include thru bolts on exterior, hollow metal doors or where required for application.
8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.
9. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
10. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
11. Supply from the following list of manufacturers

Falcon	FAL SC70 / SC80
LCN	LCN 4011 /4111
Norton	NOR 78B/D

J. Door Protection Plates
1. Protective plates shall meet ANSI A156.6 requirements for .050 thickness.
2 Protection plates should be fabricated from stainless steel or brass based on finish.
3 Protection plate shall be height as shown in Hardware Sets. Width shall be 10" by 2" less than door width on single door or pair with a mullion and 1" less than door width on pair of doors without mullion.
4 Beveled 4 edges.
5 Provide kickplate on all doors with closers, unless not required for aesthetic reasons.
6 Prep protective plates for hardware as required.
7. Supply from the following manufacturers:

Ives	IVE
Rockwood	ROC
Trimco	TRI

K. Door Stops and Holders:
1. Supply wall stops at all openings to protect doors or door hardware. Install so lock does not lock unintentionally. Install blocking in wall where wall stop will be mounted.
2 When wall conditions do not permit use of wall stop provide floor stops with risers as needed to adjust for floor conditions.
3 When wall conditions do not permit use of wall stop provide overhead stops. Jamb mount where required to not be visible from Corridor.
4 Exterior Ground Level Doors: Provide security floor stop.
5 Exterior Roof Doors: Provide heavy duty overhead stop.
6 Supply from the following list of manufacturers:

Glynn Johnson	GLY
Rockwood	ROC
Trimco	TRI

L. Silencers
1. Provide silencers on all doors without seal. 3 for single doors and 2 for pairs.
2 Provide silencers as required for frame conditions. SR64 for hollow metal frames. SR65/SR66 for wood frames.
3 At wood frames, ensure height of stop is compatible with silencer.
4 Supply from the following list of manufacturer's

Ives	IVE
Rockwood	ROC
Trimco	TRI

M. Thresholds/Weatherstripping

1. Thresholds on doors in the accessible path shall conform to accessibility codes.
2 Threshold should be based on sill detail.
3 Smoke seal shall be teardrop design bulb seal.
4 Exterior seal/thresholds shall be silicone or brush as shown in hardware sets.
5 Drip strips shall protrude 2 ½" and be 4" wider than opening.
6 At S Label single doors provide seals on frame to comply with UL1784
7. At S Label pair of doors provide seals on frame and as meeting stile to comply with UL1784.

8. Automatic Door Bottom shall be mortised to comply with accessibility codes.
9. Supply from the following list of manufacturer's

Zero	ZER
National Guard	NGP
Pemko	PEM

N. Top Hung Interior Folding Partitions on Bi-Fold Track System

1. 8 panel unit pivoted to one side with an additional single hung panel leaf.
2. Floor pivot socket to be flush to adjacent floor.
3. Longest track lengths are referred.
4. Supply from the following list of manufacturer's or similar.

Basis of design Brio	BRI

2.03 KEYING:

A. General: Finish Hardware Supplier shall meet in person with owner to finalize keying requirements prior to the locks and exit devices being ordered and match existing or start a new Master Key System for the project. During keying meeting all hardware functions should be reviewed with the owner to finalize lock and exit device functions. During keying meeting determine all expansion required.

B. Cylinders: Provide the correct and quantity of cylinders for all applications. Keys: Provide nickel silver keys only. Furnish 2 change keys for each lock: 5 control keys: 5 master keys for each master system and 5 grandmaster keys for each grandmaster key system. Deliver all keys to Owners Representative.

C. Cores and keys shall be provided with identification stamping.

D. Provide construction keying / construction cores for this project with constructions keys.

E. Provide Bitting List to Owner.

2.04 KEY CONTROL:

A. Key Management: Key control shall be provided, by supplying a complete key storage and management system. Each key shall be fully cut, indexed, tagged, and installed on cabinet hooks by the lock supplier and shipped with the locks. Key cabinet provided shall be wall-mounted type with capacity plus 50%.

PART 3 – EXECUTION:

3.01 EXAMINATION:

A. Examine doors, frames and related items for conditions that would prevent the proper application of any finish hardware items. Do not proceed with installation until all defects are corrected.

B. Existing Door and Frame Compatibility: Field verify existing doors and frames receiving new hardware and existing conditions receiving new openings. Verify that new hardware is compatible with existing door and frame preparation and existing conditions.

C. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 INSTALLATION:

A. Follow Door and Hardware Institute Publication:
Recommended Location for Architectural Hardware for Standard Steel Doors and Frames
Recommended Location for Builder's Hardware for Custom Steel Doors and Frames
Recommended Locations for Architectural Hardware for Wood Flush Door

B. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.

C. Follow ANSI A117.1-1998 Accessible and Usable Building and Facilities and Texas Accessibility Standards.

D. Review mounting locations with Architect where required.

E. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers should not be visible in corridors, lobbies, and other public spaces where possible.

F. Locate power supplies in accessible location and indicate in as-builts where located.

G. Set threshold in full bed of sealant complying with requirements specified in Division 07.

H. Pre-Installation meeting required with attendees to include Architect, General Contractor, Mechanical Hardware Installer, Electrified Hardware Installer, Finish Hardware Supplier and Manufacturer's Representative for Exit Device, Locks and Closers and Door/Frame Suppliers before installation begins.

3.03 FIELD QUALITY CONTROL:

A. After installation has been completed, obtain the services of an Architectural Hardware Consultant to check for proper installation of finish hardware, according to the finish hardware schedule and keying schedule. In addition, check all hardware for adjustments and proper operation.

3.04 ADJUST AND CLEAN:

A. Adjust, clean, and inspect all hardware, to ensure proper operation and function of every opening. Replace items, which cannot be adjusted to operate freely and smoothly as intended for the application made.

3.05 PROTECTION:

A. The General Contractor shall use all means at his disposal to protect all finish hardware items from abuse, corrosion and other damage until the owner accepts the project as complete.

3.06 TRAINING

A. After installation has been completed, provide training to the Owner on the operation of the Finish Hardware and programming of any electrified hardware.

3.07 HARDWARE SCHEDULE

A. These hardware set shown below are for use as a guideline. Provide hardware as required to meet the requirements of the openings, security, and code requirements.

Door#	HwSet#
1	C714AJ
2A	S711J
2B	SC715J
3A	S711J
3B	001
4	S203JS
5	S711J
6	C2121SJ
7	S203J
8	S403J
9	343JS
10	203JS
11	2121SJ
13C	C715AJ
14	801CJ
15	801J
16	103S
17	343JS
18	203JS
19	343J
20	C714AJ
21	103J
22	103J

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Legend:
Link to catalog cut sheet

Hardware Group No. 001

For use on Door #(s):
3B

QTY		DESCRIPTION	CATALOG NUMBER	FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)	643e	MCK
1		PUSH/PULL	8311	613	IVES
1		PUSH PLATE	8200	613	613
8		BI-FOLD PANEL ONE SIDE	BRIO	SN	BRI
		TRACK	350 (STANDARD LENGTHS)		
		BRACKET	1SS/250		
1		PIVOT SET	21HP/21HP-C		
3		HANGERS	21/4HN		
1		HANGERS	21HN		
21		HINGES	404/3S		
4		GUIDES	21RB/94		
		CHANNELS	94A,94B,94P,94A		
5		FLUSH PULLS	401		
5		FLUSH BOLTS	456		

COORDINATE WITH ARCHITECT TO RESTORE & UTILIZE EXISTING RECESSED PULL HARDWARE

Hardware Group No. 103J

For use on Door #(s):
21 22

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	OFFICE/ENTRY LOCK	L9050T LATA L583-363		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 103S

For use on Door #(s):
16

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	OFFICE/ENTRY LOCK	L9050T LATA L583-363		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	OH STOP	90S		643E/716	GLY
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 203JS

For use on Door #(s):
10 18

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	STOREROOM LOCK	L9080T LATA		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	OH STOP	90S		643E/716	GLY
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 343J

For use on Door #(s):
19

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	L9040 LATA L583-363 OS-OCC		643e	SCH
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 343JS

For use on Door #(s):
9 17

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	PRIVACY LOCK W/ OUTSIDE INDICATOR	L9040 LATA L583-363 OS-OCC		643e	SCH

1	EA	OH STOP	90S		643E/716	GLY
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 801CJ

For use on Door #(s):
14

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	TRADITIONAL CAST PULL	RM5532		613	ROC
1	EA	TRADITIONAL PLAIN CAST PLATE 3.5" X 15"	RM5598B		613	ROC
1	EA	SPRING ARM CLOSER	UNI78B/D MTG BRKT, SPCR & PLATE AS REQ		613	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 801J

For use on Door #(s):
15

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	TRADITIONAL CAST PULL	RM5532		613	ROC
1	EA	TRADITIONAL PLAIN CAST PLATE 3.5" X 15"	RM5598B		613	ROC
1	EA	REGULAR ARM CLOSER	78B/D-RA		613	NOR
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		613	IVE
3	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. 2121SJ

For use on Door #(s):
11

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	CONST LATCHING BOLT	FB61P		613	IVE
1	EA	DUST PROOF STRIKE	DP2		643E/716	IVE
1	EA	STOREROOM LOCK	L9080T LATA		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH

~~1~~	~~EA~~	~~OH HOLD-OPEN~~	~~90H~~		~~643E/7 16~~	~~GLY~~
2	**EA**	**KICK DOWN HOLDER**	**FS455**		**613**	**IVE**
~~1~~ **2**	EA	WALL STOP	WS406/407CCV		613	IVE
2	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE

Hardware Group No. C714AJ

For use on Door #(s):
1 20

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
2	EA	CONTINUOUS HINGE	112XY EPT		313AN	IVE
2	EA	POWER TRANSFER	EPT10 CON		SP313	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-3347A-EO-LBR-CON 24 VDC		313	VON
1	EA	ELEC PANIC HARDWARE	RX-QEL-3347A-NL-OP-LBR-388-CON 24 VDC		313	VON
1	EA	RIM CYLINDER	20-057 ICX W/ CONSTRUCTION CORE		613	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
2	EA	TRADITIONAL CAST PULL	RM5510		613	ROC
2	EA	SPRING ARM CLOSER	UNI78B/D MTG BRKT, SPCR & PLATE AS REQ		613	NOR
1	EA	RAIN DRIP	142D DOOR WIDTH + 4"		D	ZER
1	EA	PERIMETER SEAL	BY FRAME MANUFACTURER			B/O
1	EA	MEETING STILE SEAL	BY DOOR MANUFACTURER			B/O
2	EA	DOOR SWEEP	39D		D	ZER
1	EA	THRESHOLD	655D-E-223		D	ZER
1	EA	CREDENTIAL READER	BY SECURITY - DIVISION 28			B/O
2	EA	DOOR POSITION SWITCH	BY SECURITY - DIVISION 28			B/O
1	EA	POWER SUPPLY FOR ELEC PANIC	PS902 900-2RS 120/240 VAC		LGR	SCE

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY THE CREDENTIAL READER OR KEY OVERRIDE.
- FREE EGRESS AT ALL TIMES.
- DOORS WILL REMAIN LOCKED UPON LOSS OF POWER.
- COORDINATE POWER SUPPLY WITH SECURITY CONTRACTOR PRIOR TO SUBMITTALS.
- OMIT POWER SUPPLY WHERE PROVIDED BY THE SECURITY CONTRACTOR.

Hardware Group No. C715AJ

For use on Door #(s):
13C

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	CONTINUOUS HINGE	112XY EPT		313AN	IVE
1	EA	POWER TRANSFER	EPT10 CON		SP313	VON

1	EA	ELEC PANIC HARDWARE	RX-QEL-33A-NL-OP-388-299-CON 24 VDC		643E	VON
1	EA	RIM CYLINDER	20-057 ICX W/ CONSTRUCTION CORE		613	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	TRADITIONAL CAST PULL	RM5510		613	ROC
1	EA	SPRING ARM CLOSER	UNI78B/D MTG BRKT, SPCR & PLATE AS REQ		613	NOR
1	EA	RAIN DRIP	142D DOOR WIDTH + 4"		D	ZER
1	EA	PERIMETER SEAL	BY FRAME MANUFACTURER			B/O
1	EA	DOOR SWEEP	39D		D	ZER
1	EA	THRESHOLD	655D-E-223		D	ZER
1	EA	CREDENTIAL READER	BY SECURITY - DIVISION 28			B/O
1	EA	DOOR POSITION SWITCH	BY SECURITY - DIVISION 28			B/O
1	EA	POWER SUPPLY FOR ELEC PANIC	PS902 900-2RS 120/240 VAC		LGR	SCE

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY THE CREDENTIAL READER OR KEY OVERRIDE.
- FREE EGRESS AT ALL TIMES.
- DOORS WILL REMAIN LOCKED UPON LOSS OF POWER.
- COORDINATE POWER SUPPLY WITH SECURITY CONTRACTOR PRIOR TO SUBMITTALS.
- OMIT POWER SUPPLY WHERE PROVIDED BY THE SECURITY CONTRACTOR.

Hardware Group No. C2121SJ

For use on Door #(s):
6

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
5	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	ELECTRIC HINGE	TA2714 4.4 x 4.5 CC8 BT (BALL TIP)		643e	MCK
1	EA	CONST LATCHING BOLT	FB61P		613	IVE
1	EA	DUST PROOF STRIKE	DP2		643E/716	IVE
1	EA	ELEC MORTISE LOCK (FAIL SECURE)	L9092TEU LATA RX CON 12/24 VDC		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	OH STOP	90S		643E/716	GLY
1	EA	WALL STOP	WS406/407CCV		613	IVE
2	EA	SILENCER	SR64 OR SR65 (HM OR WD FRAME)		GRY	IVE
1	EA	CREDENTIAL READER	BY SECURITY - DIVISION 28			B/O
2	EA	DOOR POSITION SWITCH	BY SECURITY - DIVISION 28			B/O
1	EA	POWER SUPPLY FOR ELEC LOCK	PS902 120/24 VAC		LGR	SCE

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY THE CREDENTIAL READER OR KEY OVERRIDE.
- FREE EGRESS AT ALL TIMES.
- DOORS WILL REMAIN LOCKED UPON LOSS OF POWER.
- COORDINATE POWER SUPPLY WITH SECURITY CONTRACTOR PRIOR TO SUBMITTALS.
- OMIT POWER SUPPLY WHERE PROVIDED BY THE SECURITY CONTRACTOR.

Hardware Group No. S203J

For use on Door #(s):
7

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	STOREROOM LOCK	L9080T LATA		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	WALL STOP	WS406/407CCV		613	IVE
1	EA	PERIMETER SEAL (FOR SOUND)	117SBK PSA		BK	ZER
1	EA	CONCEALED AUTO DOOR BOTTOM (FOR SOUND)	350AA		AA	ZER

Hardware Group No. S203JS

For use on Door #(s):
4

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	STOREROOM LOCK	L9080T LATA		643e	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	OH STOP	90S		643E/716	GLY
1	EA	PERIMETER SEAL (FOR SOUND)	117SBK PSA		BK	ZER
1	EA	CONCEALED AUTO DOOR BOTTOM (FOR SOUND)	350AA		AA	ZER

Hardware Group No. S403J

For use on Door #(s):
8

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	TA2714 4.4 x 4.5 BT (BALL TIP)		643e	MCK
1	EA	PASSAGE SET	L9010 LATA		643e	SCH
1	EA	WALL STOP	WS406/407CCV		613	IVE

1	EA	PERIMETER SEAL (FOR SOUND)	117SBK PSA		BK	ZER
1	EA	CONCEALED AUTO DOOR BOTTOM (FOR SOUND)	350AA		AA	ZER
~~1~~	~~EA~~	~~KICK DOWN HOLDER~~	~~FS455~~		~~613~~	~~IVE~~
1	**EA**	**OH HOLD-OPEN**	**90H**		**613**	**IVE**

Hardware Group No. S711J

For use on Door #(s):
2A 3A 5

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	T4A3386 4.5 X 4.5 BT (BALL TIP)		613	MCK
1	EA	PANIC HARDWARE	55-L-01-SNB		643E	VON
1	EA	RIM CYLINDER	20-057 ICX W/ CONSTRUCTION CORE		613	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	PARALLEL ARM CLOSER	78B/D-PA		613	NOR
1	EA	ADJUSTABLE THRESHOLD	68 (2), 676		D	ZER
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	PERIMETER SEAL (FOR SOUND)	117SBK PSA		BK	ZER
1	EA	CONCEALED AUTO DOOR BOTTOM (FOR SOUND)	350AA		AA	ZER

Hardware Group No. SC715J

For use on Door #(s):
2B

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	T4A3386 4.5 X 4.5 BT (BALL TIP)		613	MCK
1	EA	ELECTRIC HINGE	T4A3386 4.5 X 4.5 -+CC8 BT (BALL TIP)		613	MCK
1	EA	ELEC EXIT DEVICE	RX-QEL-99-NL-OP-110MD-CON 24 VDC		313	VON
1	EA	RIM CYLINDER	20-057 ICX W/ CONSTRUCTION CORE		613	SCH
1	EA	FSIC PERMANENT CORE	23-030		613	SCH
1	EA	TRADITIONAL CAST PULL	RM5510		613	ROC
1	EA	SPRING ARM CLOSER	UNI78B/D MTG BRKT, SPCR & PLATE AS REQ		613	NOR
1	EA	RAIN DRIP	142D DOOR WIDTH + 4"		D	ZER
1	SET	GASKETING	328D H & J		D	ZER
1	EA	DOOR SWEEP	39D		D	ZER
1	EA	ADJUSTABLE THRESHOLD	68 (2), 269 (2), 675 (3)		D	ZER
1	EA	CREDENTIAL READER	BY SECURITY - DIVISION 28			B/O
1	EA	DOOR POSITION SWITCH	BY SECURITY - DIVISION 28			B/O
1	EA	POWER SUPPLY FOR ELEC PANIC	PS902 900-2RS 120/240 VAC		LGR	SCE

- DOORS NORMALLY CLOSED AND LOCKED.
- ENTRY BY THE CREDENTIAL READER OR KEY OVERRIDE.
- FREE EGRESS AT ALL TIMES.
- DOORS WILL REMAIN LOCKED UPON LOSS OF POWER.
- COORDINATE POWER SUPPLY WITH SECURITY CONTRACTOR PRIOR TO SUBMITTALS.
- OMIT POWER SUPPLY WHERE PROVIDED BY THE SECURITY CONTRACTOR.

END SECTION 087100

STEPHENSON SCHOOL BUILDING

Rehabilitation and Addition

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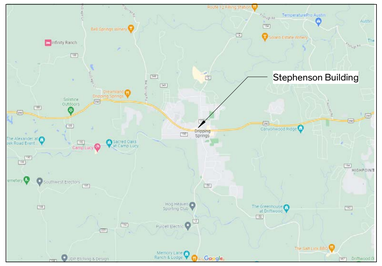
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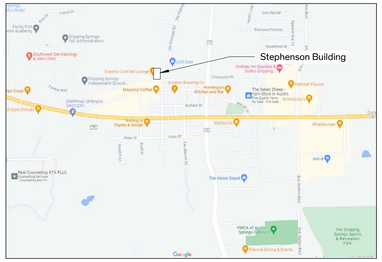
VICINITY MAP

CITY OF DRIPPING SPRINGS



STREET MAP

CITY OF DRIPPING SPRINGS





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GENERAL NOTES

GENERAL DEMOLITION NOTES

1. THE MAXIMUM ALLOWABLE LOADING ON THE EXISTING FLOOR STRUCTURES SHALL BE CONFIRMED WITH STRUCTURAL ENGINEER. AREAS OF THE BUILDING WHICH MAY HAVE GREATER LOADING IMPOSED ON IT BY THE CONTRACTOR'S DEMOLITION PROCEDURE SHALL BE SHORED. COORDINATE WITH STRUCTURAL.
2. EXISTING STRUCTURE SHALL BE SHORED PRIOR TO COMMENCEMENT OF DEMOLITION. SECTIONS OF STRUCTURE BEING DEMOLISHED SHALL NOT BE ALLOWED TO DROP ONTO FLOOR STRUCTURE BELOW.
3. SHORING SHALL TRANSFER LOADING DIRECTLY TO EXISTING LOAD BEARING MASONRY WALLS. SHORING SHALL BE DESIGNED TO SUPPORT THE FULL ANTICIPATED LOADING WITH NO BENEFIT FROM THE EXISTING STRUCTURAL FRAMING.
4. EXISTING CONSTRUCTION SHOWN TO REMAIN SHALL NOT BE DAMAGED DURING THE DEMOLITION PROCESS. PROVIDE ALL NECESSARY TEMPORARY PROTECTION.

GENERAL CONSTRUCTION NOTES

1. THE WORK SHALL CONFORM WITH THE CURRENT EDITION OF THE FOLLOWING REGULATIONS AS ADOPTED BY THE CITY OF DRIPPING SPRINGS:
   - -2018 INTERNATIONAL BUILDING CODE
   - -2018 INTERNATIONAL EXISTING BUILDING CODE
   - -2018 INTERNATIONAL FIRE CODE
   - -2018 INTERNATIONAL PLUMBING CODE
   - -2018 INTERNATIONAL MECHANICAL CODE
   - -2017 NATIONAL ELECTRICAL CODE
   - -2018 INTERNAL ENERGY CONSERVATION CODE
   - -2012 TEXAS ACCESSIBILITY STANDARDS
   - -U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
2. THE CONTRACTOR SHALL VISIT THE SITE TO REVIEW AND SURVEY EXISTING CONDITIONS TO FULLY UNDERSTAND SCOPE OF WORK.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND INSPECTIONS AND PAY ALL APPLICATION FEES.
4. IF THE CONTRACTOR PERFORMS OR PROCEEDS WITH ANY WORK, CONTRARY TO APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS WITHOUT GIVING PRIOR WRITTEN NOTICE TO THE ARCHITECT, HE/SHE SHALL ASSUME FULL RESPONSIBILITY THEREFORE AND SHALL BEAR ALL COST ATTRIBUTABLE.
5. THE CONTRACTOR SHALL CAREFULLY STUDY THE CONTRACT DOCUMENTS PRIOR TO CONSTRUCTION AND SHALL REPORT TO THE ARCHITECT ANY ERROR, INCONSISTENCY OR OMISSION DISCOVERED AND SHALL NOT PROCEED WITH THE WORK UNTIL THE INTENT OF THE DOCUMENTS IS VERIFIED BY THE ARCHITECT.
6. ALL DRAWINGS AND SPECIFICATIONS FORMING PART OF THE CONSTRUCTION DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS CALLED FOR BY ONE WILL BE BINDING AS IF CALLED FOR BY ALL; ANY WORK SHOWN OR REFERRED TO ON ANY ONE DOCUMENT SHALL BE PROVIDED AS THOUGH SHOWN ON ALL DOCUMENTS.
7. THE CONTRACT DOCUMENTS SHALL BE INTERPRETED WITH THE FOLLOWING ORDER OF PRECEDENCE: SPECIFICATIONS, DETAILS, ENLARGEMENTS, OVERALL DRAWINGS, AND SUBSEQUENT CLARIFICATIONS. ADDENDA SHALL OVERRIDE THE AFFECTED COMPONENTS IN ALL OF THE ABOVE. ALL VERBAL CLARIFICATIONS ARE TO BE RECORDED BY THE CONTRACTOR AND SENT TO THE ARCHITECT WITHIN SEVEN DAYS OF THE OCCURRENCE.
8. THE CIVIL, STRUCTURAL, MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, LANDSCAPING, AND AUDIO/VISUAL DOCUMENTS ARE SUPPLEMENTARY TO THE ARCHITECTURAL DOCUMENTS. SHOULD THERE BE A DISCREPANCY BETWEEN THE ARCHITECTURAL DOCUMENTS AND THE STRUCTURAL, MECHANICAL, PLUMBING, ELECTRICAL, LANDSCAPING, AND AUDIO/VISUAL DOCUMENTS, SUCH DISCREPANCY IS TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. THE CONTRACTOR SHALL RECEIVE INSTRUCTIONS PRIOR TO INSTALLATION OR PERFORMANCE OF SAID WORK. ANY WORK PERFORMED OR INSTALLED IN CONFLICT WITH THE DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
9. INFORMATION CONTAINED ON THESE DRAWINGS WITH REGARD TO EXISTING CONDITIONS OF CONSTRUCTION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR EXECUTING THE WORK. EVERY ATTEMPT HAS BEEN MADE TO PROVIDE COMPLETE AND ACCURATE REPRESENTATIONS OF SUCH EXISTING CONDITIONS. THIS INTERPRETATION HAS BEEN TAKEN BY FIELD MEASUREMENT AND OBSERVATION. THE ARCHITECT HAS ENDEAVORED TO IDENTIFY AS COMPLETELY AS POSSIBLE IN THE CONSTRUCTION DOCUMENTS, EXISTING ITEMS OF EQUIPMENT AND CONSTRUCTION THAT ARE REQUIRED TO BE REMOVED OR OTHERWISE DEMOLISHED. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR AND IS IN NO WAY INTENDED TO MEAN THAT DEMOLITION IS LIMITED ONLY TO THOSE ITEMS SPECIFICALLY IDENTIFIED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXECUTE DEMOLITION WORK AS REQUIRED TO REMOVE ELEMENTS AND SYSTEMS IDENTIFIED IN THE CONSTRUCTION DOCUMENTS, ALONG WITH THEIR ASSOCIATED PARTS.
10. ALL AREAS AND ITEMS INDICATING CONTRACT LIMITS AND LINES OF DEMARCATION ARE SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR AND ARE NOT TO BE TAKEN LITERALLY. ACTUAL CONTRACT LIMITS ARE TO BE DETERMINED PRIOR TO CONSTRUCTION BY FIELD VERIFICATION.
11. EXISTING CONSTRUCTION SHOWN TO REMAIN SHALL NOT BE DAMAGED DURING THE DEMOLITION PROCESS. PROVIDE ALL NECESSARY TEMPORARY PROTECTION.
12. CONTRACTOR TO ASSIST THE ARCHITECT IN MAKING THEIR EVALUATIONS AND RECOMMENDATIONS BY PROVIDING IN A TIMELY MANNER, AT NO ADDITIONAL COST TO THE OWNER, ACCURATE AND COMPLETE DRAWINGS, SKETCHES, AND PHOTOGRAPHS, SUFFICIENT TO CLEARLY DESCRIBE DISCREPANCIES, CONFLICTS, AND CONCEALED OR OTHERWISE UNANTICIPATED CONDITIONS AFFECTING NEW CONSTRUCTION.
13. SCAFFOLDING AND SHORING CANNOT BE SECURED TO EXISTING HISTORIC MATERIALS, OR CAUSE DAMAGE TO EXISTING MATERIALS.
14. REINSTALL EACH ELEMENT IN ITS ORIGINAL LOCATION UNLESS NOTED OTHERWISE.
15. SIZE NOTED IN CONSTRUCTION DOCUMENTS FOR ORIGINAL MATERIALS ARE APPROXIMATE AND ARE TO BE FIELD VERIFIED PRIOR TO SUBMITTAL OF SHOP DRAWINGS. MATCH EXACT SIZES AND PROFILES OF ORIGINAL ELEMENTS.
16. FIELD VERIFICATIONS OF EXISTING CONDITIONS RELATED TO SPECIFIC PORTIONS OF THE WORK SHALL BE UNDERTAKEN IN ADVANCE TO ALLOW FOR THE TIMELY IDENTIFICATION OF EXISTING CONDITIONS THAT MAY AFFECT THE SCHEDULED INSTALLATION OF NEW WORK AS DESIGNED AND DETAILED, AND TO AVOID UNDUE AND UNREASONABLE DELAYS TO THE PROJECT SHOULD SUCH CONDITIONS BE DISCOVERED. TIMELY IDENTIFICATION OF SUCH CONDITIONS SHALL PROVIDE FOR A MINIMUM PERIOD OF 10 (TEN) WORKING DAYS DURING WHICH TIME THE ARCHITECT WILL EVALUATE THE CONDITION AND MAKE RECOMMENDATIONS FOR ACCOMMODATING NEW WORK.
17. CONTRACTOR IS TO PROVIDE AND INSTALL ALL ACCESS PANELS, RATED OR OTHERWISE, SIZE AS REQUIRED, AT ALL CONCEALED MECHANICAL AND PLUMBING ITEMS WHICH REQUIRE SERVICE OR ACCESS (VALVES, FIE DAMPERS, DUCT HEATERS, ETC.). ACCESS PANELS IN RATED CEILINGS AND PARTITIONS SHALL HAVE THE APPROPRIATE UL LABELS.
18. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL EQUIPMENT MANUFACTURER'S ROUGH-IN REQUIREMENTS.
19. EXISTING UTILITY SERVICES ARE TO REMAIN, BE PROTECTED, AND/OR TO BE OPERATIONAL DURING DEMOLITION AND CONSTRUCTION. REFERENCE RELEVANT CIVIL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS. CONTRACTOR TO BE RESPONSIBLE FOR PROTECTION OF AND RESTORATION OF SERVICES, AS WELL AS PROVISION OF TEMPORARY UTILITY SERVICES.
20. NOTIFY CITY OF DRIPPING SPRINGS WHEN IT IS NECESSARY TO AFFECT UTILITIES BEFORE PROCEEDING WITH THE WORK. ALL EXISTING UTILITIES MUST BE CHECKED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF DEMOLITION WORK. ANY DAMAGES RESULTING FROM LACK OF COMPLIANCE WITH THE PROVISIONS SHOULD BE CORRECTED BY THE CONTRACTOR AT HIS OR HER OWN EXPENSE.

NEW FASTENERS

1. ATTACHMENTS TO MASONRY I.E.: CONDUIT, WOOD FRAMING, ETC. MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURES UNLESS NOTED OTHERWISE.

CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS AND CEILINGS:

1. CONDUIT, WIRING, AND PIPING, IS TO BE CONCEALED BEHIND FINISH FACE OF GYPSUM BOARD AND PLASTER WALLS UNLESS NOTED OTHERWISE.
2. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
3. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE OF THE WALL.

PENETRATIONS AT MASONRY WALLS:

1. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENT, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION OF OPERATION OF ELECTRICAL, MECHANICAL, AND PLUMBING SYSTEMS. RE: STRUCTURAL FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

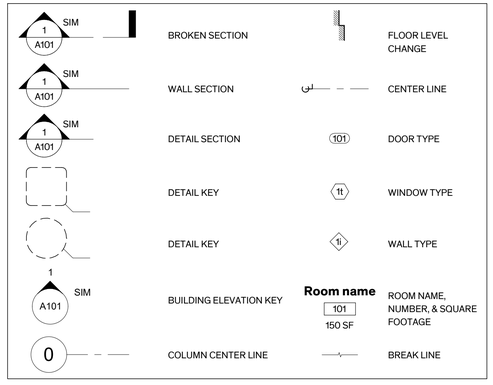
EXISTING BUILDING:
1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

ABBREVIATIONS

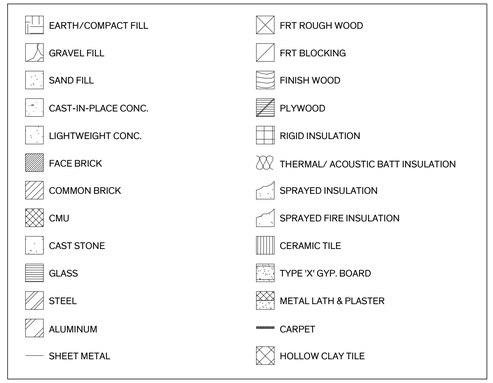
±	PLUS/MINUS
DIAM.	DIAMETER
A/C	AIR CONDITIONER
ACM	ASBESTOS CONTAINING
AHU	AIR HANDLING UNIT
CABS.	CABINETS
CLG.	CEILING
CONC.	CONCRETE
DN.	DOWN
ELEV.	ELEVATOR
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
FIXT.	FIXTURES
FLR.	FLOOR
F.R.	FIRE RATED
GYP.	GYPSUM
HIST.	HISTORIC
MECH.	MECHANICAL
MIN	MINIMAL
MISC.	MISCELLANEOUS
MTL.	METAL
MFR	MANUFACTURER
NIC	NOT IN CONTRACT
OC	ON CENTER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OPNG	OPENING
ORIG.	ORIGINAL
PTD.	PAINTED
PTN.	PARTITION
QTR.	QUARTER
REF.	REFERENCE
REQ'D	REQUIRED
SSTL	STAINLESS STEEL
STRUCT.	STRUCTURAL
T.B.D.	TO BE DETERMINED
TRTD	TREATED
TYP.	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
W/	WITH
WD.	WOOD

NOTE: CONTRACTOR SHALL VERIFY WITH ARCHITECT FOR ANY ABBREVIATION NOT LISTED.

SYMBOL LEGEND



MATERIAL LEGEND



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REHABILITATION AND ADDITION

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REVISION HISTORY
1 07/08/2025 Addendum 1

Issued for Permit and Construction

REGISTERED ARCHITECT ALEXIS M. MCKINNEY 22892 STATE OF TEXAS

#22892 07/08/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
Cover Sheet

Sheet Number
A0.01

BUILDING CODE ANALYSIS

Applicable Code(s):
1. International Building Code (IBC) - 2018 Edition
2. International Existing Building Code (IBEC) - 2018 Edition
3. International Fire Code (IFC) - 2018 Edition
4. International Plumbing Code (IPC) - 2018 Edition
5. International Mechanical Code (IMC) - 2018 Edition
6. National Electrical Code (NEC) - 2023 Edition
7. International Energy Conservation Code (IECC) - 2018 Edition
8. City of Dripping Springs Code of Ordinances
9. 2012 Texas Accessibility Standards

SUMMARY SHEET - BUILDING CODE (IEBC Table 1301.7)

Existing occupancy:	**B**	Proposed occupancy:	**A-3, B**
Year building was constructed:	**1939**	Number of stories: **1**	Height in feet: **±25'-0"**
Type of construction:	**V-B**	Area per floor:	**5,901 sq.ft.**
Percentage of open perimeter:	**100%**	Percentage of height reduction:	**0%**
Completely suppressed:	**Yes**	Corridor wall rating:	**N/A**
Compartmentation:	**No**	Required door closers:	**No**
Fire Resistance of rating of vertical opening enclosures:	**N/A**		
Type of HVAC system:	**Split System**		
Automatic fire detection:	**Yes**	Type and location:	**Smoke detectors throughout**
Fire alarm system:	**Yes**	Type:	**Fire alarm system complying w/ sect. 907 plus emergency voice/alarm & fire command station**
Smoke control:	**No**	Type:	**N/A**
Adequate exit routes:	**Yes**	Dead ends:	**No**
Maximum exit access travel distance: **250' (Per Table 1017.2, A-3=250' max, B=300' max)**		Elevator controls:	**N/A**
Means of egress emergency lighting: **Yes**		Mixed occupancies: **B; A-3**	

ALLOWABLE HEIGHT AND BUILDING AREA (IBC TABLE 504.3, 504.4, 506.2):

Occupancy:	Group A-3/ B
Construction Type:	V-B
Max. height in feet:	60 feet
Max. number of stories:	2 (A-3), 3 (B)
Max. allowable area:	24,000 sq. ft. (A-3), 38,000 sq.ft. (B)

TYPE OF CONSTRUCTION (IBC Section 602.3)

Type V-B construction is that type of construction in which the structural elements, exterior walls, and interior walls are of any building material permitted by this code.

SEPARATED OCCUPANCIES

Per IBC Table 508.2.4, Required Separation of Occupancies: Occupancy type A shall have a 1-hour separation from occupancy type B (with sprinkler)

REQUIRED FIRE RESISTANCE RATINGS BASED ON CONSTRUCTION TYPE (IBC Table 601)

Type V-B buildings having specific fire resistance requirements for Structural Components as follows:

Structural Frame:	0
Exterior Bearing Walls:	0
Interior Bearing Walls:	0
Non-Bearing Walls:	0
Floor Construction:	0
Roof Construction:	0

AUTOMATIC FIRE SPRINKLER SYSTEMS (IBC Sect. 903)

The following information indicates minimum requirements for installation of a fire sprinkler system in buildings with group A occupancies:

Per 903.2.1, An automatic fire sprinkler system shall be provided throughout buildings and portions thereof used as Group A occupancies. For Group A-3 occupancies, the automatic sprinkler system shall be provided throughout the floor area where the Assembly occupancy is located, and on all floors from the Group A occupancy to, and including, the nearest level of exit discharge serving the Group A

Per 903.2.1.3 for Group A-3, An automatic fire sprinkler system shall be provided throughout a fire area containing a Group A-3 occupancy where one of the following conditions exist:

1. The area exceeds 12,000 sq.ft. - Not Applicable
2. The fire area has an occupant load of 300 or more - Applicable, occupant load is 363 people.
3. The fire area is located on a floor other than the level of exit discharge - not applicable, one story

Due to occupant load an automatic fire sprinkler is required.

FIRE HYDRANT SYSTEMS (IFC Sect. 507.5)

For buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Sec. 903.1.3, a fire hydrant shall be located within 600 feet of the building.
Nearest existing fire hydrant is located at northeast corner of Mercer and Old Fitzhugh, near 222 W. Mercer. Fire hydrant is located with 400 ft. per City code. A hydrant will be added near the water meter at Old Fitzhugh under separate contract. Refer to separate site development permit.

UNDERFLOOR VENTILATION (IBC 1202.4)

Per 1202.4.1.2 Ventilation area for crawl spaces with covered floors, the net area of ventilation openings for crawl spaces with the ground surface covered with a Class 1 vapor retarder shall be not less than 1 square foot for each 1,500 square feet of crawlspace area
3,839 sq.ft. / 1,500 sq.ft = ***2.6 sq.ft. Required*** ***11.6 sq.ft. Provided***

OCCUPANT LOAD (IBC Table 1004.5)

The Occupant load below is based upon the proposed floor plan layout.

Function of Space (area total)	Occupant Load Factor	Occupant Load
A-3		
Assembly (2,088 sq. ft.)	1 person/7 net sq. ft. (Concentrated)	299 persons
Platform (454 sq. ft.)	1 person/15 net sq. ft.	31 persons
Gallery (312 sq. ft.)	1 person/30 net sq. ft. (	11 persons
Catering (179 sq. ft.)	1 person/200 net sq. ft.	1 persons
Dressing (219 sq. ft.)	1 person/50 gross sq. ft.	5 persons
Accessory Storage/Mech (208 sq. ft.)	1 person/ 300 gross sq. ft.	1 person
B		
Business (640 sq. ft.)	1 person/ 150 gross sq. ft.	5 persons
	Total Building Occupancy:	**353 persons**

EXITING REQUIREMENTS (IBC Sect. 1005.3)

Floor	Sizing base on Occupant Load	Minimum size per Opening	Provided
Assembly			
1st Floor	348 persons x 0.2" = 71.6"	32" min. clear (1010.1.1)	3 Exits @ 32"= 144"
Offices			
1st Floor	5 persons x 0.2" = 1"	32" min. clear (1010.1.1)	1 Exit @ 64"

Per Table 1006.3.2 Minimum Number of Exits or Access to Exits per Story. For an occupant load of 1-500, a minimum of two exits or access to exits from story are required.

Per Table 1006.2.1, Two exits or exit access doorways from any space shall be provided where the design occupant load exceeds 49 persons.

PROPOSED NEW BUILDING ELEMENTS AND SYSTEMS:

1. HVAC system: New HVAC system throughout complying with section 1004.3.2.4 and section 602 of the international mechanical code.
2. Automatic Fire detection: New smoke detectors throughout.
3. Means of Egress emergency lighting: New means of egress lighting and exit signs with battery backup power in the event of power failure to the site or building.
4. ADA compliant ramps shall be provided at east entry and in addition as part of the accessible route to the building and the platform.
5. Accessible restrooms throughout
6. Class 1 vapor barrier shall be provided at crawl space

PARKING (City of Dripping Springs Code of Ordinances)

Parking to be provided by Stephenson TIRZ Parking Project, NIC

FENESTRATION PERFORMANCE

GLAZED ALUMINUM STOREFRONT & GLAZED ALUMINUM STOREFRONT DOOR
U-factor = .6 max, SHGC = .4 max, VLT = 62% min

METAL CLAD WOOD WINDOWS (ADDITION)- NRRC Labeled
U-factor = .35 max, SHGC = .3 max, VLT = 62% min

EXISTING WOOD WINDOWS (HISTORIC)- Replace sashes only
U-factor = .35 max, SHGC = .3 max, VLT = 62% min

REQUIRED PLUMBING FIXTURES (IBC Table 2902.1)

A-3 OCCUPANCY (358 Persons)

Water Closets	Male		Female	
	174 persons at 1/125 =	1.4	174 persons at 1/65 =	2.7
TOTAL REQUIRED		2		3
TOTAL PROVIDED		**3**		**4**

Lavatories	Male		Female	
	174 persons at 1/200 =	.87	174 persons at 1/200 =	.87
TOTAL REQUIRED		1		1
TOTAL PROVIDED		**4**		**4**

Drinking Fountains		
	348 occupants @ 1/500=	.7
TOTAL REQUIRED		1
TOTAL PROVIDED		**2**

Service Sink		
	348 occupants @ 1/500=	.7
TOTAL REQUIRED		1
TOTAL PROVIDED		**1**

B OCCUPANCY (5 Persons)
Reference IBC 2902.2 for seprate facilities exception for business occupancy under 25

Water Closets		
B Occupancy	5 persons at 1/25 for 1st 50 & 1/50 for remainder =	.2
TOTAL REQUIRED		1
TOTAL PROVIDED		**1**

Lavatories		
B Occupancy	5 persons at 1/40 for 1st 80 & 1/80 for remainder =	.125
TOTAL REQUIRED		1
TOTAL PROVIDED		**1**

Drinking Fountains
Reference IBC 2902.6 for drinking fountain exception for occupant loads under 15

Service Sink
Reference IBC 2902.1 e. for service sink exception for busniss occupancy under 15

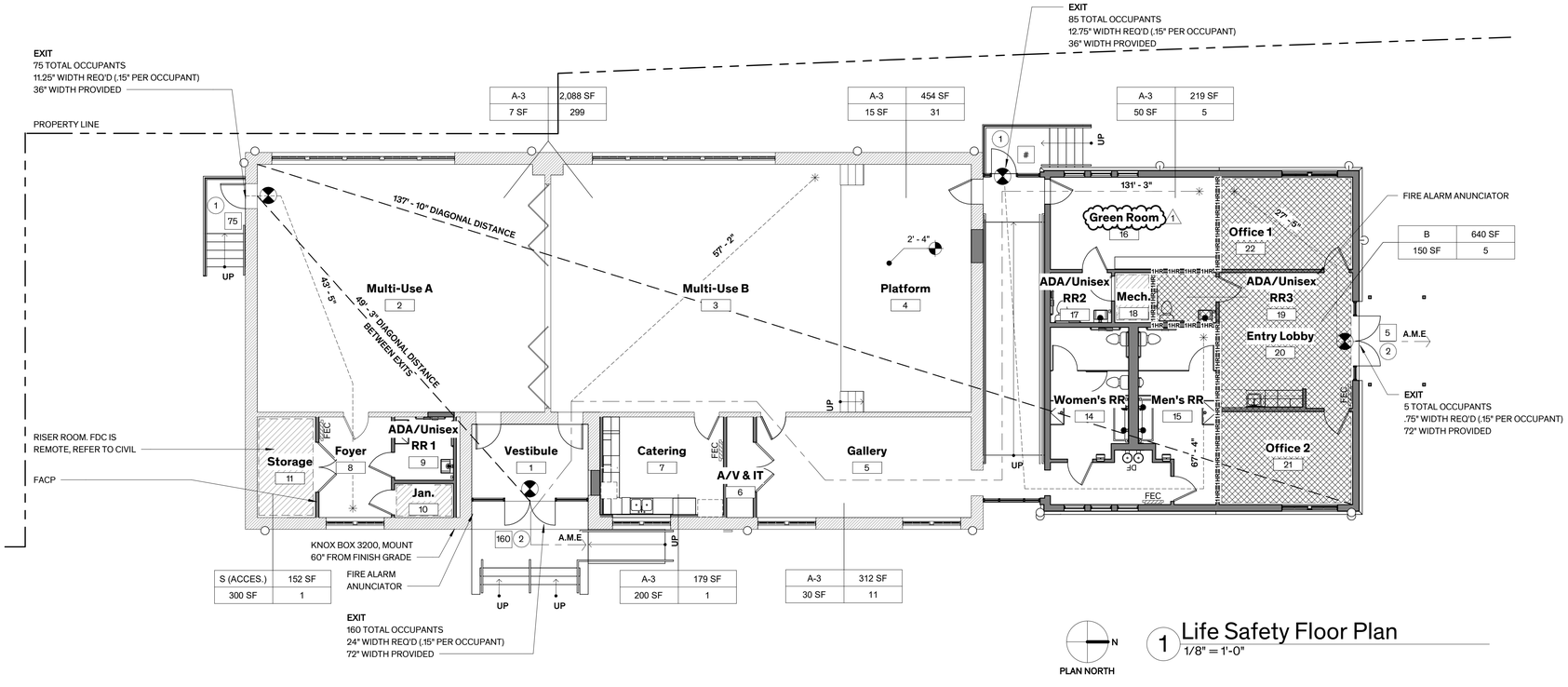
TOTAL FACILITY PROVIDED PLUMBING FIXTURES
Total provided fixture count is 6 water closets, 1 urinal, 7 lavatories, 2 water fountainS, and 1 service sink.

LIFE SAFETY LEGEND

- 1 — 3'-0" DOORS
- 2 — 6'-0" DOORS
- # — # OF OCC. AT EGRESS ELEMENTS
- ✳ — MOST REMOTE POINT OF TRAVEL
- MOST REMOTE POINT OF TRAVEL PATH
- A.M.E — A.M.E = ACCESSIBLE MEANS OF EGRESS
- 1HR 1HR — 1-HR FIRE RATED WALL
- FE — FIRE EXTINGUISHER / BRACKET (MAX 75')
- FEC — FIRE EXTINGUISHER / CABINET (MAX 75')
- EXIT SIGN RE: ELEC
- OCCUPANCY USE AREA

B	31,939 SF
150 SF	212

- OCCUPANT TOTAL PER AREA
- MAX. FLR. AREA ALLOWANCE PER OCCUPANT
- A-3 ASSEMBLY
- B BUSINESS
- ACCESS. STORAGE/MECH



1 Life Safety Floor Plan
1/8" = 1'-0"

Item 2.

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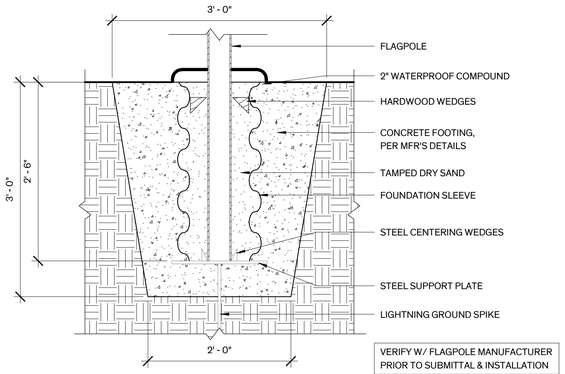
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#22892 07/08/2025

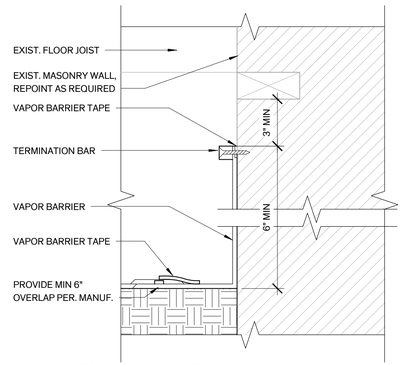
Architexas No. 2314
Date January 17, 2025

Sheet Name
Life Safety

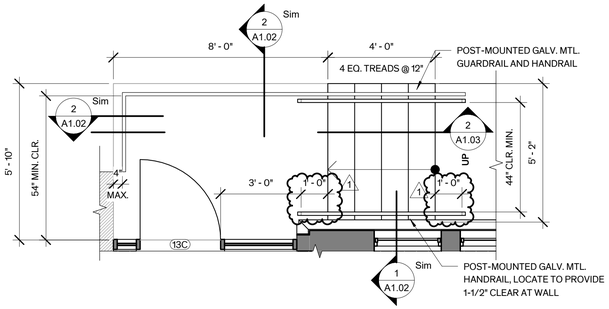
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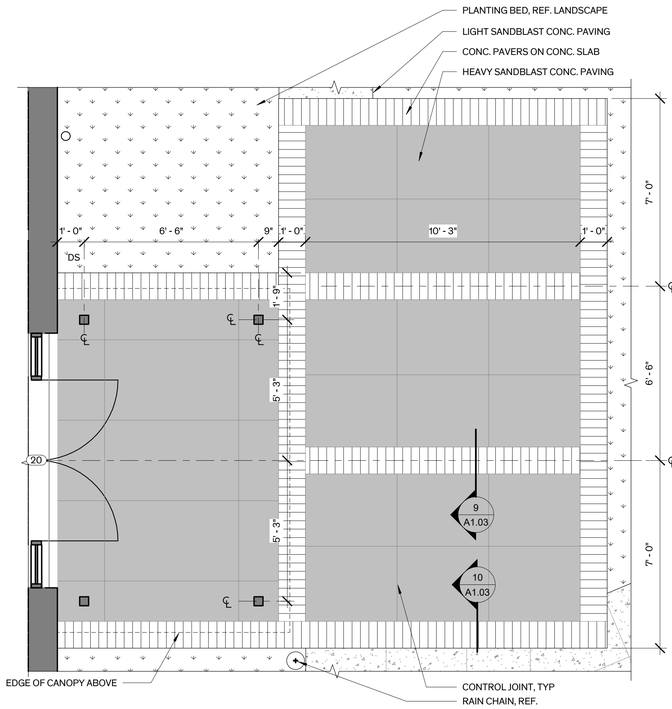
10 Flagpole Base Det.
1" = 1'-0"



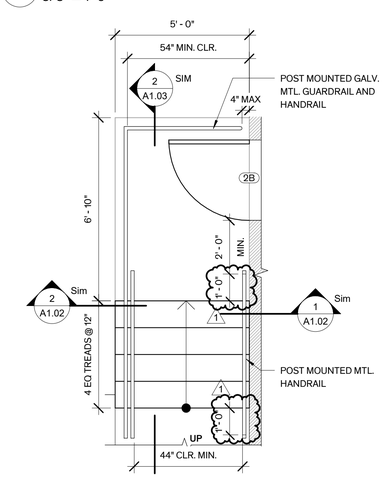
9 Vapor Barrier @ Crawlspace
3" = 1'-0"



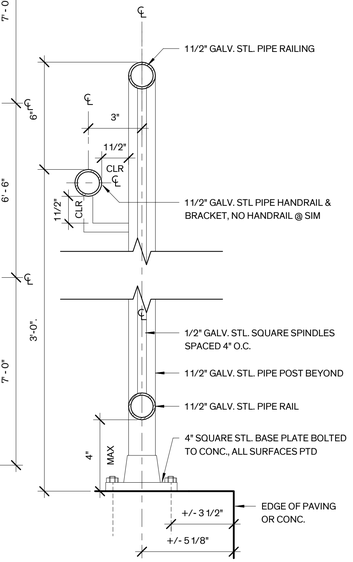
6 Enlarged Site Plan- West Stairs
3/8" = 1'-0"



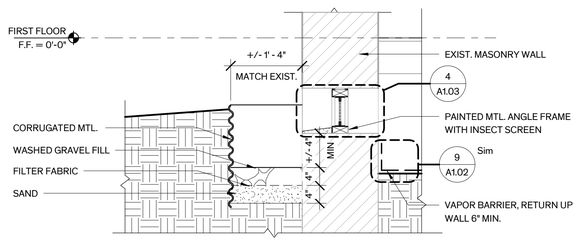
4 Enlarged Site Plan- North Porch
3/8" = 1'-0"



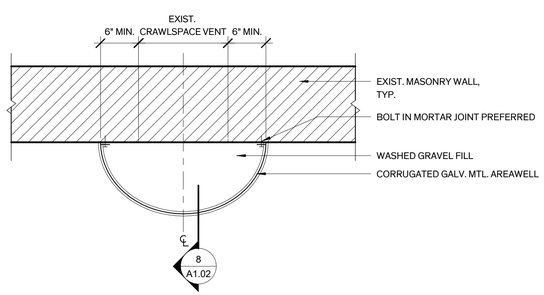
5 Enlarged Site Plan- South Stairs
3/8" = 1'-0"



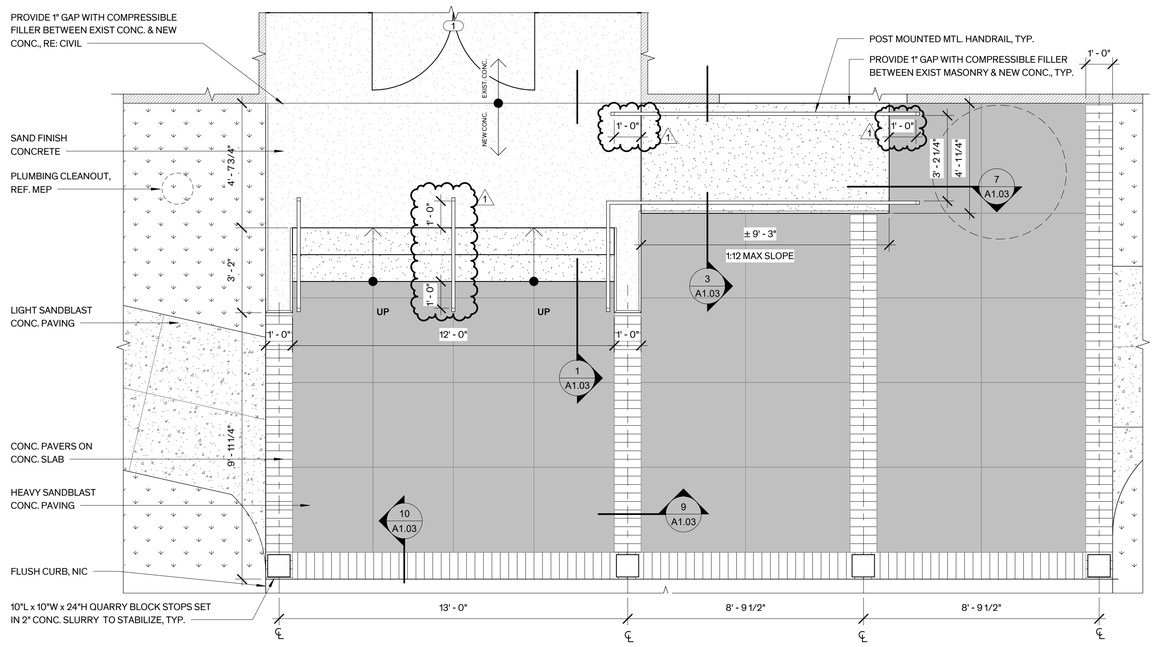
2 Post Mounted Guardrail Det.
3" = 1'-0"



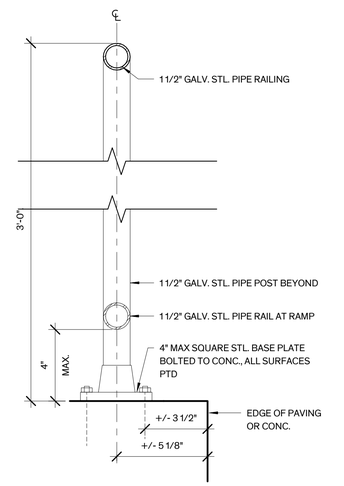
8 Section Through Area Well, Typ.
3/4" = 1'-0"



7 Areawell Foundation Plan
3/4" = 1'-0"



Enlarged Site Plan- East Stairs and Ramp
3/8" = 1'-0"



1 Post Mounted Handrail Det.
3" = 1'-0"

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1	07/08/2025	Addendum 1

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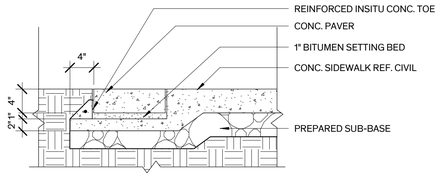
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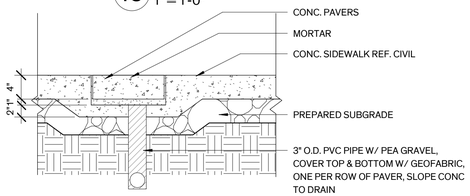
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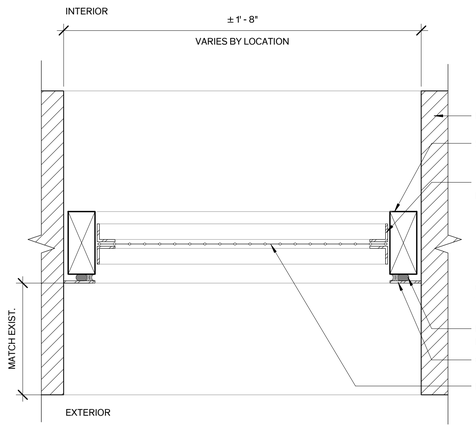
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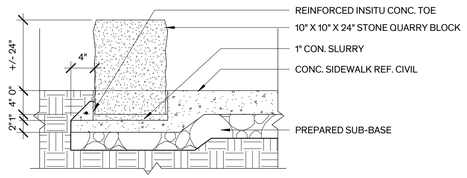


10 Unit Paver Edge
1" = 1'-0"

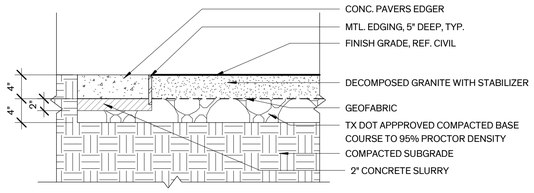


9 Unit Pavers on Concrete Base
1" = 1'-0"

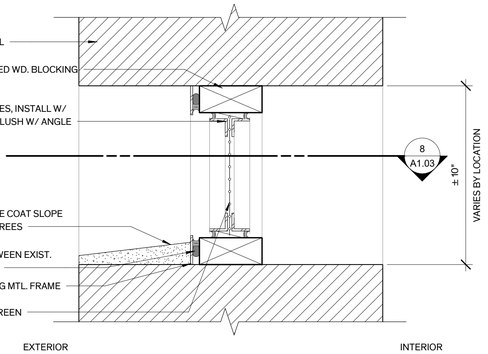


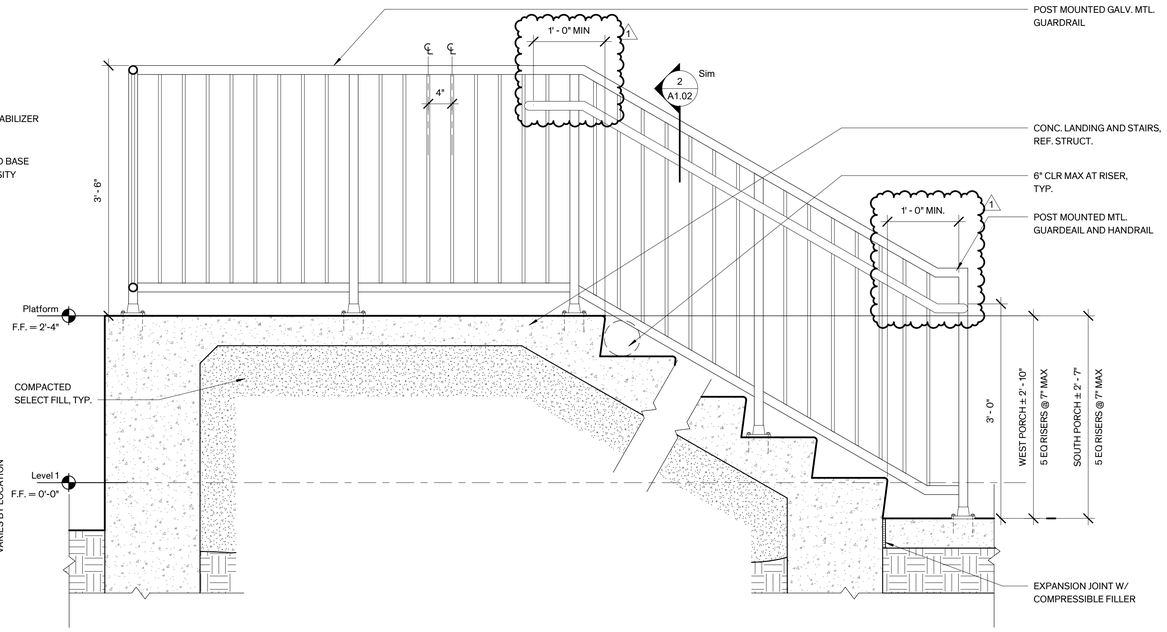


6 QUARRY BLOCK
1" = 1'-0"

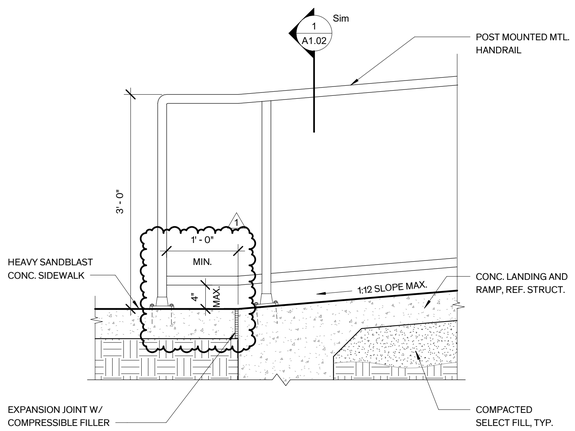


5 Stabilized Decomposed Granite
1" = 1'-0"

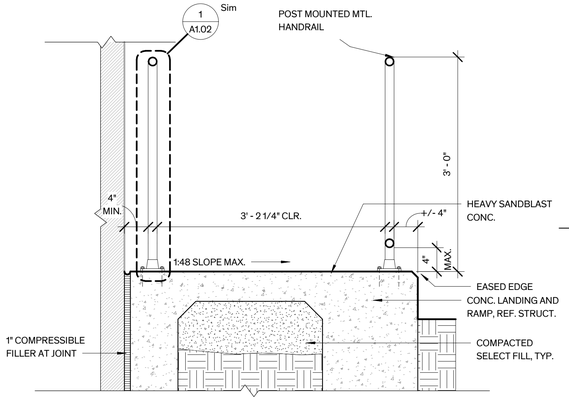




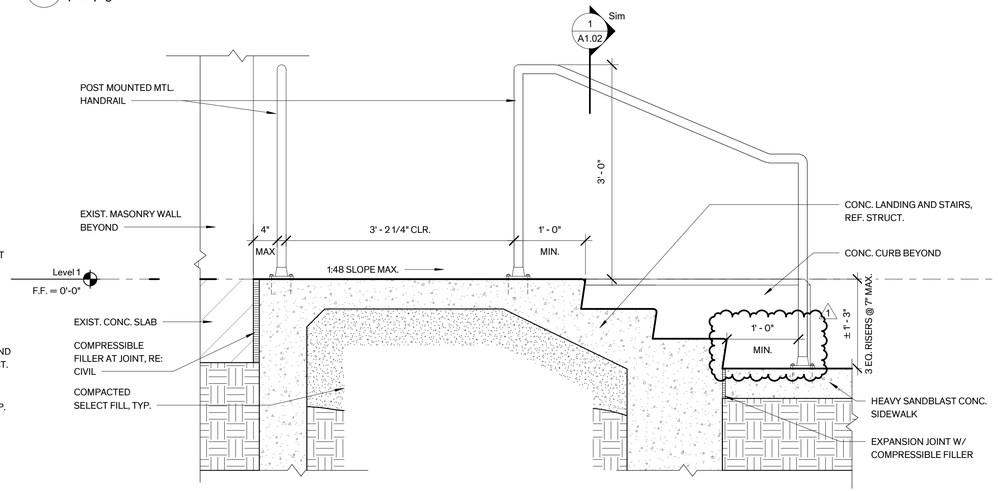
8 Crawlspace Vent Grill Plan
3" = 1'-0"



4 Crawlspace Vent Grill Section
3" = 1'-0"



2 West Stair Detail Section
1" = 1'-0"



7 Detail at Bottom of Ramp
1" = 1'-0"

3 East Ramp Detail Section
1" = 1'-0"

1 East Stair Detail Section
1" = 1'-0"

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Item 2.

City of Dripping Springs
STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION

311 Old Fitzhugh Rd.
Dripping Springs, TX
78620

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REVISION HISTORY

1	07/08/2025	Addendum 1

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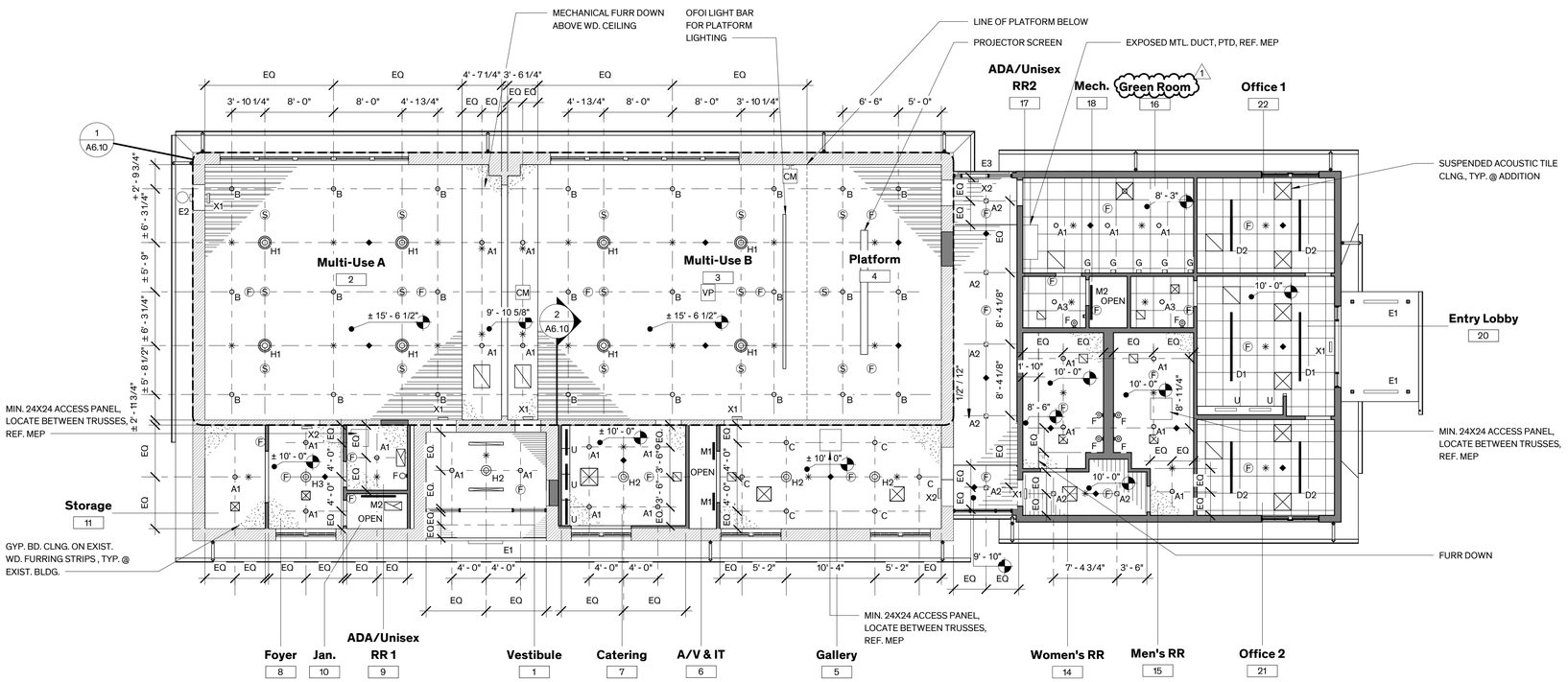
REGISTERED ARCHITECT ALEXIS M. MCKINNEY 22892 STATE OF TEXAS

#22892 07/08/2025

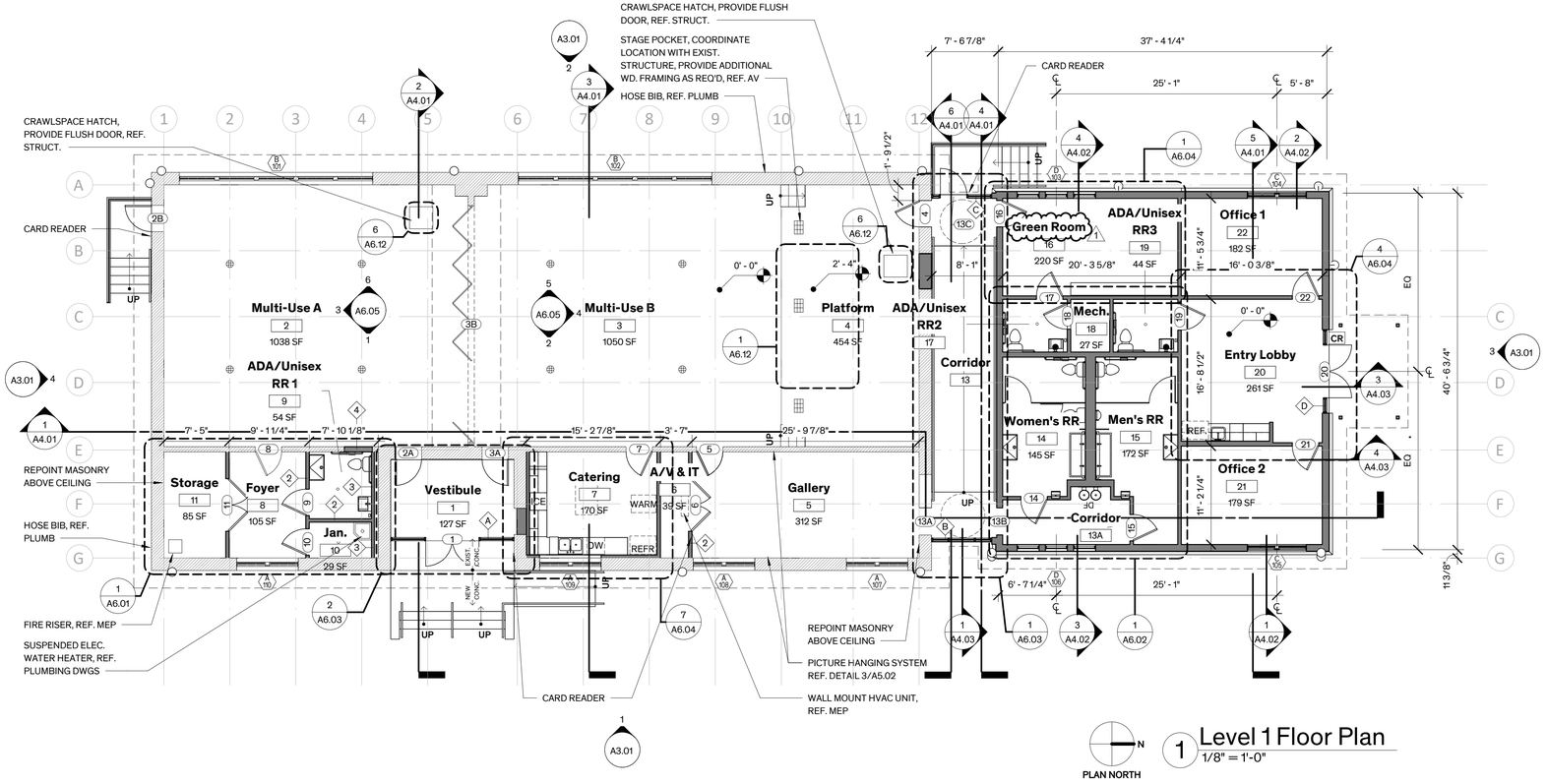
Architexas No. 2314
Date January 17, 2025

Sheet Name
Site Details

Sheet Number
A1.03



2 Reflected Ceiling Plan
1/8" = 1'-0"



1 Level 1 Floor Plan
1/8" = 1'-0"

GENERAL NOTES - RCP

1. **LIGHT FIXTURE LOCATIONS:**
   - A. LIGHT FIXTURES ARE TO BE LOCATED IN THE FIELD AS DIMENSIONED ON THE ARCHITECTURAL REFLECTED CEILING PLANS U.O.N
   - B. LIGHT FIXTURES & CEILING DEVICES SHALL BE LOCATED IN SPACES BETWEEN EXISTING WOOD FURRING STRIP CEILING AT MULTI-USE A & B AND PLATFORM.
   - C. LIGHT FIXTURE LOCATIONS HAVE PRIORITY OVER LOCATION OF DEVICES FOR OTHER MEP EQUIPMENT OR A/V DEVICES. CONTRACTOR TO COORDINATE LOCATION OF MEP SYSTEMS AND A/V DEVICES AWAY FROM LIGHT FIXTURES. MEP AND A/V SHOP DRAWINGS ARE TO INCLUDE AN OVERLAY OF LIGHT FIXTURE LOCATIONS.
   - D. SINGLE LIGHT FIXTURE IN A ROOM SHALL BE CENTERED WITHIN THE SPACE UNLESS DIMENSIONED OR NOTED OTHERWISE
   - E. EXIT SIGNS AT DOORWAYS SHALL BE CENTERED ON DOOR OPENING, U.O.N
2. **DEVICE LOCATIONS:** LOCATE DEVICE ON CENTERLINE OF LIGHT FIXTURE ROWS & AT MIDPOINT BETWEEN FIXTURES WHEREVER POSSIBLE
3. **HVAC GRILLE AND DIFFUSER LOCATIONS:**
   - A. HVAC RETURN & SUPPLY GRILLES ARE TO BE LOCATED AS INDICATED ON THE ARCHITECTURAL PLANS, REFLECTED CEILING PLANS, SECTIONS, DETAILS, & INTERIOR ELEVATIONS WHERE NOTED.
   - B. CENTER WALL GRILLE ABOVE DOOR WHENEVER POSSIBLE.
   - C. WHERE GRILLES OF DIFFERENT HEIGHTS ARE SCHEDULED ON THE SAME WALL, ALIGN TOP OF GRILLES.
4. **DISCREPANCIES OR CONFLICTS:** CONTRACTOR IS TO NOTIFY ARCHITECT IF A DISCREPANCY OR CONFLICT OCCURS THAT DOES NOT ALLOW PLACEMENT OF ELEMENTS AS NOTED ABOVE. IF SUCH CONDITION OCCURS THE CONTRACTOR MUST PROVIDE AN R.F.I. ALONG WITH A DRAWING OR PHOTO, WHERE APPLICABLE, WHICH DESCRIBES THE CONFLICT, AND THE CONTRACTOR IS TO PROVIDE A RECOMMENDATION FOR ALTERNATE PLACEMENT
5. **FINISHING AT CONCEALED LOCATIONS:** REMOVE LOOSE, DELAMINATING, & DAMAGED FINISH ABOVE NEW SUSPENDED CEILINGS, FURR-DOWNS & HVAC CHASES. DO NOT REPAIR PLASTER OR PAINT FINISH SURFACES AT CONCEALED LOCATIONS
6. **FINISHES:** REFER TO ROOM FINISH SCHEDULE & GENERAL FINISH NOTES, SHT. A-5.01 FOR SCOPE OF WORK.
7. MULTI-PURPOSE ROOM - PAINT ALL EXPOSED PIPING, CONDUIT, UNISTRUT, DUCT, ETC ABOVE FURRING, TYP

GENERAL NOTES - PLAN

1. **DIMENSIONING AT WALLS:** WALL DIMENSIONS ARE FINISHED FACE OF WALL TO FINISHED FACE OF WALL U.O.N
2. **MASONRY INFILL:**
   - A. FILL OPENINGS WHERE INDICATED TO MATCH EXISTING CONSTRUCTION. FINISH WALLS & CEILINGS AS SCHEDULED TO PROVIDE A SEAMLESS TRANSITION BETWEEN EXISTING & NEW CONSTRUCTION.
3. **STRUCTURAL STEEL (REFER TO STRUCTURAL):**
   - A. PROVIDE LINTELS AT NEW OR MODIFIED OPENINGS IN MASONRY WALLS AT SCHEDULED DOOR/GRILLE OPENINGS & MEP PENETRATIONS WHERE INDICATED
   - B. REINFORCE GIRDERS AS REQ.'D
4. **ROUGH CARPENTRY (REFER TO STRUCTURAL)**
5. **PARTITIONS:**
   - A. REFER TO SHT. A5.01 FOR PARTITION TYPES
   - B. REPAIR HOLES IN EXIST. PARTITIONS SCHEDULED TO REMAIN. MATCH CONSTRUCTION AND FINISH OF EXIST. WALL ASSEMBLY AS REQ.'D TO PROVIDE A SEAMLESS TRANSITION BETWEEN REPAIRED AREAS & ADJACENT SURFACES
6. **MILLWORK:**
   - A. WOOD BASE: REFER TO ROOM FINISH SCHED., SHT. A5.01 FOR COMPLETE SCOPE OF WORK.
7. **DOORS:**
   - A. REFER TO DOOR SCHEDULE ON SHT. A5.21
8. **WINDOWS:**
   - A. REFER TO WINDOW SCHEDULE ON SHT. A5.11
9. **CRAWL SPACE VENTS:**
   - A. REPLACE EXIST. VENTS WITH PAINTED MTL. ANGLE FRAME AND WIRE CLOTH INSECT SCREEN. REPLACE PARGED SILL. REFER TO A1.03.
10. **FINISHES:**
    - A. REFER TO ROOM FINISH SCHEDULE GENERAL FINISH NOTES ON SHT. A5.01 FOR SCOPE OF WORK.
11. **FLAT PLASTER WALL RESTORATION:**
    - A. REFER TO ROOM FINISH SCHEDULE SHT. A5.01 FOR SCOPE OF WORK
12. **FLOOR FINISH RESTORATION:**
    - A. REFER TO ROOM FINISH SCHEDULE SHT. A5.01 FOR SCOPE OF WORK
13. **TOILET ACCESSORIES:**
    - A. REFER TO TOILET ACCESSORIES SCHEDULE IN SPECIFICATIONS.
14. **SIGNAGE:** PROVIDE SIGNAGE TO COMPLY WITH TAS, REF. SPEC. SECT. 101423 INTERIOR PANEL SIGNS.
15. **INSULATION:** REFER TO WALL TYPES SHT. A5.01 FOR INSULATION IN NEW WALLS

LEGEND - RCP

- NEW WALL
- EXIST'G WALL
- EXIST'G WD FURRING
- BEAD BOARD
- TONGUE & GROOVE WOOD CEILING
- GYP BD CEILING
- ACOUSTIC TILE CEILING
- SUPPLY DIFFUSER
- RETURN GRILLE
- ACCESS PANEL, SIZE NOTED
- A1 4" ROUND RECESSED DOWNLIGHT
- A2 4" SQUARE RECESSED DOWNLIGHT
- A3 4" RECESSED DOWNLIGHT
- B 4" CYLINDER DOWNLIGHT
- C 4" ROUND RECESSED WALLWASH
- D1 8' LINEAR PENDANT
- D2 6' LINEAR PENDANT
- E1 EXTERIOR SIDE MOUNT LINEAR
- E2 EXTERIOR SCONCE
- E3 EXTERIOR STRIP LIGHT
- F WALL SCONCE
- G SURFACE MTD. MARQUEE STRIP LIGHT
- H1 PENDANT WITH 16" GLASS SHADE
- H2 SURFACE MOUNT WITH 14" GLASS SHADE
- H3 SURFACE MOUNT WITH 12" GLASS SHADE
- M1 2' SURFACE MOUNT STRIP LIGHT
- M2 4' SURFACE MOUNT STRIP LIGHT
- U UNDERCABINET LIGHT
- X1 WALL MOUNT EMERGENCY EXIT LIGHT
- X2 CEILING MOUNT EMERGENCY EXIT LIGHT
- SPRINKLER
- SPEAKER
- CM CAMERA
- VACANCY SENSOR
- FIRE ALARM
- VP CEILING-HUNG VIDEO PROJECTOR

LEGEND - PLAN

- NEW WALL
- EXIST'G WALL
- FLOOR OUTLET, REF. MEP
- STAGE POCKET, REF. AV & MEP
- CR CARD READER

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REGISTERED ARCHITECT ALEXIS M. MCKINNEY 22892 STATE OF TEXAS

#22892 07/08/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
Floor Plan & Reflected Ceiling Plan

Sheet Number
A2.0x

1024

FINISH SCHEDULE

ROOM #	ROOM NAME	FLOOR	WALL BASE				WALLS				CEILING	REMARKS
			NORTH	EAST	SOUTH	WEST	NORTH	EAST	SOUTH	WEST		
1	Vestibule	EX-CONC	-	-	-	-	EX-LS	STR	EX-LS	EX-LS	EX-BB-PT	
2	Multi-Use A	EX-WD	WB1-PT	WB1-PT	WB1-PT	WB1-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	EX-WDF, GYP4-PT4	GYP. BD. SOFFIT AT NORTH; OPEN TO ABOVE BETWEEN FURRING STRIPS, PAINT ALL SURFACES AND EQUIPMENT ABOVE FLAT BLACK
3	Multi-Use B	EX-WD	EX-WB1-PT	EX-WB1-PT	EX-WB1-PT	EX-WB1-PT	EX-BB-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	EX-WDF, GYP2-PT4	GYP. BD. SOFFIT AT SOUTH; OPEN TO ABOVE BETWEEN FURRING STRIPS, PAINT ALL SURFACES AND EQUIPMENT ABOVE FLAT BLACK
4	Platform	EX-WD	WB1-PT	WB1-PT	-	WB1-PT	EX-PL-PT	EX-PL-PT	-	EX-PL-PT	EX-WDF	OPEN TO ABOVE BETWEEN FURRING STRIPS, PAINT ALL SURFACES AND EQUIPMENT ABOVE FLAT BLACK
5	Gallery	EX-WD	WB1-PT	EX-WB1-PT	WB1-PT	WB1-PT	EX-PL-PT	EX-PL-PT	GYP1-PT	EX-PL-PT	GYP2-PT4	
6	A/V & IT	EX-WD	RB	RB	RB	RB	GYP1-PT	EX-PL-PT	GYP1-PT	EX-PL-PT	-	
7	Catering	EX-WD	EX-WB1-PT	EX-WB1-PT	EX-WB1-PT	EX-WB1-PT	GYP1-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	GYP2-PT4	
8	Foyer	EX-WD	WB1-PT	WB1-PT	WB1-PT	WB1-PT	GYP1-PT	EX-PL-PT	GYP1-PT	EX-PL-PT	GYP2-PT4	
9	ADA/Unisex RR 1	CT7	CT1	CT4	CT4	CT4	GYP1-PT	GYP1-PT	GYP1-PT	EX-PL-PT1	GYP2-PT4	
10	Jan.	CT7	FRP	FRP	FRP	FRP	EX-PL-PT	EX-PL-PT	GYP1-PT	GYP1-PT	-	
11	Storage	EX-WD	RB	RB	RB	RB	GYP1-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	GYP2-PT4	
13	Corridor	CF1	WB2-PT	WB2-PT	WB2-PT	WB2-PT	WSL-PT	STR	EX-LS	STR	WSL-PT4	BASE AT STOREFRONT: ARCH. FINISH CONC. CURB
13A	Corridor	CF1	WB2-PT, CT1	WB2-PT	WB2-PT, CT1	WB2-PT, CT1	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	WSL-PT4	
14	Women's RR	CF1	CT3	CT6	CT6	CT6	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP3-PT4	
15	Men's RR	CF1	CT5	CT5	CT2	CT5	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP3-PT4	
16	Green Room 1	CPT	WB2-PT	WB2-PT	WB2-PT	WB2-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	ACT	
17	ADA/Unisex RR2	CF1	CT5	CT2	CT5	CT5	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP3-PT4	
18	Mech.	CF1	RB	RB	RB	RB	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	-	
19	ADA/Unisex RR3	CF1	CT6	CT3	CT6	CT6	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP3-PT4	
20	Entry Lobby	CPT	WB2-PT	WB2-PT	WB2-PT	WB2-PT	GYP1-PT	GYP1-PT	WSL-PT	GYP1-PT	ACT	
21	Office 2	CPT	WB2-PT	WB2-PT	WB2-PT	WB2-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	ACT	
22	Office 1	CPT	WB2-PT	WB2-PT	WB2-PT	WB2-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	ACT	

FINISH LEGEND

ACT - SUSPENDED 2X2 ACOUSTIC TILE CEILING, TEGULAR

BB - WOOD BEAD BOARD

CF1 - CONCRETE FLOOR - POLISHED

CPT - CARPET TILE

EX - EXISTING

FRP - FIBER REINFORCED PANEL WAINSCOT

GYP1 - GYPSUM BOARD
GYP2 - GYPSUM BOARD ON EXISTING FURRING
GYP3 - SUSPENDED GYPSUM BOARD

PL - PLASTER

LS - LIMESTONE

CT1 - TILE WAINSCOT TYPES 3, 4A, 5A
CT2 - TILE WAINSCOT TYPES 3, 4B, 5B, METAL BASE TRIM
CT3 - TILE WAINSCOT TYPES 3, 4C, 5C, METAL BASE TRIM
CT4 - TILE BASE TYPE 5A
CT5 - TILE BASE TYPE 5B, METAL BASE TRIM
CT6 - TILE BASE TYPE 5C, METAL BASE TRIM
CT7 - MOSAIC TILE FLOOR, "WINDMILL" PATTERN, TILE TYPES 1 & 2

PT1 - PAINT, INTERIOR
PT2 - PAINT, INTERIOR
PT3 - PAINT, INTERIOR TRIM
PT4 - PAINT, INTERIOR CEILING

PTE1 - PAINT COLOR 1, EXTERIOR
PTE2 - PAINT COLOR 2, EXTERIOR

PLAM1- PLASTIC LAMINATE

RB - RUBBER BASE 4"

SS - SOLID SURFACE, COLOR:

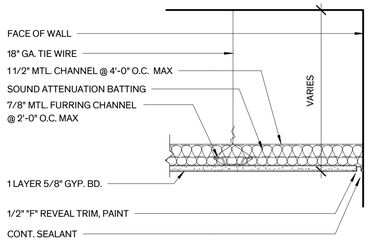
STR - SCHED. STOREFRONT

WB1 - WOOD BASE, TYPE 1
WB2 - WOOD BASE, TYPE 2
WD - WOOD FLOOR TO MATCH EXISTING
WDF - WD FURRING STRIPS - STAIN
WSL - WOOD SHIPLAP

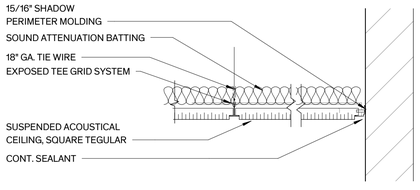
7. DOORS:
   A. STILE & RAIL DOORS: DOOR ASSEMBLIES INCLUDING CASINGS TO HAVE A PAINTED FINISH, ASSUME ONE COLOR.
   B. EXTERIOR HOLLOW METAL DOORS: PAINT FINISH. ASSUME ONE COLOR AT THE INTERIOR AND A SECOND COLOR AT THE EXTERIOR.
8. WINDOWS:
   A. RESTORED WINDOWS: WINDOW ASSEMBLIES INCLUDING CASINGS AND STOOL TO HAVE A PAINTED FINISH. ASSUME ONE COLOR ON THE INTERIOR AND ONE ON THE EXTERIOR.
   B. ADDITION WINDOWS: WINDOW ASSEMBLIES INCLUDING CASINGS, STOOL, AND APRON TO HAVE A PAINTED FINISH. ASSUME ONE COLOR ON THE INTERIOR.
9. LOUVERS AND CRAWL SPACE VENTS: PAINTED FINISH, ASSUME ONE COLOR.

GENERAL NOTES - FINISHES

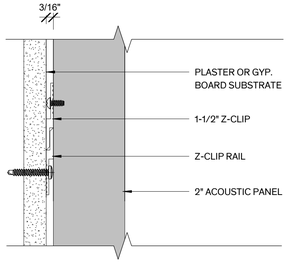
1. SURFACES:
   A. FINISH EXPOSED SURFACES U.O.N THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE COORDINATION OF THE COMPLETE FINISH-OUT OF THE PROJECT. ANY SURFACES WHICH DO NOT HAVE A SPECIFIC FINISH NOTED OR ARE NOTED TO REMAIN UNFINISHED SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND FINISHED PER THE ARCHITECT'S INSTRUCTIONS
   B. SECURING OF EXIST. MILLWORK AND TRIM: RESECURE EXISTING MATERIALS & PLACE IN ORIGINAL POSITION OF ALIGNMENT WHERE MOVEMENT HAS OCCURRED. SECURE LOOSE BLOCKING & PROVIDE SUPPLEMENTAL BLOCKING AS NECESSARY FOR ATTACHMENT OF EXIST. & NEW MATERIALS
2. EXPOSED MEP COMPONENTS:
   A. EXPOSED DUCTS, CONDUIT, PIPING, WIRING, ASSOCIATED FASTENER, ETC.. ARE TO BE PRIMED & PAINTED, EXCEPT IN MECHANICAL ROOMS
3. FLOORS:
   A. EXIST. WOOD FLOORS:
      a. RE-INSTALL SALVAGED WOOD FLOORING IN GOOD CONDITION. WHERE ADDITIONAL MATERIAL IS REQUIRED, PROVIDE MATERIAL MATCHING EXISTING IN SPECIES, CUT, DIMENSIONS, & PROFILE. ASSUME REPLACEMENT OF 30% OF TOTAL FLOOR AREA
      b. CLEAN & FINISH PER SPECIFICATIONS.
   B. EXIST. CONC. FLOORS: ETCH & SEAL.
   C. ADDITION CONCRETE FLOORS:
      a. POLISHED FINISH PER SPECIFICATIONS.
      b. SEALED WHERE SPECIFIED
4. WALLS:
   A. EXIST. PLASTER:
      a. CONTRACTOR SHALL SOUND/TAP PLASTER FINISH THROUGHOUT WITH A PLASTIC MALLET TO DETERMINE EXTENT OF DETACHED PLASTER FINISH AND MARK AREAS ON WALL. CONTACT ARCHITECT TO REVIEW PRIOR TO COMPLETE REMOVAL.
      b. REPLACE DAMAGED, DETERIORATED, & DETACHED PLASTER FINISH TO SOUND SUBSTRATE, ASSUME REPLACEMENT OF 5% OF TOTAL WALL AREA. INCLUDES POOR PRIOR PATCHES, CRACKED AREAS.
      c. REPAIR PLASTER AT REMOVED INTERIOR PARTITIONS, CEILINGS, AND OTHER DAMAGED AREAS, ASSUME 10% OF TOTAL WALL AREA.
      d. REPLACE COMPLETE PLASTER ASSEMBLY AND LATH WHERE MISSING AT EXISTING OPENINGS IN WOOD FRAMED WALLS, ASSUME 5% OF TOTAL WALL AREA.
      e. PROVIDE NEW PLASTER AND LATH ASSEMBLY AT INFILLED FORMER WINDOW AND DOOR OPENINGS IN MULTI-USE SPACES, ASSUME 50 SQUARE FEET.
      f. REPAIR PLASTER DAMAGE FROM CHANNELING FOR MEP/AV/IT CONDUIT AND DEVICES.
      g. REPOINT DETERIORATED MORTAR JOINTS BEHIND PLASTER FINISH WHERE REPLACEMENT IS REQUIRED.
      h. REPAIR PLASTER FINISH FOLLOWING INSTALLATION OF MEP DEVICES & DISTRIBUTION SYSTEMS & FOLLOWING RESETTING OF STANDING & RUNNING TRIM.
      i. NEW PLASTER FINISH SHALL MATCH FINISH & TEXTURE OF ORIGINAL PLASTER FINISH. PLASTER SHALL HAVE A PAINTED FINISH, REF. INTERIOR PAINT SCHEDULE
   B. EXIST. WOOD BEADBOARD: REPAIR EXISTING BEADBOARD. SUPPLEMENT WITH NEW AS REQUIRED TO MATCH EXISTING SPECIES, DIMENSIONS, & PROFILE.
   C. CERAMIC TILE SURFACES: PROVIDE CEMENTITIOUS BACKER BOARD BEHIND CERAMIC WALL TILES AT NEW PARTITIONS
5. CEILING:
   A. EXIST. WOOD BEADBOARD: REPAIR EXISTING BEADBOARD AND PERIMETER TRIM. SUPPLEMENT WITH NEW AS REQUIRED TO MATCH EXISTING SPECIES, DIMENSIONS, & PROFILE.
   B. EXIST. OPEN WOOD FURRING STRIP CEILING AT MULTI-USE A & B AND PLATFORM:
      a. REMOVE AREAS OF EXIST. WOOD FURRING STRIPS AS INDICATED ON A6.10 AND SALVAGE FOR RE-USE.
      b. REPLACE MISSING LATH AS REQUIRED WITH SALVAGED MATERIAL.
      c. ALL MEP EQUIPMENT, DUCTWORK, HANGERS, AIR DEVICES, PIPING, HANGERS, AND SUPPORTS ABOVE WOOD FURRING STRIP CEILING IN MULTI-USE A & B AND PLATFORM TO BE PAINTED FLAT BLACK.
   C. WOOD TONGUE & GROOVE CEILING: TUNG OIL FINISH PER SPECIFICATION.
   D. GYPSUM BOARD: PAINTED FINISH.
6. MILLWORK:
   A. WOOD BASEBOARD AT EXIST. BUILDING:
      a. REPLACE SHOE MOLD 100%.
      b. REPLACE MISSING AND DAMAGED WOOD BASEBOARDS TO MATCH EXISTING, ASSUME 60%.
      c. BASEBOARD AND SHOE MOLD SHALL HAVE A PAINTED FINISH.
   B. WOOD BASEBOARD AT ADDITION: PAINTED FINISH.



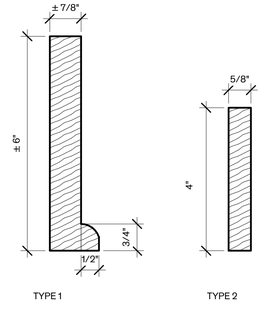
8 Suspended Gyp. Bd Ceiling
1 1/2" = 1'-0"



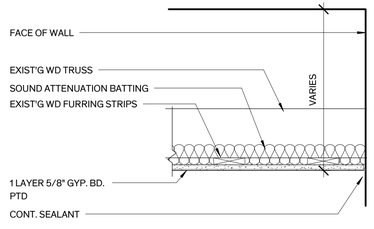
6 Suspended Acoustical Ceiling
1 1/2" = 1'-0"



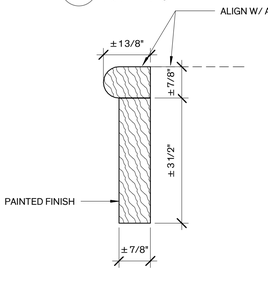
4 Acoustic Wall Panel Detail
6" = 1'-0"



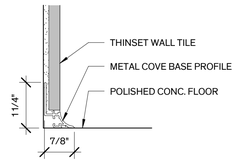
2 Baseboard Types
6" = 1'-0"



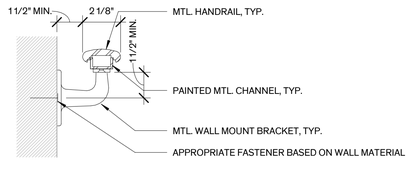
7 Gyp. Bd Ceiling over Wd Furring
1 1/2" = 1'-0"



5 Platform Edge Trim
6" = 1'-0"



3 Tile Base Detail
6" = 1'-0"



1 Int. Wall Mount Handrail Det.
3" = 1'-0"

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22892
STATE OF TEXAS

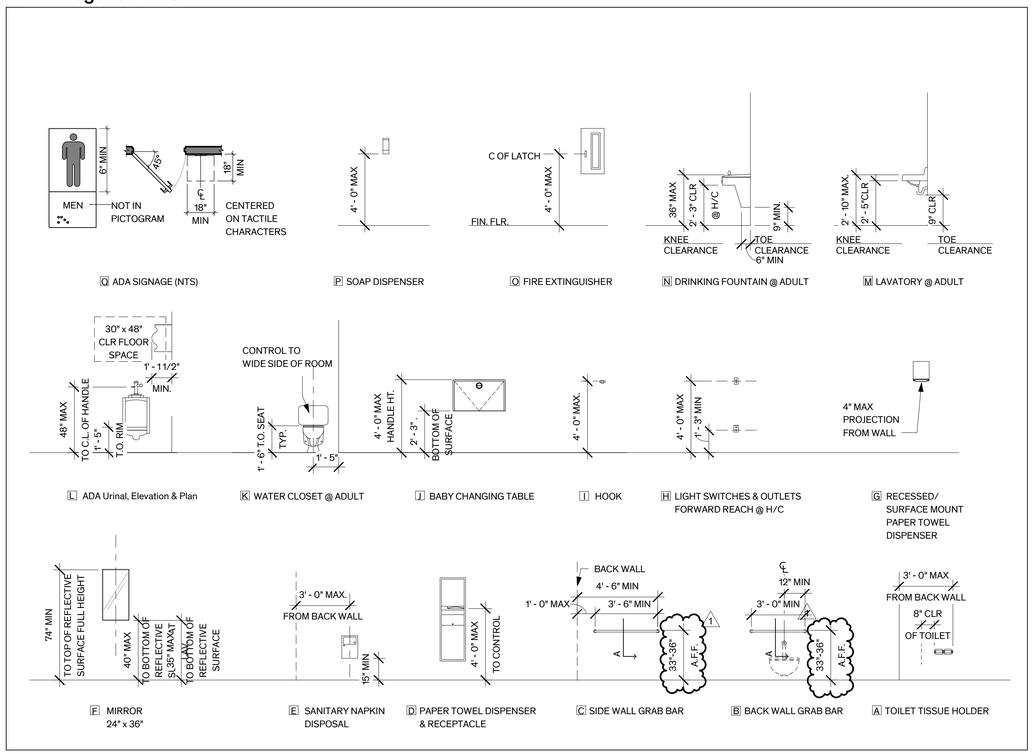
#22892 07/08/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
Finish Schedule

Sheet Number
A5.01

ADA Legend - NTS.



LEGEND - ENLARGED PLAN

- NEW WALL
- EXIST'G WALL
- FEC — FIRE EXTINGUISHER SEMI-RECESSED CABINET

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City of Dripping Springs
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78620

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REVISION HISTORY

1	07/08/2025	Addendum 1

Issued for Permit and Construction

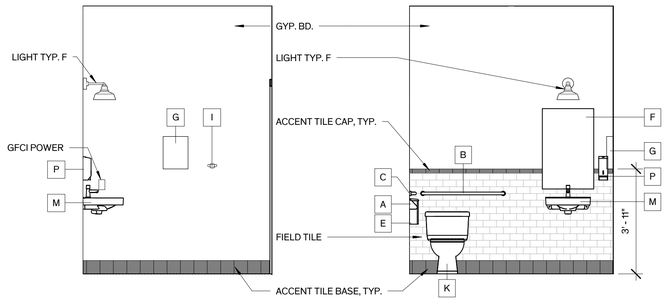
REGISTERED ARCHITECT ALEXIS M. MCKINNEY 22892 STATE OF TEXAS

#22892 07/08/2025

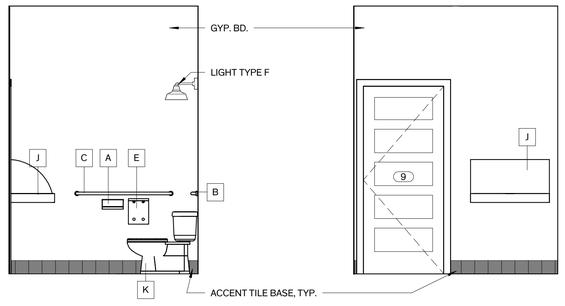
Architexas No. 2314
Date January 17, 2025

Sheet Name
Enlarged Plans - Restrooms

Sheet Number
A6.0x



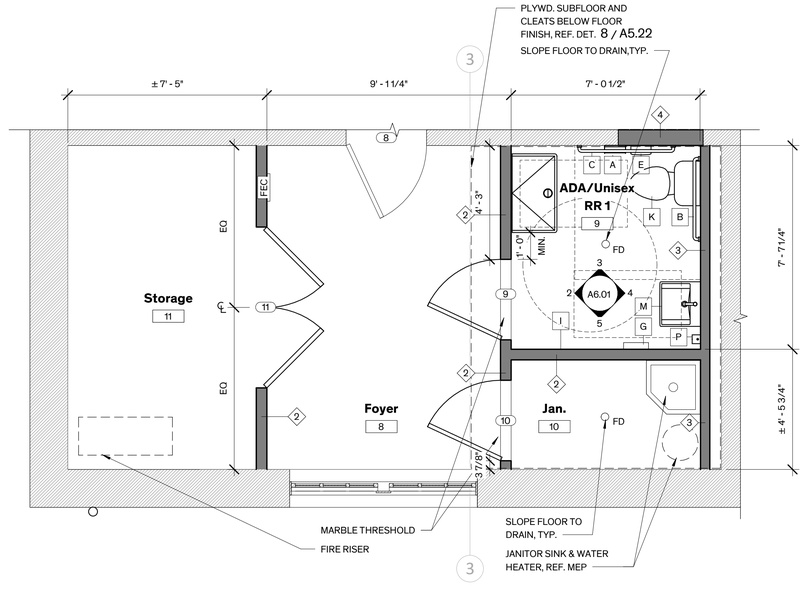
5 ADA/Unisex RR 1 - East
3/8" = 1'-0"



4 ADA/Unisex RR 1 - North
3/8" = 1'-0"

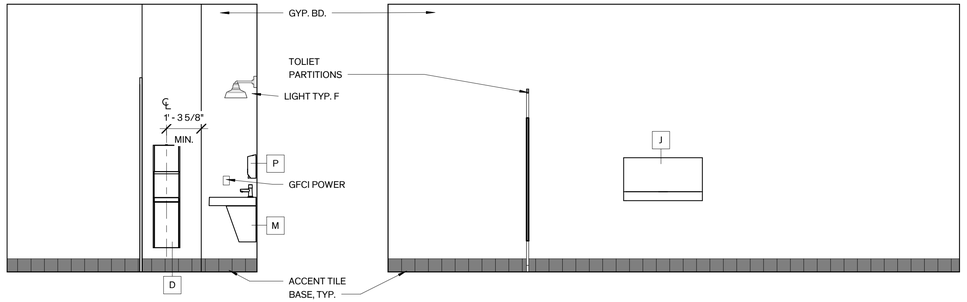
3 ADA/Unisex RR 1 - West
3/8" = 1'-0"

2 ADA/Unisex RR 1 - South
3/8" = 1'-0"

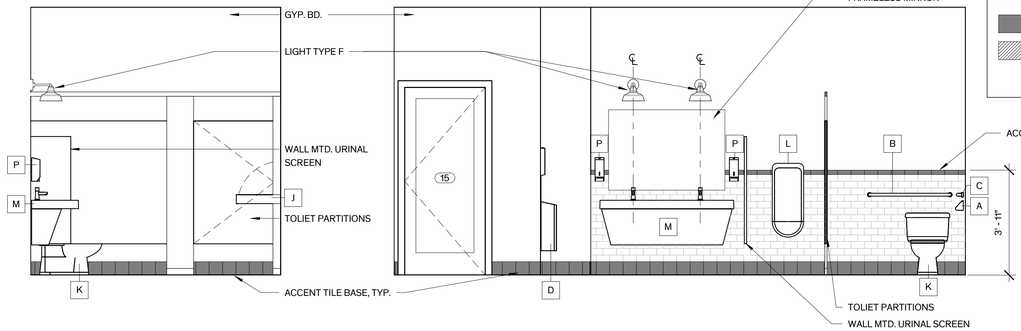


1 HC RR 1 Enlarged Plan
3/8" = 1'-0"

N
PLAN NORTH



17 Men's RR - East
3/8" = 1'-0"



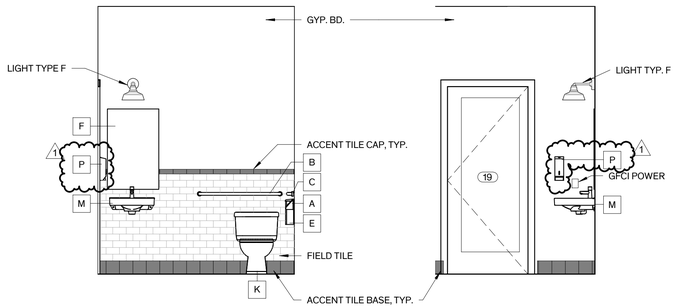
16 Men's RR - North
3/8" = 1'-0"

15 Men's RR - West
3/8" = 1'-0"

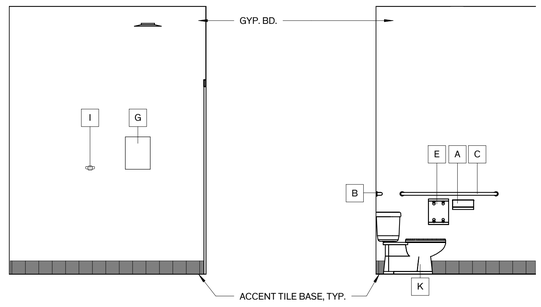
14 Men's RR - South
3/8" = 1'-0"

LEGEND - ENLARGED PLAN

	NEW WALL
	EXIST'G WALL
FEC	FIRE EXTINGUISHER SEMI-RECESSED CABINET



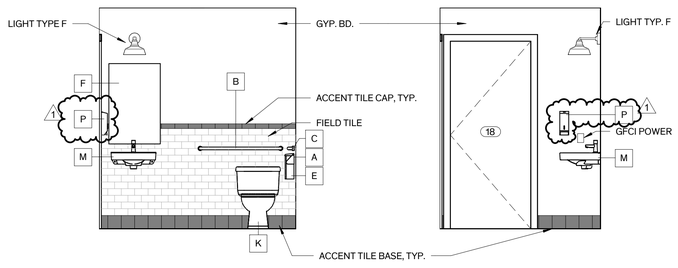
13 ADA/Unisex RR 3 - East
3/8" = 1'-0"



12 ADA/Unisex RR 3 - North
3/8" = 1'-0"

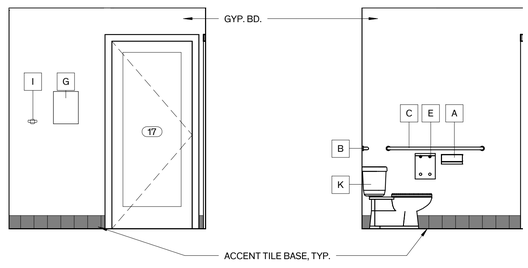
11 ADA/Unisex RR 3 - West
3/8" = 1'-0"

10 ADA/Unisex RR 3 - South
3/8" = 1'-0"



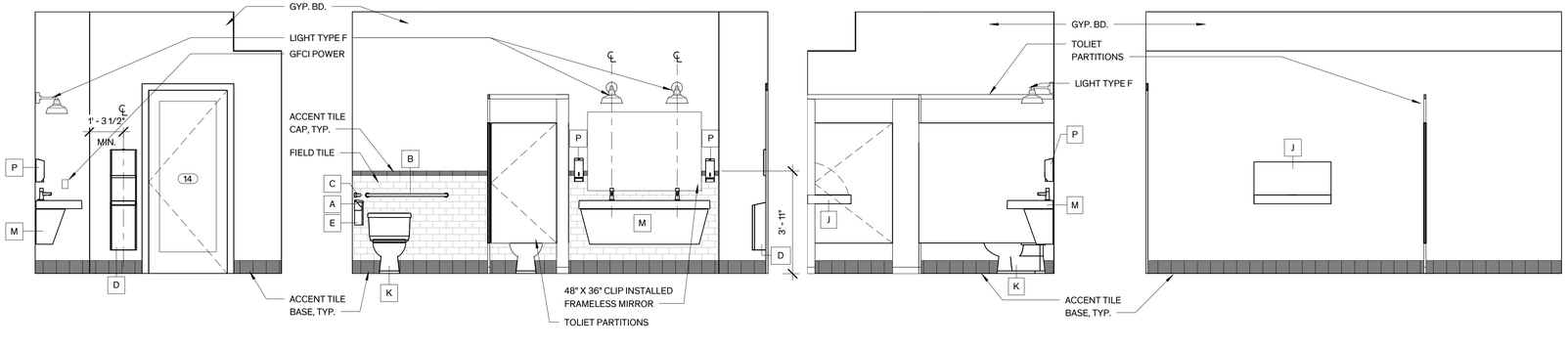
9 ADA/Unisex RR2 - East
3/8" = 1'-0"

8 ADA/Unisex RR2 - North
3/8" = 1'-0"



7 ADA/Unisex RR2 - West
3/8" = 1'-0"

6 ADA/Unisex RR2 - South
3/8" = 1'-0"

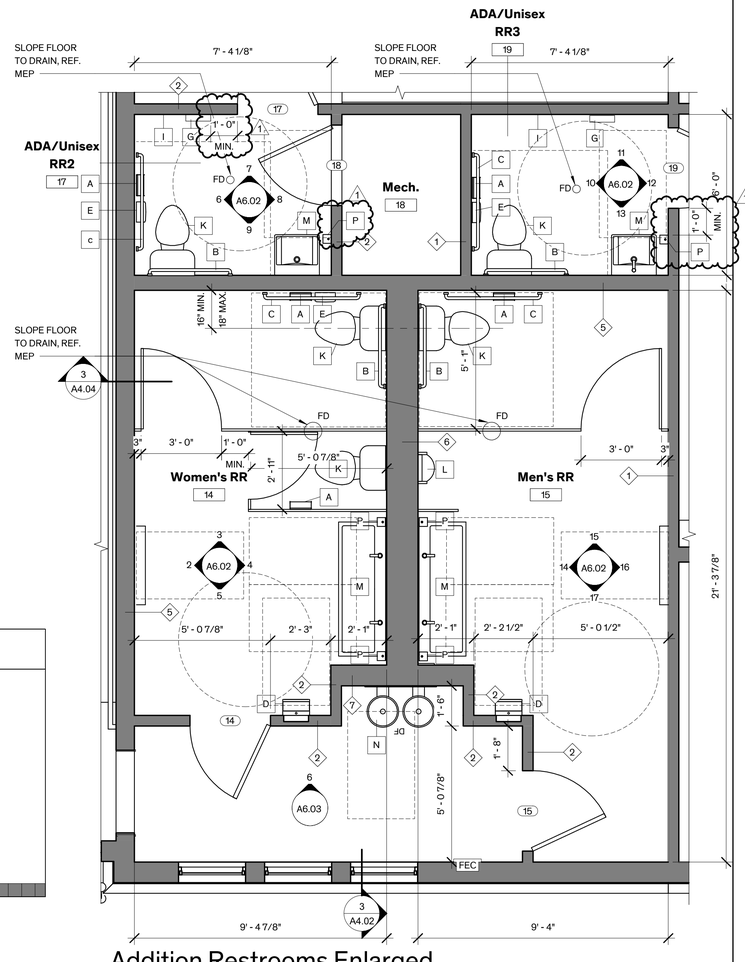


5 Women's RR - East
3/8" = 1'-0"

4 Women's RR - North
3/8" = 1'-0"

3 Women's RR - West
3/8" = 1'-0"

2 Women's RR - South
3/8" = 1'-0"



Addition Restrooms Enlarged Plan
3/8" = 1'-0"

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1	07/08/2025	Addendum 1

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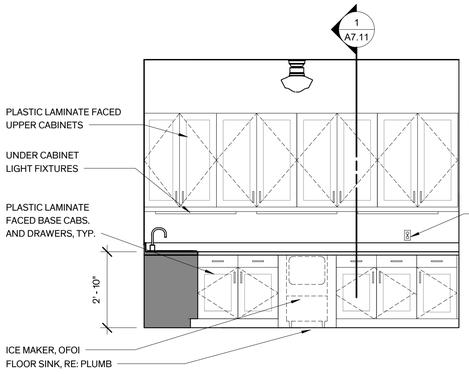
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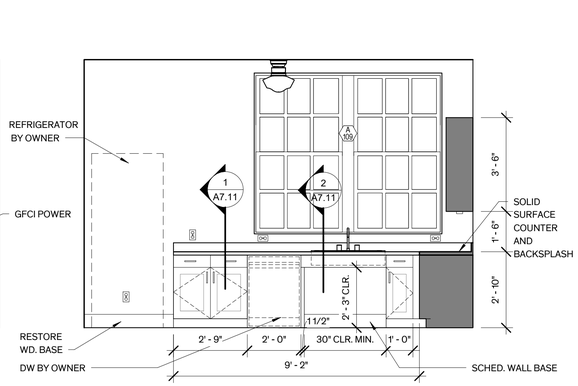
Architexas No. 2314
Date January 17, 2025

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Enlarged Plans - Restrooms

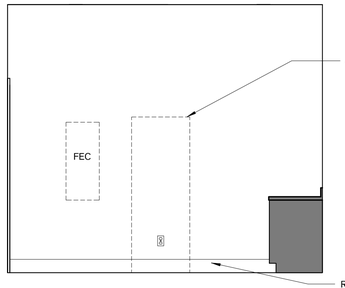
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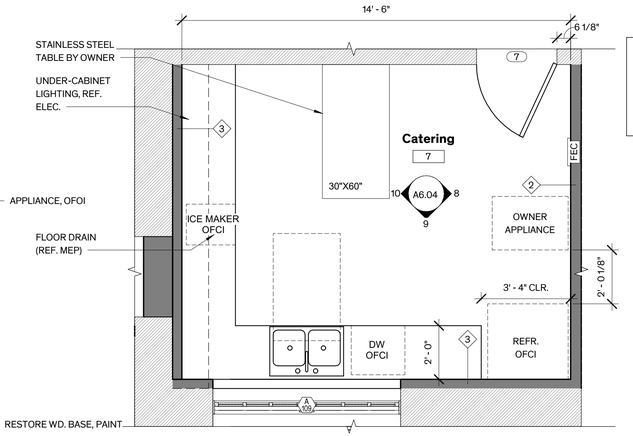
10 Catering - South
3/8" = 1'-0"



9 Catering - East
3/8" = 1'-0"



8 Catering - North
3/8" = 1'-0"

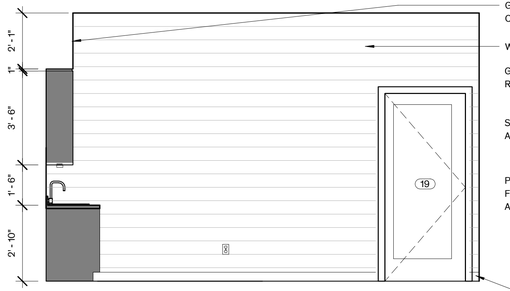


7 Catering Enlarged Plan
3/8" = 1'-0"

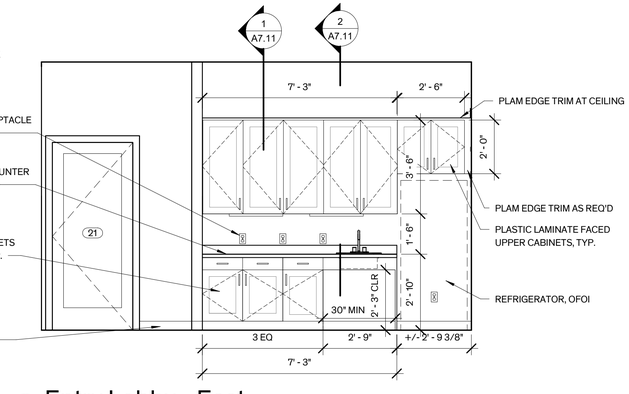
N
PLAN NORTH

LEGEND - ENLARGED PLAN

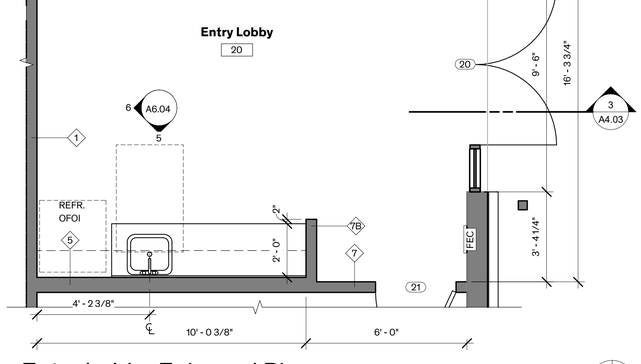
- NEW WALL
- EXIST'G WALL
- FEC — FIRE EXTINGUISHER SEMI-RECESSED CABINET



6 Entry Lobby - South
3/8" = 1'-0"

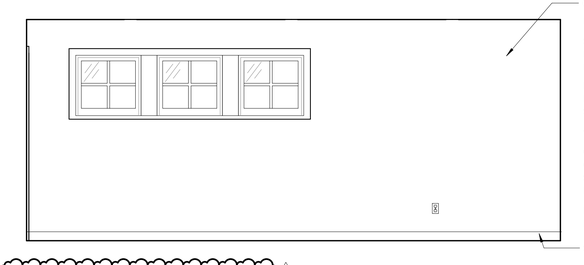


5 Entry Lobby - East
3/8" = 1'-0"

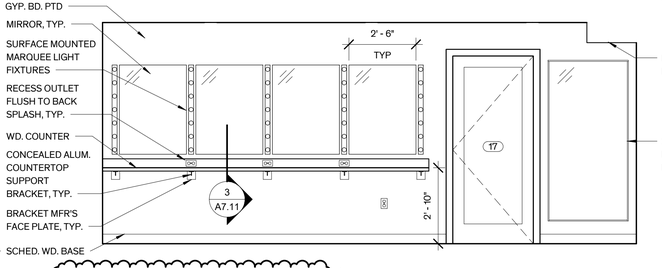


4 Entry Lobby Enlarged Plan
3/8" = 1'-0"

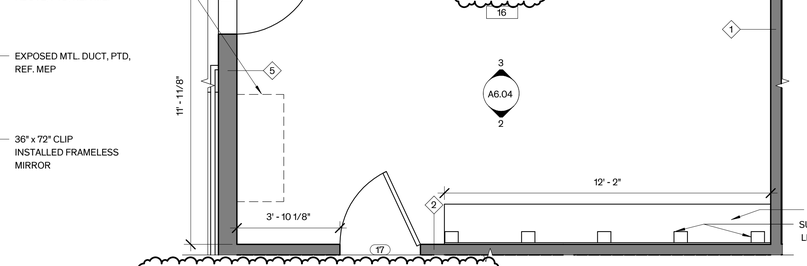
N
PLAN NORTH



3 Green Room - West
3/8" = 1'-0" 1



2 Green Room - East
3/8" = 1'-0" 1



1 Green Room Enlarged Plan
3/8" = 1'-0" 1

N
PLAN NORTH

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Item 2.

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1	07/08/2025	Addendum 1

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#22892 07/08/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
Enlarged Plans & Interior Elevations

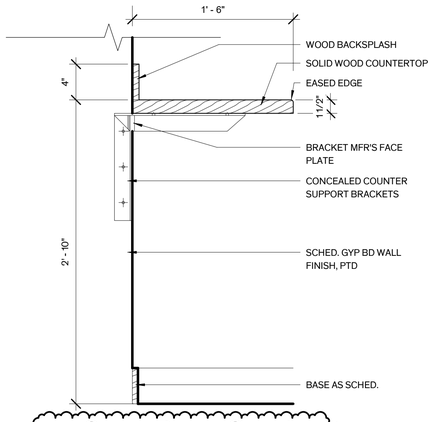
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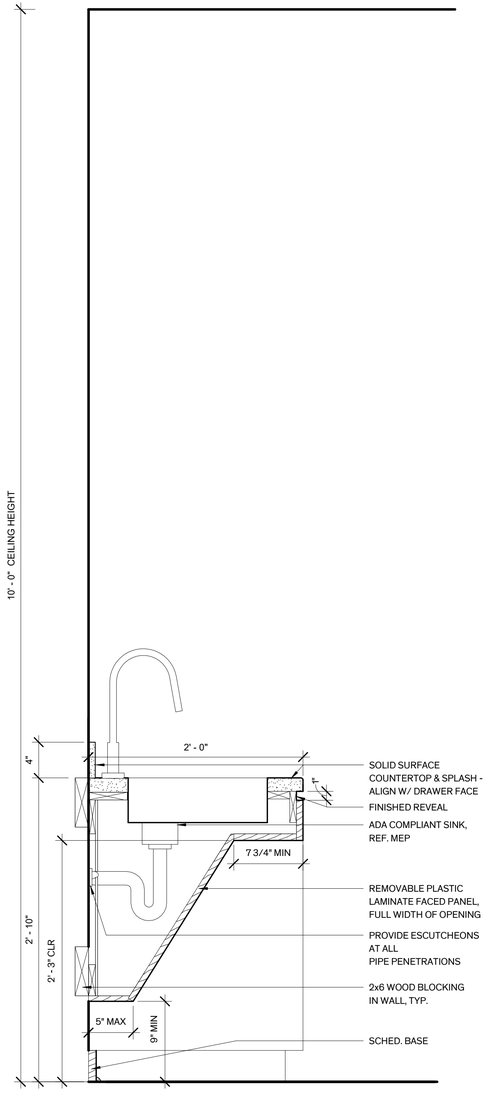
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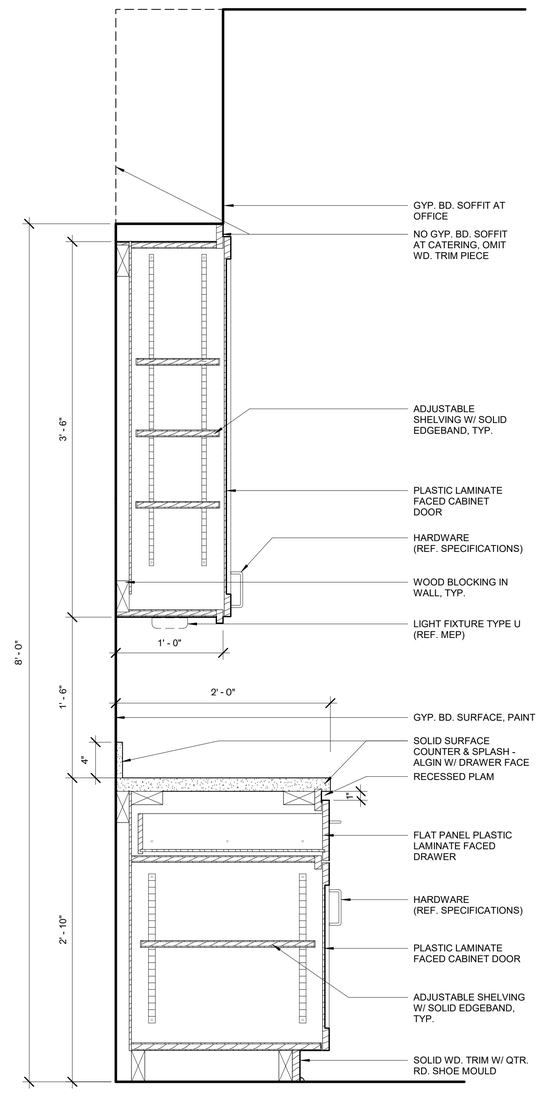
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3 Green Room Counter
11/2" = 1'-0"



2 Sink Detail
11/2" = 1'-0"



1 Cabinet Detail
11/2" = 1'-0"

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#22892 07/08/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
Millwork Details

Sheet Number
A7.X

STEPHENSON SCHOOL BUILDING

Rehabilitation and Addition

PROJECT MEMBERS

OWNER
CITY OF DRIPPING SPRINGS
511 MERCER STREET
DRIPPING SPRINGS, TEXAS 78620
T (512) 858-4725

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ARCHITEXAS - ARCHITECTURE, PLANNING & HISTORIC PRESERVATION, INC.
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ARCHITECTURAL ENGINEERS COLLABORATIVE
3800 N. LAMAR BLVD., SUITE 300
AUSTIN, TEXAS 78756
T (512) 472-2111

CIVIL
DOUCET & ASSOCIATES
7401 STATE HWY 71, B160
AUSTIN, TEXAS 78735
T (512) 583-2600

MEP
CLEARY ZIMMERMANN ENGINEERS
3218 MANOR RD. SUITE 200
AUSTIN, TEXAS 78723
T (512) 220-9200

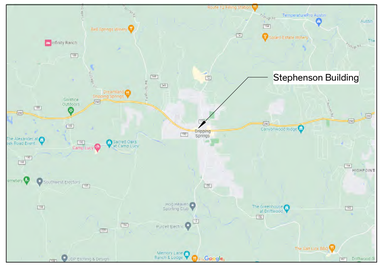
LANDSCAPE
CO'DESIGN, LLC
1155 BARTON SPRINGS ROAD
AUSTIN, TEXAS 78704
T (512) 328-5231

ACOUSTICS & A/V
BAI, LLC
4006 SPEEDWAY
AUSTIN, TEXAS 78751
T (512) 476-3464

ACCESSIBILITY
ROB ROY PARNELL, INC
251 MCKELLAR ROAD
DRIPPING SPRINGS, TEXAS 78620
T (512) 784-3699

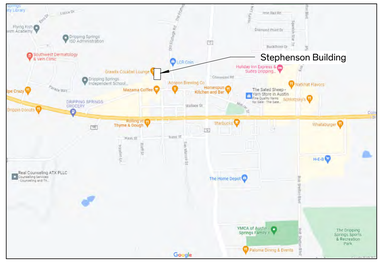
VICINITY MAP

CITY OF DRIPPING SPRINGS



STREET MAP

CITY OF DRIPPING SPRINGS





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A0.02 Life Safety

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D1.02 Demo Floor Plan, Roof Plan, & North Elevation

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6 Exisiting Drainage Conditions
7 Proposed Drainage Plan
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9 Utility Plan
10 Grading Plan
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S1.02 General Notes
S1.03 Special Inspections
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PD101 Plumbing Level 1 Demolition Plan
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P100 Plumbing Underfloor Plan
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P102 Plumbing Roof Plan
P201 Plumbing Enlarged Plans
P301 Plumbing Schedules
P401 Plumbing Risers
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P502 Plumbing Details

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AUDIOVISUAL
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AV2-01 AV Systems - First Floor
AV4-01 AV Systems - Sections & Details
AV6-01 AV Systems - Plate Details & Rack Elevations
AV6-02 AV Systems - Oneline

GENERAL NOTES

GENERAL DEMOLITION NOTES

1. THE MAXIMUM ALLOWABLE LOADING ON THE EXISTING FLOOR STRUCTURES SHALL BE CONFIRMED WITH STRUCTURAL ENGINEER. AREAS OF THE BUILDING WHICH MAY HAVE GREATER LOADING IMPOSED ON IT BY THE CONTRACTOR'S DEMOLITION PROCEDURE SHALL BE SHORED. COORDINATE WITH STRUCTURAL.
2. EXISTING STRUCTURE SHALL BE SHORED PRIOR TO COMMENCEMENT OF DEMOLITION. SECTIONS OF STRUCTURE BEING DEMOLISHED SHALL NOT BE ALLOWED TO DROP ONTO FLOOR STRUCTURE BELOW.
3. SHORING SHALL TRANSFER LOADING DIRECTLY TO EXISTING LOAD BEARING MASONRY WALLS. SHORING SHALL BE DESIGNED TO SUPPORT THE FULL ANTICIPATED LOADING WITH NO BENEFIT FROM THE EXISTING STRUCTURAL FRAMING.
4. EXISTING CONSTRUCTION SHOWN TO REMAIN SHALL NOT BE DAMAGED DURING THE DEMOLITION PROCESS. PROVIDE ALL NECESSARY TEMPORARY PROTECTION.

GENERAL CONSTRUCTION NOTES

1. THE WORK SHALL CONFORM WITH THE CURRENT EDITION OF THE FOLLOWING REGULATIONS AS ADOPTED BY THE CITY OF DRIPPING SPRINGS:
   - -2018 INTERNATIONAL BUILDING CODE
   - -2018 INTERNATIONAL EXISTING BUILDING CODE
   - -2018 INTERNATIONAL FIRE CODE
   - -2018 INTERNATIONAL PLUMBING CODE
   - -2018 INTERNATIONAL MECHANICAL CODE
   - -2017 NATIONAL ELECTRICAL CODE
   - -2018 INTERNAL ENERGY CONSERVATION CODE
   - -2012 TEXAS ACCESSIBILITY STANDARDS
   - -U.S. DEPARTMENT OF LABOR, OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
2. THE CONTRACTOR SHALL VISIT THE SITE TO REVIEW AND SURVEY EXISTING CONDITIONS TO FULLY UNDERSTAND SCOPE OF WORK.
3. THE CONTRACTOR SHALL OBTAIN ALL NECESSARY PERMITS AND INSPECTIONS AND PAY ALL APPLICATION FEES.
4. IF THE CONTRACTOR PERFORMS OR PROCEEDS WITH ANY WORK, CONTRARY TO APPLICABLE LAWS, ORDINANCES, RULES AND REGULATIONS WITHOUT GIVING PRIOR WRITTEN NOTICE TO THE ARCHITECT, HE/SHE SHALL ASSUME FULL RESPONSIBILITY THEREFORE AND SHALL BEAR ALL COST ATTRIBUTABLE.
5. THE CONTRACTOR SHALL CAREFULLY STUDY THE CONTRACT DOCUMENTS PRIOR TO CONSTRUCTION AND SHALL REPORT TO THE ARCHITECT ANY ERROR, INCONSISTENCY OR OMISSION DISCOVERED AND SHALL NOT PROCEED WITH THE WORK UNTIL THE INTENT OF THE DOCUMENTS IS VERIFIED BY THE ARCHITECT.
6. ALL DRAWINGS AND SPECIFICATIONS FORMING PART OF THE CONSTRUCTION DOCUMENTS ARE COMPLEMENTARY, AND WHAT IS CALLED FOR BY ONE WILL BE BINDING AS IF CALLED FOR BY ALL; ANY WORK SHOWN OR REFERRED TO ON ANY ONE DOCUMENT SHALL BE PROVIDED AS THOUGH SHOWN ON ALL DOCUMENTS.
7. THE CONTRACT DOCUMENTS SHALL BE INTERPRETED WITH THE FOLLOWING ORDER OF PRECEDENCE: SPECIFICATIONS, DETAILS, ENLARGEMENTS, OVERALL DRAWINGS, AND SUBSEQUENT CLARIFICATIONS. ADDENDA SHALL OVERRIDE THE AFFECTED COMPONENTS IN ALL OF THE ABOVE. ALL VERBAL CLARIFICATIONS ARE TO BE RECORDED BY THE CONTRACTOR AND SENT TO THE ARCHITECT WITHIN SEVEN DAYS OF THE OCCURRENCE.
8. THE CIVIL, STRUCTURAL, MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, LANDSCAPING, AND AUDIO/VISUAL DOCUMENTS ARE SUPPLEMENTARY TO THE ARCHITECTURAL DOCUMENTS. SHOULD THERE BE A DISCREPANCY BETWEEN THE ARCHITECTURAL DOCUMENTS AND THE STRUCTURAL, MECHANICAL, PLUMBING, ELECTRICAL, LANDSCAPING, AND AUDIO/VISUAL DOCUMENTS, SUCH DISCREPANCY IS TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. THE CONTRACTOR SHALL RECEIVE INSTRUCTIONS PRIOR TO INSTALLATION OR PERFORMANCE OF SAID WORK. ANY WORK PERFORMED OR INSTALLED IN CONFLICT WITH THE DOCUMENTS SHALL BE CORRECTED BY THE CONTRACTOR AT THEIR OWN EXPENSE.
9. INFORMATION CONTAINED ON THESE DRAWINGS WITH REGARD TO EXISTING CONDITIONS OF CONSTRUCTION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR EXECUTING THE WORK. EVERY ATTEMPT HAS BEEN MADE TO PROVIDE COMPLETE AND ACCURATE REPRESENTATIONS OF SUCH EXISTING CONDITIONS. THIS INTERPRETATION HAS BEEN TAKEN BY FIELD MEASUREMENT AND OBSERVATION. THE ARCHITECT HAS ENDEAVORED TO IDENTIFY AS COMPLETELY AS POSSIBLE IN THE CONSTRUCTION DOCUMENTS, EXISTING ITEMS OF EQUIPMENT AND CONSTRUCTION THAT ARE REQUIRED TO BE REMOVED OR OTHERWISE DEMOLISHED. THIS INFORMATION IS PROVIDED FOR THE CONVENIENCE OF THE CONTRACTOR AND IS IN NO WAY INTENDED TO MEAN THAT DEMOLITION IS LIMITED ONLY TO THOSE ITEMS SPECIFICALLY IDENTIFIED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO EXECUTE DEMOLITION WORK AS REQUIRED TO REMOVE ELEMENTS AND SYSTEMS IDENTIFIED IN THE CONSTRUCTION DOCUMENTS, ALONG WITH THEIR ASSOCIATED PARTS.
10. ALL AREAS AND ITEMS INDICATING CONTRACT LIMITS AND LINES OF DEMARCATION ARE SHOWN FOR THE CONVENIENCE OF THE CONTRACTOR AND ARE NOT TO BE TAKEN LITERALLY. ACTUAL CONTRACT LIMITS ARE TO BE DETERMINED PRIOR TO CONSTRUCTION BY FIELD VERIFICATION.
11. EXISTING CONSTRUCTION SHOWN TO REMAIN SHALL NOT BE DAMAGED DURING THE DEMOLITION PROCESS. PROVIDE ALL NECESSARY TEMPORARY PROTECTION.
12. CONTRACTOR TO ASSIST THE ARCHITECT IN MAKING THEIR EVALUATIONS AND RECOMMENDATIONS BY PROVIDING IN A TIMELY MANNER, AT NO ADDITIONAL COST TO THE OWNER, ACCURATE AND COMPLETE DRAWINGS, SKETCHES, AND PHOTOGRAPHS, SUFFICIENT TO CLEARLY DESCRIBE DISCREPANCIES, CONFLICTS, AND CONCEALED OR OTHERWISE UNANTICIPATED CONDITIONS AFFECTING NEW CONSTRUCTION.
13. SCAFFOLDING AND SHORING CANNOT BE SECURED TO EXISTING HISTORIC MATERIALS, OR CAUSE DAMAGE TO EXISTING MATERIALS.
14. REINSTALL EACH ELEMENT IN ITS ORIGINAL LOCATION UNLESS NOTED OTHERWISE.
15. SIZE NOTED IN CONSTRUCTION DOCUMENTS FOR ORIGINAL MATERIALS ARE APPROXIMATE AND ARE TO BE FIELD VERIFIED PRIOR TO SUBMITTAL OF SHOP DRAWINGS. MATCH EXACT SIZES AND PROFILES OF ORIGINAL ELEMENTS.
16. FIELD VERIFICATIONS OF EXISTING CONDITIONS RELATED TO SPECIFIC PORTIONS OF THE WORK SHALL BE UNDERTAKEN IN ADVANCE TO ALLOW FOR THE TIMELY IDENTIFICATION OF EXISTING CONDITIONS THAT MAY AFFECT THE SCHEDULED INSTALLATION OF NEW WORK AS DESIGNED AND DETAILED, AND TO AVOID UNDUE AND UNREASONABLE DELAYS TO THE PROJECT SHOULD SUCH CONDITIONS BE DISCOVERED. TIMELY IDENTIFICATION OF SUCH CONDITIONS SHALL PROVIDE FOR A MINIMUM PERIOD OF 10 (TEN) WORKING DAYS DURING WHICH TIME THE ARCHITECT WILL EVALUATE THE CONDITION AND MAKE RECOMMENDATIONS FOR ACCOMMODATING NEW WORK.
17. CONTRACTOR IS TO PROVIDE AND INSTALL ALL ACCESS PANELS, RATED OR OTHERWISE, SIZE AS REQUIRED, AT ALL CONCEALED MECHANICAL AND PLUMBING ITEMS WHICH REQUIRE SERVICE OR ACCESS (VALVES, FIE DAMPERS, DUCT HEATERS, ETC.). ACCESS PANELS IN RATED CEILINGS AND PARTITIONS SHALL HAVE THE APPROPRIATE UL LABELS.
18. THE CONTRACTOR SHALL COORDINATE ALL WORK WITH ALL EQUIPMENT MANUFACTURER'S ROUGH-IN REQUIREMENTS.
19. EXISTING UTILITY SERVICES ARE TO REMAIN, BE PROTECTED, AND/OR TO BE OPERATIONAL DURING DEMOLITION AND CONSTRUCTION. REFERENCE RELEVANT CIVIL, MECHANICAL, PLUMBING, AND ELECTRICAL DRAWINGS. CONTRACTOR TO BE RESPONSIBLE FOR PROTECTION OF AND RESTORATION OF SERVICES, AS WELL AS PROVISION OF TEMPORARY UTILITY SERVICES.
20. NOTIFY CITY OF DRIPPING SPRINGS WHEN IT IS NECESSARY TO AFFECT UTILITIES BEFORE PROCEEDING WITH THE WORK. ALL EXISTING UTILITIES MUST BE CHECKED BY THE CONTRACTOR PRIOR TO THE COMMENCEMENT OF DEMOLITION WORK. ANY DAMAGES RESULTING FROM LACK OF COMPLIANCE WITH THE PROVISIONS SHOULD BE CORRECTED BY THE CONTRACTOR AT HIS OR HER OWN EXPENSE.

NEW FASTENERS

1. ATTACHMENTS TO MASONRY I.E.: CONDUIT, WOOD FRAMING, ETC. MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURES UNLESS NOTED OTHERWISE.

CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS AND CEILINGS:

1. CONDUIT, WIRING, AND PIPING, IS TO BE CONCEALED BEHIND FINISH FACE OF GYPSUM BOARD AND PLASTER WALLS UNLESS NOTED OTHERWISE.
2. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
3. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE OF THE WALL.

PENETRATIONS AT MASONRY WALLS:

1. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENT, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION OF OPERATION OF ELECTRICAL, MECHANICAL, AND PLUMBING SYSTEMS. RE: STRUCTURAL FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

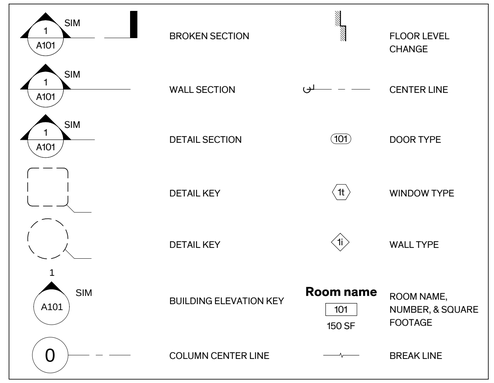
EXISTING BUILDING:
1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

ABBREVIATIONS

±	PLUS/MINUS
DIAM.	DIAMETER
A/C	AIR CONDITIONER
ACM	ASBESTOS CONTAINING
AHU	AIR HANDLING UNIT
CABS.	CABINETS
CLG.	CEILING
CONC.	CONCRETE
DN.	DOWN
ELEV.	ELEVATOR
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
FIXT.	FIXTURES
FLR.	FLOOR
F.R.	FIRE RATED
GYP.	GYPSUM
HIST.	HISTORIC
MECH.	MECHANICAL
MIN	MINIMAL
MISC.	MISCELLANEOUS
MTL.	METAL
MFR	MANUFACTURER
NIC	NOT IN CONTRACT
OC	ON CENTER
OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
OFOI	OWNER FURNISHED, OWNER INSTALLED
OPNG	OPENING
ORIG.	ORIGINAL
PTD.	PAINTED
PTN.	PARTITION
QTR.	QUARTER
REF.	REFERENCE
REQ'D	REQUIRED
SSTL	STAINLESS STEEL
STRUCT.	STRUCTURAL
T.B.D.	TO BE DETERMINED
TRTD	TREATED
TYP.	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VIF	VERIFY IN FIELD
W/	WITH
WD.	WOOD

NOTE: CONTRACTOR SHALL VERIFY WITH ARCHITECT FOR ANY ABBREVIATION NOT LISTED.

SYMBOL LEGEND



MATERIAL LEGEND

- EARTH/COMPACT FILL
- GRAVEL FILL
- SAND FILL
- CAST-IN-PLACE CONC.
- LIGHTWEIGHT CONC.
- FACE BRICK
- COMMON BRICK
- CMU
- CAST STONE
- GLASS
- STEEL
- ALUMINUM
- SHEET METAL
- FRT ROUGH WOOD
- FRT BLOCKING
- FINISH WOOD
- PLYWOOD
- RIGID INSULATION
- THERMAL/ ACOUSTIC BATT INSULATION
- SPRAYED INSULATION
- SPRAYED FIRE INSULATION
- CERAMIC TILE
- TYPE 'X' GYP. BOARD
- METAL LATH & PLASTER
- CARPET
- HOLLOW CLAY TILE

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City of Dripping Springs
STEPHENSON SCHOOL BUILDING,
REHABILITATION AND ADDITION

311 Old Fitzhugh Rd.
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REVISION HISTORY

Issued for Permit and Construction

REGISTERED ARCHITECT
ALEXIS M. MCKINNEY
22892
STATE OF TEXAS

#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

Sheet Name
Cover Sheet

Sheet Number
A0.01

BUILDING CODE ANALYSIS

Applicable Code(s):
1. International Building Code (IBC) - 2018 Edition
2. International Existing Building Code (IBEC) - 2018 Edition
3. International Fire Code (IFC) - 2018 Edition
4. International Plumbing Code (IPC) - 2018 Edition
5. International Mechanical Code (IMC) - 2018 Edition
6. National Electrical Code (NEC) - 2023 Edition
7. International Energy Conservation Code (IECC) - 2018 Edition
8. City of Dripping Springs Code of Ordinances
9. 2012 Texas Accessibility Standards

SUMMARY SHEET - BUILDING CODE (IEBC Table 1301.7)

Existing occupancy:	**B**	Proposed occupancy:	**A-3, B**
Year building was constructed:	**1939**	Number of stories: **1**	Height in feet: **±25'-0"**
Type of construction:	**V-B**	Area per floor:	**5,901 sq.ft.**
Percentage of open perimeter:	**100%**	Percentage of height reduction:	**0%**
Completely suppressed:	**Yes**	Corridor wall rating:	**N/A**
Compartmentation:	**No**	Required door closers:	**No**

Fire Resistance of rating of vertical opening enclosures: **N/A**

Type of HVAC system: **Split System**

Automatic fire detection: **Yes** Type and location: **Smoke detectors throughout**

Fire alarm system: **Yes** Type: **Fire alarm system complying w/ sect. 907 plus emergency voice/alarm & fire command station**

Smoke control: **No** Type: **N/A**

Adequate exit routes: **Yes** Dead ends: **No**

Maximum exit access travel distance: **250'**
(Per Table 1017.2, A-3=250' max, B=300' max) Elevator controls: **N/A**

Means of egress emergency lighting: **Yes** Mixed occupancies: **B; A-3**

ALLOWABLE HEIGHT AND BUILDING AREA (IBC TABLE 504.3, 504.4, 506.2):

Occupancy:	Group A-3/ B
Construction Type:	V-B
Max. height in feet:	60 feet
Max. number of stories:	2 (A-3), 3 (B)
Max. allowable area:	24,000 sq. ft. (A-3), 38,000 sq.ft. (B)

TYPE OF CONSTRUCTION (IBC Section 602.3)

Type V-B construction is that type of construction in which the structural elements, exterior walls, and interior walls are of any building material permitted by this code.

SEPARATED OCCUPANCIES

Per IBC Table 508.2.4, Required Separation of Occupancies: Occupancy type A shall have a 1-hour separation from occupancy type B (with sprinkler)

REQUIRED FIRE RESISTANCE RATINGS BASED ON CONSTRUCTION TYPE (IBC Table 601)

Type V-B buildings having specific fire resistance requirements for Structural Components as follows:

Structural Frame:	0
Exterior Bearing Walls:	0
Interior Bearing Walls:	0
Non-Bearing Walls:	0
Floor Construction:	0
Roof Construction:	0

AUTOMATIC FIRE SPRINKLER SYSTEMS (IBC Sect. 903)

The following information indicates minimum requirements for installation of a fire sprinkler system in buildings with group A occupancies:

Per 903.2.1, An automatic fire sprinkler system shall be provided throughout buildings and portions thereof used as Group A occupancies. For Group A-3 occupancies, the automatic sprinkler system shall be provided throughout the floor area where the Assembly occupancy is located, and on all floors from the Group A occupancy to, and including, the nearest level of exit discharge serving the Group A

Per 903.2.1.3 for Group A-3, An automatic fire sprinkler system shall be provided throughout a fire area containing a Group A-3 occupancy where one of the following conditions exist:

1. The area exceeds 12,000 sq.ft. - Not Applicable
2. The fire area has an occupant load of 300 or more - Applicable, occupant load is 363 people.
3. The fire area is located on a floor other than the level of exit discharge - not applicable, one story

Due to occupant load an automatic fire sprinkler is required.

FIRE HYDRANT SYSTEMS (IFC Sect. 507.5)

For buildings equipped throughout with an approved automatic sprinkler system installed in accordance with Sec. 903.1.3, a fire hydrant shall be located within 600 feet of the building.
Nearest existing fire hydrant is located at northeast corner of Mercer and Old Fitzhugh, near 222 W. Mercer. Fire hydrant is located with 400 ft. per City code. A hydrant will be added near the water meter at Old Fitzhugh under separate contract. Refer to separate site development permit.

UNDERFLOOR VENTILATION (IBC 1202.4)

Per 1202.4.1.2 Ventilation area for crawl spaces with covered floors, the net area of ventilation openings for crawl spaces with the ground surface covered with a Class 1 vapor retarder shall be not less than 1 square foot for each 1,500 square feet of crawlspace area
3,839 sq.ft. / 1,500 sq.ft = ***2.6 sq.ft. Required*** ***11.6 sq.ft. Provided***

OCCUPANT LOAD (IBC Table 1004.5)

The Occupant load below is based upon the proposed floor plan layout.

Function of Space (area total)	Occupant Load Factor	Occupant Load
A-3		
Assembly (2,088 sq. ft.)	1 person/7 net sq. ft. (Concentrated)	299 persons
Platform (454 sq. ft.)	1 person/15 net sq. ft.	31 persons
Gallery (312 sq. ft.)	1 person/30 net sq. ft. (	11 persons
Catering (179 sq. ft.)	1 person/200 net sq. ft.	1 persons
Dressing (219 sq. ft.)	1 person/50 gross sq. ft.	5 persons
Accessory Storage/Mech (208 sq. ft.)	1 person/ 300 gross sq. ft.	1 person
B		
Business (640 sq. ft.)	1 person/ 150 gross sq. ft.	5 persons
	Total Building Occupancy:	**353 persons**

EXITING REQUIREMENTS (IBC Sect. 1005.3)

Floor	Sizing base on Occupant Load	Minimum size per Opening	Provided
Assembly			
1st Floor	348 persons x 0.2" = 71.6"	32" min. clear (1010.1.1)	3 Exits @ 32"= 144"
Offices			
1st Floor	5 persons x 0.2" = 1"	32" min. clear (1010.1.1)	1 Exit @ 64"

Per Table 1006.3.2 Minimum Number of Exits or Access to Exits per Story. For an occupant load of 1-500, a minimum of two exits or access to exits from story are required.

Per Table 1006.2.1, Two exits or exit access doorways from any space shall be provided where the design occupant load exceeds 49 persons.

PROPOSED NEW BUILDING ELEMENTS AND SYSTEMS:

1. HVAC system: New HVAC system throughout complying with section 1004.3.2.4 and section 602 of the international mechanical code.
2. Automatic Fire detection: New smoke detectors throughout.
3. Means of Egress emergency lighting: New means of egress lighting and exit signs with battery backup power in the event of power failure to the site or building.
4. ADA compliant ramps shall be provided at east entry and in addition as part of the accessible route to the building and the platform.
5. Accessible restrooms throughout
6. Class 1 vapor barrier shall be provided at crawl space

PARKING (City of Dripping Springs Code of Ordinances)

Parking to be provided by Stephenson TIRZ Parking Project, NIC

FENESTRATION PERFORMANCE

GLAZED ALUMINUM STOREFRONT & GLAZED ALUMINUM STOREFRONT DOOR
U-factor = .6 max, SHGC = .4 max, VLT = 62% min

METAL CLAD WOOD WINDOWS (ADDITION)- NRRC Labeled
U-factor = .35 max, SHGC = .3 max, VLT = 62% min

EXISTING WOOD WINDOWS (HISTORIC)- Replace sashes only
U-factor = .35 max, SHGC = .3 max, VLT = 62% min

REQUIRED PLUMBING FIXTURES (IBC Table 2902.1)

A-3 OCCUPANCY (358 Persons)

Water Closets	Male		Female	
	174 persons at 1/125 =	1.4	174 persons at 1/65 =	2.7
TOTAL REQUIRED		2		3
TOTAL PROVIDED		**3**		**4**

Lavatories	Male		Female	
	174 persons at 1/200 =	.87	174 persons at 1/200 =	.87
TOTAL REQUIRED		1		1
TOTAL PROVIDED		**4**		**4**

Drinking Fountains		
	348 occupants @ 1/500=	.7
TOTAL REQUIRED		1
TOTAL PROVIDED		**2**

Service Sink		
	348 occupants @ 1/500=	.7
TOTAL REQUIRED		1
TOTAL PROVIDED		**1**

B OCCUPANCY (5 Persons)
Reference IBC 2902.2 for seprate facilities exception for business occupancy under 25

Water Closets		
B Occupancy	5 persons at 1/25 for 1st 50 & 1/50 for remainder =	.2
TOTAL REQUIRED		1
TOTAL PROVIDED		**1**

Lavatories		
B Occupancy	5 persons at 1/40 for 1st 80 & 1/80 for remainder =	.125
TOTAL REQUIRED		1
TOTAL PROVIDED		**1**

Drinking Fountains
Reference IBC 2902.6 for drinking fountain exception for occupant loads under 15

Service Sink
Reference IBC 2902.1 e. for service sink exception for busniss occupancy under 15

TOTAL FACILITY PROVIDED PLUMBING FIXTURES
Total provided fixture count is 6 water closets, 1 urinal, 7 lavatories, 2 water fountainS, and 1 service sink.

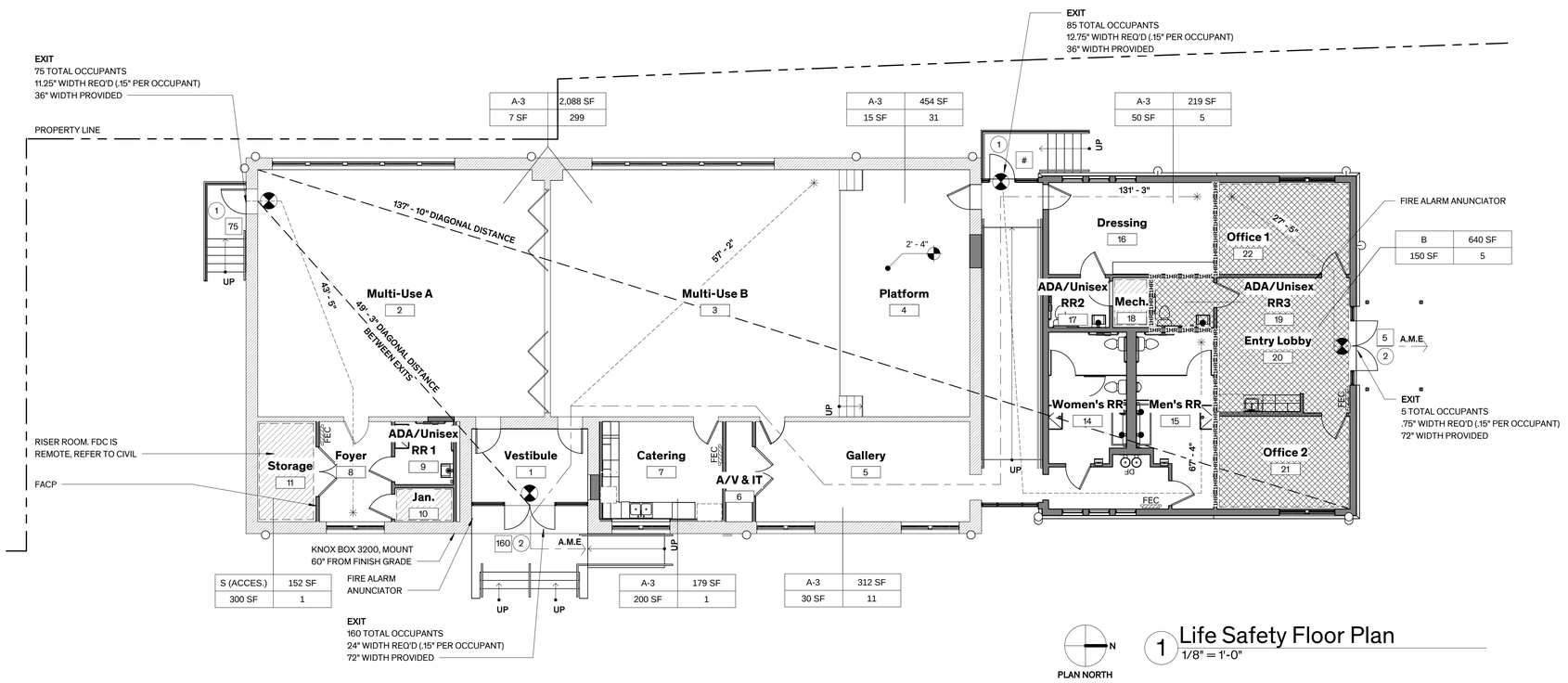
LIFE SAFETY LEGEND

- 1 — 3'-0" DOORS
- 2 — 6'-0" DOORS
- # — # OF OCC. AT EGRESS ELEMENTS
- ✳ — MOST REMOTE POINT OF TRAVEL
- MOST REMOTE POINT OF TRAVEL PATH
- A.M.E — A.M.E = ACCESSIBLE MEANS OF EGRESS
- 1HR 1HR — 1-HR FIRE RATED WALL
- FE — FIRE EXTINGUISHER / BRACKET (MAX 75')
- FEC — FIRE EXTINGUISHER / CABINET (MAX 75')
- EXIT SIGN RE: ELEC
- OCCUPANCY USE AREA

B	31,939 SF
150 SF	212

OCCUPANT TOTAL PER AREA
MAX. FLR. AREA ALLOWANCE PER OCCUPANT

- A-3 ASSEMBLY
- B BUSINESS
- ACCESS. STORAGE/MECH



1 Life Safety Floor Plan
1/8" = 1'-0"

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City of Dripping Springs
STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION

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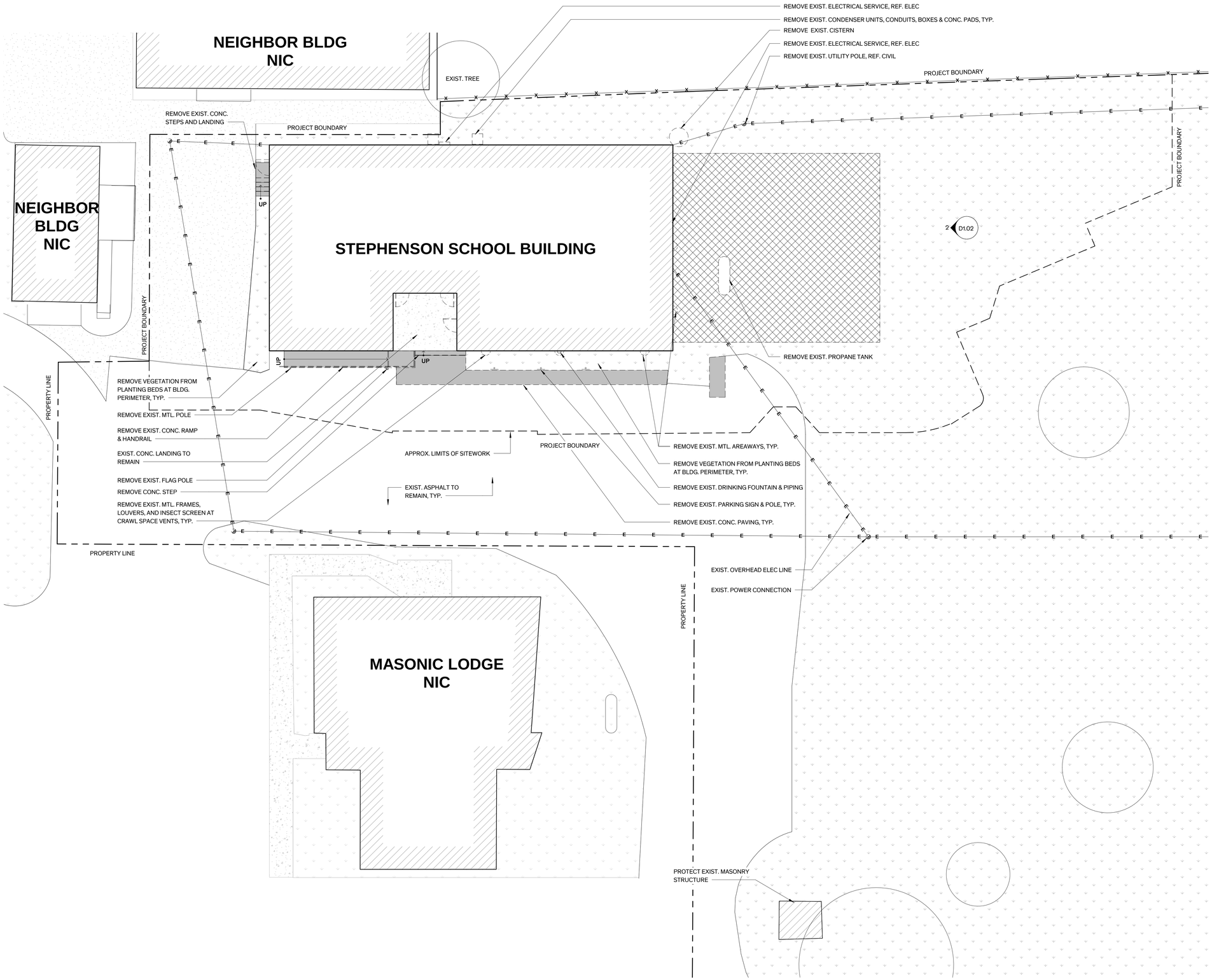
REGISTERED ARCHITECT ALEXIS M. MCKINNEY 22892 STATE OF TEXAS

#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

Sheet Name
Life Safety

Sheet Number
Ao.



1 Demo Site Plan
1" = 10'-0"

N
PLAN NORTH

GENERAL NOTES - SITE DEMO

1. **GENERAL SITE WORK:**
   - A. UTILITY LOCATIONS ARE APPROXIMATE, V.I.F. LOCATE GAS, WATER, ELECTRICAL, & OTHER MISC. UTILITY LINES PRIOR TO TRENCHING.
   - B. REFERENCE CIVIL FOR SITE UTILITY WORK BEYOND 5' FROM BUILDING. REFER TO MEP DRAWINGS FOR SCOPE OF SITE UTILITY WORK WITHIN 5' OF BUILDING.
   - C. INFORMATION FOR SITE PLAN WAS TAKEN FROM SURVEY PREPARED BY MCCANN ADAMS STUDIO, DATED NOVEMBER 11, 2020, DRIPPING SPRINGS TIRZ PRIORITY PROJECTS
2. **TREE PROTECTION:** PROTECT EXIST. TREES & ROOT SYSTEMS DURING EXCAVATING & BACKFILLING OPERATIONS. IF TREES ARE DAMAGED BY CONSTRUCTION OPERATIONS, CONTRACTOR SHALL OBTAIN THE SERVICES OF A CERTIFIED ARBORIST TO PERFORM REPAIRS AT NO ADDITIONAL COST TO THE OWNER.
3. **DEMOLITION:**
   - A. REMOVE EXISTING CONCRETE AND ASPHALT PAVING WHERE INDICATED
   - B. REMOVE CONC. RAMP, LANDING, & STEP AT EAST ELEVATION, PROTECT EXIST. MASONRY WALLS
   - C. REMOVE CONC. STEPS AND LANDING AT SOUTH ELEVATION, PROTECT EXIST. MASONRY WALLS
   - D. REMOVE MTL. AREAWAYS AT CRAWLSPACE VENTS, TYP.
   - E. REMOVE EXIST. MTL. CRAWLSPACE VENTS, LOUVERS, & SCREENING MATERIALS ENTIRELY, INCLUDING PARGING, TO STONE SUBSTRATE
   - F. REMOVE EXIST. MEP EQUIPMENT U.N.O. & DISTRIBUTION SYSTEMS ATTACHED TO THE EXTERIOR OF THE BUILDING U.N.O., REF. MEP. REPAIR MASONRY, TYP.
   - G. REMOVE MISC ABANDONED FASTENERS
   - H. REMOVE VEGETATION AT PERIMETER OF BUILDING, TYP.

LEGEND - DEMO SITE PLAN

- EXIST. CONCRETE TO BE REMOVED
- EXCAVATION AREA
- EXISTING GRAVEL
- EXIST. BUILDING
- EXIST. BUILDING
- EXIST. LANDSCAPING
- PROTECT EXIST. FENCE
- PROPERTY LINE
- PROJECT BOUNDARY
- POWER POLE
- EXIST. PARKING SIGN
- EXIST. OVERHEAD ELECTRIC
- ELEMENT TO BE REMOVED

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REHABILITATION AND ADDITION

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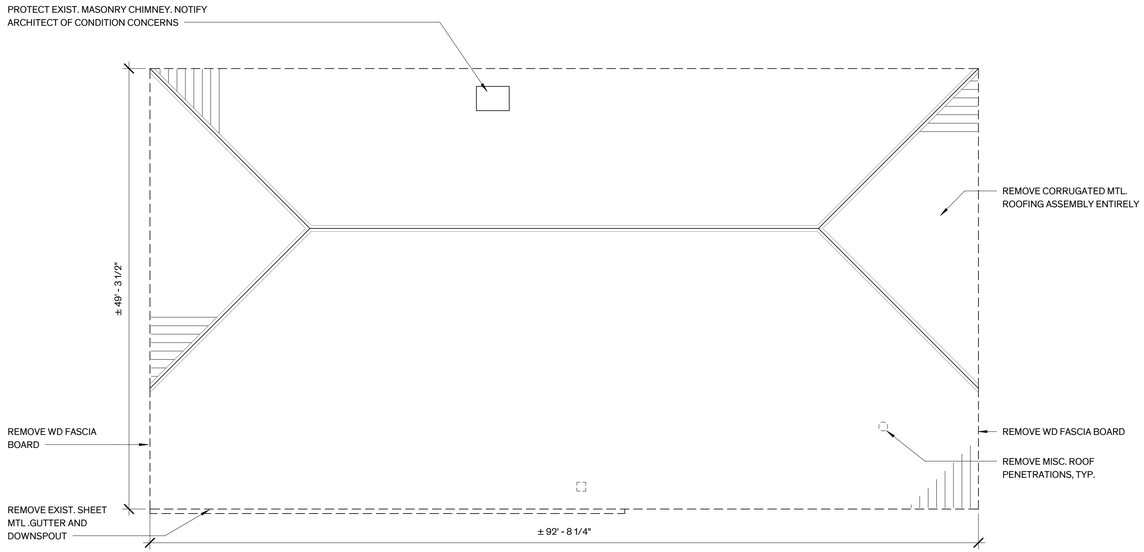
REGISTERED ARCHITECT ALEXIS M. MCGINNEY 22892 STATE OF TEXAS

#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

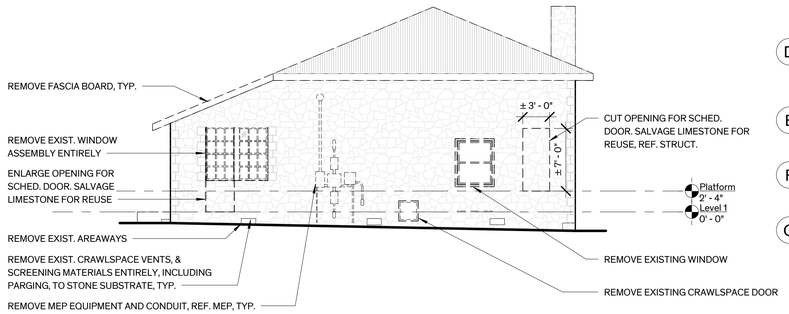
Sheet Name
Demo Site Plan

Sheet Number
D1.01

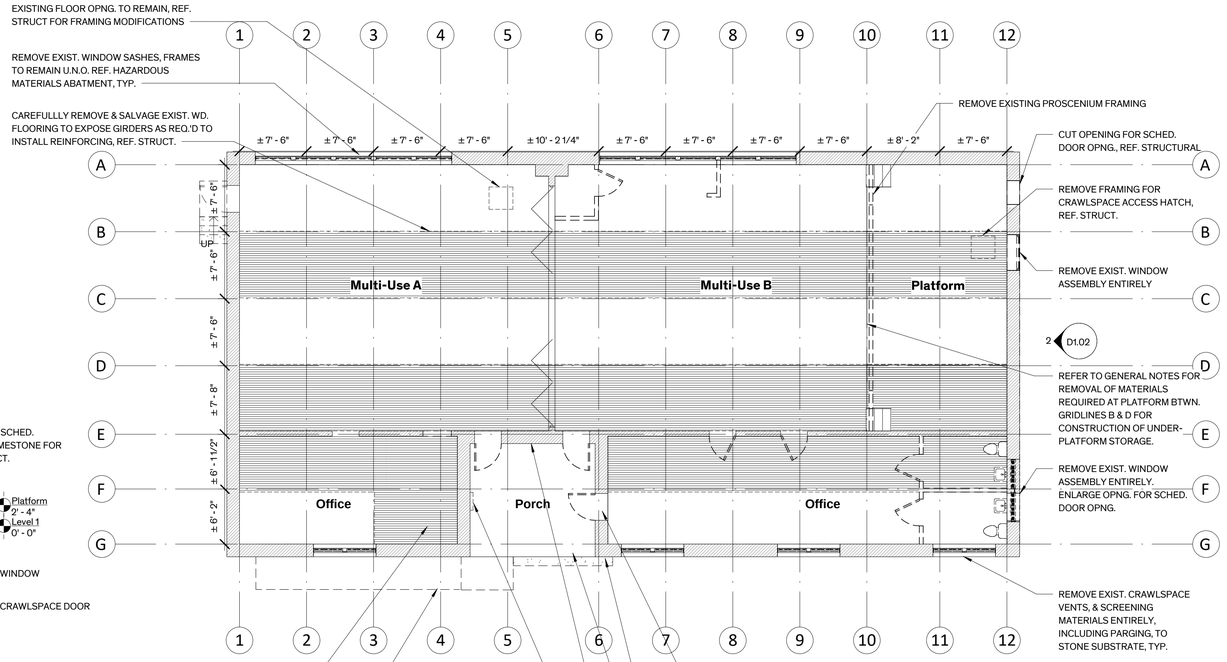


3 Demo Roof Plan
1/8" = 1'-0"

N
PLAN NORTH



2 Demo North Elevation
1/8" = 1'-0"



N
PLAN NORTH

1 Demo Level 1
1/8" = 1'-0"

GENERAL NOTES - FP DEMO

C. EXACT LOCATION OF FLOOR & CEILING GRILLES/REGISTERS ARE TO BE MARKED IN-SITU BY THE CONTRACTOR & APPROVED BY THE ARCHITECT PRIOR TO CUTTING OF STRUCTURAL ELEMENTS (MASONRY WALLS, FLOOR FRAMING, ETC...) & FINISH SURFACES.

11. **RESTROOMS:**
    A. REMOVE ALL EXIST. PLUMBING FIXTURES & TOLIET ACCESSORIES ENTIRELY.
12. **ROOFING SYSTEM:**
    A. REMOVE EXIST. CORRUGATED MTL. ROOFING TO EXPOSE WOOD FRAMING, INCLUDING ASSOCIATED FLASHING ELEMENTS
    B. WOOD SOFFIT BOARD TO REMAIN, REMOVE DAMAGED & DETERIORATED SECTIONS, ALLOW APPROXIMATE 25% REPLACEMENT
    C. WOOD RAFTER TAILS TO REMAIN, REMOVE DAMAGED & DETERIORATED SECTIONS, ALLOW APPROXIMATE 10% REPLACEMENT.
    D. REMOVE EXIST. WOOD PURLINS.
    E. REMOVE EXIST. FASCIA BOARD ENTIRELY AT NORTH & SOUTH ELEVATIONS
    F. REMOVE EXIST. MTL. GUTTERS & DOWNSPOUTS ENTIRELY
13. **SIGNAGE:** PROVIDE PROTECTION FOR HISTORIC SIGNAGE TO REMAIN ADJACENT TO DEMOLITION ACTIVITY, REMOVE ALL OTHER SIGNAGE.
14. **HAZARDOUS MATERIALS ABATEMENT:**
    A. ABATEMENT CONTRACTOR TO REMOVE ASBESTOS CONTAINING MATERIALS ENTIRELY AT WINDOW GLAZING. REFER TO HAZARDOUS MATERIALS TESTING REPORT & SPECIFICATIONS IN THE APPENDIX OF THE PROJECT MANUAL FOR LOCATIONS & FULL DESCRIPTION OF WORK
    B. LEAD BASED PAINT: REFER TO LEAD BASED PAINT TESTING REPORT & THE REMEDIATION PLAN IN THE APPENDIX OF THE PROJECT MANUAL FOR LOCATIONS & FULL DESCRIPTION OF WORK.

LEGEND - DEMO FLOOR PLAN

- EXIST. MASONRY WALL TO REMAIN
- MASONRY WALL TO BE REMOVED
- WALLS OR ELEMENTS TO BE REMOVED
- REMOVE DOOR, HARDWARE, & FRAME
- EXISTING WOOD FLOOR TO BE REMOVED
- EXISTING CORRUGATED MTL. ROOF TO BE REMOVED

GENERAL NOTES - FP DEMO

1. **GENERAL:**
   A. ITEMS NOT MARKED FOR REUSE ARE TO BE SALVAGED FOR THE OWNER OR ARE TO BE REMOVED FROM THE SITE & PROPERLY DISPOSED OF PER LOCAL CODE. COORDINATE ITEMS TO BE SALVAGED WITH OWNER.
2. **PROTECTION:**
   A. PRIOR TO THE START OF WORK PROTECT INTERIOR FINISHES & ELEMENTS SCHEDULED TO REMAIN DURING DEMOLITION & CONSTRUCTION PROCEDURES. DAMAGE TO EXISTING FINISH SURFACES & ELEMENTS BY THE CONTRACTOR SHALL BE CORRECTED AT NO ADDITIONAL COST TO THE OWNER.
   B. PROVIDE PROTECTION FOR FLOOR ASSEMBLIES INCLUDING STAIR TREADS & FINISHES SCHEDULED TO REMAIN ADJACENT TO DEMOLITION ACTIVITY.
   C. PROVIDE PROTECTION FOR HISTORIC SIGNAGE TO REMAIN ADJACENT TO DEMOLITION ACTIVITY, REMOVE ALL OTHER SIGNAGE.
   D. REMOVE DEBRIS FROM DEMOLITION AT THE END OF EACH WORK DAY, & MAINTAIN BUILDING IN A SAFE MANNER CLEAR OF DEMOLITION & CONSTRUCTION DEBRIS & EQUIPMENT.
   E. WHERE FLOOR ASSEMBLIES ARE SCHEDULED TO BE REMOVED, PROVIDE OSHA COMPLIANT TEMPORARY 2X4 WOOD RAILING AT PERIMETER OF FLOOR OPNG. DO NOT DAMAGE EXIST. FINISHES SCHEDULED TO REMAIN.
3. **FLOORS:**
   A. GENERAL: REMOVE MISC. ABANDONED PIPES, CONDUIT, FASTENERS, ETC. AS REQUIRED TO PREP. SURFACES FOR SCHEDULED REPAIRS.
   B. CAREFULLY REMOVE EXIST. WOOD FLOORING TO EXPOSE GIRDERS AS REQ.'D TO INSTALL REINFORCING & SALVAGE FLOORING FOR REINSTALLATION, REF. STRUCT.
   C. REMOVE & REINSTALL BATT INSULATION AND WIRE MESH BETWEEN JOISTS AS REQ'D. TO INSTALL REINFORCING. SALVAGE FOR REINSTALLATION.
   D. FULLY PROTECT WOOD FLOORING SCHEDULED TO REMAIN.
   E. ASSUME REPLACEMENT OF 30% OF TOTAL FLOOR AREA.
4. **WALLS:**
   A. PLASTER: REMOVE DAMAGED, DETERIORATED & DETACHED PLASTER FINISH TO SOUND SUBSTRATE INCLUDING SKIM COAT & NON-ORIGINAL WALL TEXTURE ENTIRELY, U.O.N. REMOVE POOR PRIOR PATCHES. SOUND PLASTER WITH RUBBER MALLET TO DETERMINE EXTENT OF DETACHED PLASTER. ASSUME APPROXIMATE 10% OF TOTAL PLASTER FINISH WILL REQUIRE REMOVAL.
   B. REMOVE MISC. PERIMETER TRIM ON WALLS AT FORMER DROP CEILING LOCATIONS.
5. **PROSCENIUM & PLATFORM:**
   A. REMOVE 2X PROSCENIUM FRAMING AT FRONT OF PLATFORM.
   B. REMOVE & SALVAGE BEADBOARD FACE AND TRIM BETWEEN GRIDLINES B & D AS REQ'D FOR CONSTRUCTION OF UNDER-PLATFORM STORAGE DOORS. ASSUME APPROXIMATE 10% REPLACEMENT.
   C. REMOVE MISC. WD. BRACING BELOW FRONT OF PLATFORM BETWEEN GRIDLINES B & D AS REQ'D FOR CONSTRUCTION OF UNDER-PLATFORM STORAGE SPACES. CONSULT STRUCT. ENGINEER AS REQ'D.
6. **CEILING:**
   A. REMOVE AND SALVAGE FOR REINSTALLATION FURRING STRIPS IN MULTI-USE A & B AS REQ'D FOR INSTALLATION OF MEP SYSTEMS ABOVE CEILING.
   B. REMOVE FURRING STRIPS AS INDICATED ON ENLARGED RCP, REF. A6.10.
   C. REMOVE MISC. PERIMETER TRIM AT FORMER DROP CEILING LOCATIONS.
7. **DOORS:**
   A. REMOVE & DISCARD NON-ORIGINAL DOOR ASSEMBLY INCLUDING FRAME, CASINGS, & TRIM WHERE INDICATED.
8. **WINDOWS:**
   A. REMOVE EXISTING WINDOW SASHES, FRAMES TO REMAIN UNO. REF. HAZARDOUS MATERIALS ABATEMENT REQUIREMENTS.
   B. REMOVE AND SALVAGE HARDWARE FOR REINSTALLATION
   C. REMOVE WINDOW AND FRAME ASSEMBLIES WHERE NOTED.
   D. REMOVE EXTERIOR PLYWOOD COVERINGS AT ALL WINDOWS.
   E. REMOVE MISC. WOOD BLOCKING AND FRAMING AT INTERIOR OF WINDOW OPENINGS.
9. **CRAWLSPACE VENTS:**
   A. REMOVE EXIST. CRAWLSPACE VENTS, LOUVERS, & SCREENING MATERIALS ENTIRELY, INCLUDING PARGING, TO STONE SUBSTRATE
10. **MEP:**
    A. REMOVE EXIST. MEP SYSTEMS ENTIRELY U.O.N REF. MEP.
       a. MECHANICAL: REMOVE EXIST. MECHANICAL EQUIPMENT, RELATED DEVICES, & DISTRIBUTION LINES.
       b. ELECTRICAL: REMOVE EXIST. LIGHT FIXTURES, RELATED DEVICES, & DISTRIBUTION LINES ENTIRELY
       c. PLUMBING: REMOVE EXIST. PLUMBING FIXTURES & RELATED PLUMBING LINES ENTIRELY
       d. FIRE ALARM & SMOKE DETECTORS: REMOVE EXIST. DEVICES & DISTRIBUTION LINES ENTIRELY
       e. REMOVE MEP EQUIP., DEVICES, & DISTRIBUTION LINES ON THE EXTERIOR OF THE BUILDING ENTRIELY, REF. MEP FOR RELOCATION
       f. REMOVE ALL LINES AND ATTACHMENTS THAT WILL BE ABANDONED RESULTING FROM THE WORK OF THIS CONTRACT.
    B. DEMO & REINFORCE EXIST. CONSTRUCTION FOR INSTALLATION OF MEP SYSTEMS. REF. MEP & STRUCTURAL DWGS.

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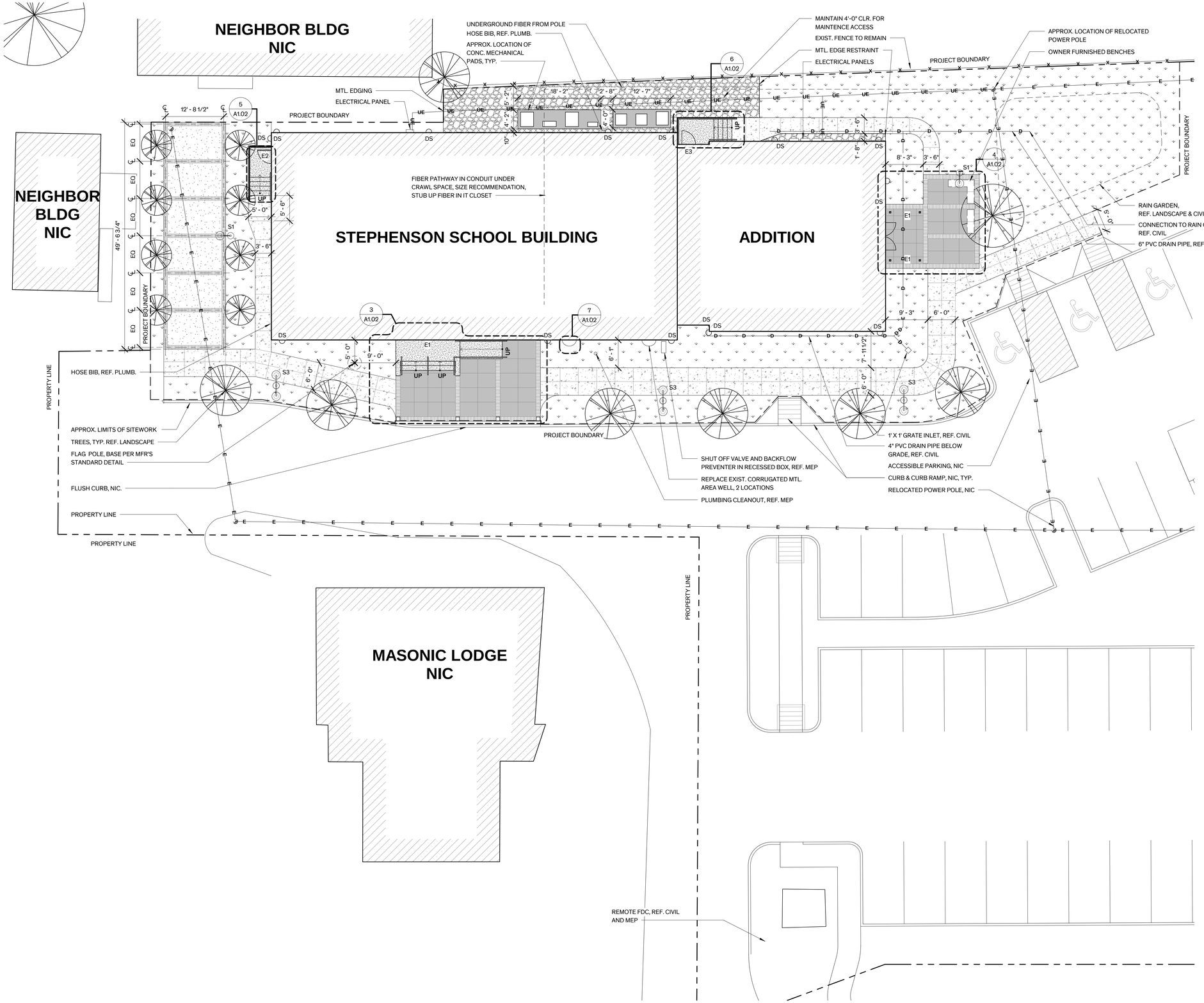
REGISTERED ARCHITECT · ALEXIS M. MCKINNEY · 22892 · STATE OF TEXAS

#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

Sheet Name
Demo Floor Plan, Roof Plan, & North Elevation

Sheet Number



1 Site Plan
1" = 10'-0"

GENERAL NOTES - SITE PLAN

1. **GENERAL SITE WORK**
   - A. UTILITY LOCATIONS ARE APPROXIMATE, V.I.F. LOCATE GAS, WATER, ELECTRICAL, & OTHER MISC. UTILITY LINES PRIOR TO BEGINNING WORK.
   - B. REFERENCE CIVIL FOR SITE UTILITY WORK BEYOND 5' FROM BUILDING. REFER TO MEP DRAWINGS FOR SCOPE OF SITE UTILITY WORK WITHIN 5' OF BUILDING.
   - C. INFORMATION FOR SITE PLAN WAS TAKEN FROM SURVEY PREPARED BY MCCANN ADAMS STUDIO, DATED NOVEMBER 11, 2020, DRIPPING SPRINGS TIRZ PRIORITY PROJECTS.
2. **TREE PROTECTION**
   - A. PROTECT EXIST. TREES & ROOT SYSTEMS DURING EXCAVATING & BACKFILLING OPERATIONS. IF TREES ARE DAMAGED BY CONSTRUCTION OPERATIONS, CONTRACTOR SHALL OBTAIN THE SERVICES OF A CERTIFIED ARBORIST TO PERFORM REPAIRS AT NO ADDITIONAL COST TO THE OWNER.
3. **SITE WORK**
   - A. PROVIDE CORRUGATED MTL AREA WELLWITH DRAIN COINCIDING WITH LOCATION OF (2) ORIGINAL CRAWLSPACE OPENINGS AT EAST ELEVATION.
   - B. PROVIDE SPLASH BLOCKS AT BOTTOM OF EACH DOWNSPOUT AT EXIST. BUILDING.
4. **SITE LIGHTING**
   - A. PROVIDE SITE LIGHTING WHERE INDICATED, REF. ELEC

LEGEND - SITE PLAN

- BUILDING EXTENTS
- PLANTING AREA, REF. LANDSCAPE
- DECOMPOSED GRANITE
- HEAVY SANDBLAST CONC. PAVING
- LIGHT SANDBLAST CONC. PAVING
- SAND FINISH CONCRETE
- CONCRETE PAVERS
- DECORATIVE AGGREGATE
- EXIST. FENCE
- PROPERTY LINE
- PROJECT BOUNDARY
- OVERHEAD ELECTRIC
- UNDERGROUND ELECTRIC
- FRENCH DRAIN
- POWER POLE
- DS — DOWNSPOUT
- E1 — RAFTER MOUNTED LIGHT
- E2 — WALL MOUNTED LIGHT
- E3 — SOFFIT LIGHT
- S1 — SINGLE HEAD CUSTOM PEDESTRIAN LIGHTING POST
- S2 — NOT USED
- S3 — DOUBLE HEAD CUSTOM PEDESTRIAN LIGHTING POST

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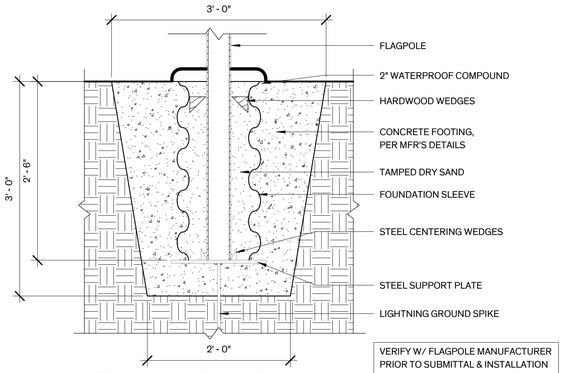
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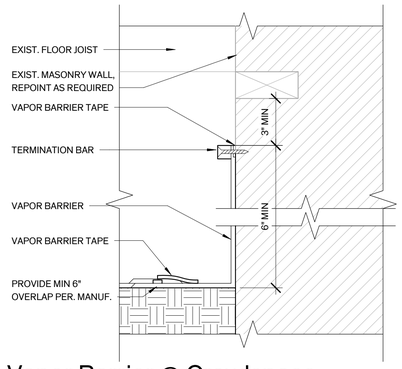
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Site Plan

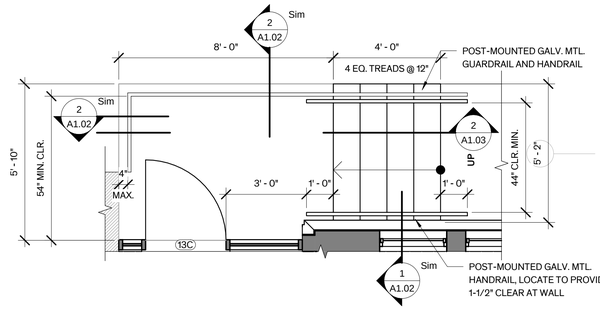
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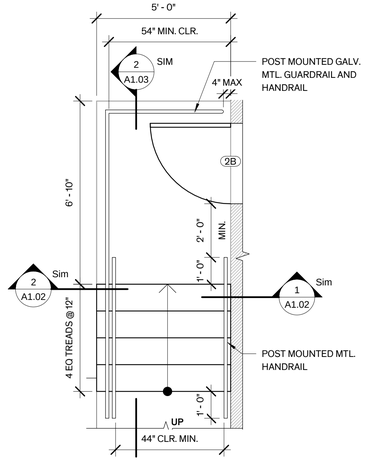
10 Flagpole Base Det.
1" = 1'-0"



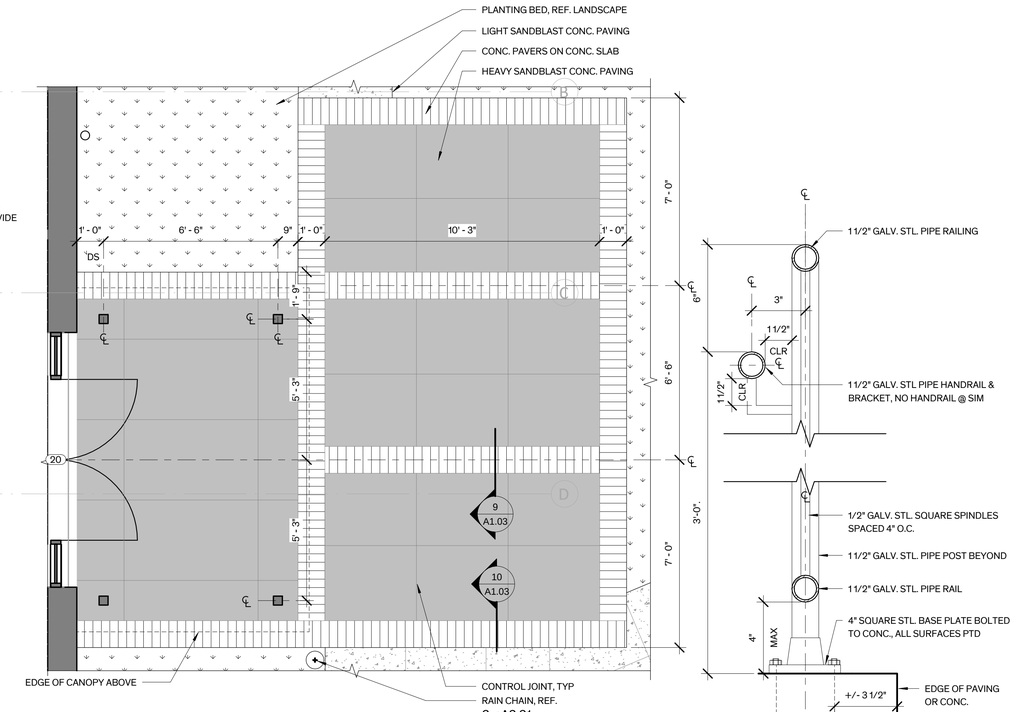
9 Vapor Barrier @ Crawlspace
3" = 1'-0"



6 Enlarged Site Plan- West Stairs
3/8" = 1'-0"

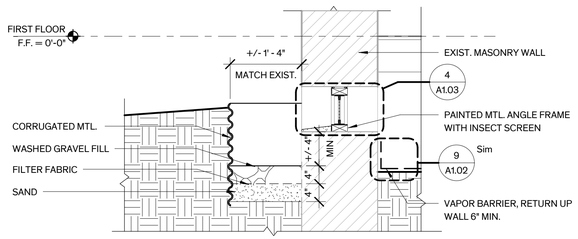


5 Enlarged Site Plan- South Stairs
3/8" = 1'-0"

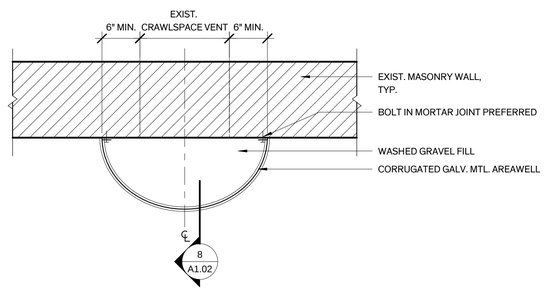


4 Enlarged Site Plan- North Porch
3/8" = 1'-0"

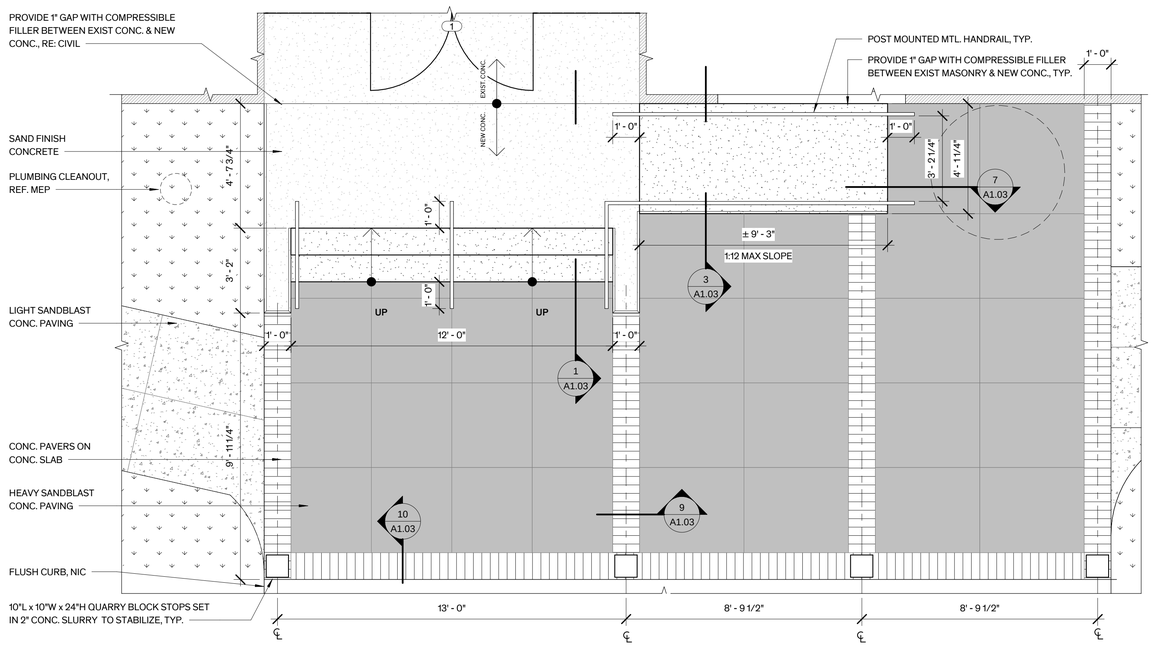
2 Post Mounted Guardrail Det.
3" = 1'-0"



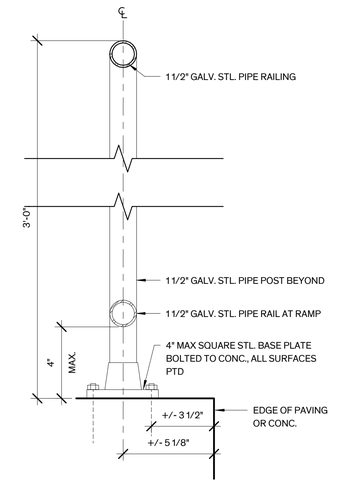
8 Section Through Area Well, Typ.
3/4" = 1'-0"



7 Areawell Foundation Plan
3/4" = 1'-0"



Enlarged Site Plan- East Stairs and Ramp
3/8" = 1'-0"



1 Post Mounted Handrail Det.
3" = 1'-0"

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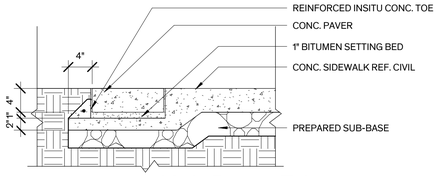
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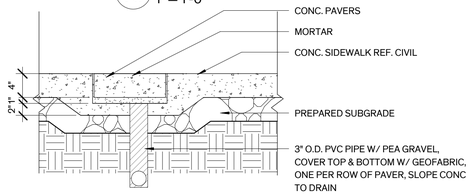
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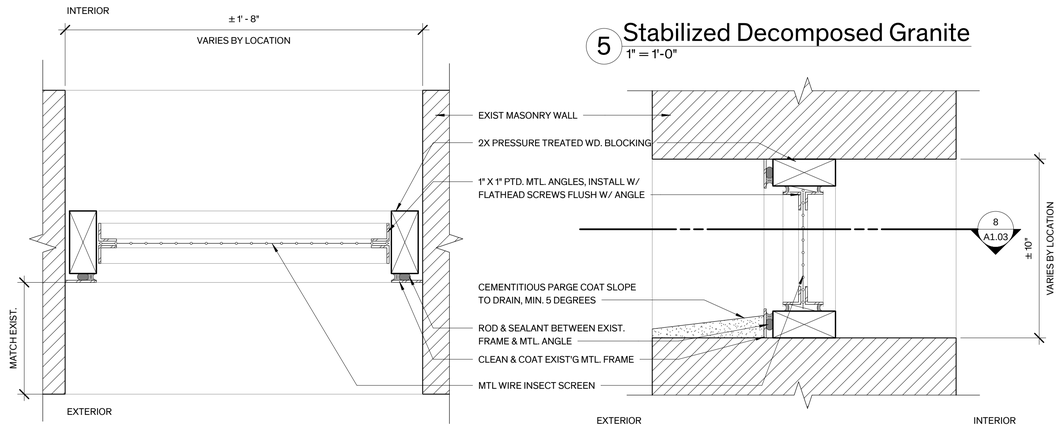
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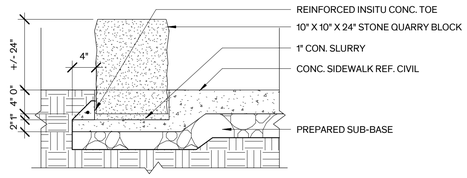


10 Unit Paver Edge
1" = 1'-0"

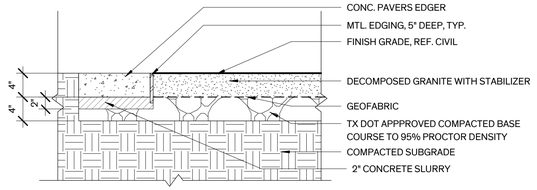


9 Unit Pavers on Concrete Base
1" = 1'-0"

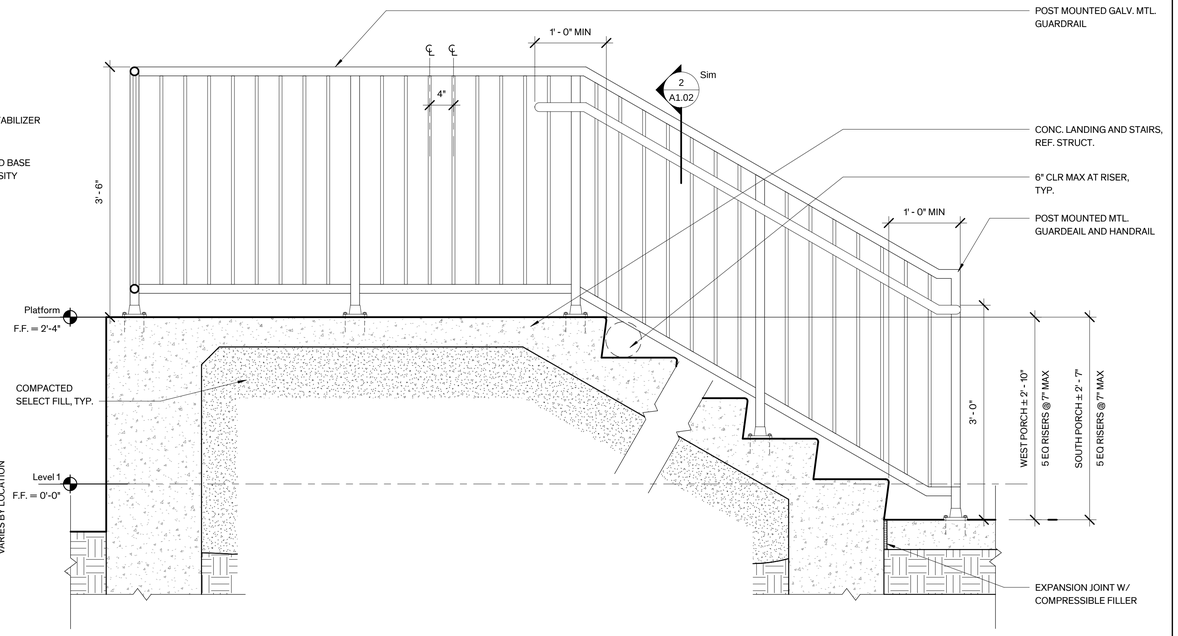




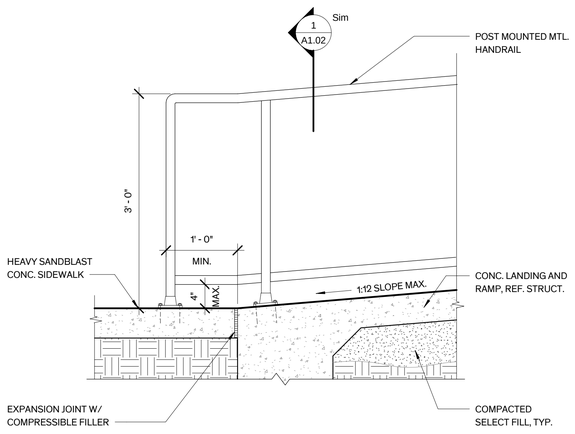
6 QUARRY BLOCK
1" = 1'-0"



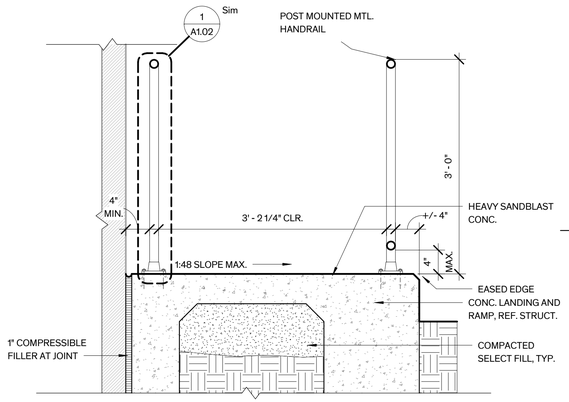
5 Stabilized Decomposed Granite
1" = 1'-0"



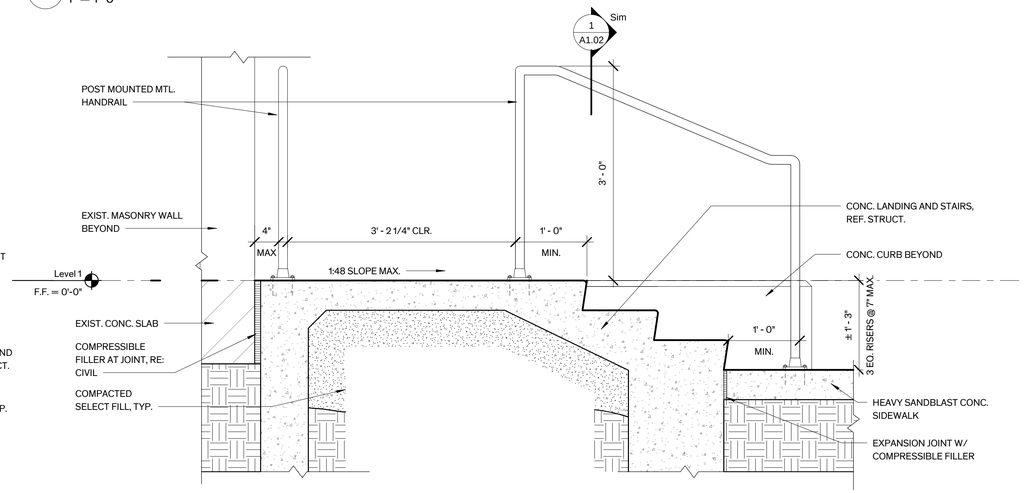
8 Crawlspace Vent Grill Plan
3" = 1'-0"



4 Crawlspace Vent Grill Section
3" = 1'-0"



2 West Stair Detail Section
1" = 1'-0"



7 Detail at Bottom of Ramp
1" = 1'-0"

3 East Ramp Detail Section
1" = 1'-0"

1 East Stair Detail Section
1" = 1'-0"

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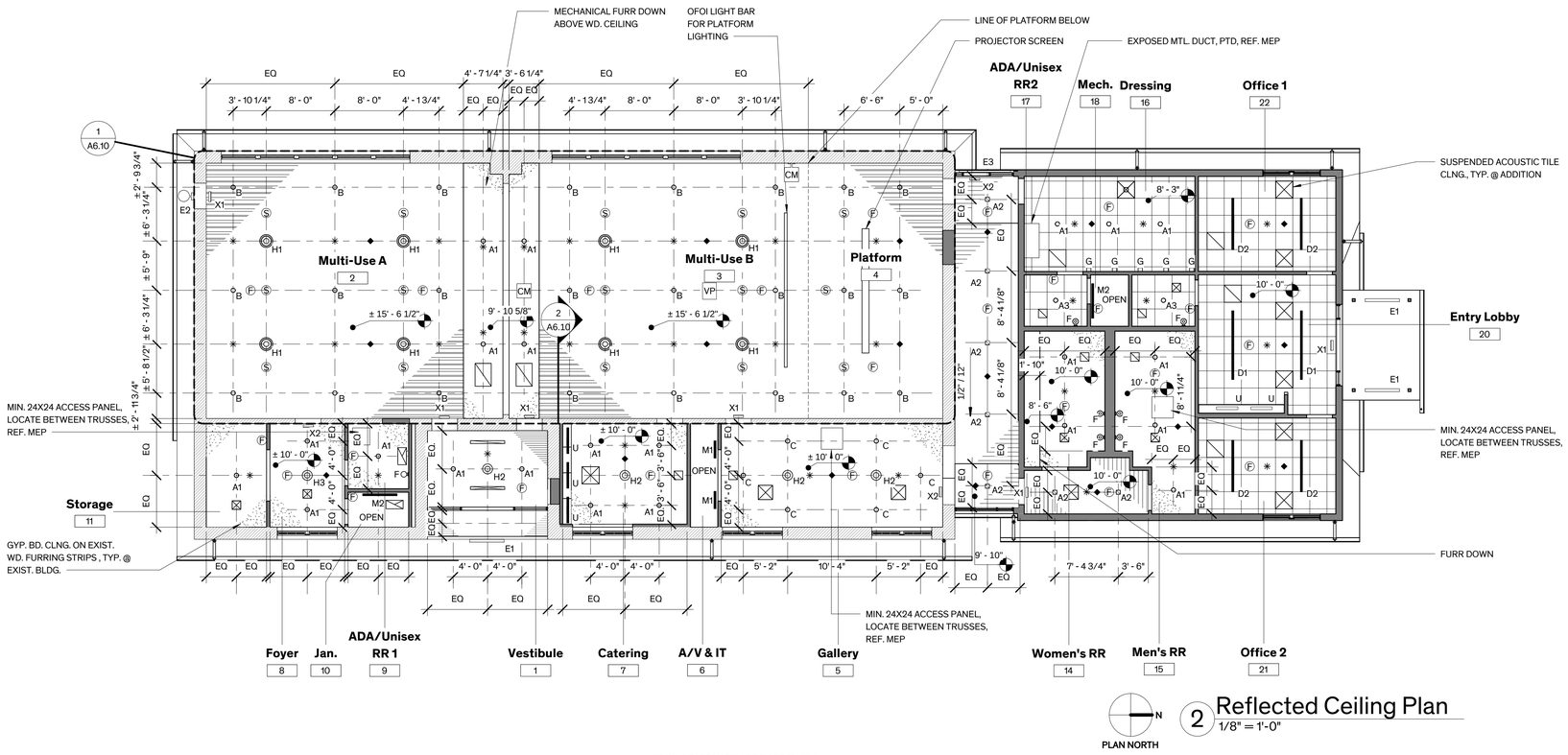
REGISTERED ARCHITECT ALEXIS M. MCGINNEY 22892 STATE OF TEXAS

#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

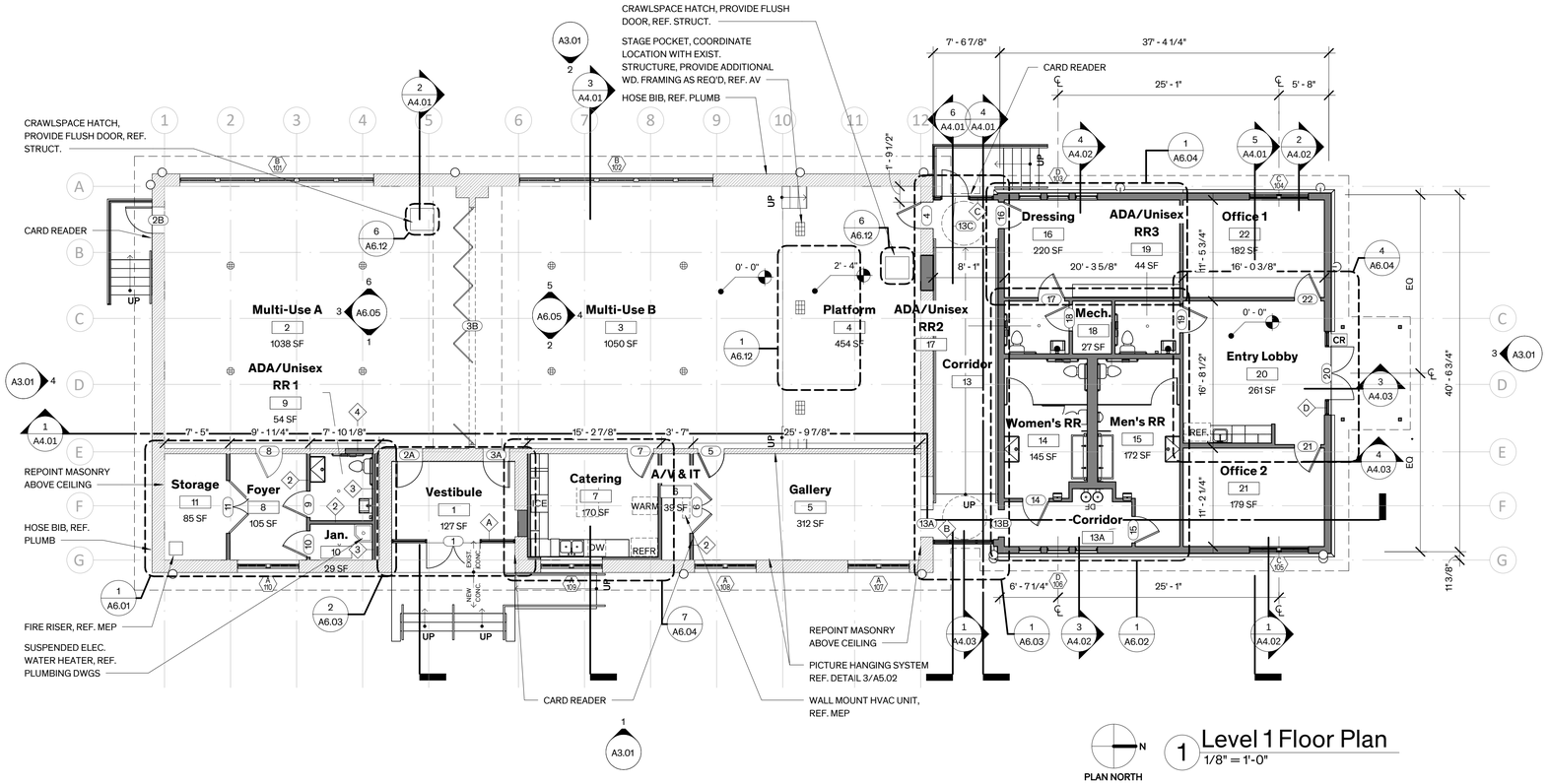
Sheet Name
Site Details

Sheet Number
A1.03



2 Reflected Ceiling Plan
1/8" = 1'-0"

PLAN NORTH



1 Level 1 Floor Plan
1/8" = 1'-0"

PLAN NORTH

GENERAL NOTES - RCP

1. **LIGHT FIXTURE LOCATIONS:**
   A. LIGHT FIXTURES ARE TO BE LOCATED IN THE FIELD AS DIMENSIONED ON THE ARCHITECTURAL REFLECTED CEILING PLANS U.O.N
   B. LIGHT FIXTURES & CEILING DEVICES SHALL BE LOCATED IN SPACES BETWEEN EXISTING WOOD FURRING STRIP CEILING AT MULTI-USE A & B AND PLATFORM.
   C. LIGHT FIXTURE LOCATIONS HAVE PRIORITY OVER LOCATION OF DEVICES FOR OTHER MEP EQUIPMENT OR A/V DEVICES. CONTRACTOR TO COORDINATE LOCATION OF MEP SYSTEMS AND A/V DEVICES AWAY FROM LIGHT FIXTURES. MEP AND A/V SHOP DRAWINGS ARE TO INCLUDE AN OVERLAY OF LIGHT FIXTURE LOCATIONS.
   D. SINGLE LIGHT FIXTURE IN A ROOM SHALL BE CENTERED WITHIN THE SPACE UNLESS DIMENSIONED OR NOTED OTHERWISE
   E. EXIT SIGNS AT DOORWAYS SHALL BE CENTERED ON DOOR OPENING, U.O.N
2. **DEVICE LOCATIONS**: LOCATE DEVICE ON CENTERLINE OF LIGHT FIXTURE ROWS & AT MIDPOINT BETWEEN FIXTURES WHEREVER POSSIBLE
3. **HVAC GRILLE AND DIFFUSER LOCATIONS:**
   A. HVAC RETURN & SUPPLY GRILLES ARE TO BE LOCATED AS INDICATED ON THE ARCHITECTURAL PLANS, REFLECTED CEILING PLANS, SECTIONS, DETAILS, & INTERIOR ELEVATIONS WHERE NOTED.
   B. CENTER WALL GRILLE ABOVE DOOR WHENEVER POSSIBLE.
   C. WHERE GRILLES OF DIFFERENT HEIGHTS ARE SCHEDULED ON THE SAME WALL, ALIGN TOP OF GRILLES.
4. **DISCREPANCIES OR CONFLICTS:** CONTRACTOR IS TO NOTIFY ARCHITECT IF A DISCREPANCY OR CONFLICT OCCURS THAT DOES NOT ALLOW PLACEMENT OF ELEMENTS AS NOTED ABOVE. IF SUCH CONDITION OCCURS THE CONTRACTOR MUST PROVIDE AN R.F.I. ALONG WITH A DRAWING OR PHOTO, WHERE APPLICABLE, WHICH DESCRIBES THE CONFLICT, AND THE CONTRACTOR IS TO PROVIDE A RECOMMENDATION FOR ALTERNATE PLACEMENT
5. **FINISHING AT CONCEALED LOCATIONS:** REMOVE LOOSE, DELAMINATING, & DAMAGED FINISH ABOVE NEW SUSPENDED CEILINGS, FURR-DOWNS & HVAC CHASES. DO NOT REPAIR PLASTER OR PAINT FINISH SURFACES AT CONCEALED LOCATIONS
6. **FINISHES:** REFER TO ROOM FINISH SCHEDULE & GENERAL FINISH NOTES, SHT. A-5.01 FOR SCOPE OF WORK.
7. MULTI-PURPOSE ROOM - PAINT ALL EXPOSED PIPING, CONDUIT, UNISTRUT, DUCT, ETC ABOVE FURRING, TYP

GENERAL NOTES - PLAN

1. **DIMENSIONING AT WALLS:** WALL DIMENSIONS ARE FINISHED FACE OF WALL TO FINISHED FACE OF WALL U.O.N
2. **MASONRY INFILL:**
   A. FILL OPENINGS WHERE INDICATED TO MATCH EXISTING CONSTRUCTION. FINISH WALLS & CEILINGS AS SCHEDULED TO PROVIDE A SEAMLESS TRANSITION BETWEEN EXISTING & NEW CONSTRUCTION.
3. **STRUCTURAL STEEL (REFER TO STRUCTURAL):**
   A. PROVIDE LINTELS AT NEW OR MODIFIED OPENINGS IN MASONRY WALLS AT SCHEDULED DOOR/GRILLE OPENINGS & MEP PENETRATIONS WHERE INDICATED
   B. REINFORCE GIRDERS AS REQ.'D
4. **ROUGH CARPENTRY (REFER TO STRUCTURAL)**
5. **PARTITIONS:**
   A. REFER TO SHT. A5.01 FOR PARTITION TYPES
   B. REPAIR HOLES IN EXIST. PARTITIONS SCHEDULED TO REMAIN. MATCH CONSTRUCTION AND FINISH OF EXIST. WALL ASSEMBLY AS REQ.'D TO PROVIDE A SEAMLESS TRANSITION BETWEEN REPAIRED AREAS & ADJACENT SURFACES
6. **MILLWORK:**
   A. WOOD BASE: REFER TO ROOM FINISH SCHED., SHT. A5.01 FOR COMPLETE SCOPE OF WORK.
7. **DOORS:**
   A. REFER TO DOOR SCHEDULE ON SHT. A5.21
8. **WINDOWS:**
   A. REFER TO WINDOW SCHEDULE ON SHT. A5.11
9. **CRAWL SPACE VENTS:**
   A. REPLACE EXIST. VENTS WITH PAINTED MTL. ANGLE FRAME AND WIRE CLOTH INSECT SCREEN. REPLACE PARGED SILL. REFER TO A1.03.
10. **FINISHES:**
    A. REFER TO ROOM FINISH SCHEDULE GENERAL FINISH NOTES ON SHT. A5.01 FOR SCOPE OF WORK.
11. **FLAT PLASTER WALL RESTORATION:**
    A. REFER TO ROOM FINISH SCHEDULE SHT. A5.01 FOR SCOPE OF WORK
12. **FLOOR FINISH RESTORATION:**
    A. REFER TO ROOM FINISH SCHEDULE SHT. A5.01 FOR SCOPE OF WORK
13. **TOILET ACCESSORIES:**
    A. REFER TO TOILET ACCESSORIES SCHEDULE IN SPECIFICATIONS.
14. **SIGNAGE:** PROVIDE SIGNAGE TO COMPLY WITH TAS, REF. SPEC. SECT. 101423 INTERIOR PANEL SIGNS.
15. **INSULATION:** REFER TO WALL TYPES SHT. A5.01 FOR INSULATION IN NEW WALLS

LEGEND - RCP

- NEW WALL
- EXIST'G WALL
- EXIST'G WD FURRING
- BEAD BOARD
- TONGUE & GROOVE WOOD CEILING
- GYP BD CEILING
- ACOUSTIC TILE CEILING
- SUPPLY DIFFUSER
- RETURN GRILLE
- ACCESS PANEL, SIZE NOTED
- A1 4" ROUND RECESSED DOWNLIGHT
- A2 4" SQUARE RECESSED DOWNLIGHT
- A3 4" RECESSED DOWNLIGHT
- B 4" CYLINDER DOWNLIGHT
- C 4" ROUND RECESSED WALLWASH
- D1 8' LINEAR PENDANT
- D2 6' LINEAR PENDANT
- E1 EXTERIOR SIDE MOUNT LINEAR
- E2 EXTERIOR SCONCE
- E3 EXTERIOR STRIP LIGHT
- F WALL SCONCE
- G SURFACE MTD. MARQUEE STRIP LIGHT
- H1 PENDANT WITH 16" GLASS SHADE
- H2 SURFACE MOUNT WITH 14" GLASS SHADE
- H3 SURFACE MOUNT WITH 12" GLASS SHADE
- M1 2' SURFACE MOUNT STRIP LIGHT
- M2 4' SURFACE MOUNT STRIP LIGHT
- U UNDERCABINET LIGHT
- X1 WALL MOUNT EMERGENCY EXIT LIGHT
- X2 CEILING MOUNT EMERGENCY EXIT LIGHT
- SPRINKLER
- (S) SPEAKER
- CM CAMERA
- VACANCY SENSOR
- (F) FIRE ALARM
- VP CEILING-HUNG VIDEO PROJECTOR

LEGEND - PLAN

- NEW WALL
- EXIST'G WALL
- FLOOR OUTLET, REF. MEP
- STAGE POCKET, REF. AV & MEP
- CR CARD READER

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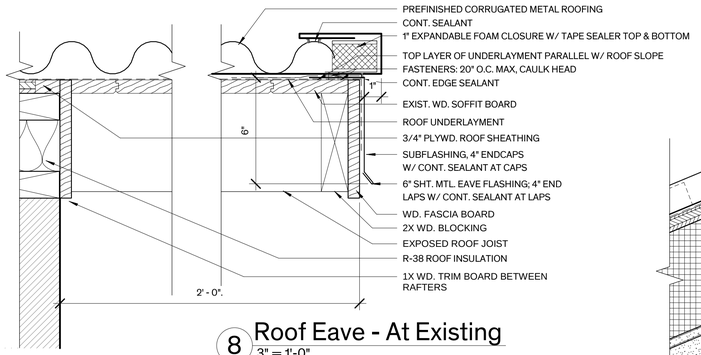
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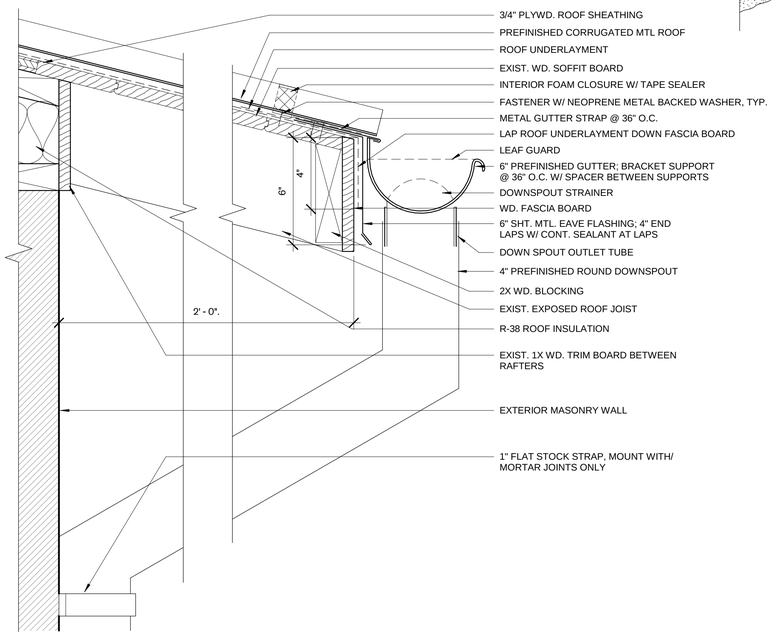
Architexas No. 2314
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Sheet Name
Floor Plan & Reflected Ceiling Plan

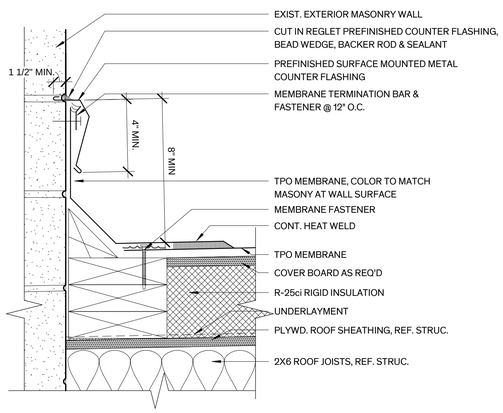
Sheet Number
A2.01



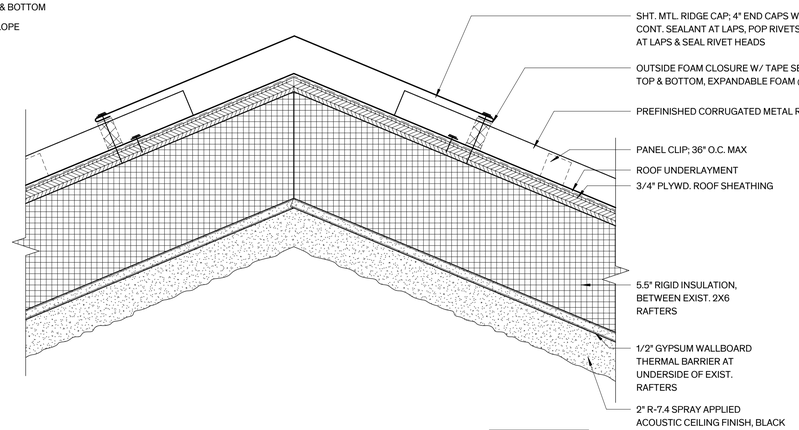
8 Roof Eave - At Existing
3" = 1'-0"



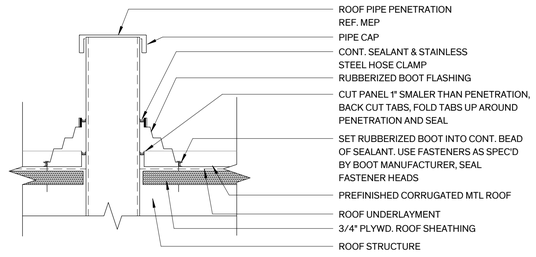
6 Roof Eave @ Gutter - At Existing
3" = 1'-0"



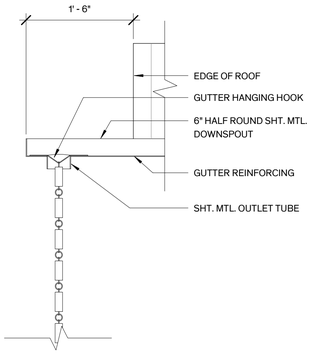
2 TPO Termination Bar - At Existing
3" = 1'-0"



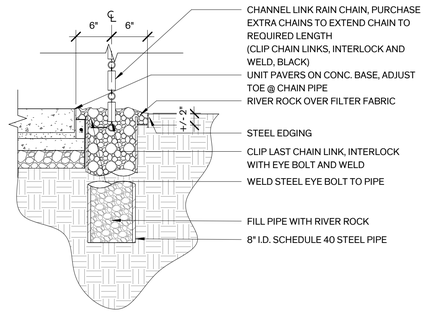
7 Roof Ridge - At Existing
3" = 1'-0"



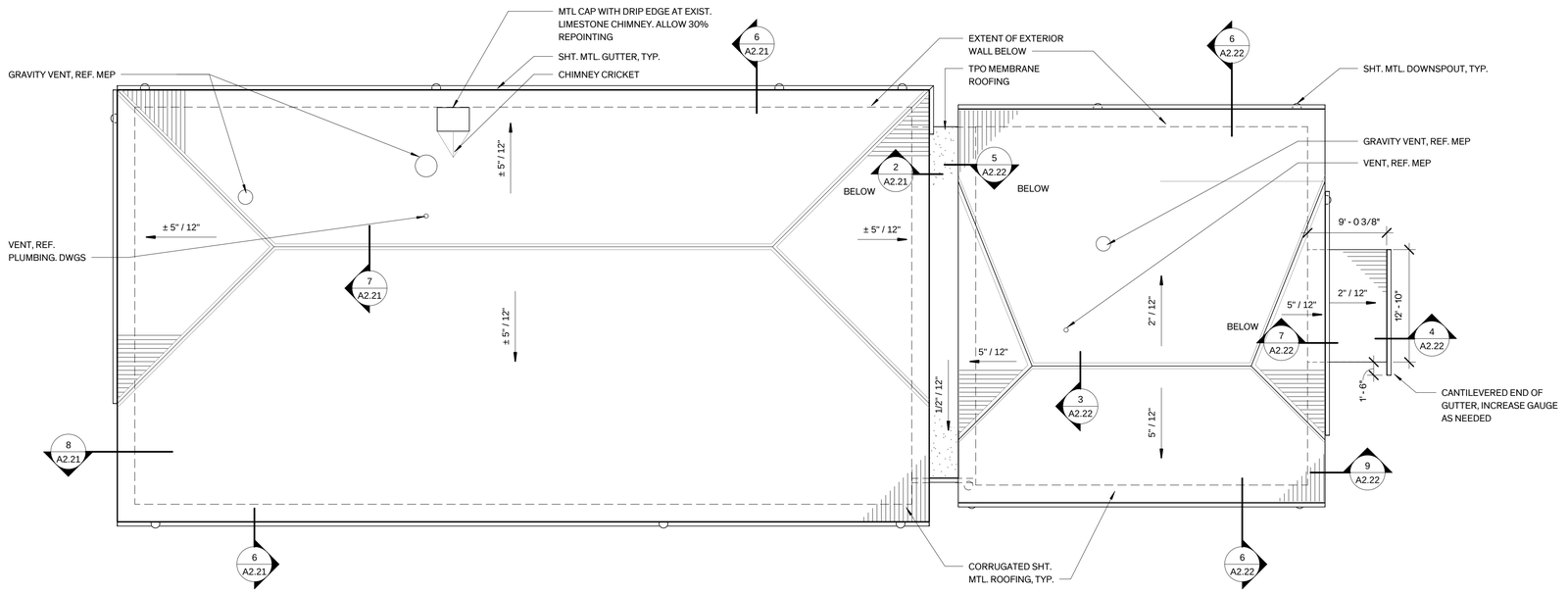
5 Pipe Pentration
3" = 1'-0"



4 Gutter & Rain Chain Elevation
1" = 1'-0"



3 Rain Chain Base
1" = 1'-0"



1 Roof Plan
1/8" = 1'-0"

GENERAL NOTES - ROOF

1. **ROOFING:**
   - A. PROVIDE CORRUGATED SHT. MTL. ROOFING INCLUDING WOOD SUBSTRATE, UNDERLAYMENT, SHT. MTL FLASHING, HIP & RIDGE CAPS, & INSULATION AS REQ.'D FOR A COMPLETE SYSTEM AT EXISTING BUILDING AND ADDITION
   - B. PROVIDE TPO MEMBRANE ROOF AND GUTTER WITH DOWNSPOUT @ GLASS LINK BETWEEN EXIST. BUILDING AND ADDITION.
2. **CHIMNEY:**
   - A. REPOINT CHIMNEY, ASSUME 30%
3. **GUTTERS AND DOWNSPOUTS**
   - A. PROVIDE PREFINISHED SHEET METAL GUTTERS AND 6" ROUND DOWNSPOUTS 100%. PROVIDE CONC. SPLASH BLOCKS AT THE BOTTOM OF EACH DOWNSPOUT AT EXIST. BUILDING, DIRECT WATER AWAY FROM THE BUILDING.
   - B. PROVIDE DOWNSPOUT BOOT CONNECTIONS TO BELOW-GRADE PERIMETER DRAIN AT ADDITION.
   - C. FASTEN DOWNSPOUT STRAPS TO MASONRY JOINTS ONLY, DO NOT ANCHOR INTO MASONRY UNITS.
4. **EXTERIOR WOOD**
   - A. REPLACE DAMAGED & DETERIORATED WOOD SOFFIT BOARDS, ALLOW 25% REPLACEMENT
   - B. REPLACE DAMAGED & DETERIORATED WOOD RAFTER TAIL SECTIONS, ALLOW 10% REPLACEMENT
   - C. RESTORE WOOD RAFTER TAIL SECTIONS, ALLOW 90%
   - D. REPLACE MISSING & DAMAGED FASCIA BOARDS

ALTERNATES

REFER TO SPEC. SECTION 012300 - ALTERNATES FOR DETAILED DESCRIPTION OF WORK

ALTERNATE NO. 2: ROOF THERMAL AND ACOUSTIC INSULATION AT EXISTING BUILDING

PROVIDE 5 1/2" BATT INSULATION BETWEEN EXISTING 2X6 RAFTERS AND 2" BLACK ACOUSTIC INSULATION BOARD AT UNDERSIDE OF RAFTERS.

LEGEND

- CORRUGATED METAL ROOF
- TPO ROOF
- ROOF RIDGE
- HALF ROUND GUTTER & DOWNSPOUT

Item 2.

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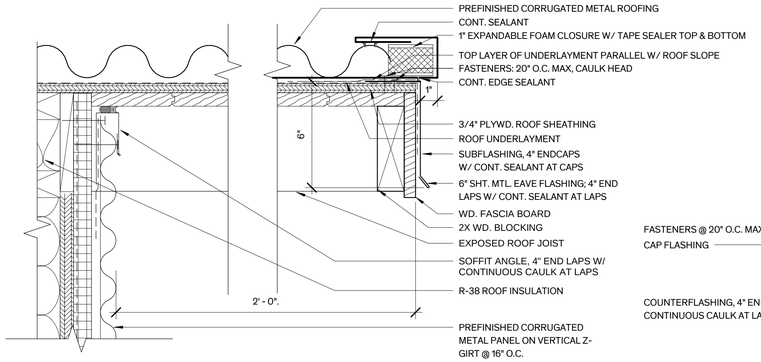
#22892 1/17/25

Architexas No. 2314

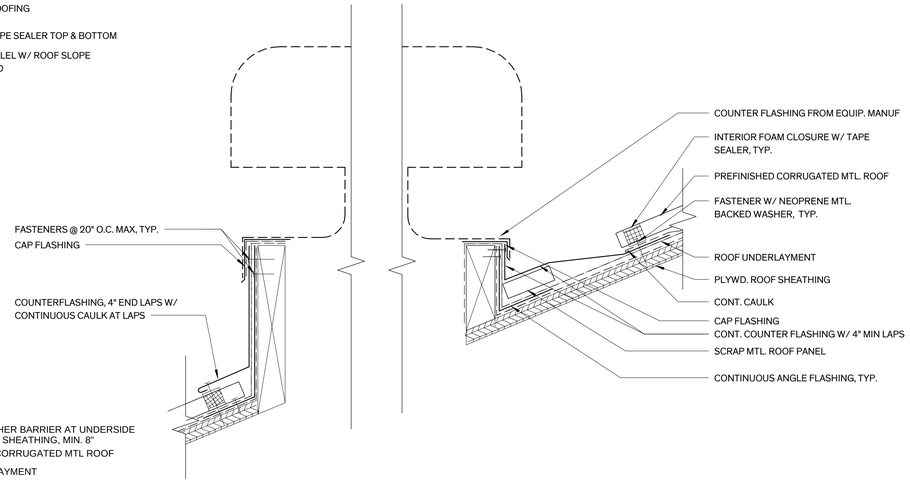
Date January 17, 2025

Sheet Name
Roof Plan & Details

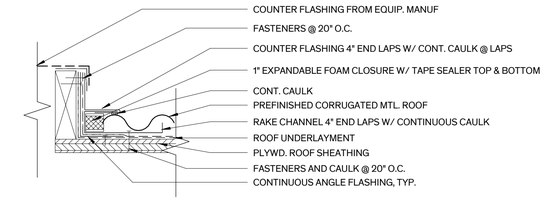
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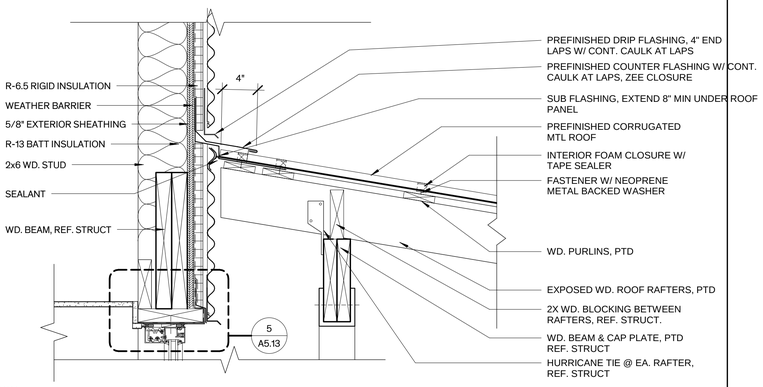
9 Roof Eave - At Addition
3" = 1'-0"



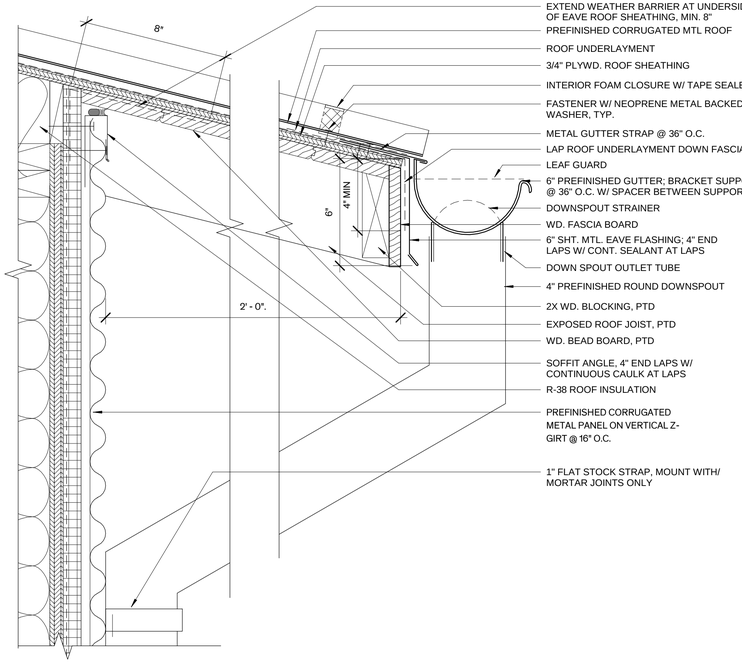
8 Gravity Vent
3" = 1'-0"



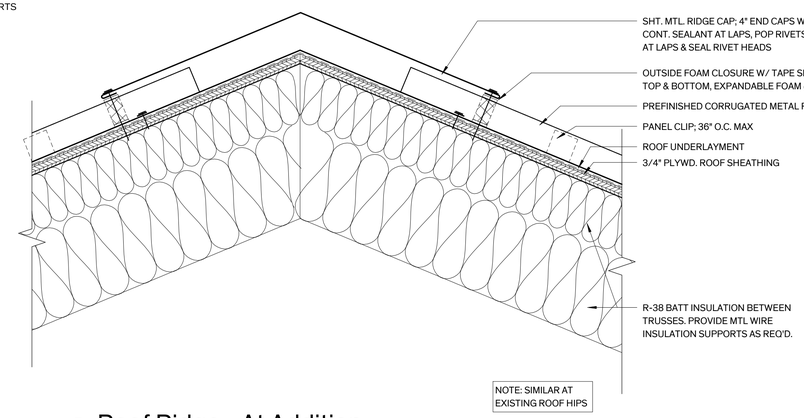
10 Gravity Vent Flashing
3" = 1'-0"



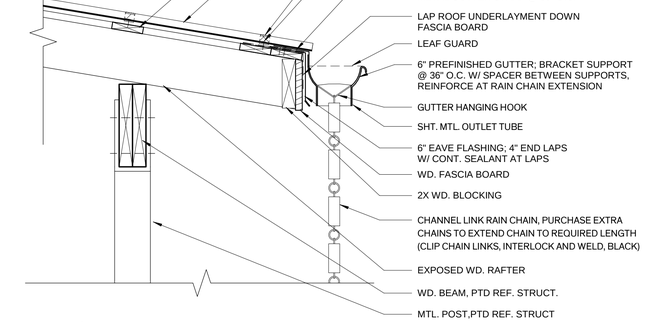
7 North Canopy Connection
11/2" = 1'-0"



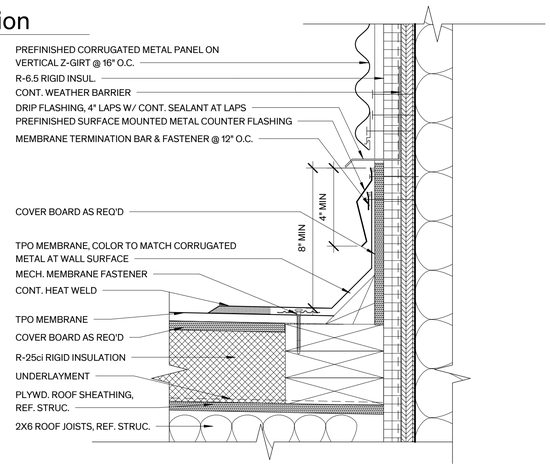
6 Roof Eave @ Gutter - At Addition
3" = 1'-0"



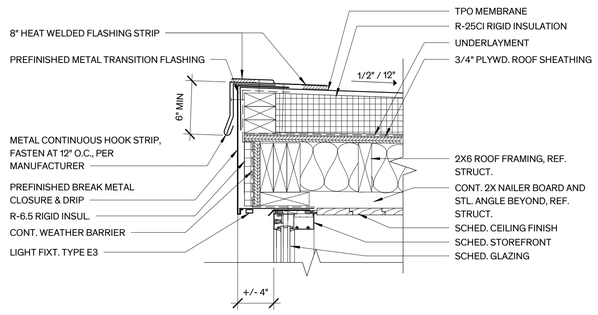
3 Roof Ridge - At Addition
3" = 1'-0"



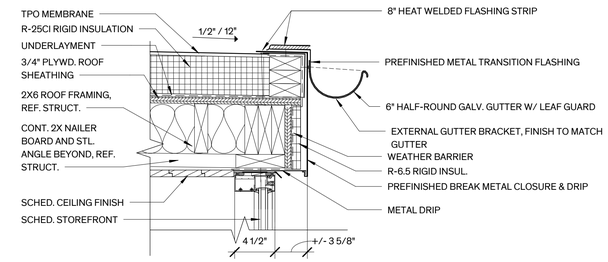
4 Canopy Edge
11/2" = 1'-0"



5 TPO Termination Bar - At Addition
3" = 1'-0"



2 Roof Edge West TPO
11/2" = 1'-0"



1 Roof Edge East TPO
11/2" = 1'-0"

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ALEXIS M. MCKINNEY
22892
STATE OF TEXAS

#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

Sheet Name
Roof Details

Sheet Number
A2.22

LEGEND - ELEVATIONS

- CORRUGATED MTL. ROOF
- EXIST'G LIMESTONE
- CONTEMPORARY LIMESTONE
- RESTORE EXIST. LIMESTONE VENEER, REPOINT
- CORRUGATED MTL. PANELS

GENERAL NOTES - ELEVATIONS

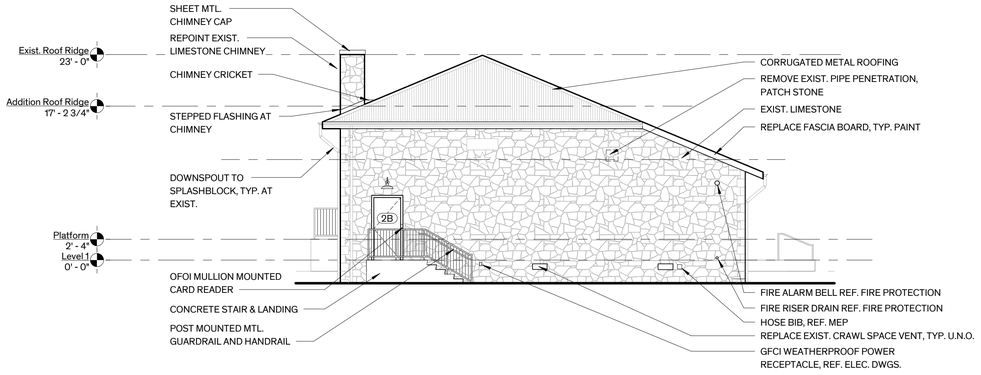
1. **MASONRY CLEANING:**
   - A. PRIOR TO CLEANING OF EXTERIOR, CLEAN & REMOVE DEBRIS (DIRT, BIRD DROPPING, ETC.) FROM EXTERIOR SURFACES.
   - B. CLEAN STONE MASONRY & EAST CONCRETE PORCH 100%.
2. **STONE MASONRY RESTORATION:** SELECTIVELY REPAIR STONE MASONRY, SEE BELOW FOR DESCRIPTION OF WORK.
   - A. CAREFULLY REMOVE LIMESTONE AT SCHEDULED OPENINGS, SALVAGE FOR REUSE.
   - B. STONE MASONRY INFILL AT EXIST. OPENINGS: INFILL WITH NEW OR SALVAGED STONE MASONRY UNITS TO MATCH EXIST. IN SIZE COLOR, & SURFACE TEXTURE/FINISH. DO NOT DAMAGE ADJACENT UNITS. TOOTH-IN REPLACEMENT UNITS TO MATCH ADJACENT COURSING & REPOINT WITH APPROVED MORTAR.
   - C. PATCH STONE OR PROVIDE DUTCHMAN REPAIRS AT REMOVED MEP EQUIPMENT, DEVICES, AND PENETRATIONS, ASSUME 20 LOCATIONS.
   - D. PATCH MASONRY AT REMOVED MISCELLANEOUS FASTENERS.
   - E. PARGING RESTORATION: REPLACE PARGE COAT 100% AT CRAWL SPACE VENT OPENINGS, WINDOW SILLS, AND DOOR OPENINGS.
3. **MORTAR JOINTS**
   - A. REPOINT DETERIORATED MASONRY JOINTS AS REQUIRED, ASSUME 25% OF TOTAL EXPOSED AREA. ASSUME 30% REPOINTING AT CHIMNEY.
   - B. REPOINT DETERIORATED MASONRY JOINTS AT EXPOSED INTERIOR MASONRY AT GABLE ENDS ABOVE CEILING FRAMING, ASSUME 100% OF TOTAL EXPOSED AREA
4. **REMOVAL OF FASTENERS:** REMOVE MISCELLANEOUS ABANDONED FASTENERS, BOLTS, CLAMPS, NON-HISTORIC SIGNAGE, ETC... ON THE EXTERIOR OF THE BUILDING THAT ARE ATTACHED OR EMBEDDED IN EXISTING MATERIALS & ARE NOT BEING USED TO FASTEN ELEMENTS TO REMAIN. PATCH HOLES AT REMOVED FASTENERS OR BRACKETS TO MATCH ADJACENT SURFACES.
5. **ROOF:** REFER TO SHT. A2.21 FOR EXTENT OF ROOFING WORK
6. **DOORS & WINDOWS:**
   - A. REFER TO DOOR SCHEDULE ON SHEET A5.21 FOR SCOPE OF WORK.
   - B. REFER TO WINDOW SCHEDULE ON SHEET A5.11 FOR SCOPE OF WORK
7. **CRAWL SPACE:**
   - A. AREAWAYS:REMOVE AND REPLACE EXISTING HALF ROUND METAL AREAWAYS
   - B. VENTS: REMOVE AND REPLACE EXIST. CRAWLSPACE VENTS
   - C. REMOVE EXISTING CRAWLSPACE ACCESS HATCH AT NORTH ELEVATION AND INFILL OPENING.
   - D. REPOINT DETERIORATED MASONRY JOINTS AT INTERIOR OF CRAWL SPACE AS REQUIRED
8. **SEALANTS**: PROVIDE/REPLACE SEALANT AT PERIMETER OF DOOR & WINDOW OPENINGS, PENETRATIONS, JOINTS, BETWEEN DISSIMILAR MATERIALS, & OTHER LOCATIONS AS REQ'D FOR WEATHERTIGHT ASSEMBLIES.
9. **PAINT:**
   - A. WOOD WINDOW ASSEMBLIES
   - B. HOLLOW METAL DOOR ASSEMBLIES
   - C. METAL CRAWLSPACE VENTS
   - D. EXPOSED STEEL LINTELS
   - E. EXTERIOR ARCHITECTURAL WOODWORK
10. **MEP:**
    - A. REMOVE EXIST. MEP EQUIPMENT & DISTRIBUTION SYSTEMS ATTACHED TO THE EXTERIOR OF THE BUILDING UNLESS OTHERWISE NOTED, REF. MEP
    - B. PATCH HOLES AT REMOVED FASTENERS OR BRACKETS TO MATCH ADJACENT SURFACES. PROVIDE MASONRY PATCH REPAIR.

ALTERNATES

REFER TO SPEC. SECTION 012300 - ALTERNATES FOR DETAILED DESCRIPTION OF WORK

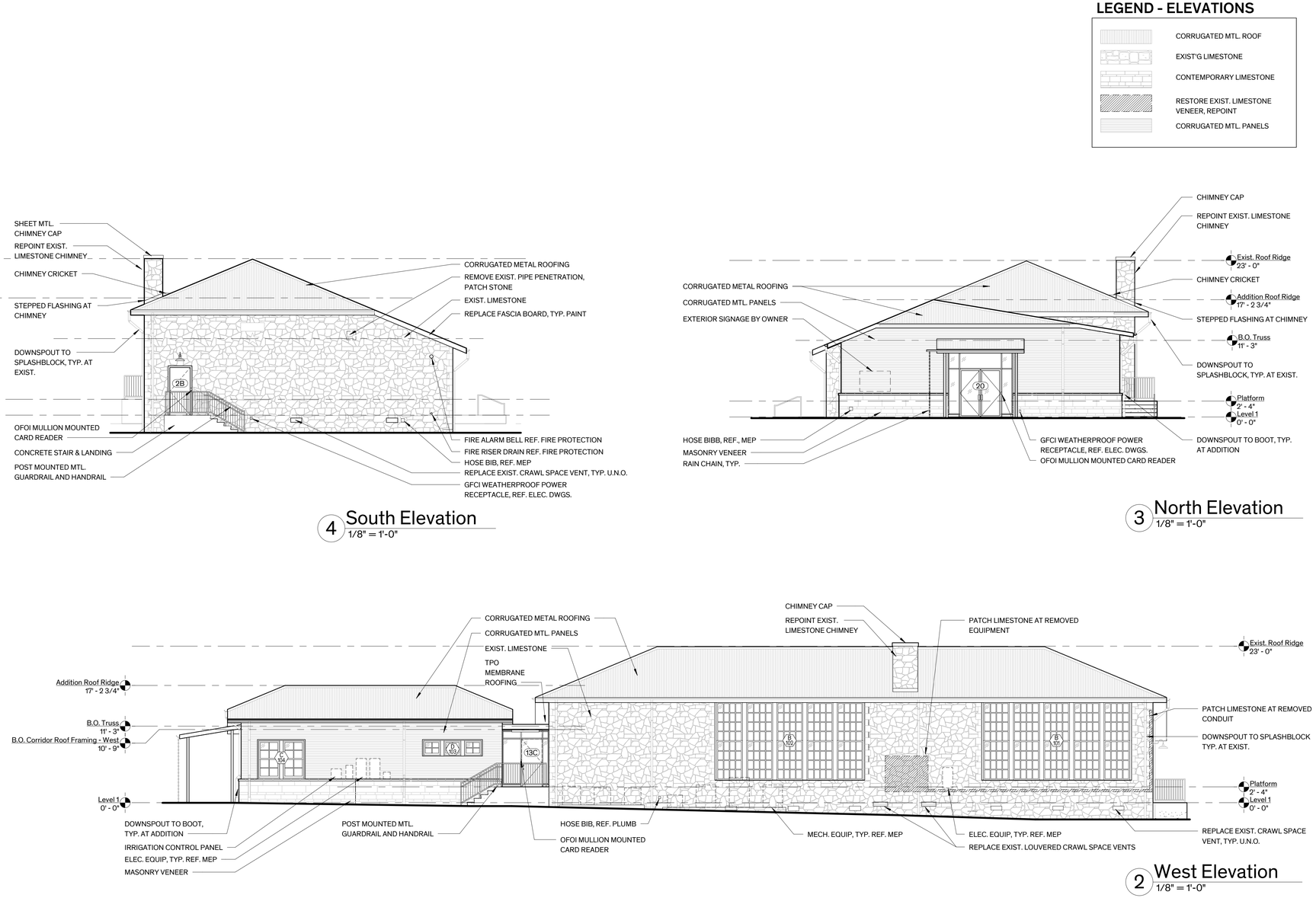
ALTERNATE NO. 1: REPLACE WINDOW SASHES AND FRAMES

REMOVE ALL EXISTING WINDOWS & FRAMES AND REPLACE WITH MAHOGANY MARVIN ULTIMATE WOOD SINGLE HUNG MAGNUM WITH INSULATED GLAZING. MATCH ORIGINAL WINDOWS IN STYLE AND MUNTIN PATTERNING. CUSTOMIZE & REINFORCE AS REQUIRED FOR HEIGHT OF WEST ELEVATION WINDOWS.

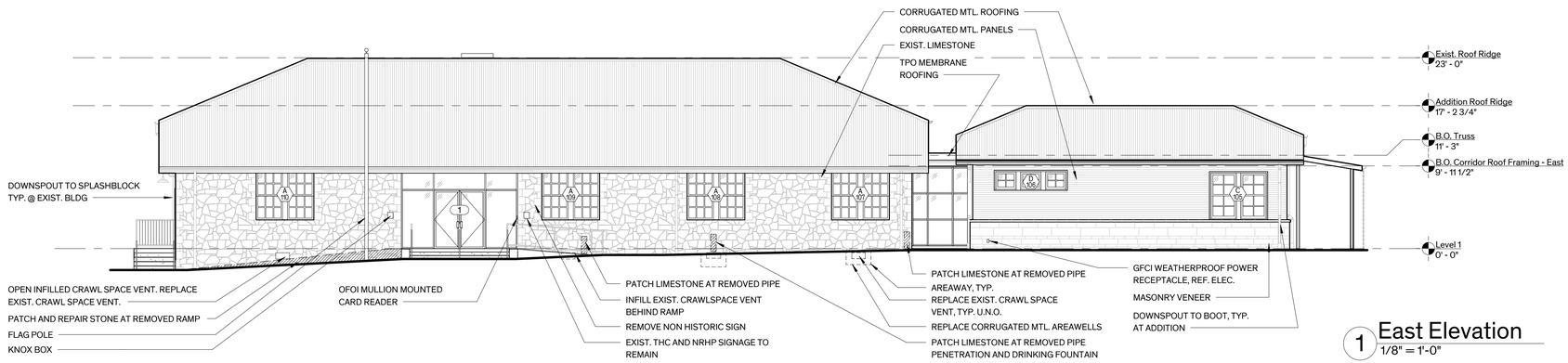


4 South Elevation
1/8" = 1'-0"

3 North Elevation
1/8" = 1'-0"



2 West Elevation
1/8" = 1'-0"



1 East Elevation
1/8" = 1'-0"

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#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

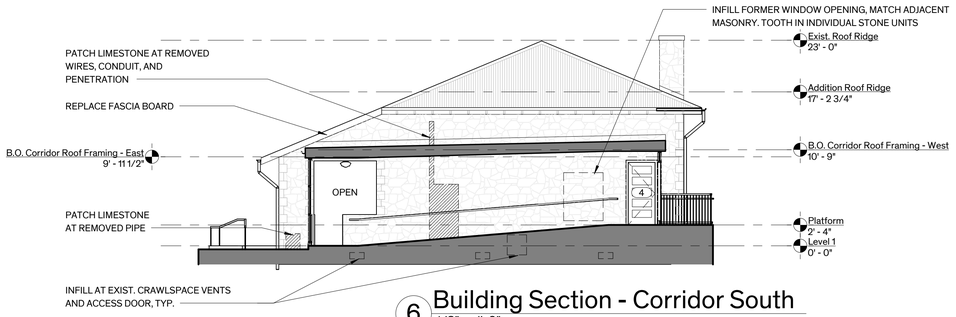
Sheet Name
Exterior Elevations

Sheet Number
A3.01

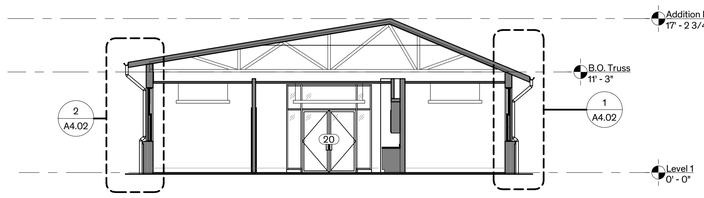
LEGEND - SECTIONS

NEW CONSTRUCTION

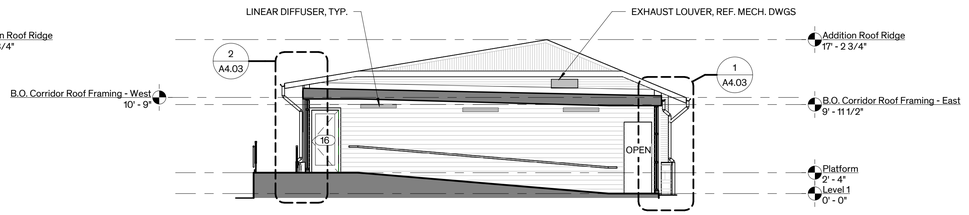
EXIST'G CONSTRUCTION



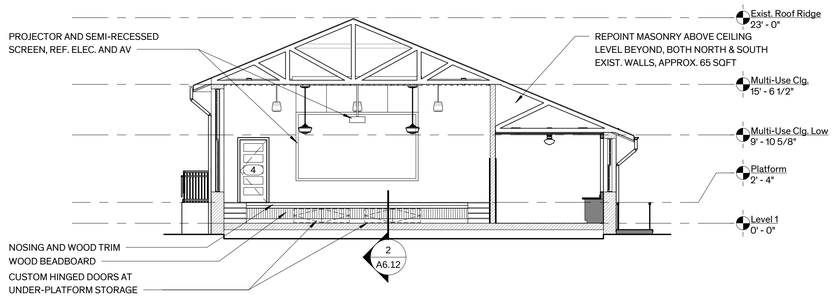
6 Building Section - Corridor South
1/8" = 1'-0"



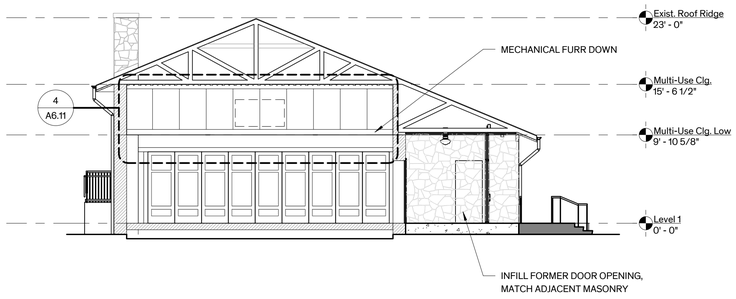
5 Building Section - Office
1/8" = 1'-0"



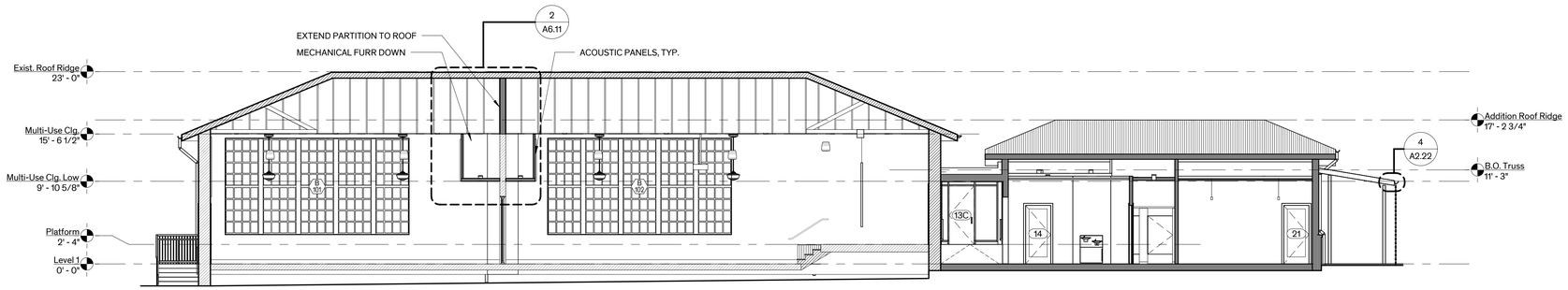
4 Building Section - Corridor North
1/8" = 1'-0"



3 Building Section - Platform Elev.
1/8" = 1'-0"



2 Building Section E/W 1
1/8" = 1'-0"



1 Building Section N/S
1/8" = 1'-0"

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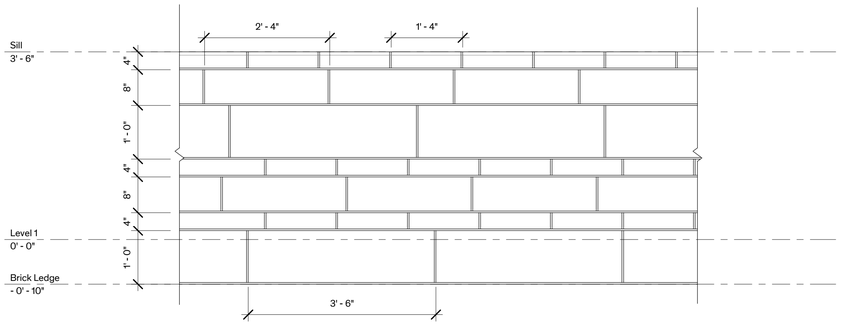
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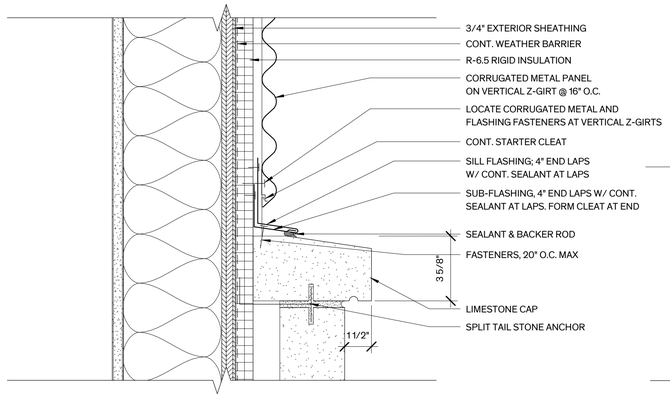
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Sheet Name
Building Sections

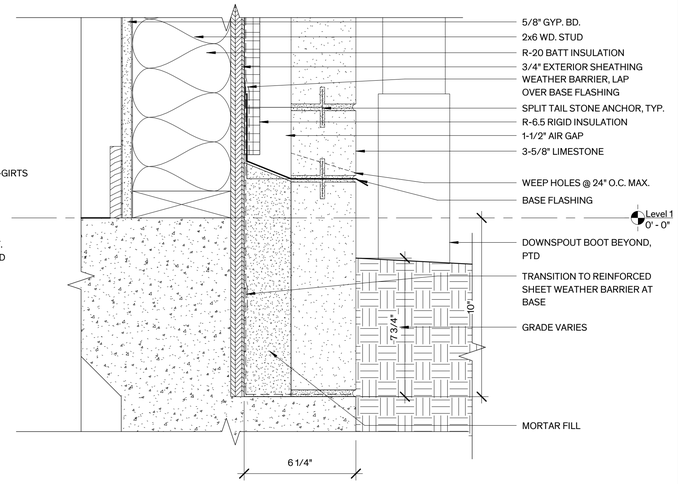
Sheet Number
A4.01



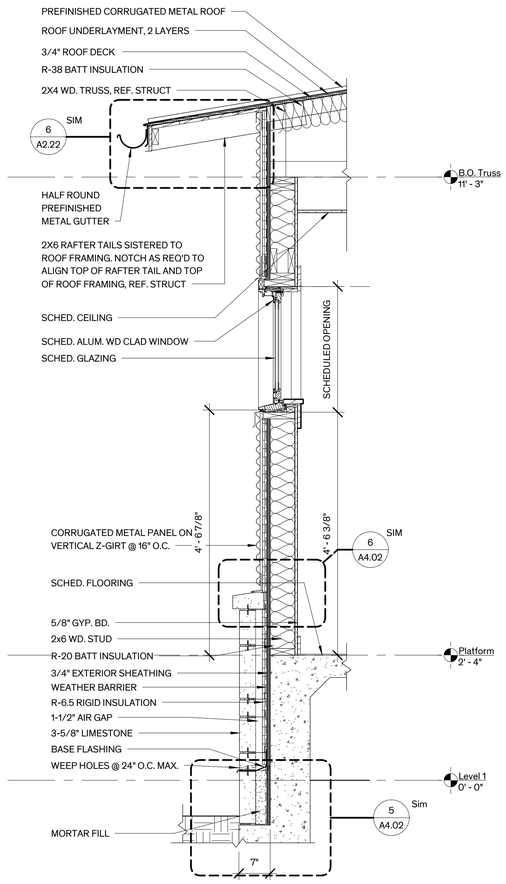
7 Stone Pattern
3/4" = 1'-0"



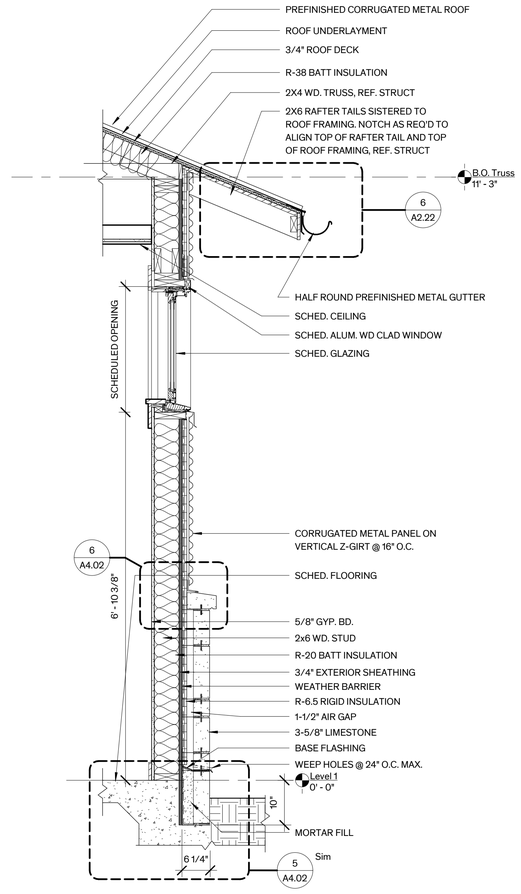
6 Corrugated to Masonry Detail
3" = 1'-0"



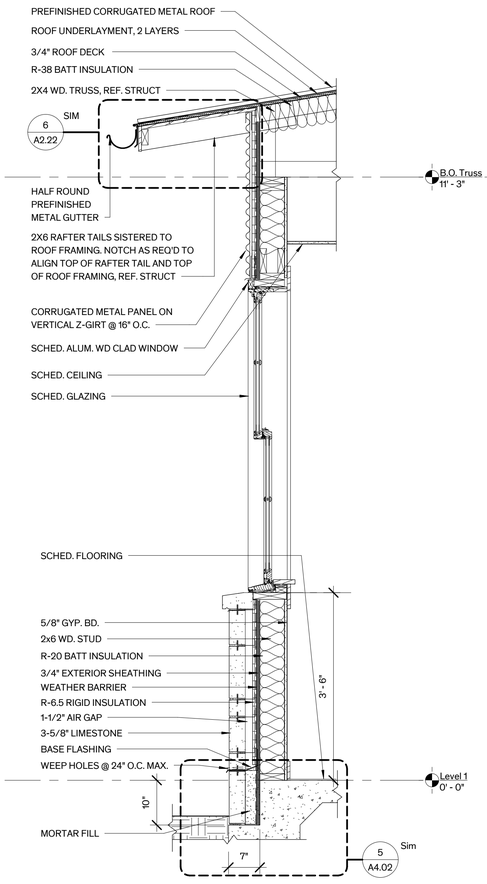
5 Masonry Veneer Detail
3" = 1'-0"



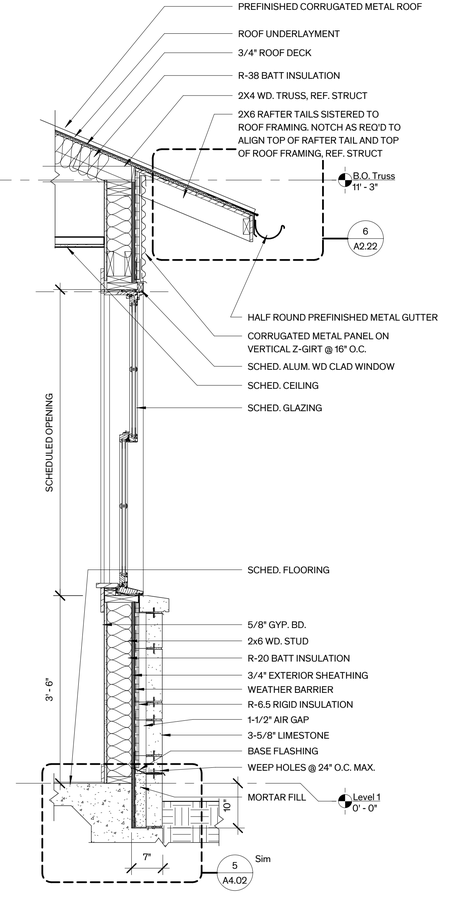
4 West Wall @ Add. Window D
3/4" = 1'-0"



3 East Wall @ Add. Window D
3/4" = 1'-0"



2 West Wall @ Add. Window C
3/4" = 1'-0"



1 East Wall @ Add. Window C
3/4" = 1'-0"

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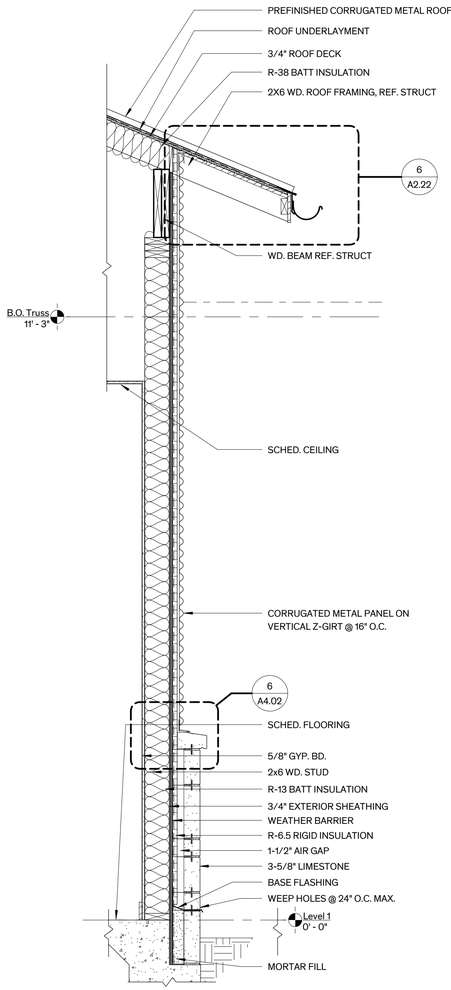
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Sheet Name
Wall Sections

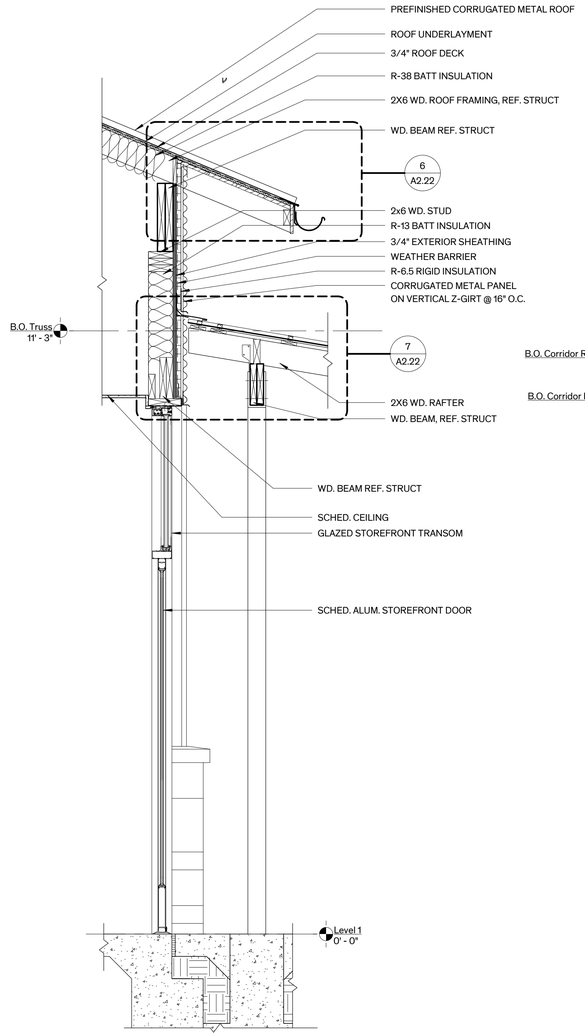
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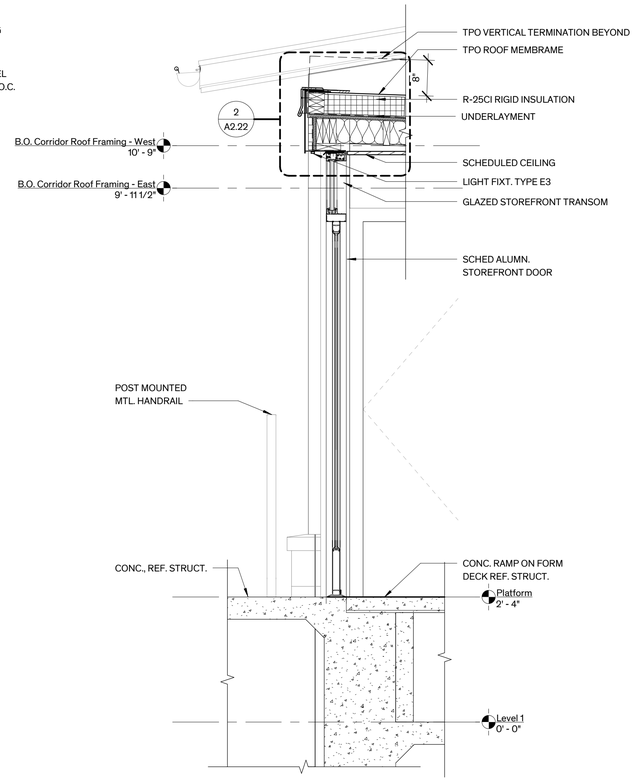
4 Ext. Wall Sect. @ Add. Coursing - N

3/4" = 1'-0"



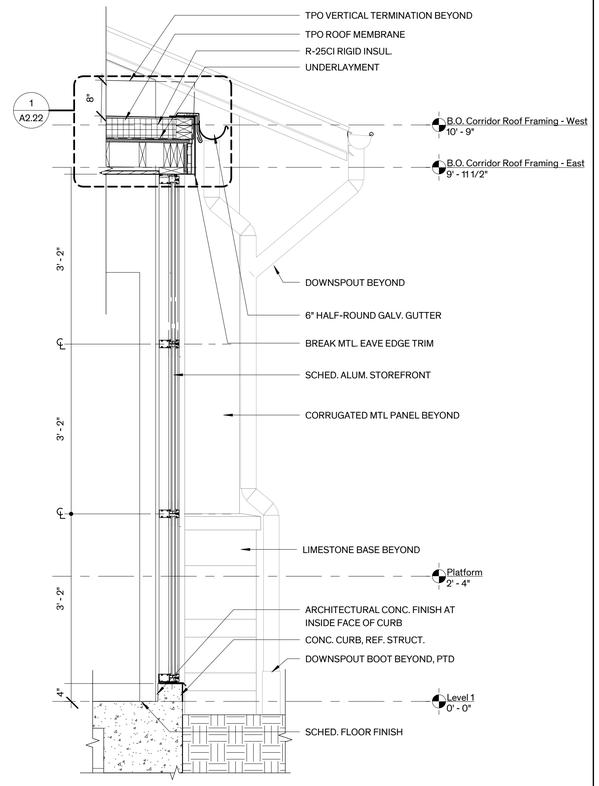
3 Ext. Wall Sect. @ Add. Storefront

3/4" = 1'-0"



2 Wall Sect. @ Glass Link - W

3/4" = 1'-0"



1 Wall Sect. @ Glass Link - E

3/4" = 1'-0"

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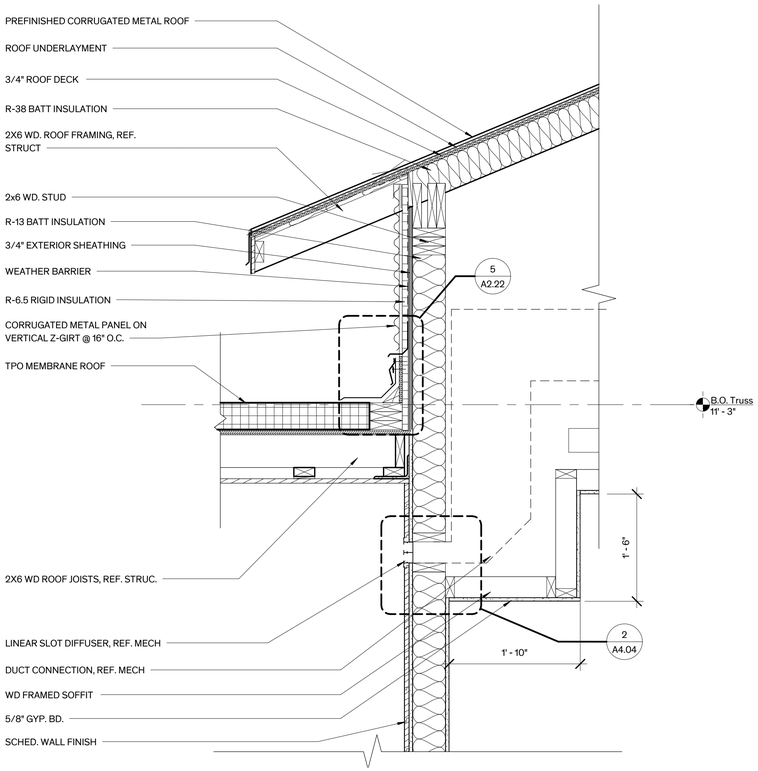
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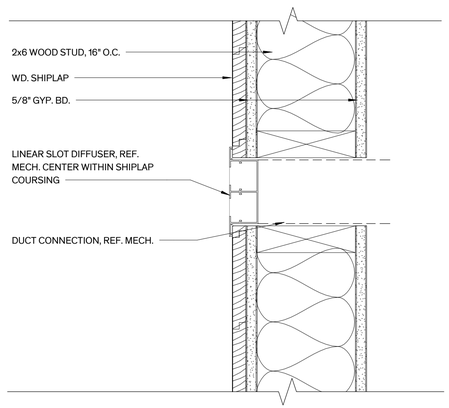
Architexas No. 2314
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Sheet Name
Wall Sections

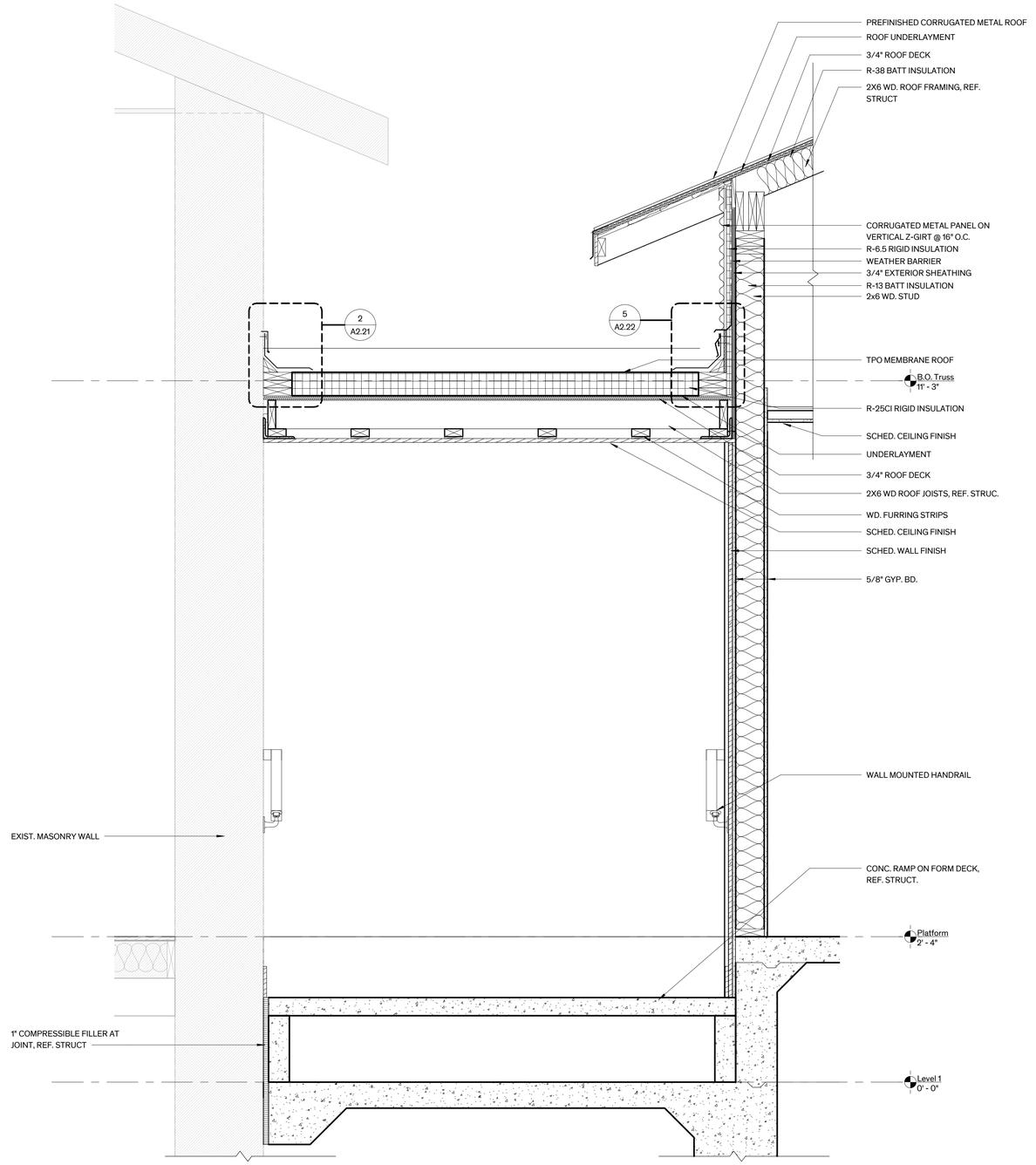
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3 Wall Sect. @ Add. Corridor
1" = 1'-0"



2 Linear Diffuser
3" = 1'-0"



1 Corridor Section
1" = 1'-0"

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Wall Sections

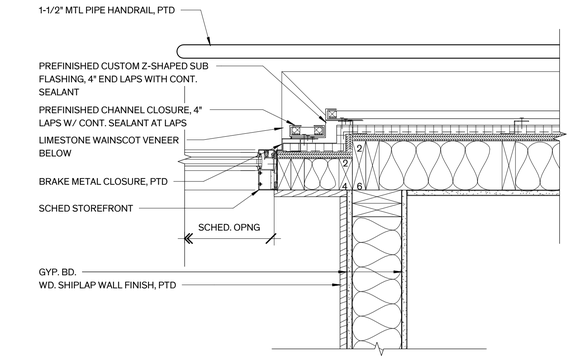
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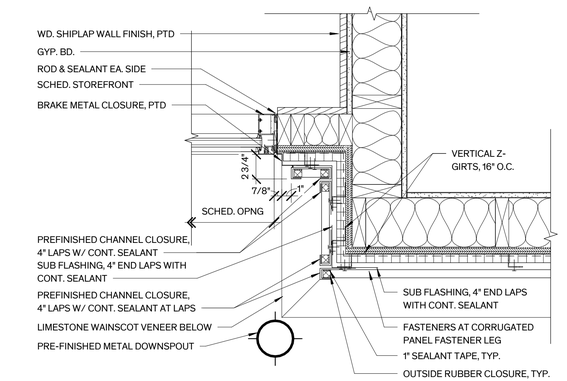
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Addition Plan Det. @ Corridor West

N
PLAN NORTH

2 11/2" = 1'-0"



Addition Plan Det. @ Corridor East

N
PLAN NORTH

1 11/2" = 1'-0"

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Larry W. Irsik
TX Registration No. 17673

1/17/25

Architexas No.
2314

Date
January 17, 2025

Sheet Name
Plan Details

Sheet Number
A4.2

FINISH SCHEDULE

ROOM #	ROOM NAME	FLOOR	WALL BASE				WALLS				CEILING	REMARKS
			NORTH	EAST	SOUTH	WEST	NORTH	EAST	SOUTH	WEST		
1	Vestibule	EX-CONC	-	-	-	-	EX-LS	STR	EX-LS	EX-LS	EX-BB-PT	
2	Multi-Use A	EX-WD	WB1-PT	WB1-PT	WB1-PT	WB1-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	EX-WDF, GYP4-PT4	GYP. BD. SOFFIT AT NORTH; OPEN TO ABOVE BETWEEN FURRING STRIPS, PAINT ALL SURFACES AND EQUIPMENT ABOVE FLAT BLACK
3	Multi-Use B	EX-WD	EX-WB1-PT	EX-WB1-PT	EX-WB1-PT	EX-WB1-PT	EX-BB-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	EX-WDF, GYP2-PT4	GYP. BD. SOFFIT AT SOUTH; OPEN TO ABOVE BETWEEN FURRING STRIPS, PAINT ALL SURFACES AND EQUIPMENT ABOVE FLAT BLACK
4	Platform	EX-WD	WB1-PT	WB1-PT	-	WB1-PT	EX-PL-PT	EX-PL-PT	-	EX-PL-PT	EX-WDF	OPEN TO ABOVE BETWEEN FURRING STRIPS, PAINT ALL SURFACES AND EQUIPMENT ABOVE FLAT BLACK
5	Gallery	EX-WD	WB1-PT	EX-WB1-PT	WB1-PT	WB1-PT	EX-PL-PT	EX-PL-PT	GYP1-PT	EX-PL-PT	GYP2-PT4	
6	A/V & IT	EX-WD	RB	RB	RB	RB	GYP1-PT	EX-PL-PT	GYP1-PT	EX-PL-PT	-	
7	Catering	EX-WD	EX-WB1-PT	EX-WB1-PT	EX-WB1-PT	EX-WB1-PT	GYP1-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	GYP2-PT4	
8	Foyer	EX-WD	WB1-PT	WB1-PT	WB1-PT	WB1-PT	GYP1-PT	EX-PL-PT	GYP1-PT	EX-PL-PT	GYP2-PT4	
9	ADA/Unisex RR 1	CT7	CT1	CT4	CT4	CT4	GYP1-PT	GYP1-PT	GYP1-PT	EX-PL-PT1	GYP2-PT4	
10	Jan.	CT7	FRP	FRP	FRP	FRP	EX-PL-PT	EX-PL-PT	GYP1-PT	GYP1-PT	-	
11	Storage	EX-WD	RB	RB	RB	RB	GYP1-PT	EX-PL-PT	EX-PL-PT	EX-PL-PT	GYP2-PT4	
13	Corridor	CF1	WB2-PT	WB2-PT	WB2-PT	WB2-PT	WSL-PT	STR	EX-LS	STR	WSL-PT4	BASE AT STOREFRONT: ARCH. FINISH CONC. CURB
13A	Corridor	CF1	WB2-PT, CT1	WB2-PT	WB2-PT, CT1	WB2-PT, CT1	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	WSL-PT4	
14	Women's RR	CF1	CT3	CT6	CT6	CT6	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP3-PT4	
15	Men's RR	CF1	CT5	CT5	CT2	CT5	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP3-PT4	
16	Dressing	CPT	WB2-PT	WB2-PT	WB2-PT	WB2-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	ACT	
17	ADA/Unisex RR2	CF1	CT5	CT2	CT5	CT5	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP3-PT4	
18	Mech.	CF1	RB	RB	RB	RB	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	-	
19	ADA/Unisex RR3	CF1	CT6	CT3	CT6	CT6	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP3-PT4	
20	Entry Lobby	CPT	WB2-PT	WB2-PT	WB2-PT	WB2-PT	GYP1-PT	GYP1-PT	WSL-PT	GYP1-PT	ACT	
21	Office 2	CPT	WB2-PT	WB2-PT	WB2-PT	WB2-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	ACT	
22	Office 1	CPT	WB2-PT	WB2-PT	WB2-PT	WB2-PT	GYP1-PT	GYP1-PT	GYP1-PT	GYP1-PT	ACT	

FINISH LEGEND

ACT - SUSPENDED 2X2 ACOUSTIC TILE CEILING, TEGULAR

BB - WOOD BEAD BOARD

CF1 - CONCRETE FLOOR - POLISHED

CPT - CARPET TILE

EX - EXISTING

FRP - FIBER REINFORCED PANEL WAINSCOT

GYP1 - GYPSUM BOARD
GYP2 - GYPSUM BOARD ON EXISTING FURRING
GYP3 - SUSPENDED GYPSUM BOARD

PL - PLASTER

LS - LIMESTONE

CT1 - TILE WAINSCOT TYPES 3, 4A, 5A
CT2 - TILE WAINSCOT TYPES 3, 4B, 5B, METAL BASE TRIM
CT3 - TILE WAINSCOT TYPES 3, 4C, 5C, METAL BASE TRIM
CT4 - TILE BASE TYPE 5A
CT5 - TILE BASE TYPE 5B, METAL BASE TRIM
CT6 - TILE BASE TYPE 5C, METAL BASE TRIM
CT7 - MOSAIC TILE FLOOR, "WINDMILL" PATTERN, TILE TYPES 1 & 2

PT1 - PAINT, INTERIOR
PT2 - PAINT, INTERIOR
PT3 - PAINT, INTERIOR TRIM
PT4 - PAINT, INTERIOR CEILING

PTE1 - PAINT COLOR 1, EXTERIOR
PTE2 - PAINT COLOR 2, EXTERIOR

PLAM1 - PLASTIC LAMINATE

RB - RUBBER BASE 4"

SS - SOLID SURFACE, COLOR:

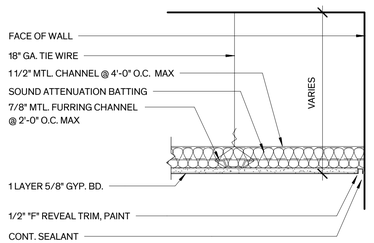
STR - SCHED. STOREFRONT

WB1 - WOOD BASE, TYPE 1
WB2 - WOOD BASE, TYPE 2
WD - WOOD FLOOR TO MATCH EXISTING
WDF - WD FURRING STRIPS - STAIN
WSL - WOOD SHIPLAP

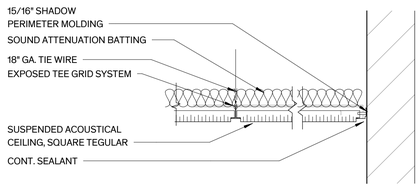
7. DOORS:
   A. STILE & RAIL DOORS: DOOR ASSEMBLIES INCLUDING CASINGS TO HAVE A PAINTED FINISH, ASSUME ONE COLOR.
   B. EXTERIOR HOLLOW METAL DOORS: PAINT FINISH. ASSUME ONE COLOR AT THE INTERIOR AND A SECOND COLOR AT THE EXTERIOR.
8. WINDOWS:
   A. RESTORED WINDOWS: WINDOW ASSEMBLIES INCLUDING CASINGS AND STOOL TO HAVE A PAINTED FINISH. ASSUME ONE COLOR ON THE INTERIOR AND ONE ON THE EXTERIOR.
   B. ADDITION WINDOWS: WINDOW ASSEMBLIES INCLUDING CASINGS, STOOL, AND APRON TO HAVE A PAINTED FINISH. ASSUME ONE COLOR ON THE INTERIOR.
9. LOUVERS AND CRAWL SPACE VENTS: PAINTED FINISH, ASSUME ONE COLOR.

GENERAL NOTES - FINISHES

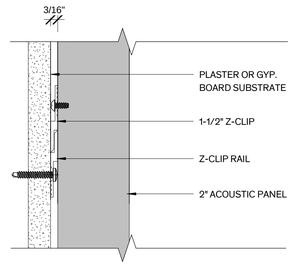
1. SURFACES:
   A. FINISH EXPOSED SURFACES U.O.N THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY FOR THE COORDINATION OF THE COMPLETE FINISH-OUT OF THE PROJECT. ANY SURFACES WHICH DO NOT HAVE A SPECIFIC FINISH NOTED OR ARE NOTED TO REMAIN UNFINISHED SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND FINISHED PER THE ARCHITECT'S INSTRUCTIONS
   B. SECURING OF EXIST. MILLWORK AND TRIM: RESECURE EXISTING MATERIALS & PLACE IN ORIGINAL POSITION OF ALIGNMENT WHERE MOVEMENT HAS OCCURRED. SECURE LOOSE BLOCKING & PROVIDE SUPPLEMENTAL BLOCKING AS NECESSARY FOR ATTACHMENT OF EXIST. & NEW MATERIALS
2. EXPOSED MEP COMPONENTS:
   A. EXPOSED DUCTS, CONDUIT, PIPING, WIRING, ASSOCIATED FASTENER, ETC.. ARE TO BE PRIMED & PAINTED, EXCEPT IN MECHANICAL ROOMS
3. FLOORS:
   A. EXIST. WOOD FLOORS:
      a. RE-INSTALL SALVAGED WOOD FLOORING IN GOOD CONDITION. WHERE ADDITIONAL MATERIAL IS REQUIRED, PROVIDE MATERIAL MATCHING EXISTING IN SPECIES, CUT, DIMENSIONS, & PROFILE. ASSUME REPLACEMENT OF 30% OF TOTAL FLOOR AREA
      b. CLEAN & FINISH PER SPECIFICATIONS.
   B. EXIST. CONC. FLOORS: ETCH & SEAL.
   C. ADDITION CONCRETE FLOORS:
      a. POLISHED FINISH PER SPECIFICATIONS.
      b. SEALED WHERE SPECIFIED
4. WALLS:
   A. EXIST. PLASTER:
      a. CONTRACTOR SHALL SOUND/TAP PLASTER FINISH THROUGHOUT WITH A PLASTIC MALLET TO DETERMINE EXTENT OF DETACHED PLASTER FINISH AND MARK AREAS ON WALL. CONTACT ARCHITECT TO REVIEW PRIOR TO COMPLETE REMOVAL.
      b. REPLACE DAMAGED, DETERIORATED, & DETACHED PLASTER FINISH TO SOUND SUBSTRATE, ASSUME REPLACEMENT OF 5% OF TOTAL WALL AREA. INCLUDES POOR PRIOR PATCHES, CRACKED AREAS.
      c. REPAIR PLASTER AT REMOVED INTERIOR PARTITIONS, CEILINGS, AND OTHER DAMAGED AREAS, ASSUME 10% OF TOTAL WALL AREA.
      d. REPLACE COMPLETE PLASTER ASSEMBLY AND LATH WHERE MISSING AT EXISTING OPENINGS IN WOOD FRAMED WALLS, ASSUME 5% OF TOTAL WALL AREA.
      e. PROVIDE NEW PLASTER AND LATH ASSEMBLY AT INFILLED FORMER WINDOW AND DOOR OPENINGS IN MULTI-USE SPACES, ASSUME 50 SQUARE FEET.
      f. REPAIR PLASTER DAMAGE FROM CHANNELING FOR MEP/AV/IT CONDUIT AND DEVICES.
      g. REPOINT DETERIORATED MORTAR JOINTS BEHIND PLASTER FINISH WHERE REPLACEMENT IS REQUIRED.
      h. REPAIR PLASTER FINISH FOLLOWING INSTALLATION OF MEP DEVICES & DISTRIBUTION SYSTEMS & FOLLOWING RESETTING OF STANDING & RUNNING TRIM.
      i. NEW PLASTER FINISH SHALL MATCH FINISH & TEXTURE OF ORIGINAL PLASTER FINISH. PLASTER SHALL HAVE A PAINTED FINISH, REF. INTERIOR PAINT SCHEDULE
   B. EXIST. WOOD BEADBOARD: REPAIR EXISTING BEADBOARD. SUPPLEMENT WITH NEW AS REQUIRED TO MATCH EXISTING SPECIES, DIMENSIONS, & PROFILE.
   C. CERAMIC TILE SURFACES: PROVIDE CEMENTITIOUS BACKER BOARD BEHIND CERAMIC WALL TILES AT NEW PARTITIONS
5. CEILING:
   A. EXIST. WOOD BEADBOARD: REPAIR EXISTING BEADBOARD AND PERIMETER TRIM. SUPPLEMENT WITH NEW AS REQUIRED TO MATCH EXISTING SPECIES, DIMENSIONS, & PROFILE.
   B. EXIST. OPEN WOOD FURRING STRIP CEILING AT MULTI-USE A & B AND PLATFORM:
      a. REMOVE AREAS OF EXIST. WOOD FURRING STRIPS AS INDICATED ON A6.10 AND SALVAGE FOR RE-USE.
      b. REPLACE MISSING LATH AS REQUIRED WITH SALVAGED MATERIAL.
      c. ALL MEP EQUIPMENT, DUCTWORK, HANGERS, AIR DEVICES, PIPING, HANGERS, AND SUPPORTS ABOVE WOOD FURRING STRIP CEILING IN MULTI-USE A & B AND PLATFORM TO BE PAINTED FLAT BLACK.
   C. WOOD TONGUE & GROOVE CEILING: TUNG OIL FINISH PER SPECIFICATION.
   D. GYPSUM BOARD: PAINTED FINISH.
6. MILLWORK:
   A. WOOD BASEBOARD AT EXIST. BUILDING:
      a. REPLACE SHOE MOLD 100%.
      b. REPLACE MISSING AND DAMAGED WOOD BASEBOARDS TO MATCH EXISTING, ASSUME 60%.
      c. BASEBOARD AND SHOE MOLD SHALL HAVE A PAINTED FINISH.
   B. WOOD BASEBOARD AT ADDITION: PAINTED FINISH.



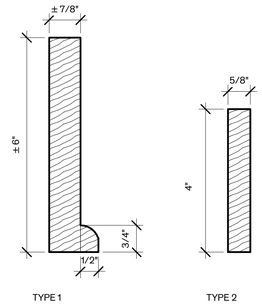
8 Suspended Gyp. Bd Ceiling
11/2" = 1'-0"



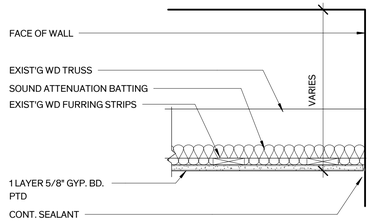
6 Suspended Acoustical Ceiling
11/2" = 1'-0"



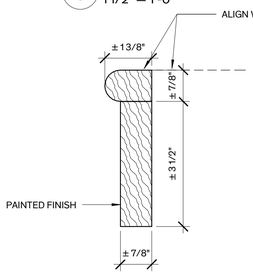
4 Acoustic Wall Panel Detail
6" = 1'-0"



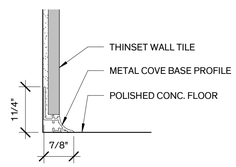
2 Baseboard Types
6" = 1'-0"



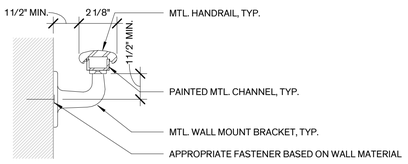
7 Gyp. Bd Ceiling over Wd Furring
11/2" = 1'-0"



5 Platform Edge Trim
6" = 1'-0"



3 Tile Base Detail
6" = 1'-0"



1 Int. Wall Mount Handrail Det.
3" = 1'-0"

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City of Dripping Springs
STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION

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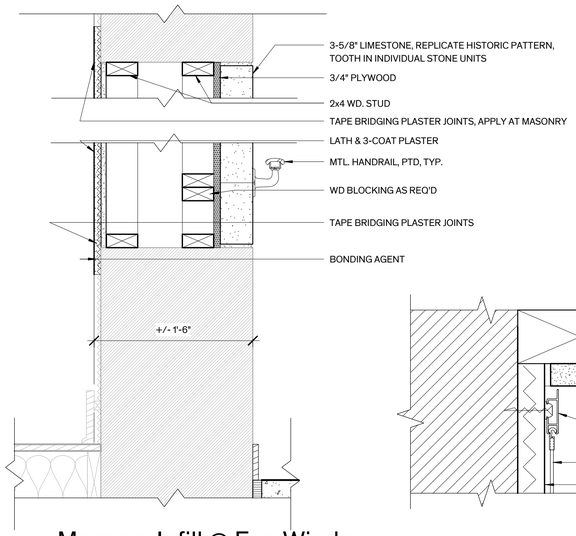
REGISTERED ARCHITECT KEVIN M. McKINNEY 22892 STATE OF TEXAS

#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

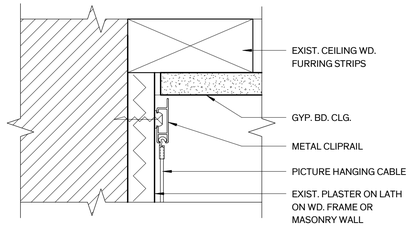
Sheet Name
Finish Schedule

Sheet Number
A5.01



4 Masonry Infill @ For. Window Opening

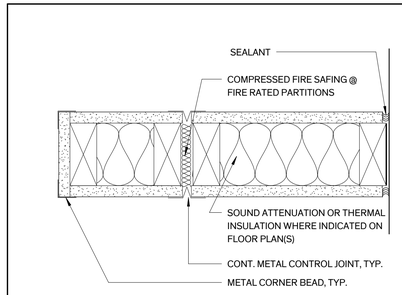
1 1/2" = 1'-0"

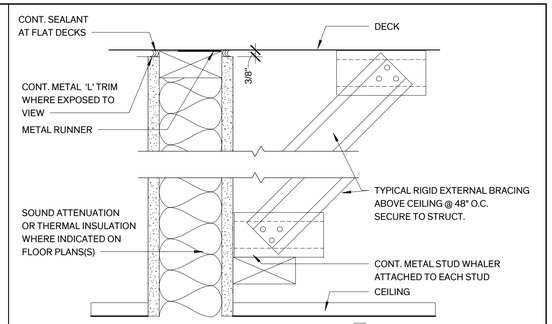


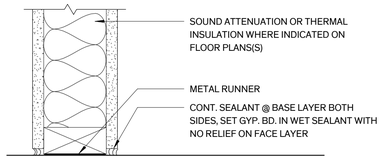
3 Picture Hanging System

6" = 1'-0"

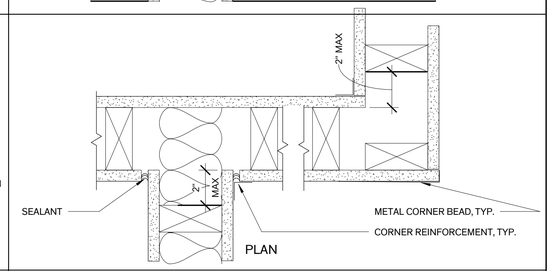
GENERAL PARTITION DETAILS



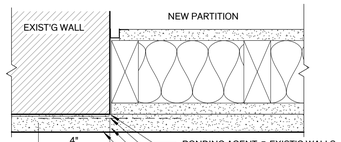




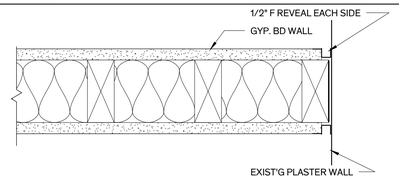
BASE



PLAN



JOINT TAPE AT FLUSH PLASTER WALLS



NEW PARTITION @ EXIST'G PLASTER

GENERAL NOTES

REFER TO FLOOR PLAN(S) FOR WALL TAGS INDICATING APPLICABLE PARTITION TYPES.

DESIGN CRITERIA: (REFER TO INDIVIDUAL PARTITION TYPES FOR NOTED DEVIATIONS)

1. ALLOWABLE DEFLECTION IS L/240 FOR LISTED LIMITING HEIGHTS.
2. 2x4 AND 2x6 STUDS AT 16" O.C.
3. 5/8" THICK GYPSUM BOARD.

FIRE RATED PARTITIONS

1. PROVIDE TYPE 'X' FIRE RESISTIVE GYPSUM BOARD.
2. FILL ALL DECK VOIDS WITH FOAM FIRE STOP SEALANT.
3. SEAL PARTITION PERIMETER AND ALL PENETRATIONS WITH FIRE RATED SEALANT.

FIRESTOPPING

1. PENETRATIONS THROUGH RATED WALLS & FLOORS ARE TO BE PROTECTED BY AN APPROVED THROUGH PENETRATION FIRESTOP SYSTEM INSTALLED AND TESTED IN ACCORDANCE WITH ASTM E 814 OR UL 1479.
2. INSTALL FIRESTOPPING AT PENETRATIONS THROUGH EXISTING MASONRY WALLS AND CONCRETE FLOORS.
3. PER CODE, PROVIDE APPROVED FIRESTOP SYSTEM AT ANNULAR SPACE IN CHASES CONNECTING 4 OR MORE LEVELS.

SOUND RATED PARTITIONS

1. SOUND RATED PARTITIONS AND PARTITIONS WITH THERMAL INSULATION ARE INDICATED WITH AN "S", (I.E. A4S). REFER TO FLOOR PLAN(S) FOR INDICATIONS.
2. PROVIDE SOUND ATTENUATION BLANKETS AT ALL RESTROOM WALLS UNLESS NOTED OTHERWISE.
3. PROVIDE 3 1/2" THICK SOUND ATTENUATION BLANKETS UNLESS NOTED OTHERWISE OR AS REQUIRED FOR STC RATING.
4. FILL ALL DECK VOIDS WITH SOUND ATTENUATION.
5. SEAL PARTITION PERIMETER AND ALL PENETRATIONS WITH ACOUSTICAL SEALANT.
6. WHERE SOUND RATED PARTITIONS ARE FIRE RATED, SEAL PARTITION AS REQUIRED FOR FIRE RATING.

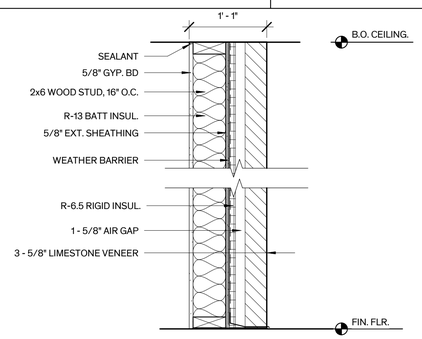
DAMP LOCATIONS

1. PROVIDE WATER RESISTIVE GYPSUM BOARD AT PARTITIONS RECEIVING TILE . REFER TO FINISH SCHEDULE FOR LOCATIONS(S).
2. MAXIMUM ALLOWABLE DEFLECTION IS L/360.

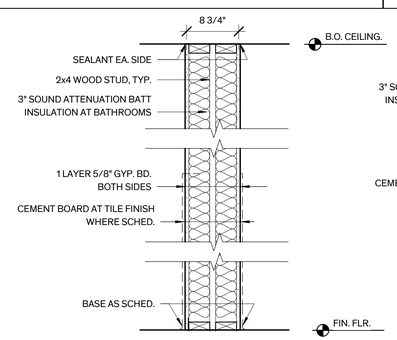
BRACING

1. RIGIDLY BRACE PARTITIONS WHICH EXCEED THE LISTED WALL HEIGHTS.
2. RIGIDLY BRACE PARTITIONS WHICH STOP ABOVE THE CEILING.
3. RIGIDLY BRACE ALL DOOR JAMBS.

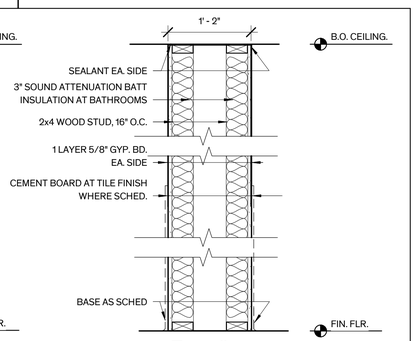
GENERAL PARTITION DETAILS



Type 8



Type 7



Type 6

Type 5

STC RATING - 34
AT BATHROOMS



Type 4

LATH AND PLASTER INFILL
STC RATING - 34
AT BATHROOMS

Type 3

STC RATING - 34
AT BATHROOMS

Type 2

STC RATING - 34
AT BATHROOMS

Type 1

1-HR MIN. FIRE RATING
UL DESIGN U305
STC RATING - 34
AT BATHROOMS

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REGISTERED ARCHITECT · ALEXIS M. MCKINNEY · 22892 · STATE OF TEXAS

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Architexas No. 2314
Date January 17, 2025

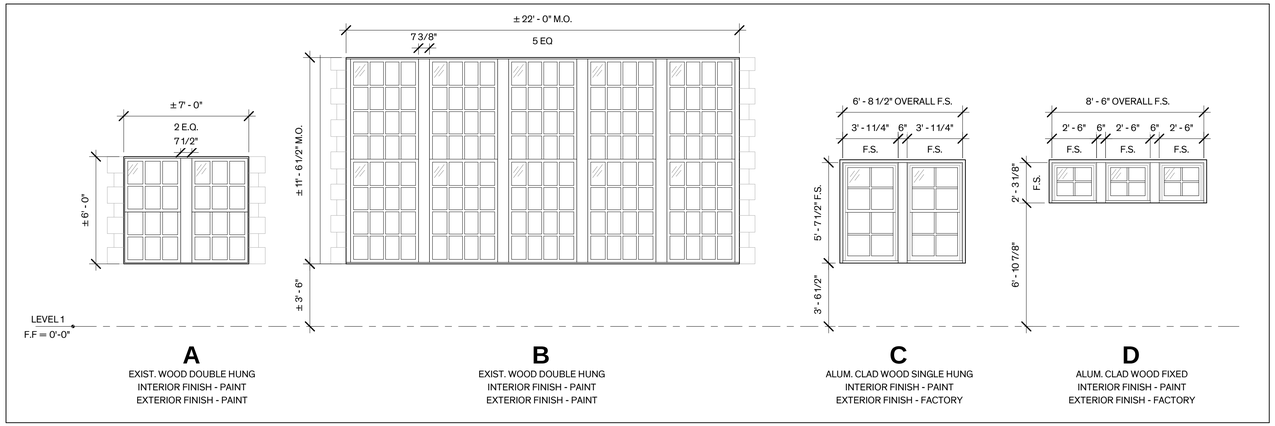
Sheet Name
Wall Types

Sheet Number
A5.03

WINDOW SCHEDULE

NO.	EXISTING	MATERIAL	SIZE (V.I.F.) +/-WIDTH	SIZE (V.I.F.) +/-HEIGHT	TYPES WINDOW	GLASS TYPE	DETAILS HEAD	DETAILS JAMB	DETAILS MULLION	DETAILS SILL	FRAME REPAIRS HEAD	FRAME REPAIRS LEFT	FRAME REPAIRS RIGHT	FRAME REPAIRS SILL	FRAME REPAIRS INT. STOP	FRAME REPAIRS EXT. STOP	MULLION BOARD INT	MULLION BOARD EXT	Hardware	REMARKS
101	EX	WD	2'-9 1/2"	11'-8 1/2"	B	G-2	5/A5.12	10/A5.12	13/A5.12	4/A5.12								5 - 1 board	7-1	1,4,5, PROVIDED SIZE IS MASONRY OPENING
102	EX	WD	2'-9 1/2"	11'-8 1/2"	B	G-2	5/A5.12	10/A5.12	13/A5.12	4/A5.12	6-2 OPNG								7-1, 8-2	1,4,5, PROVIDED SIZE IS MASONRY OPENING
103		MWD	2'-6"	2'-3 1/8"	D	G-1	11/A5.13	16/A5.13	17/A5.13	14/A5.13										3, PROVIDED SIZE IS INDIVIDUAL FRAME OPENING
104		MWD	6'-8 1/2"	5'-7 1/2"	C	G-1	11/A5.13	8/A5.13	12/A5.13	9/A5.13										PROVIDED SIZE IS OVERALL MULLED FRAME OPENING
105		MWD	6'-8 1/2"	5'-7 1/2"	C	G-1	11/A5.13	8/A5.13	12/A5.13	9/A5.13										PROVIDED SIZE IS OVERALL MULLED FRAME OPENING
106		MWD	2'-6"	2'-3 1/8"	D	G-1	11/A5.13	16/A5.13	17/A5.13	14/A5.13										3, PROVIDED SIZE IS INDIVIDUAL FRAME OPENING
107	EX	WD	7'-0"	7'-6"	A	G-2	2/A5.12	3/A5.12	6/A5.12	1/A5.12			9	2						1,4, PROVIDED SIZE IS MASONRY OPENING
108	EX	WD	7'-0"	7'-6"	A	G-2	2/A5.12	3/A5.12	6/A5.12	1/A5.12	2-24", 9	2-16"		6				5	7-1	1,4, REMOVE SILL BLOCK, PROVIDED SIZE IS MASONRY OPENING
109	EX	WD	7'-0"	7'-6"	A	G-2	10/A5.14	8/A5.14	6/A5.12	9/A5.14		6-12"		6				5	8-1	1,4, PROVIDED SIZE IS MASONRY OPENING
110	EX	WD	7'-0"	7'-6"	A	G-2	2/A5.12	3/A5.12	6/A5.12	1/A5.12		9-12"		6				6	8-1	1,4, PROVIDED SIZE IS MASONRY OPENING

WINDOW TYPES - Scale 1/4" = 1' - 0"



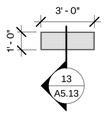
A
EXIST. WOOD DOUBLE HUNG
INTERIOR FINISH - PAINT
EXTERIOR FINISH - PAINT

B
EXIST. WOOD DOUBLE HUNG
INTERIOR FINISH - PAINT
EXTERIOR FINISH - PAINT

C
ALUM. CLAD WOOD SINGLE HUNG
INTERIOR FINISH - PAINT
EXTERIOR FINISH - FACTORY

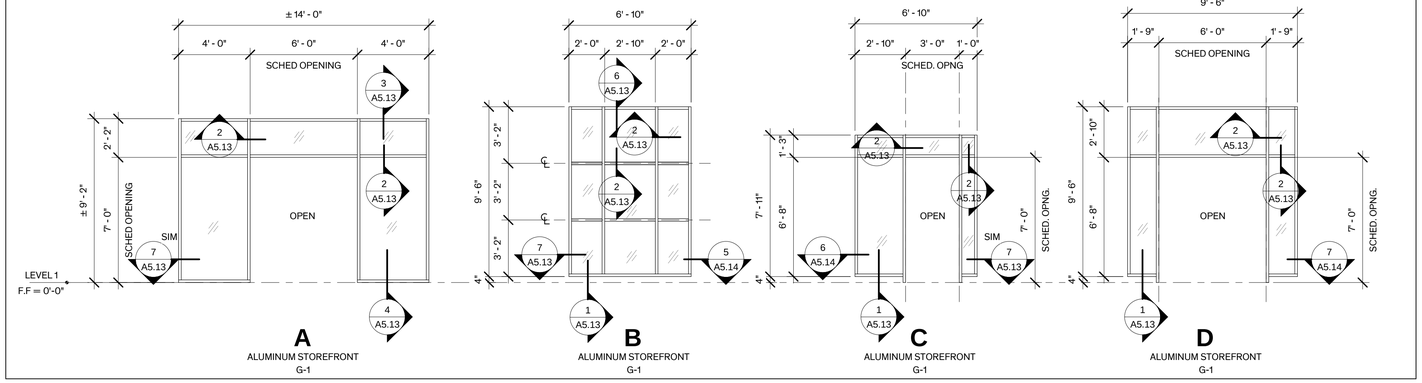
D
ALUM. CLAD WOOD FIXED
INTERIOR FINISH - PAINT
EXTERIOR FINISH - FACTORY

LOUVER TYPES - Scale 1/4" = 1' - 0"



E
ALUM. WIND-DRIVEN RAIN
LOUVER
FACTORY FINISH

STOREFRONT TYPES - Scale 1/4" = 1' - 0"



A
ALUMINUM STOREFRONT
G-1

B
ALUMINUM STOREFRONT
G-1

C
ALUMINUM STOREFRONT
G-1

D
ALUMINUM STOREFRONT
G-1

TYPICAL REPAIRS

EXISTING WINDOWS:

- EXISTING WINDOW TREATMENTS TO BE REMOVED AND INTERIOR TRIM PATCHED.
- REMOVE ALL FASTENERS AND INFILL HOLES.
- REPLACE ALL DAMAGED OR UNSOUND PIECES. PROFILES TO MATCH EXISTING.
- EPOXY END GRAINS OF STILES.
- CLEAN AND PREP INTERIOR WINDOW SURFACES FOR OPAQUE PAINTED FINISH.
- REMOVE EXISTING WINDOW SASHES, PROVIDE NEW WOOD SASH TO MATCH ORIGINAL.
- REMOVE AND SALVAGE SASH LIFT AND SASH LOCK HARDWARE FOR REINSTALLATION. REMOVE NON-HISTORIC SPRING LOCKS INSTALLED AT TYPE B BOTTOM SASHES
- INJECT ALL CRACKS IN EXISTING PARGE COATING AT SILL. NOTIFY ARCHITECT OF SIGNIFICANT DAMAGE TO EXISTING PARGE.
- PRIME ALL SURFACES, CONCEALED & EXPOSED.
- PAINT AS SCHEDULED TO ALL SURFACES INCLUDING TRIM.
- PROVIDE SPRING BRONZE WEATHERSTRIPPING
- GLAZE (PUTTY) ALL WINDOWS, TYP.
- REPLACE NON-ORIGINAL OR MISSING HARDWARE. DO NOT PAINT HARDWARE.
- REFINISH SALVAGED HARDWARE TO ORIGINAL FINISH, REINSTALL SALVAGED HARDWARE AT REPLACEMENT SASHES.
- APPLY UV GLAZING FILM TO ALL EXTERIOR WINDOWS WITHIN THE ORIGINAL BUILDING.
- PROVIDE NEW SASH CORDS, REATTACH EXISTING SASH WEIGHTS. FIX LOWER SASH IN PLACE.
- PROVIDE NEW PERIMETER SEALANT AT ALL WINDOW LOCATIONS.
- PROVIDE WINDOW BLIND AT ALL WINDOW LOCATIONS EXISTING & NEW. ROLLER SHADE AT MULTI-PURPOSE ROOM, HORIZONTAL LOUVER ELSEWHERE.

KEY NOTES

1. REPLACE ALL SASHES WITH NEW GLAZED SASHES.
2. REPLACE ELEMENT
3. PROVIDE 3 WINDOW UNITS W/ TWO MULLIONS AS SHOWN IN DETAILS.
4. APPLY UV WINDOW FILM
5. REPLACE MULLION COVER BOARD
6. CONSOLIDATE
7. PROVIDE SASH LOCK
8. PROVIDE SASH PULL
9. PLASTER REPAIR

-# AFTER KEY NOTE NUMBER INDICATES QUANTITY

GLASS TYPES

G-1	1" IGU, CLEAR
G-2	LAMINATED GLASS, CLEAR, THICKNESS TO MATCH EXISTING
G-3	1/4" CLEAR, TEMPERED
G-4	1/4" MIRROR
G-5	3/4" IGU, CLEAR, TEMPERED
G-6	1/4" FROSTED, TEMPERED

GENERAL NOTES - WINDOWS

1. **SURVEY:**
   A. WINDOW SCHEDULE PRESENTS A GENERAL SURVEY OF NON-ORIGINAL ELEMENTS TO BE REMOVED, AND HISTORIC ELEMENTS TO BE RESTORED, RECONSTRUCTED, OR REPLACED. CONTRACTOR IS RESPONSIBILE FOR SURVEYING WINDOWS DURING BIDDING TO FULLY UNDERSTAND THE SCOPE OF WINDOW WORK. THE INFORMATION CONTAINED IN THE DRAWINGS WITH REGARD TO EXISTING CONDITIONS IN NO WAY RELEASES THE CONTRACTOR FROM THE RESPONSIBILITY OF VERIFYING FIELD CONDITIONS RELATING TO AND AFFECTING THE EXECUTION OF THE WORK, AS DESCRIBED IN THE CONTRACT DOCUMENTS.
   B. DAMAGED & MISSING WOOD MEMBERS NOTED ON THE WINDOW SCHEDULE INDICATE ONLY MAJOR AREAS OF REPAIR. CONTRACTOR IS RESPONSIBLE FOR REPAIRS & REPLACEMENT OF MISSING AND DAMAGED WOOD ELEMENTS TO PRODUCE A FINISHED WINDOW ASSEMBLY
   C. WINDOW SIZES FOR EXISTING OPENING ARE APPROXIMATE; CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF OPENINGS
2. **EXIST. WINDOWS:**
   A. **BASE BID:** SCOPE OF WORK INCLUDES THE FULL RESTORATION OF EXISTING WOOD WINDOWS, INCLUDING ASSOCIATED TRIM COMPONENTS. EXISTING WINDOW SASHES ARE TO BE REPLACED WITH NEW WOOD SASHES TO MATCH THE EXISTING. REMOVAL OF THE SASHES WILL TAKE PLACE DURING ABATEMENT. WORK GENERALLY INCLUDES: REPLACEMENT OF SASHES AND GLAZING AS INDICATED ON WINDOW SCHEDULE, RESTORATION OF FRAME, BLIND STOP, SILL, BRICK MOLD & INTERIOR STOPS.
   B. HARDWARE: REPLACE SASH LOCKS, PULLS & LIFTS WHERE MISSING OR DETERIORATED BEYOND REPAIR; ALLOW FOR REPLACEMENT OF ALL SASH CORDS. WEIGHTS ARE WITHIN WINDOW POCKET, REATTACH ALL SASH WEIGHTS.
   C. REMOVE ABANDONED REMNANT HARDWARE, NON-ORIGINAL WINDOW TREATMENTS & FASTENERS.
   D. FABRICATE WOOD REPLACEMENT COMPONENTS WITH PROFILES AND DIMENSIONS THAT MATCH THE ORIGINAL COMPONENTS. CLOSELY MATCH ORIGINAL MATERIAL AND CONSTRUCTION.
3. PROVIDE WINDOWS, FRAMES, CASINGS, AND HARDWARE AS SPECIFIED IN THE WINDOW SCHEDULE AND PROJECT MANUAL.
4. SECURE LOOSE BLOCKING AND PROVIDE SUPPLEMENTARY BLOCKING AS NECESSARY FOR ATTACHMENT OF EXISTING & NEW MATERIALS.
5. **TEMPORARY PROTECTION:** PROVIDE TEMPORARY ENCLOSURES FOR WINDOW OPENINGS AS REQUIRED FOR SECURITY & TO ENSURE BUILDING IS WEATHERTIGHT.
6. **SEALANTS:**
   A. REMOVE & REPLACE PERIMETER SEALANT 100% B.
7. **PARGE COATING:** INJECT ALL CRACKS IN EXISTING SILL PARGE COAT. MATCH COLOR. NOTIFY ARCHITECT OF SIGNIFICANT DAMAGE TO EXISTING PARGE. ALLOW FOR CRACK EVERY 18 INCHES.
8. **WINDOW TREATMENT:** REMOVE ALL NON-ORIGINAL INTERIOR WINDOW TREATMENTS. PROVIDE WINDOW FILM AT SELECT WINDOWS AS SCHEDULED. PROVIDE BLINDS AT ALL WINDOWS.
9. HARDWARE:
   A. REMOVE & SALAVAGE ORIGINAL HARDWARE FOR RESTORATION WHERE NOTED. REMOVE & DISPOSE OF NON-ORIGINAL HARDWARE.
   B. PROVIDE SCREWS AND ATTACHMENTS THAT MATCH APPEARANCE & FINISH OF ORIGINAL HARDWARE.
   C. EXISTING HARDWARE IS TO BE CLEANED TO REMOVE ALL EXISTING OVERPAINT.
   D. CONTRACTOR IS RESPONSIBLE FOR FINAL ADJUSTMENT OF WINDOWS, HARDWARE & WEATHERSTRIPPING.

ALTERNATES

REFER TO SPEC. SECTION 012300 - ALTERNATES FOR DETAILED DESCRIPTION OF WORK

ALTERNATE NO. 1: REPLACE WINDOW SASHES AND FRAMES

REMOVE ALL EXISTING WINDOWS & FRAMES AND REPLACE WITH MAHOGANY MARVIN ULTIMATE WOOD SINGLE HUNG MAGNUM WITH INSULATED GLAZING. MATCH ORIGINAL WINDOWS IN STYLE AND MUNTIN PATTERNING. CUSTOMIZE & REINFORCE AS REQUIRED FOR HEIGHT OF WEST ELEVATION WINDOWS.

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City of Dripping Springs
STEPHENSON SCHOOL BUILDING,
REHABILITATION AND ADDITION

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ALEXIS M. MCKINNEY
22892
STATE OF TEXAS

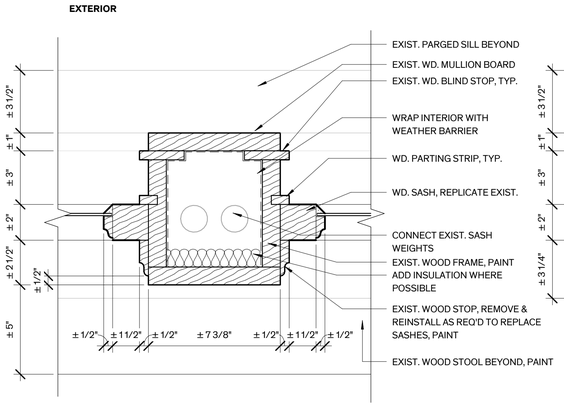
#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

Sheet Name
Window Schedule & Types

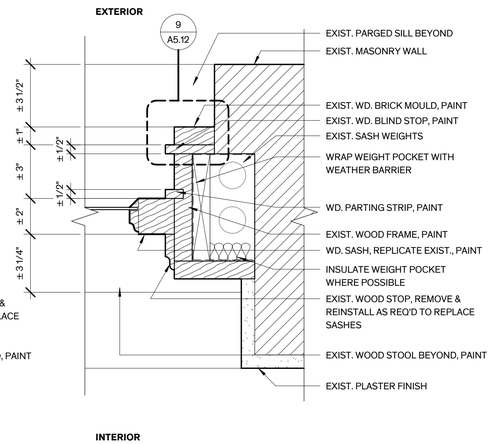
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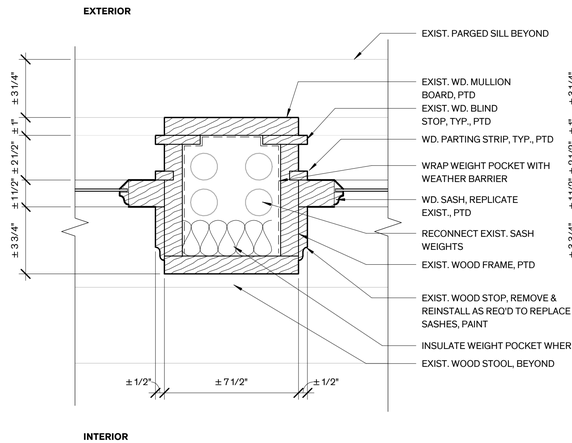


NOTE: REFER TO WINDOW SCHEDULE FOR REPAIRS PER WINDOW. CONTRACTOR TO VERIFY IN FIELD.

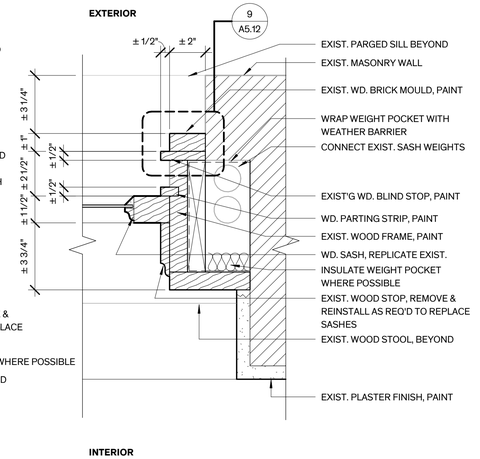
13 Mullion Det. - Type B
3" = 1'-0"



10 Jamb Det. - Type B
3" = 1'-0"

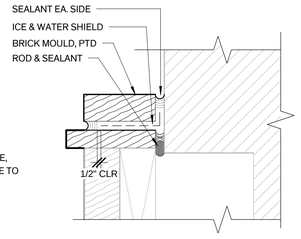


6 Window Mullion - Type A
3" = 1'-0"



3 Window Jamb - Type A
3" = 1'-0"

12 Window Meeting Rail - Type B
3" = 1'-0"



9 Typ. Brick Mold Det.
6" = 1'-0"

5 Window Head - Type B
3" = 1'-0"

2 Window Head - Type A
3" = 1'-0"

11 Window Meeting Rail - Type A
3" = 1'-0"

8 Muntin Det., - Type B
3" = 1'-0"

7 Muntin Det. - Type A
3" = 1'-0"

4 Window Sill - Type B
3" = 1'-0"

1 Window Sill - Type A
3" = 1'-0"

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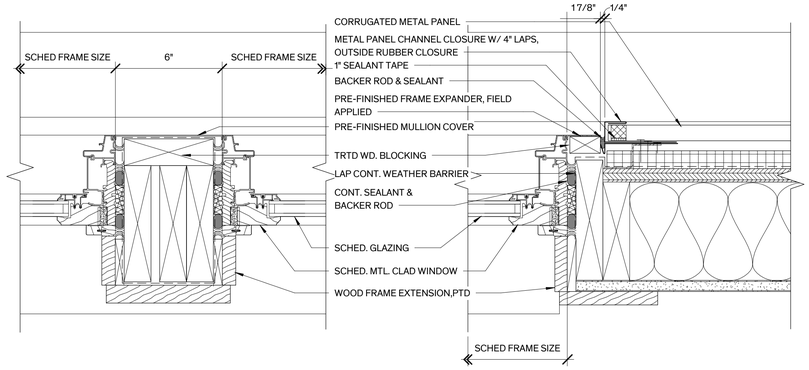
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Date January 17, 2025

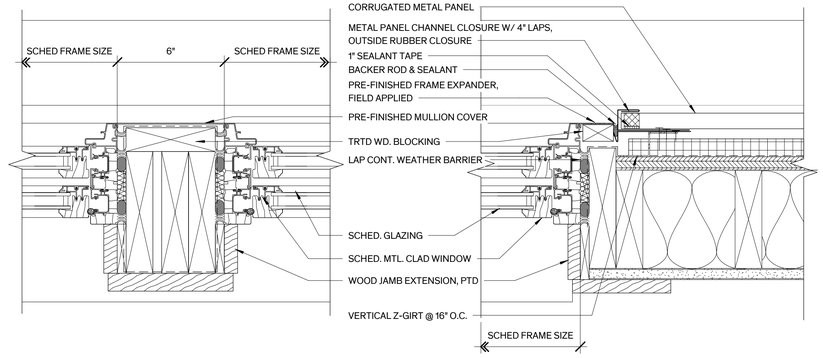
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Window Details

Sheet Number
A5.12



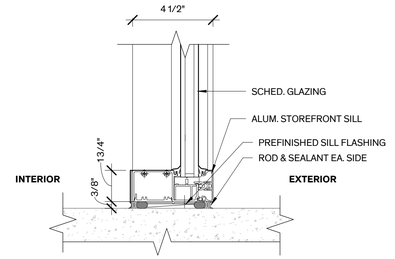
17 Fixed Mullion
3" = 1'-0"

16 Fixed Jamb/Head
3" = 1'-0"

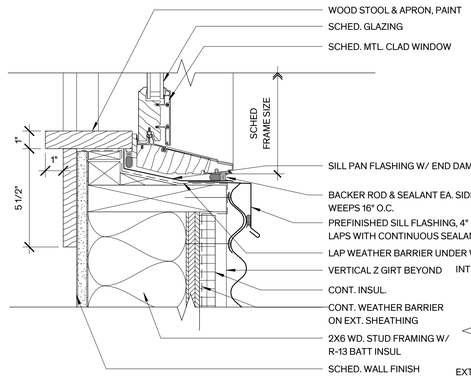


12 Double Hung Mullion Det.
3" = 1'-0"

8 Double Hung Jamb Det.
3" = 1'-0"

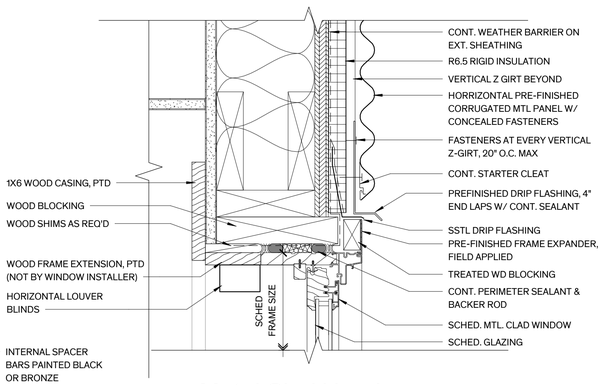


4 Storefront Sill
3" = 1'-0"

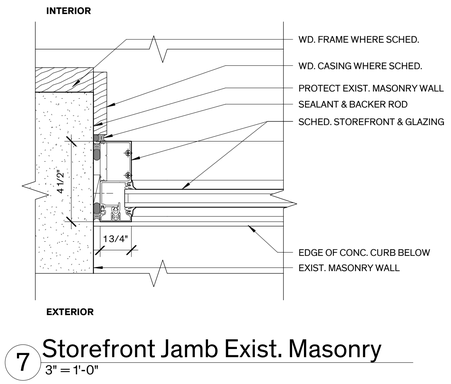


14 Fixed Sill
3" = 1'-0"

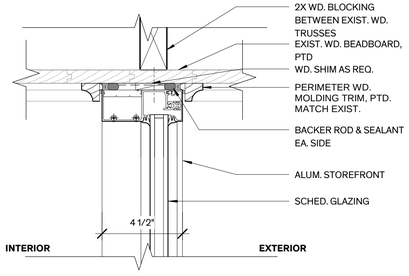
15 Muntin Det.
3" = 1'-0"



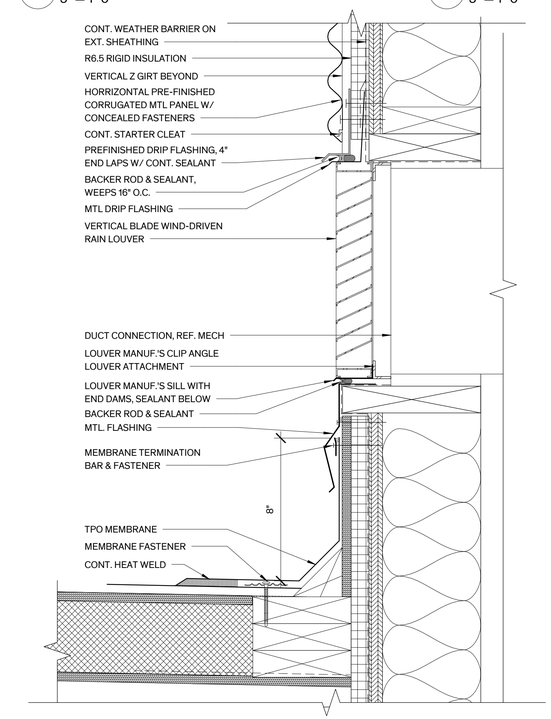
11 Metal Clad Head
3" = 1'-0"



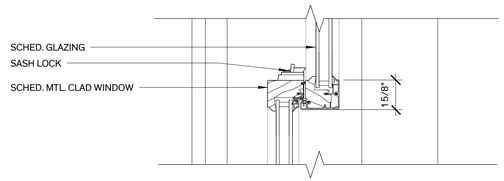
7 Storefront Jamb Exist. Masonry
3" = 1'-0"



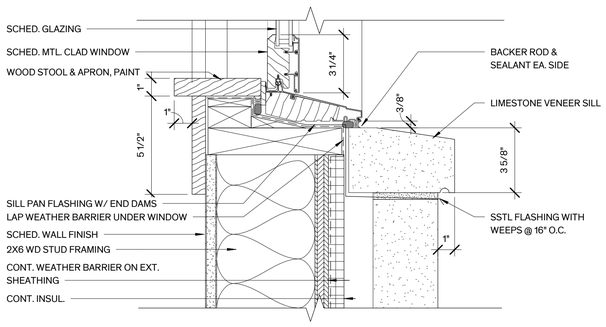
3 Storefront Head Det.
3" = 1'-0"



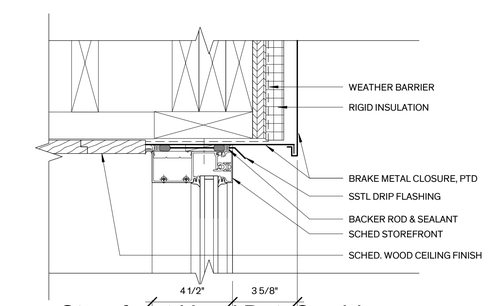
13 Wind Driven Rain Louver
3" = 1'-0"



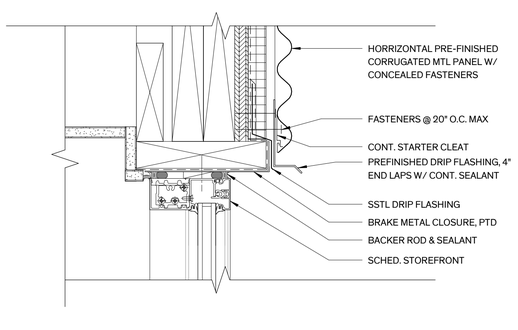
10 Metal Clad Meeting Rail
3" = 1'-0"



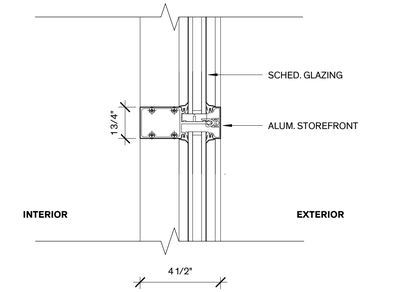
9 Metal Clad Sill
3" = 1'-0"



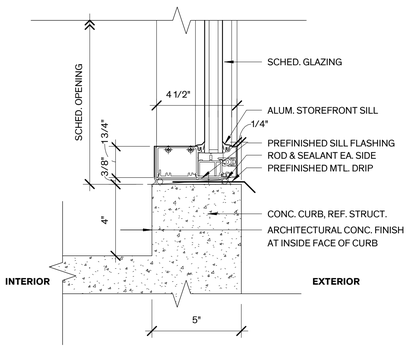
6 Storefront Head Det. Corridor
3" = 1'-0"



5 Storefront Head Det. North
3" = 1'-0"



2 Storefront Mullion
3" = 1'-0"



1 Storefront Sill Det. Addition
3" = 1'-0"

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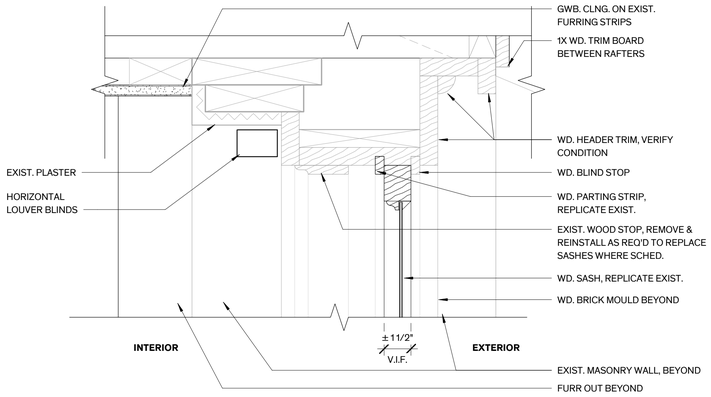
#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

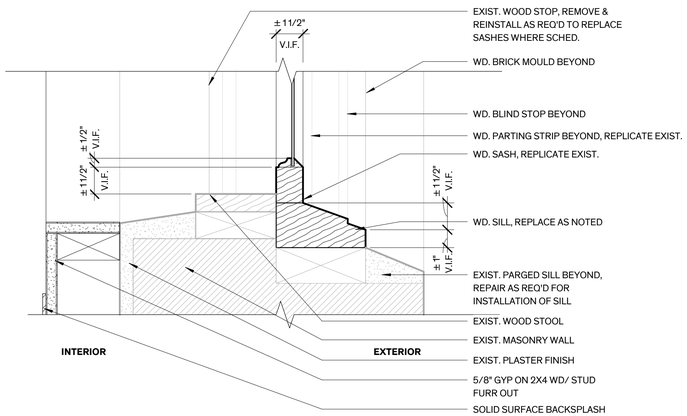
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Window Details

Sheet Number

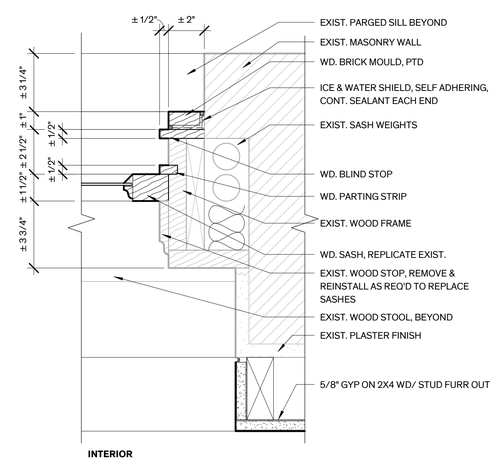
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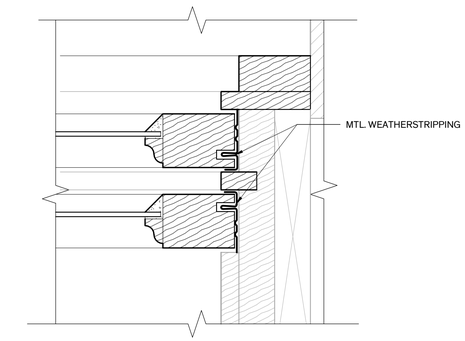
10 Window Head - Type A Catering
3" = 1'-0"



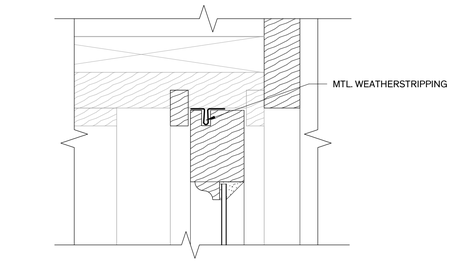
9 Window Sill - Type A Catering
3" = 1'-0"



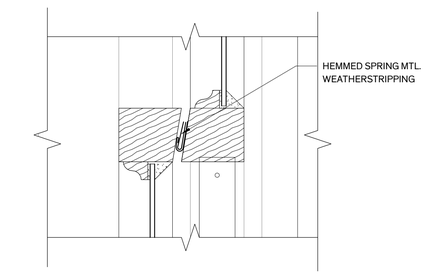
8 Window Jamb - Type A Catering
3" = 1'-0"



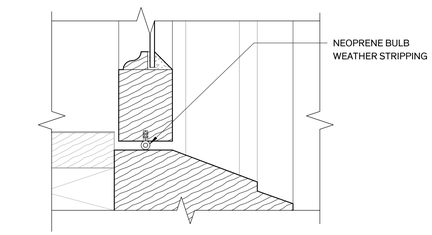
4 Jamb - Weatherstripping
6" = 1'-0"



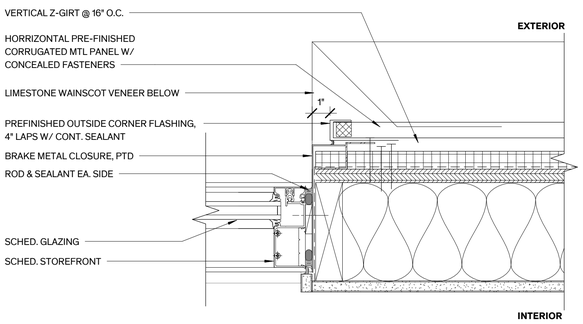
3 Window Head - Weatherstripping
6" = 1'-0"



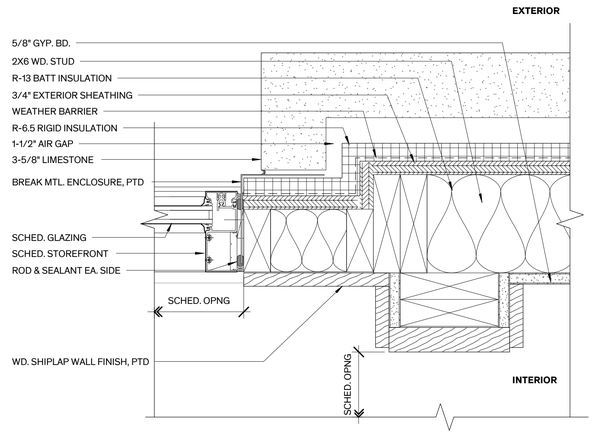
2 Meeting Rail - Weatherstripping
6" = 1'-0"



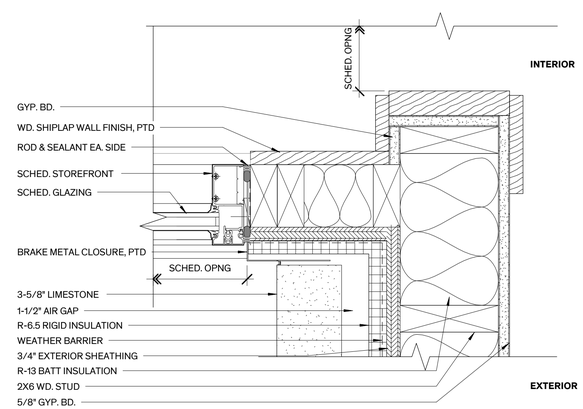
1 Sill - Weatherstripping
6" = 1'-0"



7 Storefront Jamb North Entry
3" = 1'-0"



6 Storefront Jamb West Corridor
3" = 1'-0"



5 Storefront Jamb East Corridor
3" = 1'-0"

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Date January 17, 2025

Sheet Name
Window Details

Sheet Number
A5.1

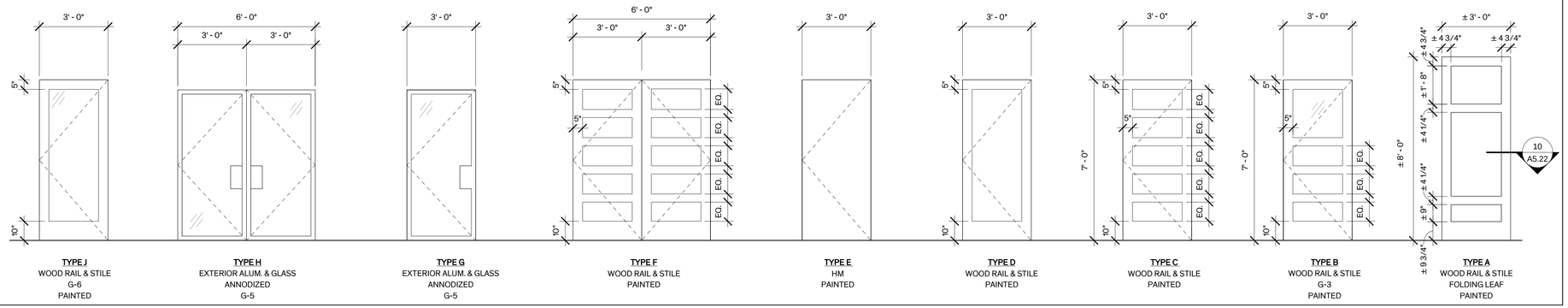
DOOR SCHEDULE

DOOR NO.	SIZE (V.I.F.) WIDTH	HEIGHT	DOOR EXIST'G	DOOR	GLASS	FRAME EXIST'G	FRAME	FINISH	CASING	DETAIL THRESH	JAMB	HEAD	FIRE RATING	REMARKS
1	6' - 0 3/4"	7' - 0"		H	G-5		D	AND	-	1/A5.22	3/A5.22	2/A5.22	-	OFOI MULLION MOUNTED CARD READER
2A	3' - 0"	7' - 0"		B	G-5	EX	E	PTD	-	13/A5.22	14/A5.22	14/A5.22		
2B	3' - 0"	7' - 0"		E	-		B	PTD	-	1/A5.21	2/A5.21	2/A5.21	-	OFOI MULLION MOUNTED CARD READER
3A	3' - 0"	7' - 0"		B	G-5	EX	E	PTD	-	13/A5.22	14/A5.22	14/A5.22		
3B	26' - 11 1/2"	8' - 0"	EX (7), NEW (2)	A	-	EX	A	PTD	B	4/A5.22	9/A5.22	5/A5.22	-	(9) folding leaves; restore (7) existing leaves and hardware; reconstruct (2) additional leaves with matching hardware
4	3' - 0"	7' - 0"		C	-		A	PTD	A	11/A5.22	12/A5.22	12/A5.22	-	
5	3' - 0"	7' - 0"		B	G-3		A	PTD	A	-	6/A5.22	6/A5.22		
6	6' - 0"	7' - 0"		F	-		A	PTD	A	-	6/A5.22	6/A5.22	-	OFOI CARD READER
7	3' - 0"	7' - 0"		C	-		A	PTD	A	-	6/A5.22	6/A5.22	-	
8	3' - 0"	7' - 0"		B	G-3		A	PTD	A	-	6/A5.22	6/A5.22		
9	3' - 0"	7' - 0"		C	-		A	PTD	A	8/A5.22	6/A5.22	6/A5.22	-	
10	3' - 0"	7' - 0"		C	-		A	PTD	A	8/A5.22	6/A5.22	6/A5.22	-	
11	6' - 0"	7' - 0"		F	-		A	PTD	A	-	6/A5.22	6/A5.22	-	
13A	3' - 1"	9' - 6"		L			A SIM	PTD	C					REFER TO CASING TYPE D FOR FULL OPENING DIMENSIONS
13B	3' - 1"	8' - 0"		K	-		A SIM	PTD	A					
13C	3' - 0"	7' - 0"		G	-		D	AND	-	1/A5.22	3/A5.22	2/A5.22	-	OFOI MULLION MOUNTED CARD READER
14	3' - 0"	7' - 0"		D	-		C		A	15/A5.22	7/A5.22	7/A5.22	-	
15	3' - 0"	7' - 0"		D	-		C		A	15/A5.22	7/A5.22	7/A5.22	-	
16	3' - 0"	7' - 0"		D	-		C		A				-	RUBBER TRANSITION STRIP AT CARPET
17	3' - 0"	7' - 0"		D	-		C		A	15/A5.22	7/A5.22	7/A5.22	-	
18	3' - 0"	7' - 0"		E	-		C		A	-	7/A5.22	7/A5.22	-	
19	3' - 0"	7' - 0"		D	-		C		A	15/A5.22	7/A5.22	7/A5.22	-	
20	6' - 0"	7' - 0"		H	-		D	AND	-	1/A5.22	3/A5.22	2/A5.22	-	OFOI MULLION MOUNTED CARD READER
21	3' - 0"	7' - 0"		J	G-6		C		A	-	7/A5.22	7/A5.22		
22	3' - 0"	7' - 0"		J	G-6		C		A	-	7/A5.22	7/A5.22		

GENERAL NOTES - DOORS

1. SCOPE OF WORK INCLUDES THE FULL RESTORATION OF EXISTING HISTORIC INTERIOR DOORS, FRAMES, CASINGS, AND HARDWARE AS NOTED ON THE DOOR SCHEDULE. PROVIDE NEW DOORS, FRAMES, CASINGS, AND HARDWARE WHERE SPECIFIED IN THE DOOR SCHEDULE AND PROJECT MANUAL. NEW WOOD MATERIAL IS TO MATCH ORIGINAL SPECIES, SIZE, PROFILE AND GRAINING.
2. DOOR SIZES FOR EXISTING OPENINGS ARE APPROXIMATE; CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFICATION OF OPENINGS.
3. CONTRACTOR IS RESPONSIBLE FOR SURVEYING DOORS DURING BIDDING TO FULLY UNDERSTAND THE SCOPE OF WORK. THE INFORMATION CONTAINED IN THE DRAWINGS WITH REGARD TO EXISTING CONDITIONS IN NO WAY RELEASES THE CONTRACTOR FROM THE RESPONSIBILITY OF VERIFYING FIELD CONDITIONS RELATING TO AND AFFECTING THE EXECUTION OF THE WORK, AS DESCRIBED IN THE CONTRACT DOCUMENTS.
4. DOOR SIZES INDICATED AT EXISTING AND NEW OPENINGS ARE APPROXIMATE. CONTRACTOR IS TO VERIFY OPENING SIZES IN THE FIELD ONCE SELECTIVE DEMOLITION IS COMPLETE.
5. PROVIDE TEMPORARY DOORS, HARDWARE AND WEATHERSTRIPPING AT BUILDING ENTRANCES AS REQUIRED FOR SECURITY AND WEATHERTIGHTNESS.
6. SECURE LOOSE BLOCKING AND PROVIDE SUPPLEMENTAL BLOCKING AS NECESSARY FOR ATTACHMENT OF EXISTING AND NEW MATERIALS.
7. **HARDWARE:**
   - A. DOCUMENT THE LOCATIONS OF EXISTING ORIGINAL HARDWARE ON DOORS ON RECORD SET OF DRAWINGS.
   - B. REMOVE AND SALVAGE ORIGINAL HARDWARE FOR RESTORATION WHERE NOTED.
   - C. REMOVE AND DISPOSE OF NON-ORIGINAL HARDWARE.
   - D. PROVIDE SCREWS AND ATTACHMENTS THAT MATCH APPEARANCE AND FINISH OF HISTORIC.
   - E. PROVIDE NEW HARDWARE AS SPECIFIED IN DOOR SCHEDULE AND PROJECT MANUAL.
   - F. CONTRACTOR IS RESPONSIBLE FOR FINAL ADJUSTMENT OF DOOR CLOSERS, HARDWARE AND WEATHERSTRIPPING.
8. **FINISHES:**
   - A. INTERIOR WOOD STILE AND RAIL DOORS, FRAMES, TRANSOMS, AND CASINGS ARE TO RECEIVE A PAINTED OPAQUE FINISH.
   - B. EXTERIOR WOOD STILE AND RAIL DOORS, FRAMES, TRANSOMS, AND CASINGS ARE TO RECEIVE A PAINTED OPAQUE FINISH.
   - C. HOLLOW METAL DOORS ARE TO RECEIVE A PAINTED FINISH.
   - D. ALUMINUM DOORS TO BE ANODIZED.
9. **GLASS:** REFER TO SHEET A5.11 FOR GLASS TYPES.

DOOR TYPES - Scale 1/4" = 1' - 0"



TYPE J — WOOD RAIL & STILE, G-6, PAINTED

TYPE H — EXTERIOR ALUM. & GLASS, ANNODIZED, G-5

TYPE G — EXTERIOR ALUM. & GLASS, ANNODIZED, G-5

TYPE F — WOOD RAIL & STILE, PAINTED

TYPE E — HM, PAINTED

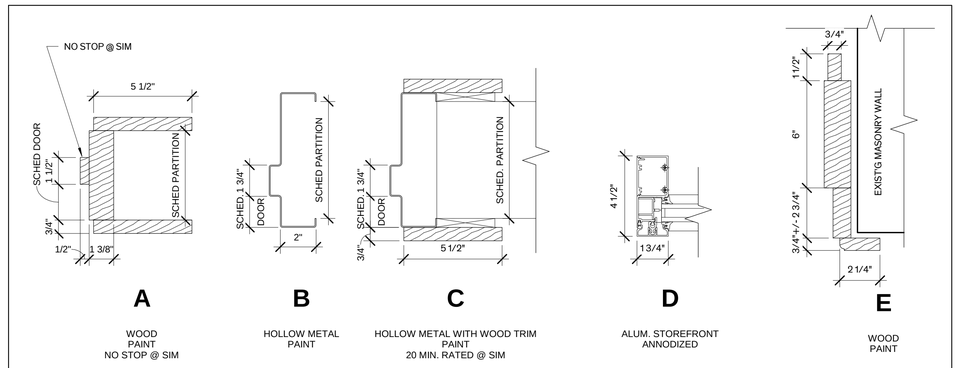
TYPE D — WOOD RAIL & STILE, PAINTED

TYPE C — WOOD RAIL & STILE, PAINTED

TYPE B — WOOD RAIL & STILE, G-3, PAINTED

TYPE A — WOOD RAIL & STILE, FOLDING LEAF, PAINTED

FRAME TYPES - Scale 3" = 1' - 0"



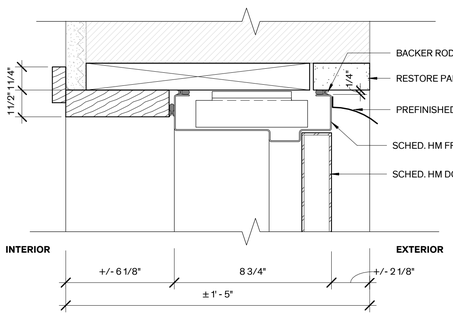
A — WOOD, PAINT, NO STOP @ SIM

B — HOLLOW METAL, PAINT

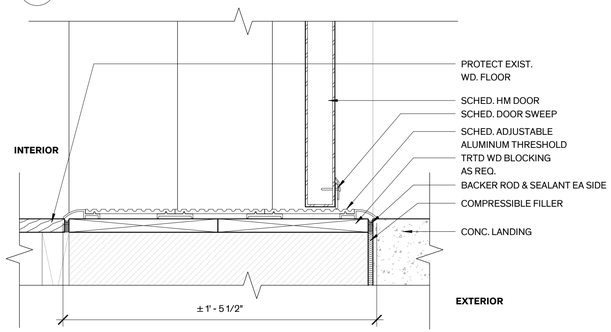
C — HOLLOW METAL WITH WOOD TRIM, PAINT, 20 MIN. RATED @ SIM

D — ALUM. STOREFRONT, ANNODIZED

E — WOOD, PAINT

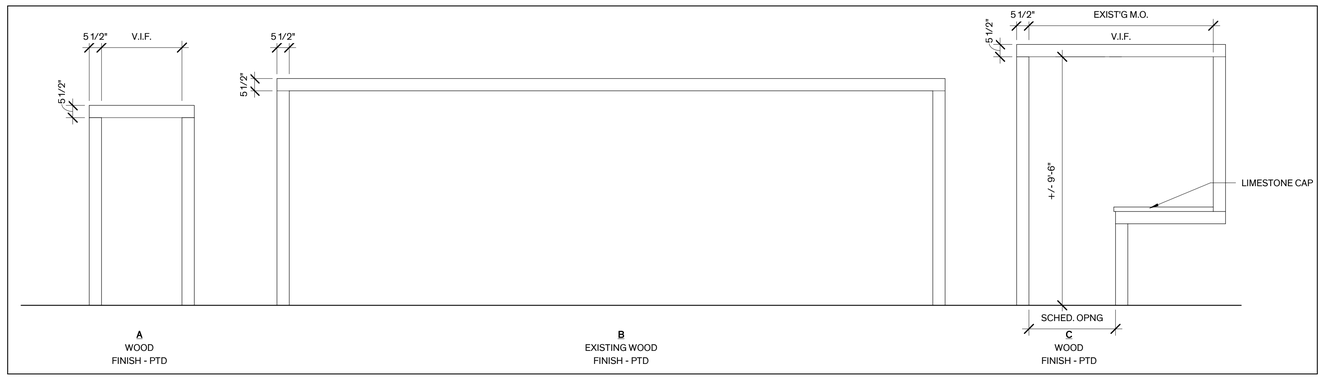


2 Exterior Head/Jamb
3" = 1'-0"



1 Exterior Threshold
3" = 1'-0"

CASING TYPES - Scale 1/4" = 1' - 0"



A — WOOD, FINISH - PTD

B — EXISTING WOOD, FINISH - PTD

C — WOOD, FINISH - PTD

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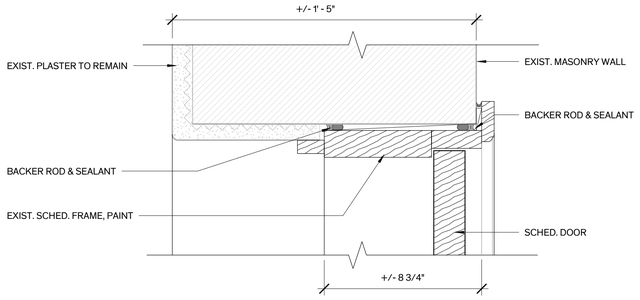
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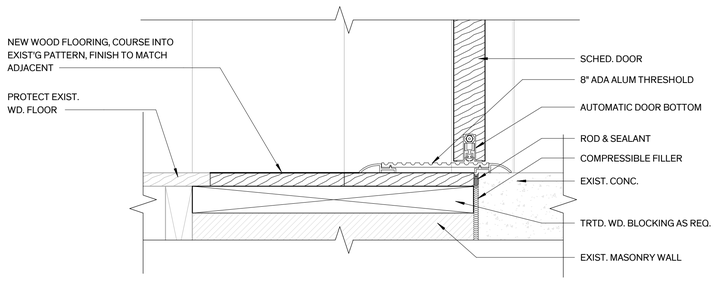
Architexas No. 2314
Date January 17, 2025

Sheet Name
Door Schedule & Types

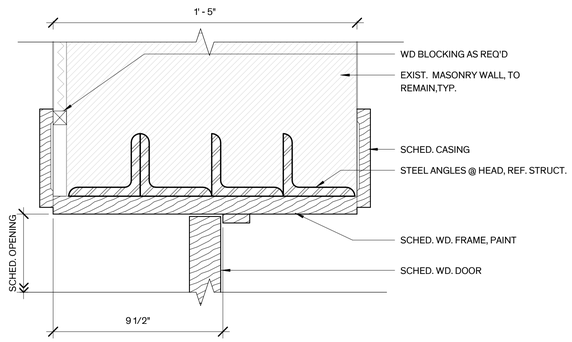
Sheet Number
A5.21



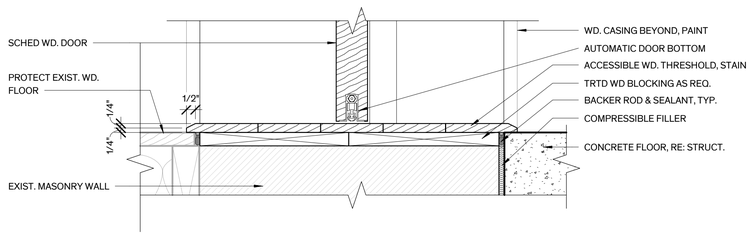
14 Exist. Masonry Opening Head/Jamb
3" = 1'-0"



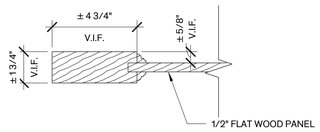
13 Exist. Masonry Opening Threshold
3" = 1'-0"



12 New Masonry Opening Head/Jamb
3" = 1'-0"

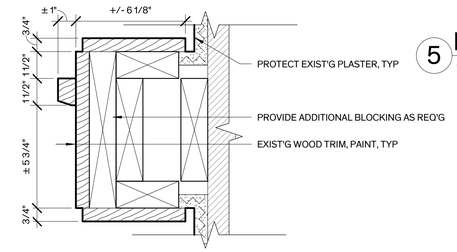


11 New Masonry Opening Threshold
3" = 1'-0"

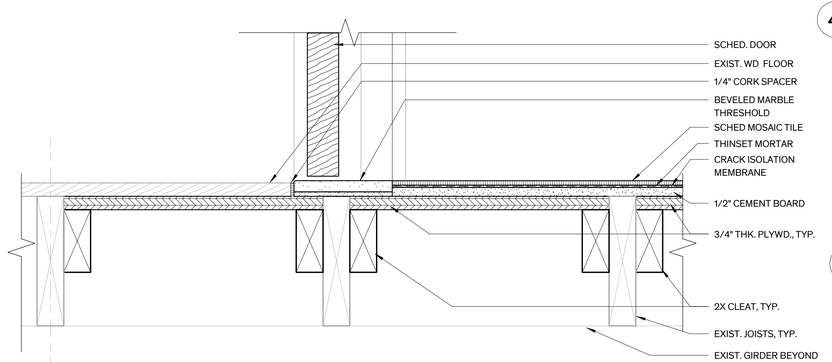


NOTE: MATCH EXIST. PROFILE

10 Wd. Panel Mold
3" = 1'-0"

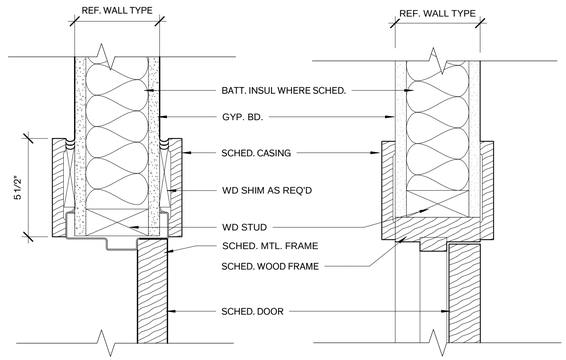


9 Folding Door Jamb
3" = 1'-0"



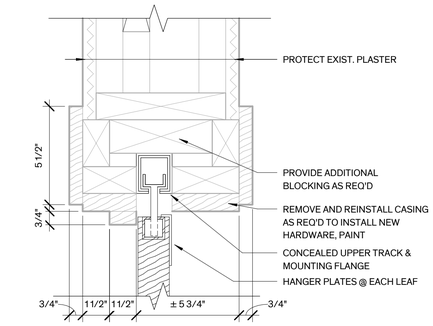
3

8 Threshold @ Tile, RR1 & JAN
3" = 1'-0"

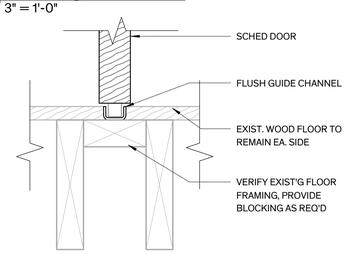


7 Head/Jamb HM
3" = 1'-0"

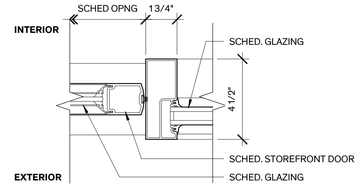
6 Typ. Wood Door Head (Jamb SIM)
3" = 1'-0"



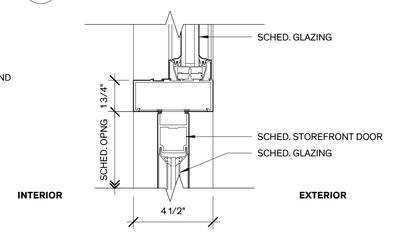
5 Folding Door Head
3" = 1'-0"



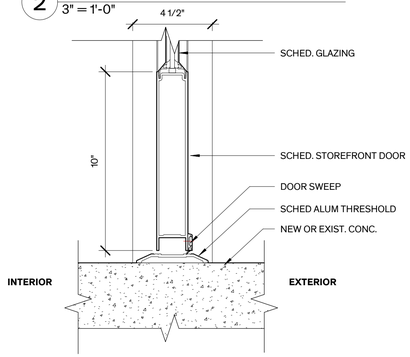
4 Folding Door Threshold
3" = 1'-0"



3 Storefront Door Jamb
3" = 1'-0"



2 Storefront Door Head
3" = 1'-0"



1 Storefront Door Threshold
3" = 1'-0"

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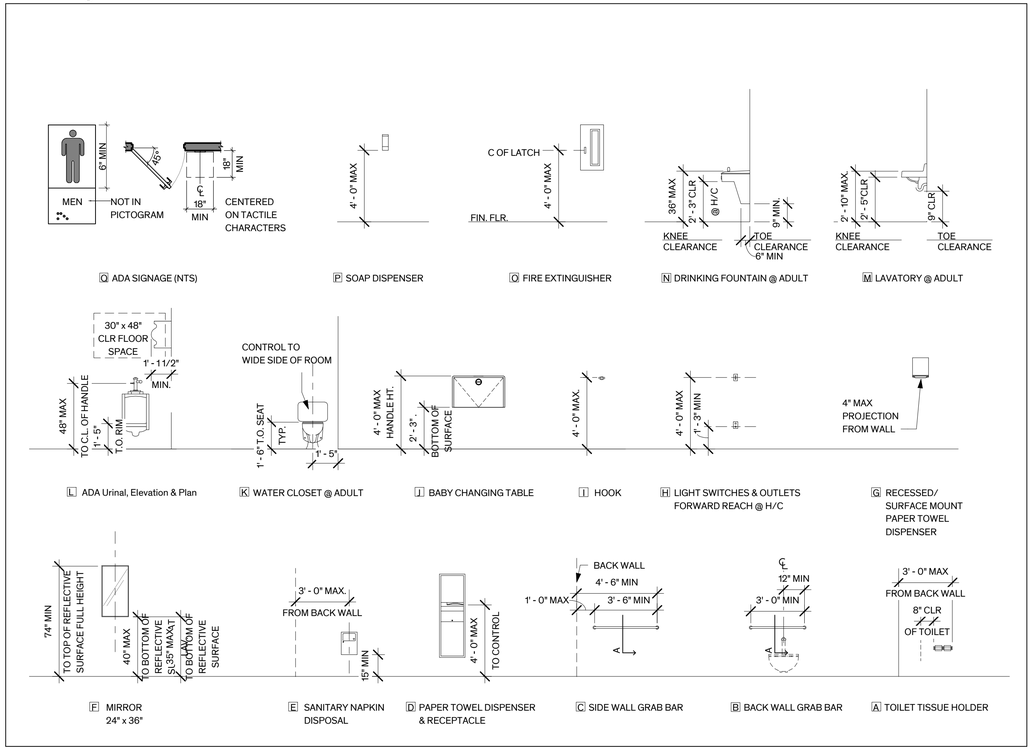
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Architexas No. 2314
Date January 17, 2025

Sheet Name
Door Details

Sheet Number
A5.22

ADA Legend - NTS.



LEGEND - ENLARGED PLAN

- NEW WALL
- EXIST'G WALL
- FEC — FIRE EXTINGUISHER SEMI-RECESSED CABINET

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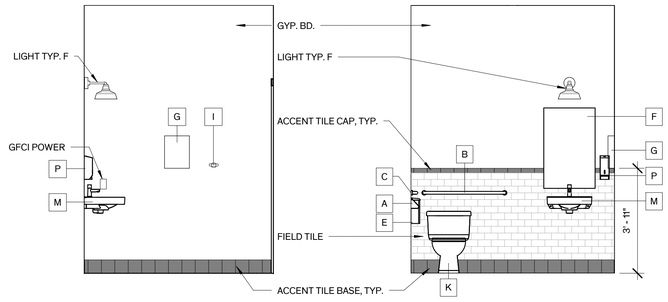
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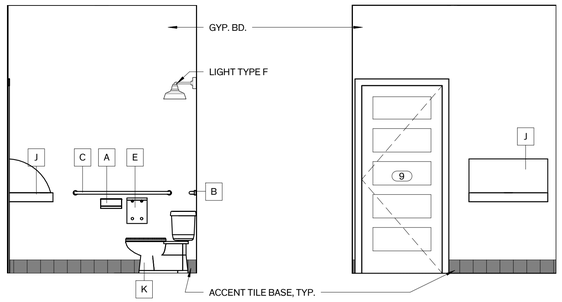
Date January 17, 2025

Sheet Name
Enlarged Plans - Restrooms

Sheet Number
A6.01



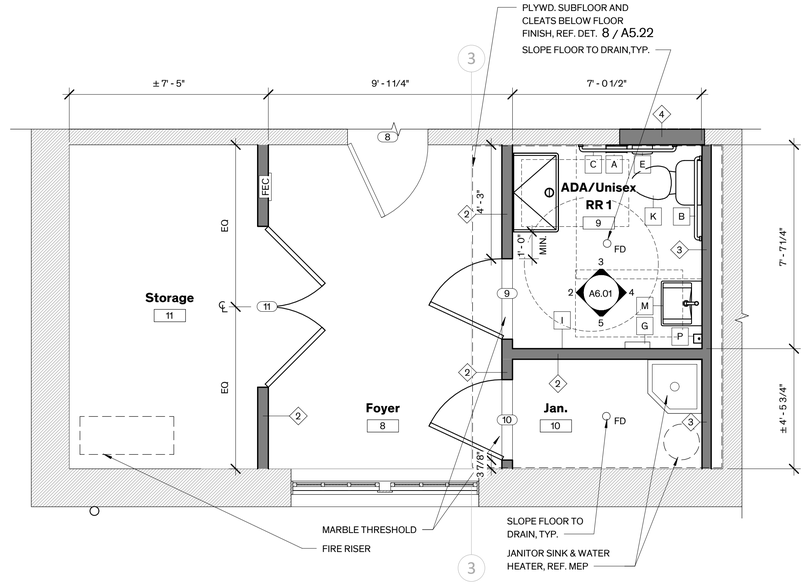
5 ADA/Unisex RR 1 - East
3/8" = 1'-0"



4 ADA/Unisex RR 1 - North
3/8" = 1'-0"

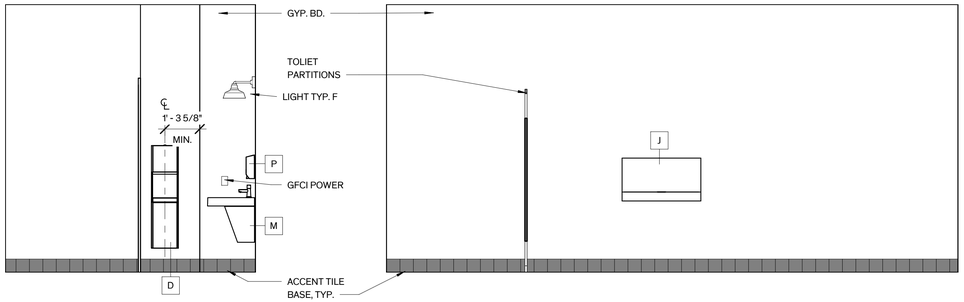
3 ADA/Unisex RR 1 - West
3/8" = 1'-0"

2 ADA/Unisex RR 1 - South
3/8" = 1'-0"

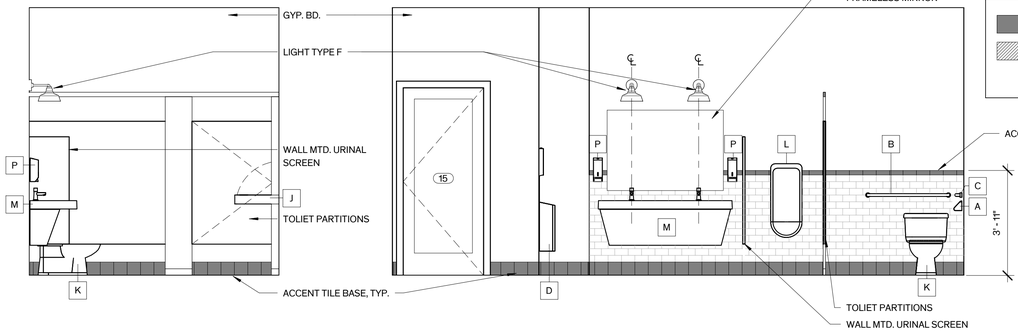


1 HC RR 1 Enlarged Plan
3/8" = 1'-0"

N
PLAN NORTH



17 Men's RR - East
3/8" = 1'-0"



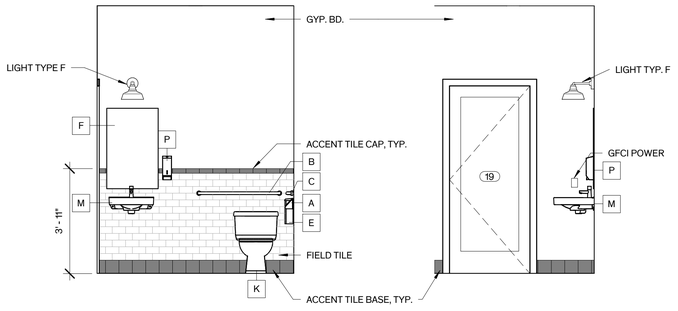
16 Men's RR - North
3/8" = 1'-0"

15 Men's RR - West
3/8" = 1'-0"

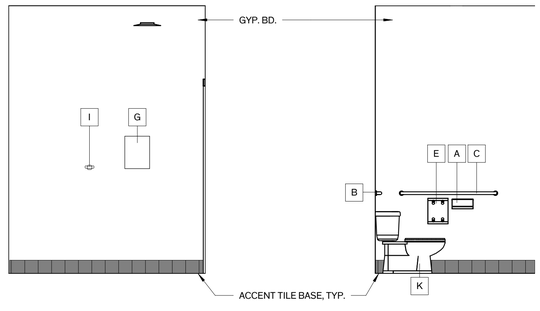
14 Men's RR - South
3/8" = 1'-0"

LEGEND - ENLARGED PLAN

- NEW WALL
- EXIST'G WALL
- FEC — FIRE EXTINGUISHER SEMI-RECESSED CABINET



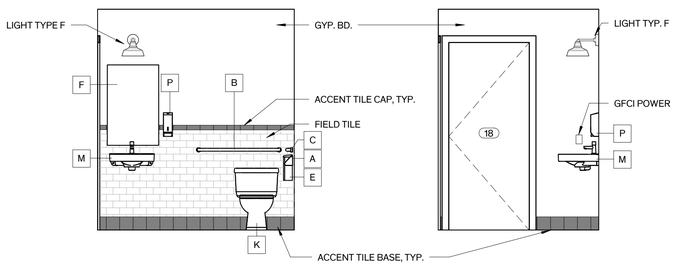
13 ADA/Unisex RR 3 - East
3/8" = 1'-0"



12 ADA/Unisex RR 3 - North
3/8" = 1'-0"

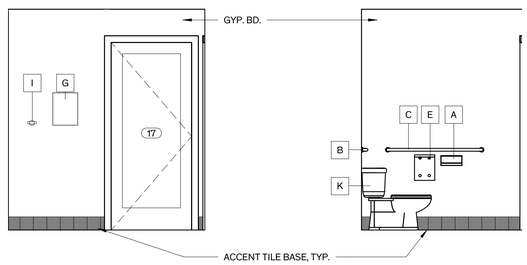
11 ADA/Unisex RR 3 - West
3/8" = 1'-0"

10 ADA/Unisex RR 3 - South
3/8" = 1'-0"



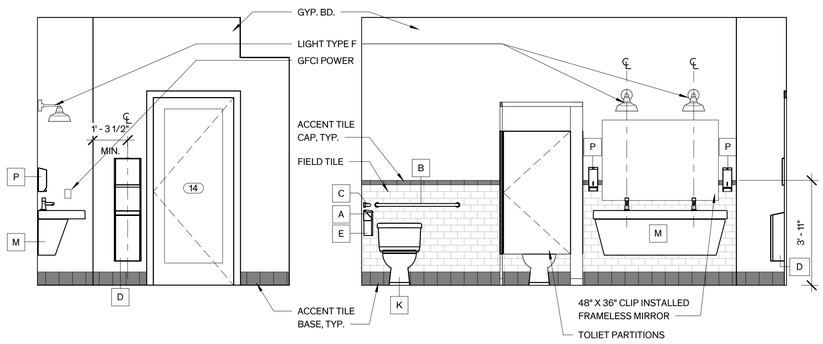
9 ADA/Unisex RR2 - East
3/8" = 1'-0"

8 ADA/Unisex RR2 - North
3/8" = 1'-0"



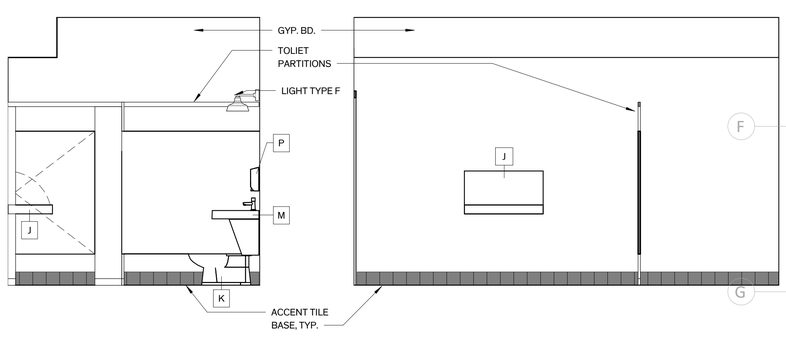
7 ADA/Unisex RR2 - West
3/8" = 1'-0"

6 ADA/Unisex RR2 - South
3/8" = 1'-0"



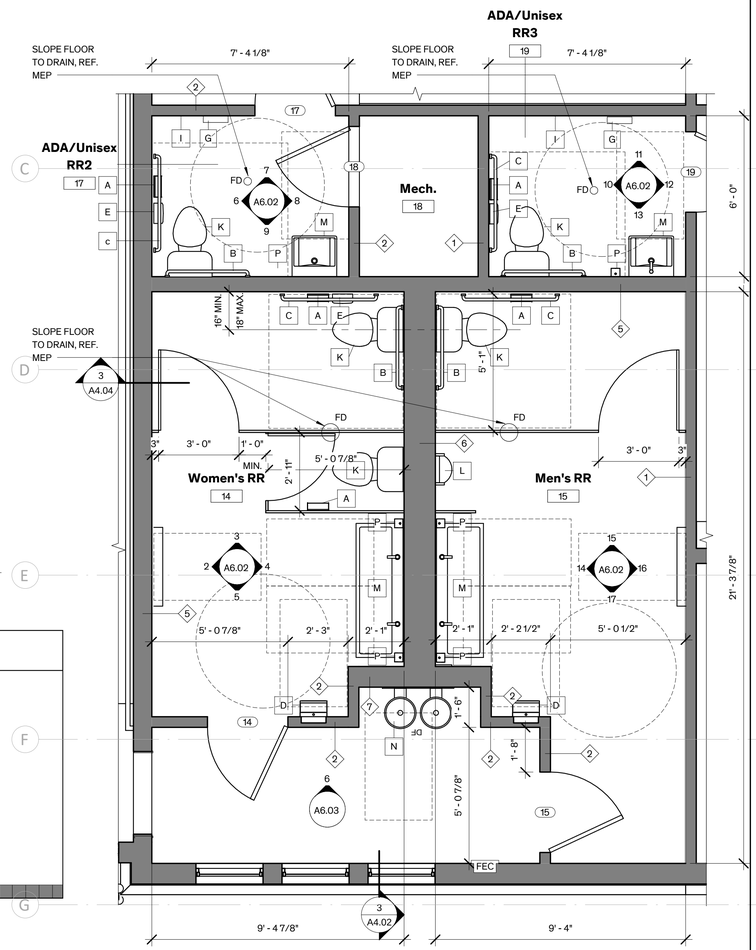
5 Women's RR - East
3/8" = 1'-0"

4 Women's RR - North
3/8" = 1'-0"



3 Women's RR - West
3/8" = 1'-0"

2 Women's RR - South
3/8" = 1'-0"



1 Addition Restrooms Enlarged Plan
3/8" = 1'-0"

PLAN NORTH

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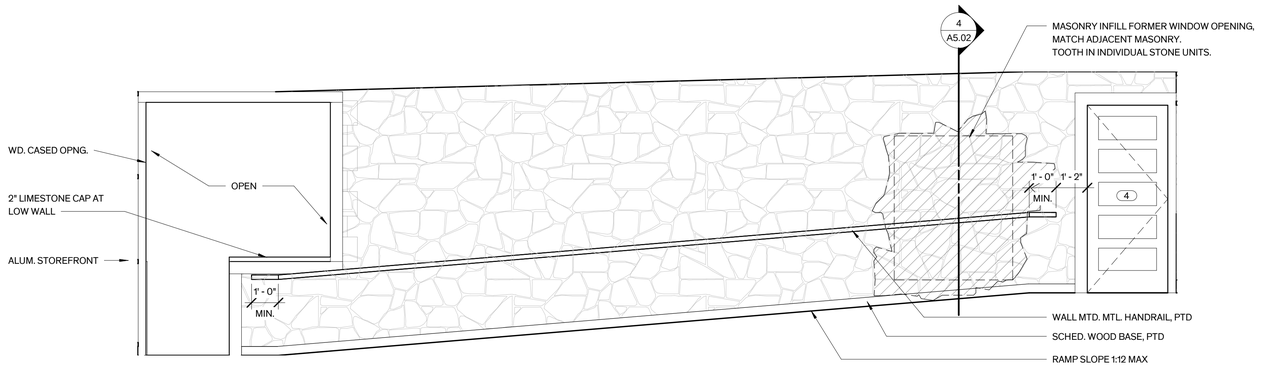
Sheet Name
Enlarged Plans - Restrooms

Sheet Number
A6.03

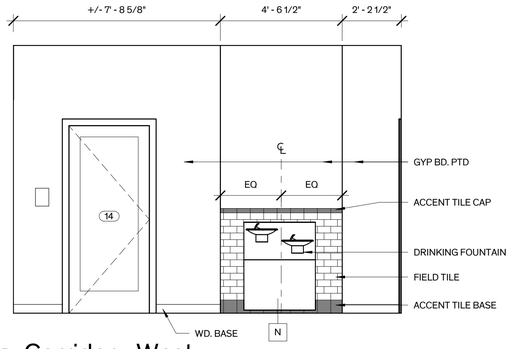
LEGEND - ENLARGED PLAN

- NEW WALL
- EXIST'G WALL
- FEC — FIRE EXTINGUISHER SEMI-RECESSED CABINET

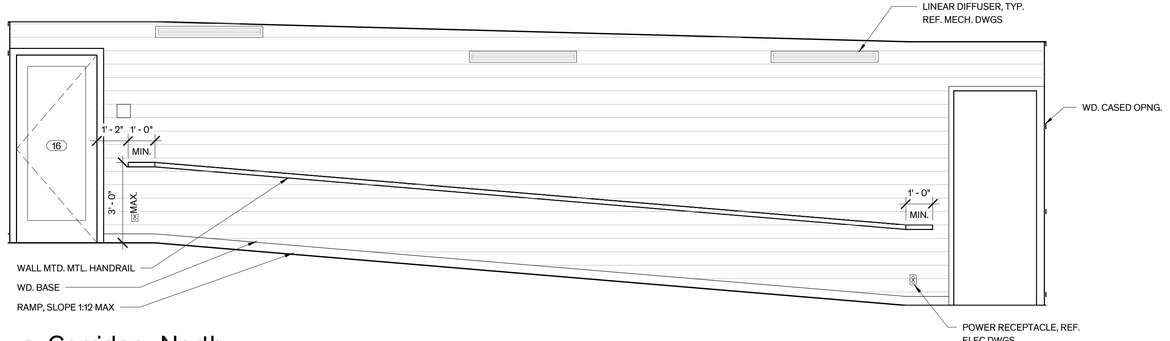
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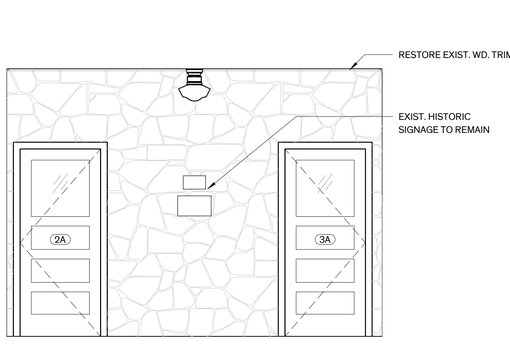
7 Corridor - South
3/8" = 1'-0"



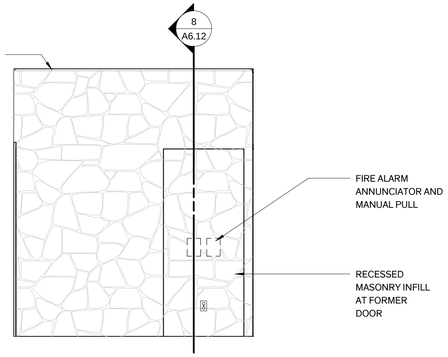
6 Corridor - West
3/8" = 1'-0"



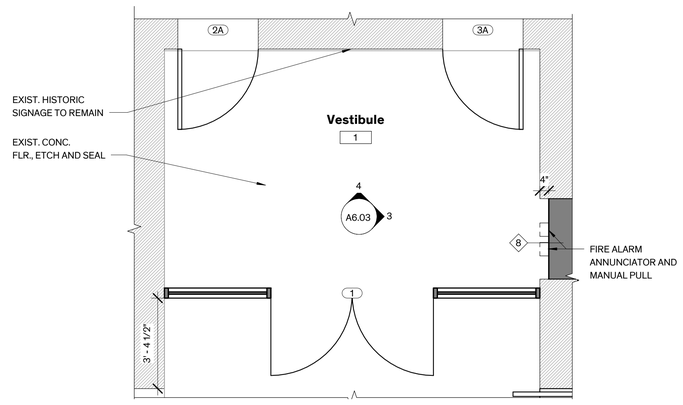
5 Corridor - North
3/8" = 1'-0"



4 Entry - West
3/8" = 1'-0"

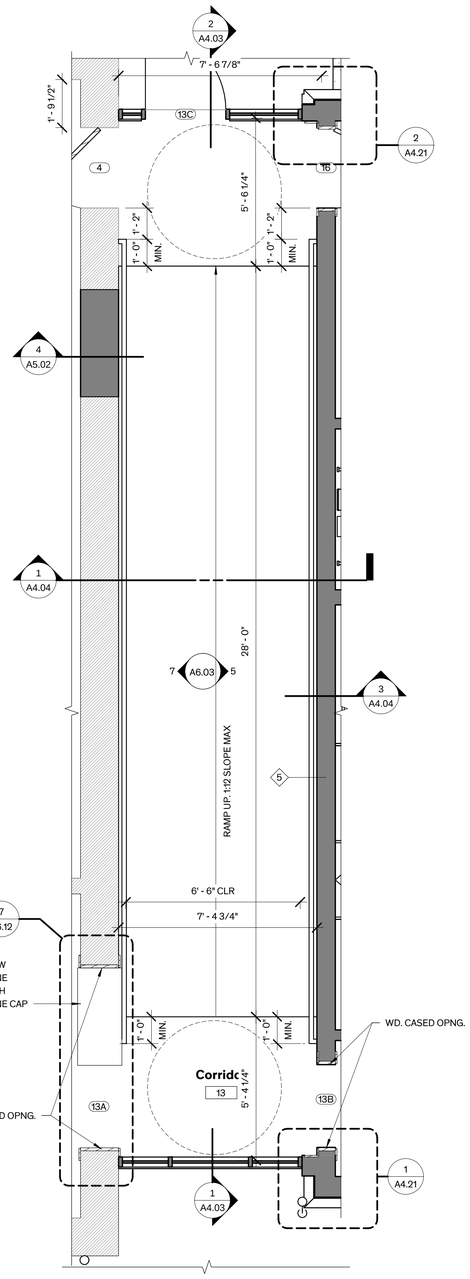


3 Entry - North
3/8" = 1'-0"



2 Entry Enlarged Plan
3/8" = 1'-0"

N
PLAN NORTH



1 Corridor Enlarged Plan
3/8" = 1'-0"

N
PLAN NORTH

City of Dripping Springs
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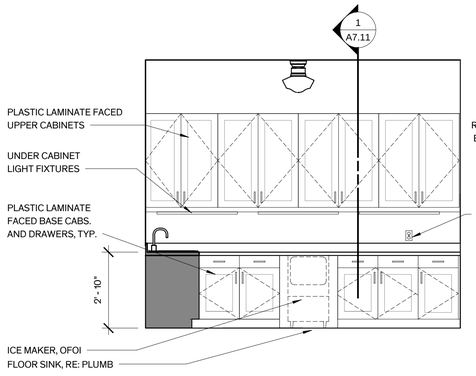
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#22892 1/17/25

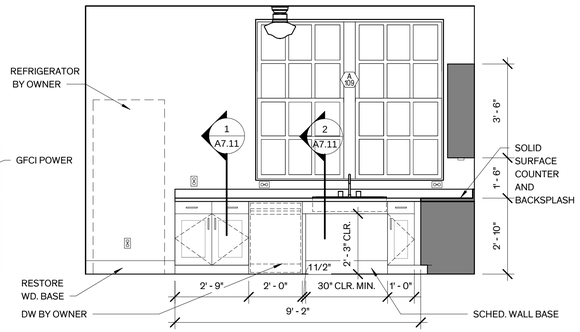
Architexas No. 2314
Date January 17, 2025

Sheet Name
Enlarged Plans & Interior Elevations

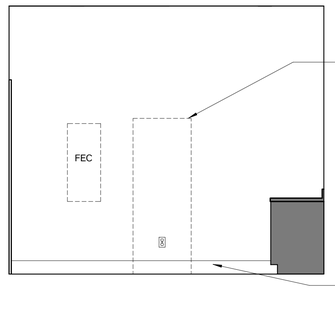
Sheet Number
A6.03



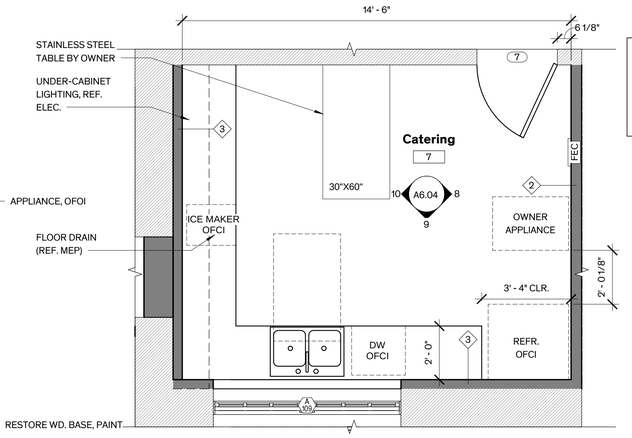
10 Catering - South
3/8" = 1'-0"



9 Catering - East
3/8" = 1'-0"



8 Catering - North
3/8" = 1'-0"

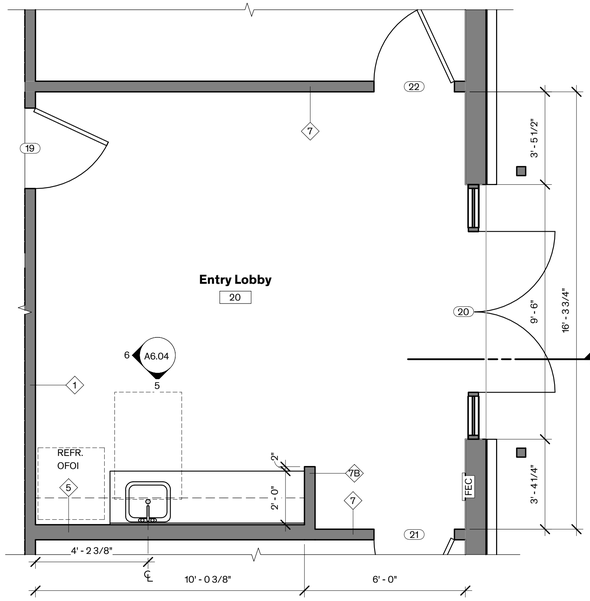


7 Catering Enlarged Plan
3/8" = 1'-0"

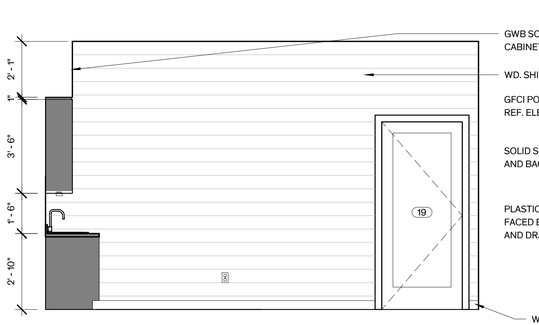
LEGEND - ENLARGED PLAN

- NEW WALL
- EXIST'G WALL
- FEC — FIRE EXTINGUISHER SEMI-RECESSED CABINET

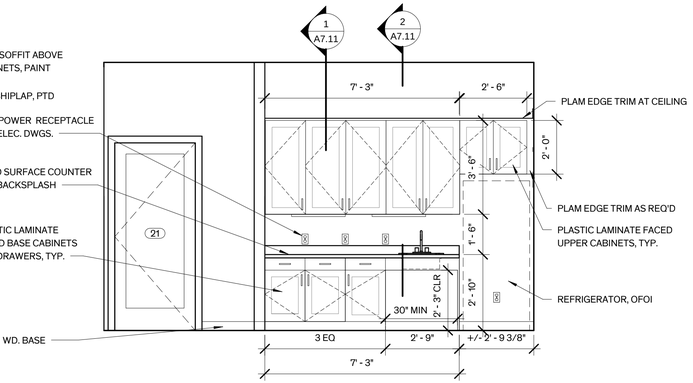




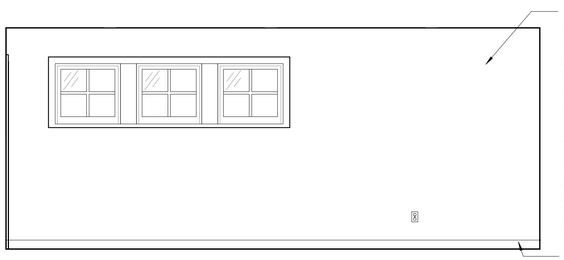
4 Entry Lobby Enlarged Plan
3/8" = 1'-0"



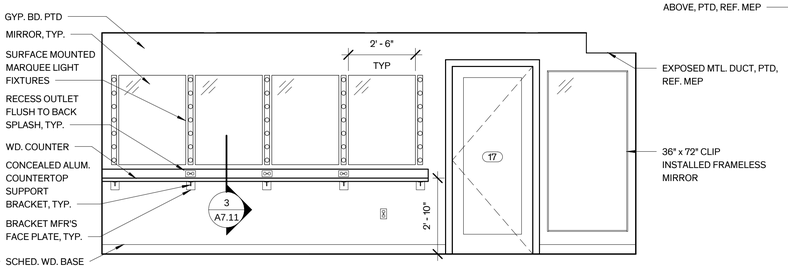
6 Entry Lobby - South
3/8" = 1'-0"



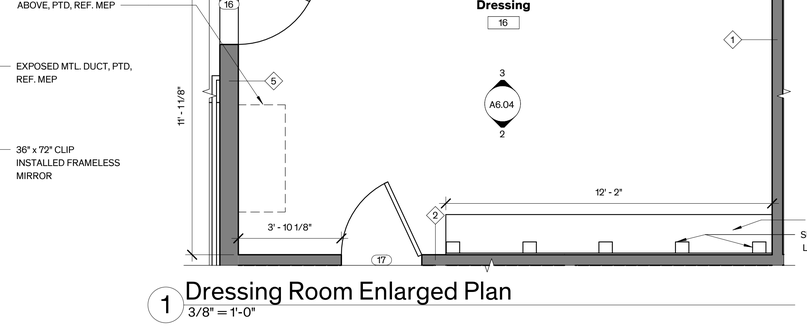
5 Entry Lobby - East
3/8" = 1'-0"



3 Dressing Room - West
3/8" = 1'-0"



2 Dressing Room - East
3/8" = 1'-0"



1 Dressing Room Enlarged Plan
3/8" = 1'-0"

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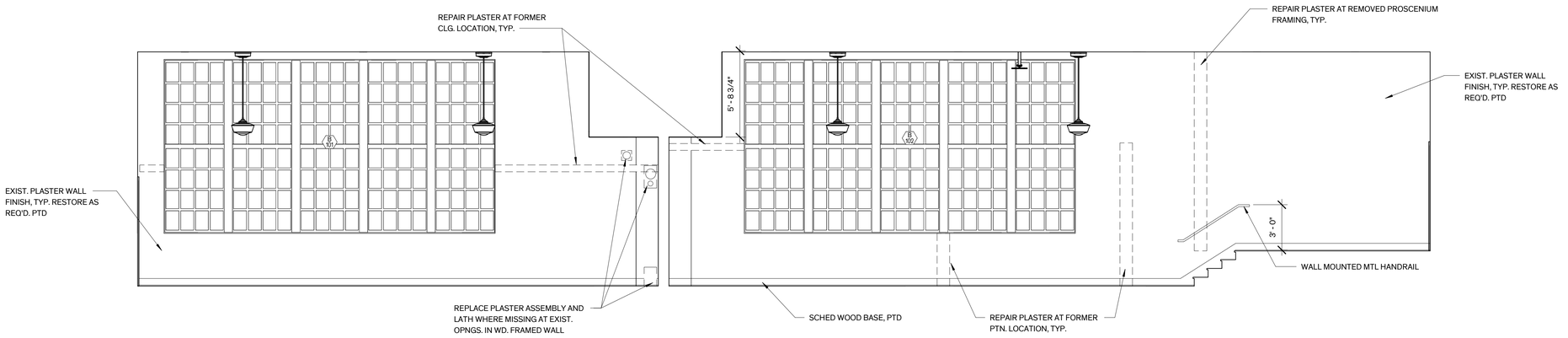
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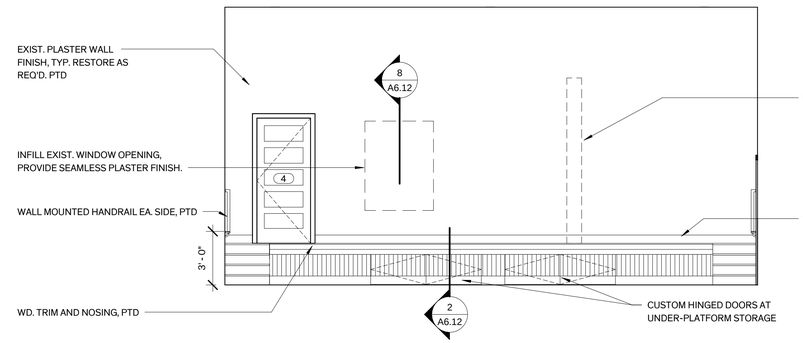
Sheet Name
Enlarged Plans & Interior Elevations

Sheet Number
A6.04

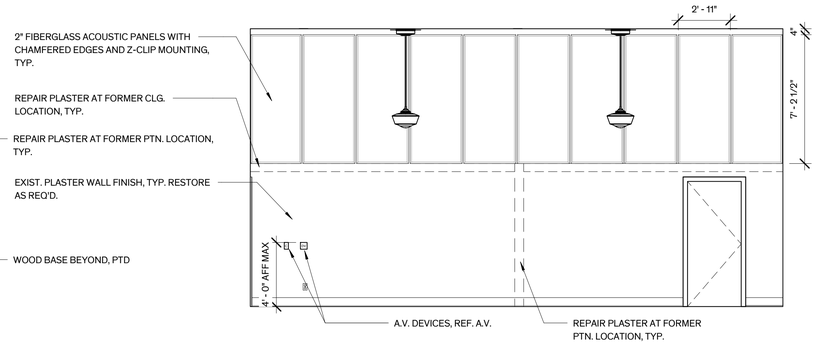


6 Multi-Use A - West
1/4" = 1'-0"

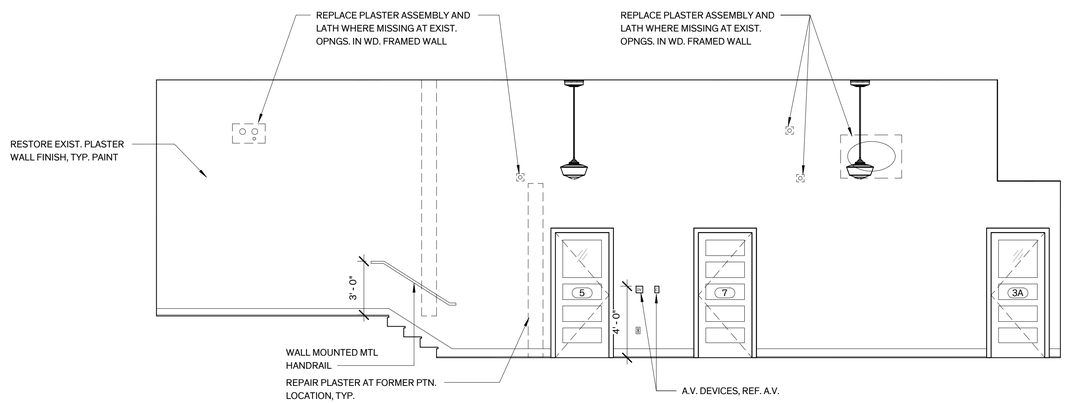
5 Multi-Use B - West
1/4" = 1'-0"



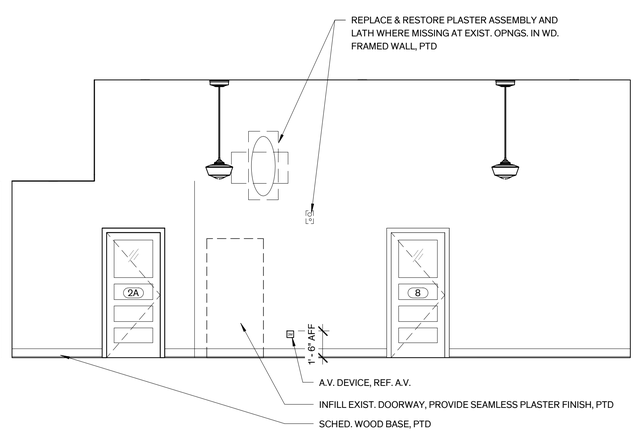
4 Multi-Use B -North
1/4" = 1'-0"



3 Multi-Use A - South
1/4" = 1'-0"



2 Multi-Use B - East
1/4" = 1'-0"



1 Mulit-Use A - East
1/4" = 1'-0"

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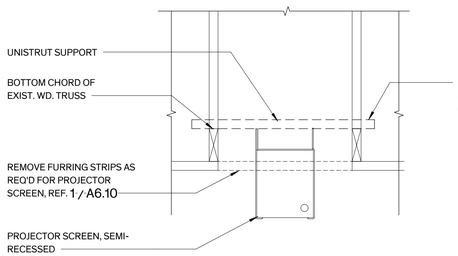
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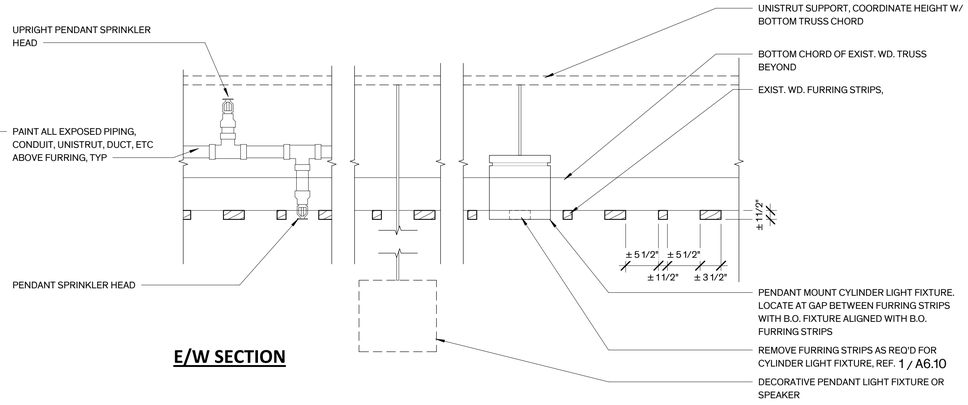
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Sheet Name
Interior Elevations

Sheet Number
A6.05



N/S SECTION



E/W SECTION

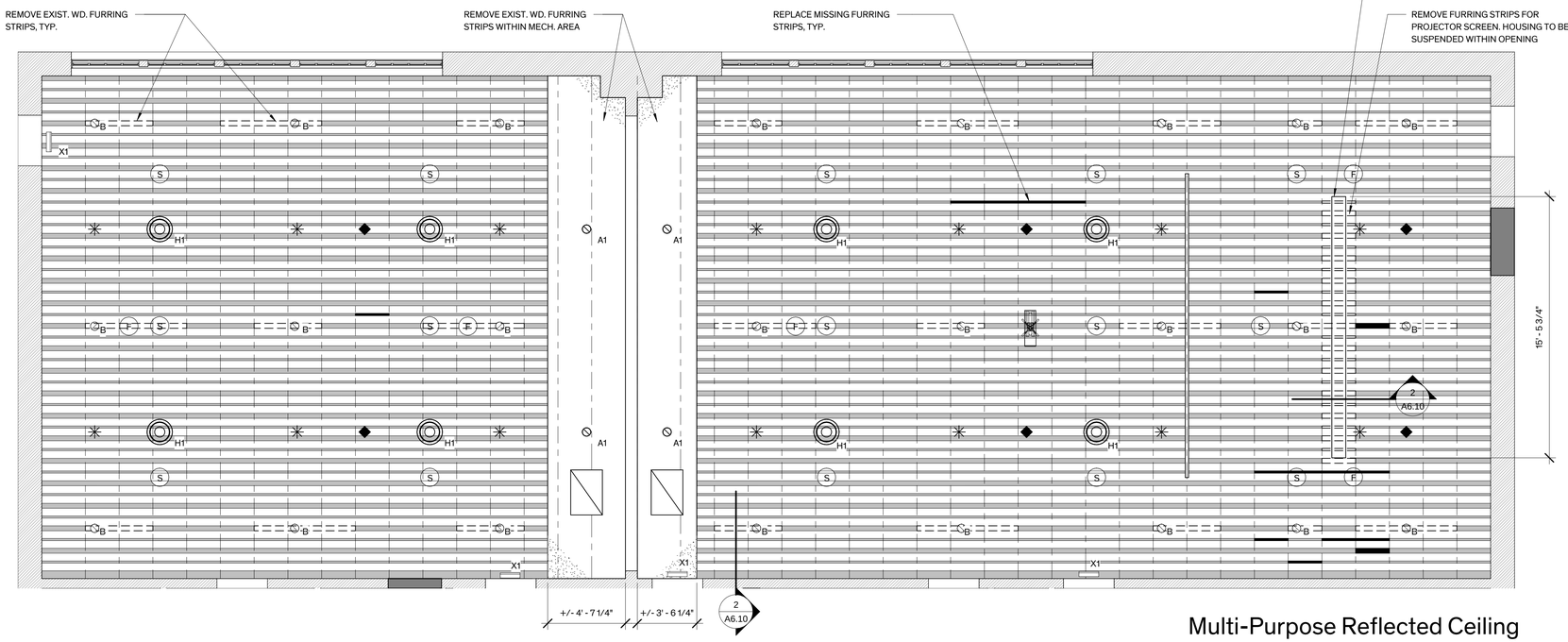
2 Multi-Use Ceiling Section Details
1" = 1'-0"

LEGEND - ENLARGED RCP

- NEW WALL
- EXIST'G WALL
- EXIST'G FURRING
- RELOCATED WD FURRING
- REMOVED WD FURRING
- GYP BD CEILING
- RETURN GRILLE
- A1 4" ROUND RECESSED DOWNLIGHT
- B 4" CYLINDER DOWNLIGHT
- H1 PENDANT WITH 16" GLASS SHADE
- X1 WALL MOUNT EMERGENCY EXIT LIGHT
- X2 CEILING MOUNT EMERGENCY EXIT LIGHT
- SPRINKLER
- S SPEAKER
- CM CAMERA
- VACANCY SENSOR
- F FIRE ALARM
- VP CEILING-HUNG VIDEO PROJECTOR

GENERAL NOTES - RCP

1. **LIGHT FIXTURE LOCATIONS:**
   - A. LIGHT FIXTURES ARE TO BE LOCATED IN THE FIELD AS DIMENSIONED ON THE ARCHITECTURAL REFLECTED CEILING PLANS U.O.N
   - B. LIGHT FIXTURES & CEILING DEVICES SHALL BE LOCATED IN SPACES BETWEEN EXISTING WOOD FURRING STRIP CEILING AT MULTI-USE A & B AND PLATFORM.
   - C. LIGHT FIXTURE LOCATIONS HAVE PRIORITY OVER LOCATION OF DEVICES FOR OTHER MEP EQUIPMENT OR A/V DEVICES. CONTRACTOR TO COORDINATE LOCATION OF MEP SYSTEMS AND A/V DEVICES AWAY FROM LIGHT FIXTURES. MEP AND A/V SHOP DRAWINGS ARE TO INCLUDE AN OVERLAY OF LIGHT FIXTURE LOCATIONS.
   - D. SINGLE LIGHT FIXTURE IN A ROOM SHALL BE CENTERED WITHIN THE SPACE UNLESS DIMENSIONED OR NOTED OTHERWISE
   - E. EXIT SIGNS AT DOORWAYS SHALL BE CENTERED ON DOOR OPENING, U.O.N
2. **DEVICE LOCATIONS**: LOCATE DEVICE ON CENTERLINE OF LIGHT FIXTURE ROWS & AT MIDPOINT BETWEEN FIXTURES WHEREVER POSSIBLE
3. **HVAC GRILLE AND DIFFUSER LOCATIONS:**
   - A. HVAC RETURN & SUPPLY GRILLES ARE TO BE LOCATED AS INDICATED ON THE ARCHITECTURAL PLANS, REFLECTED CEILING PLANS, SECTIONS, DETAILS, & INTERIOR ELEVATIONS WHERE NOTED.
   - B. CENTER WALL GRILLE ABOVE DOOR WHENEVER POSSIBLE.
   - C. WHERE GRILLES OF DIFFERENT HEIGHTS ARE SCHEDULED ON THE SAME WALL, ALIGN TOP OF GRILLES.
4. **DISCREPANCIES OR CONFLICTS:** CONTRACTOR IS TO NOTIFY ARCHITECT IF A DISCREPANCY OR CONFLICT OCCURS THAT DOES NOT ALLOW PLACEMENT OF ELEMENTS AS NOTED ABOVE. IF SUCH CONDITION OCCURS THE CONTRACTOR MUST PROVIDE AN R.F.I. ALONG WITH A DRAWING OR PHOTO, WHERE APPLICABLE, WHICH DESCRIBES THE CONFLICT, AND THE CONTRACTOR IS TO PROVIDE A RECOMMENDATION FOR ALTERNATE PLACEMENT
5. **FINISHING AT CONCEALED LOCATIONS:** REMOVE LOOSE, DELAMINATING, & DAMAGED FINISH ABOVE NEW SUSPENDED CEILINGS, FURR-DOWNS & HVAC CHASES. DO NOT REPAIR PLASTER OR PAINT FINISH SURFACES AT CONCEALED LOCATIONS
6. **FINISHES:** REFER TO ROOM FINISH SCHEDULE & GENERAL FINISH NOTES, SHT. A-5.01 FOR SCOPE OF WORK.
7. MULTI-PURPOSE ROOM - PAINT ALL EXPOSED PIPING, CONDUIT, UNISTRUT, DUCT, ETC ABOVE FURRING, TYP



1 Multi-Purpose Reflected Ceiling Plan
1/4" = 1'-0"

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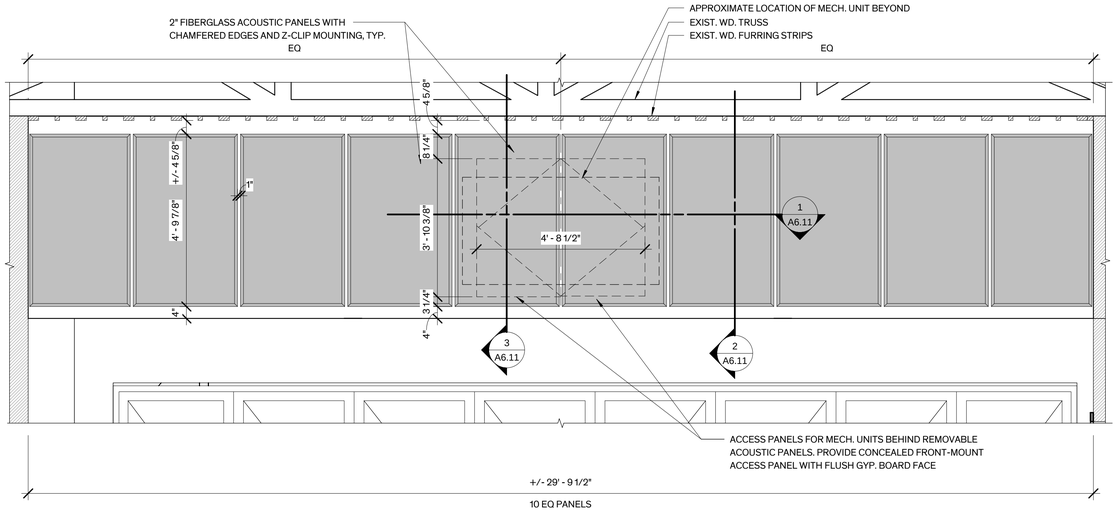
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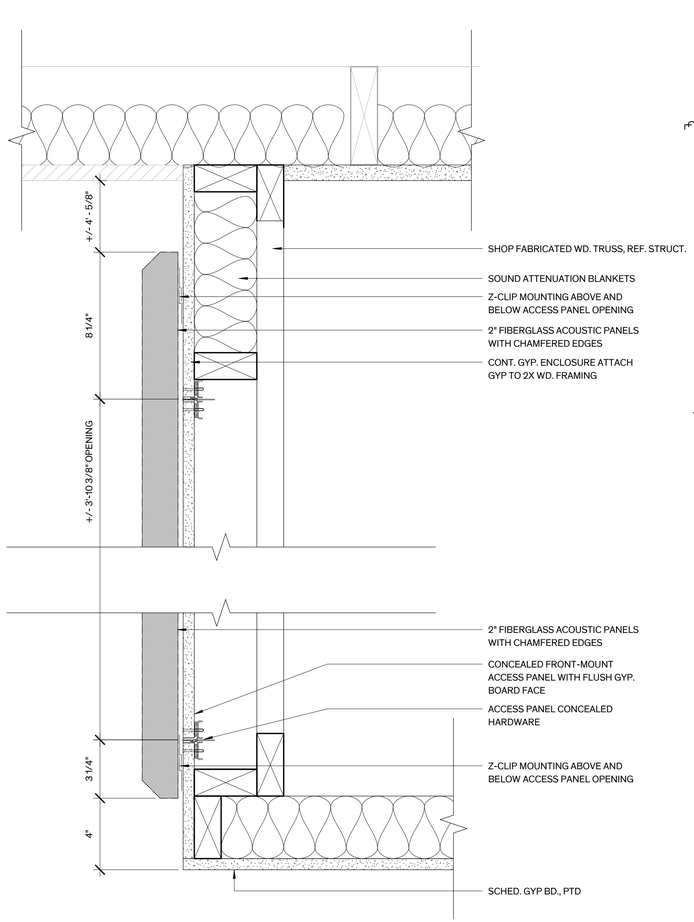
Date January 17, 2025

Sheet Name
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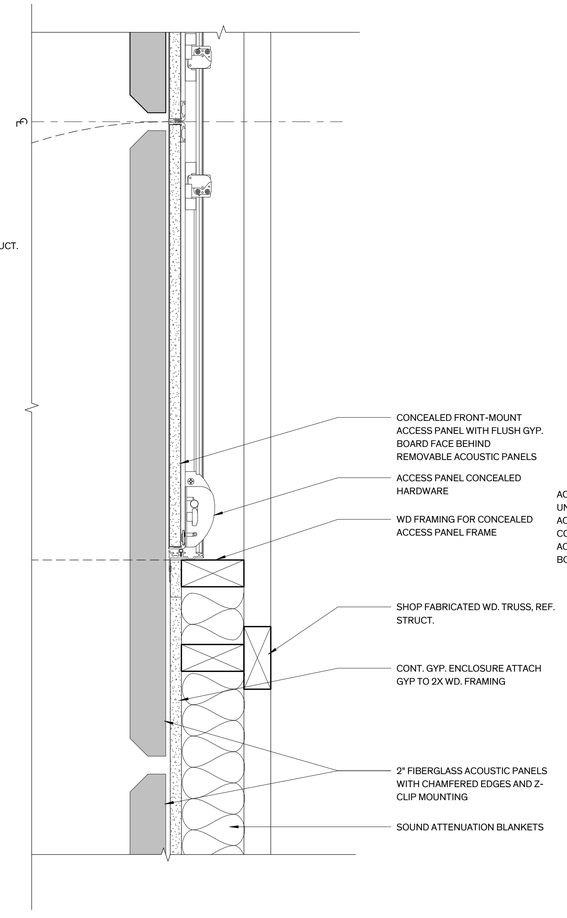
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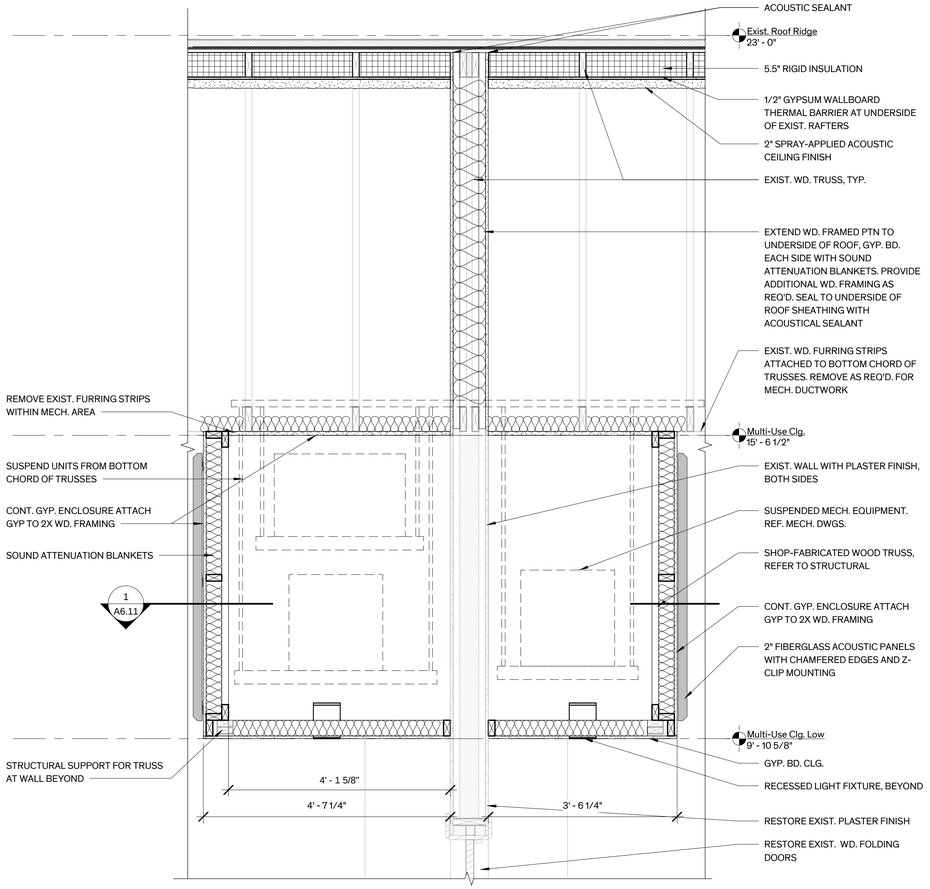
4 Furr Down Interior Elevation
1/2" = 1'-0"



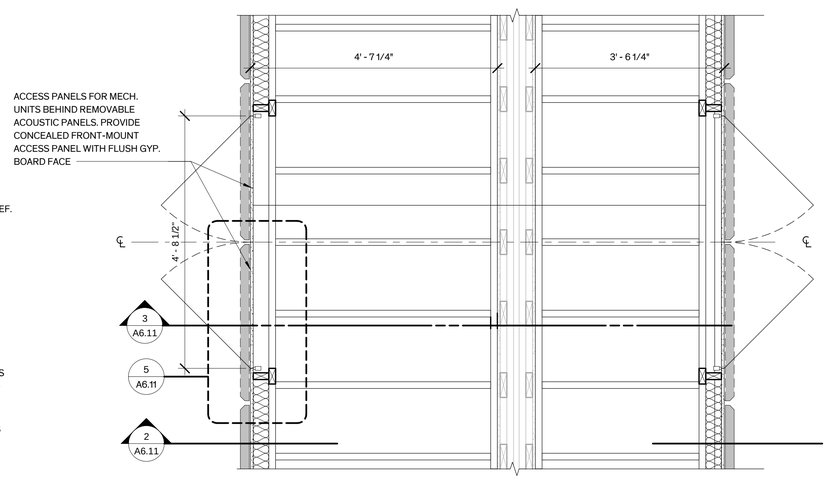
3 Access Panel Head/Sill Section
3" = 1'-0"



5 Furr Down Access Panel Jamb
3" = 1'-0"



2 Mech Furr Down Section
3/4" = 1'-0"



1 Mech Furr Down Plan Det.
3/4" = 1'-0"

PLAN NORTH

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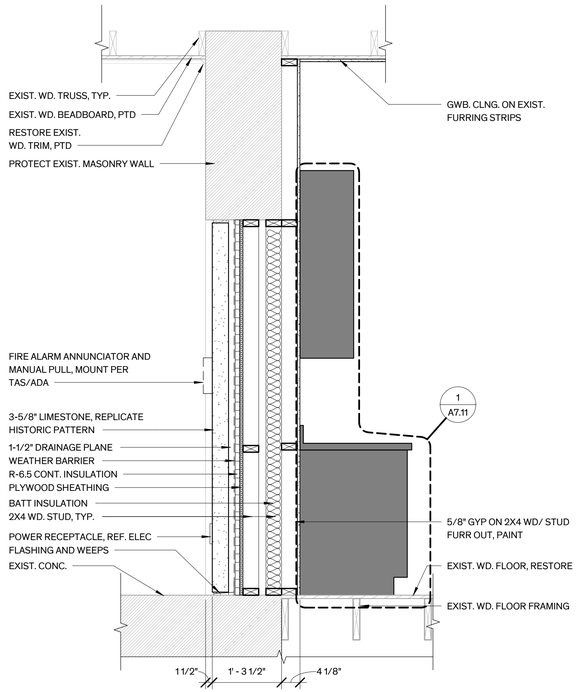
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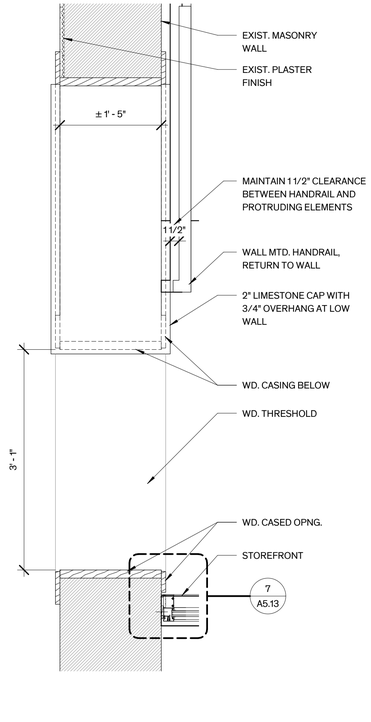
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Sheet Name
Details

Sheet Number
A6.11

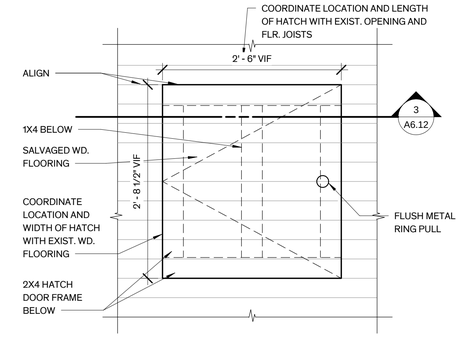


8 Masonry Infill @ Entry
3/4" = 1'-0"



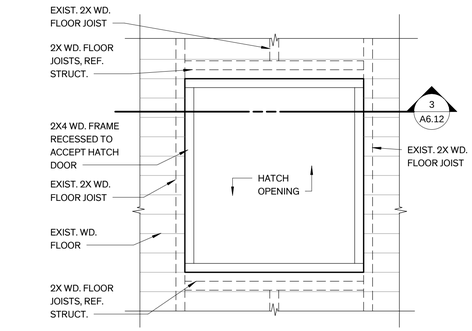
7 Addition Plan Det. Connection to Exist.
1" = 1'-0"

PLAN NORTH



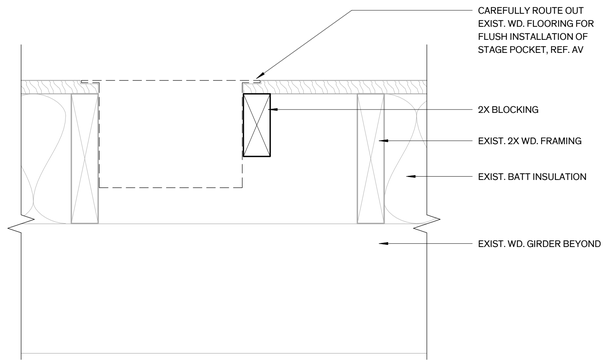
6 Crawlspace Hatch Plan Detail
1" = 1'-0"

PLAN NORTH

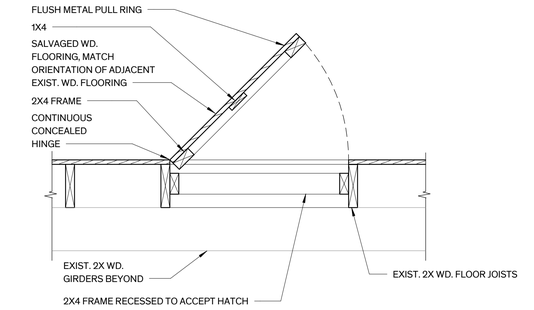


4 Crawlspace Opening Plan Detail
1" = 1'-0"

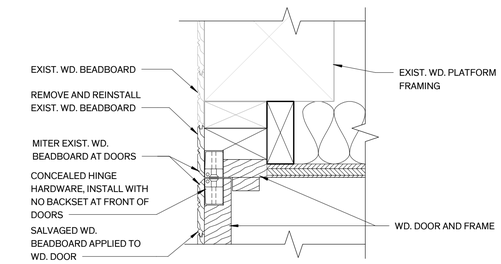
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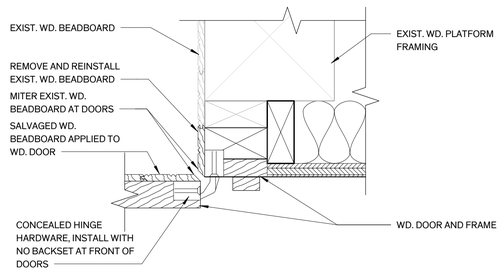
5 Stage Pocket Detail Section
3" = 1'-0"



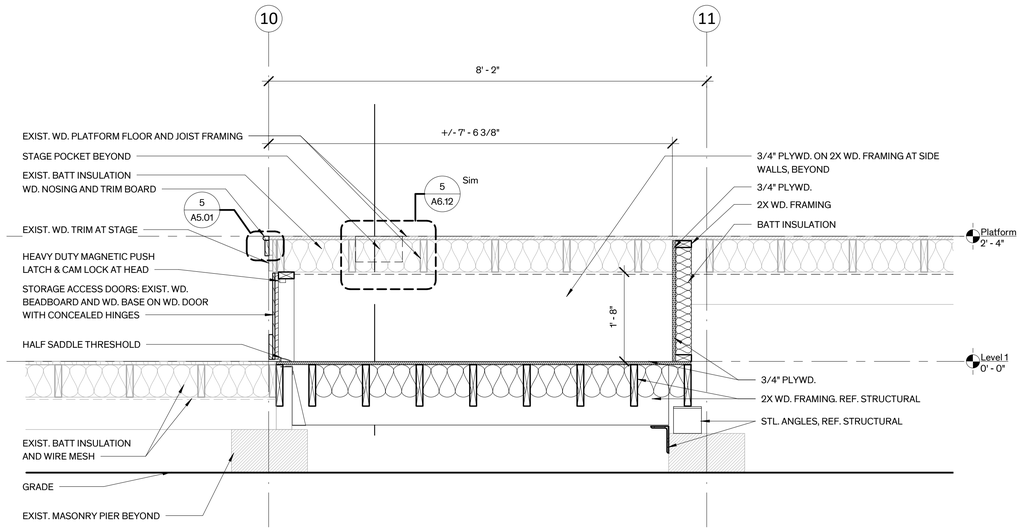
3 Crawlspace Hatch Section Detail
1" = 1'-0"



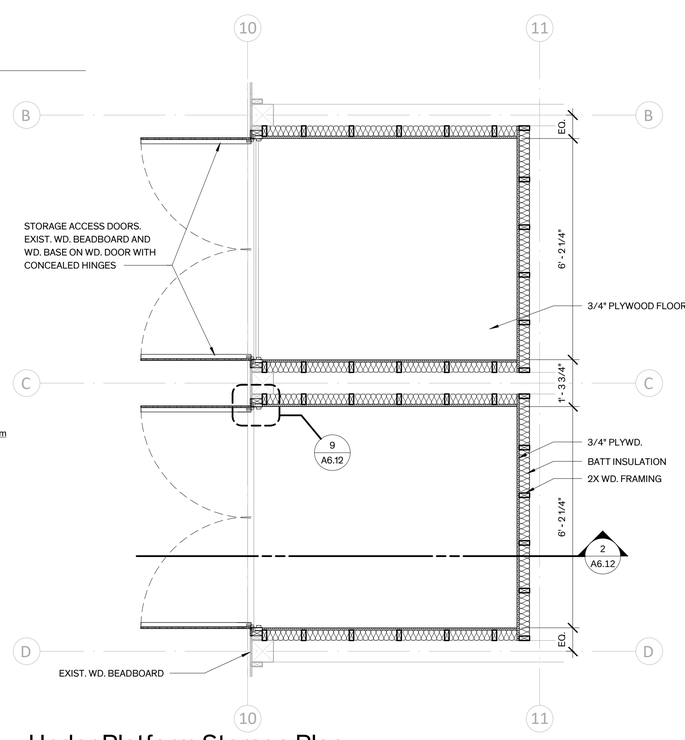
10 Under Platform Door Jamb Closed
3" = 1'-0"



9 Under Platform Door Jamb
3" = 1'-0"



2 Under-Platform Storage Detail
3/4" = 1'-0"



1 Under Platform Storage Plan Detail
1/2" = 1'-0"

PLAN NORTH

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Item 2.

City of Dripping Springs
STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION

311 Old Fitzhugh Rd.
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78620

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REGISTERED ARCHITECT ALEXIS M. MCKINNEY 22892 STATE OF TEXAS

#22892 1/17/25

Architexas No. 2314
Date January 17, 2025

Sheet Name
Details

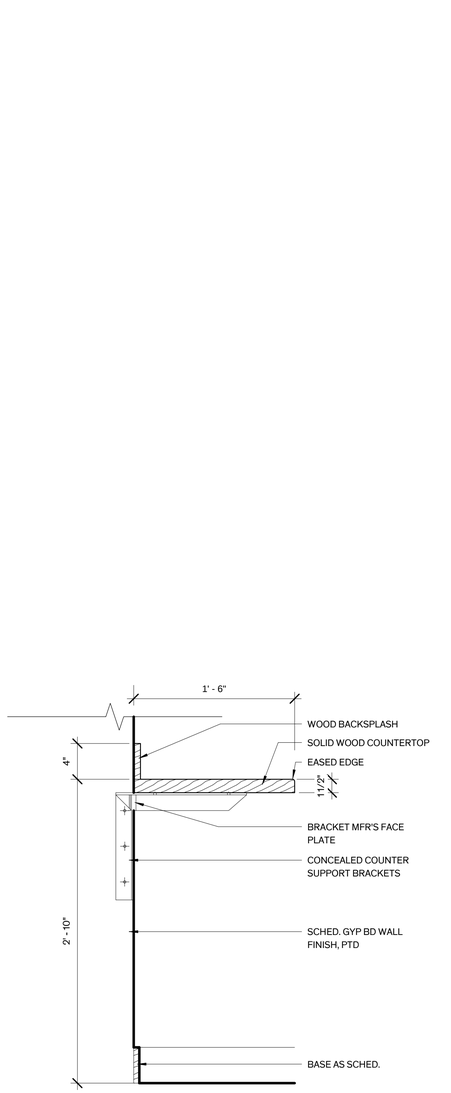
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A6.12

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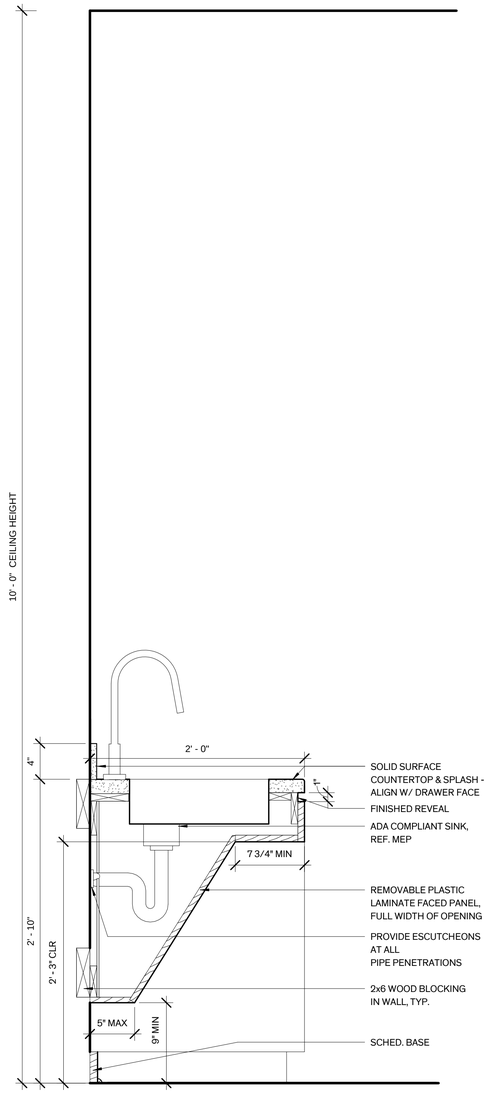
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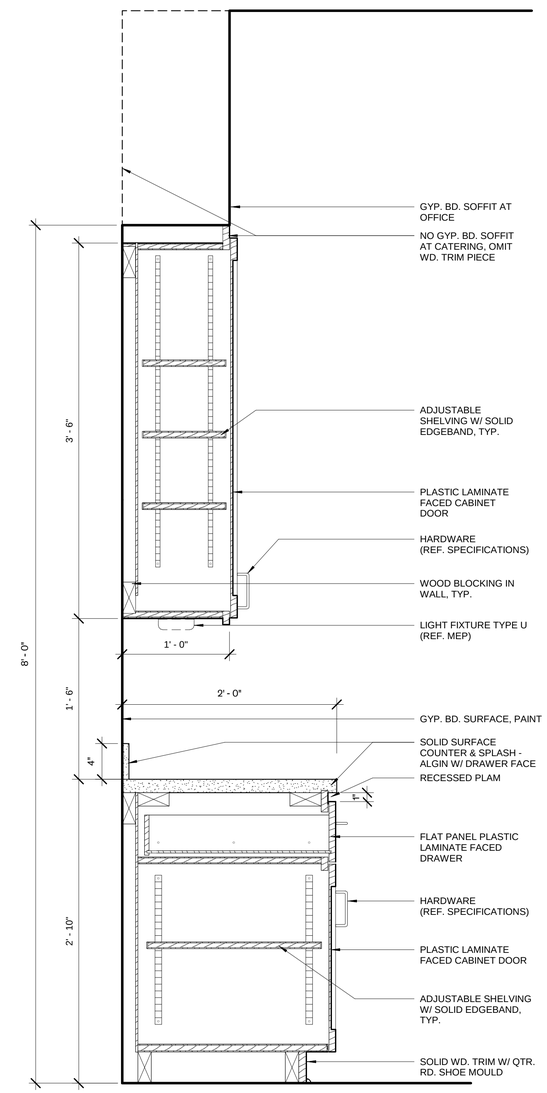
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3 Dressing Room Counter
1 1/2" = 1'-0"



2 Sink Detail
1 1/2" = 1'-0"



1 Cabinet Detail
1 1/2" = 1'-0"

City of Dripping Springs
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REVISION HISTORY

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#22892 1/17/25

Architexas No. 2314

Date January 17, 2025

Sheet Name
Millwork Details

Sheet Number
A7.1

COORDINATION

1. Only large openings in structural framing members are shown on the structural drawings. However, all sleeves, embeds, inserts, openings and frames that are necessary for the work shall be provided. The Contractor shall coordinate with all trades sizes, locations and placement. All openings and embedded items which have an effect on the structure shall be submitted to the Engineer for review.

2. Refer to Architectural, Mechanical, Electrical and Plumbing drawings for floor elevations, location of depressed or elevated floor areas, slopes and drains.

3. Contractor shall coordinate the requirements for building equipment supported on or from the structure. Submittals identify all equipment including size, dimensions, clearances, accessibility, weights and reactions. Any deviations from specified equipment shall be noted on the submittals.

4. Shop drawings shall be prepared for all structural items and submitted for review by the Engineer. Contract Drawings shall not be reproduced and used as shop drawings. All items deviating from the Contract Drawings or from previously submitted shop drawings shall be noted.

5. The details designated as "Typical Details" apply generally to the Drawings in all areas where conditions are similar to those described in the detail

6. All dimensions and conditions of existing construction shall be verified at the job site. Differences between existing construction and the Drawings shall be referred to the Architect. Differences shall also be clouded on the shop drawings.

7. The design and provision of all temporary supports required for the execution of the contract such as guys, braces, shores, reshores, falsework, supports and anchors are not included in these drawings and shall be the responsibility of the Contractor. Temporary supports shall not result in the overstress or damage to the structure.

SUBSTITUTIONS

1. All requests for substitutions of materials or details shown in the contract documents shall be submitted for approval during the bidding period. Once bids are accepted, proposed substitutions will be considered only when they are officially submitted with an identified savings to be deducted from the contract.

CODES

1. IBC 2018 International Building Code and IEBC 2018 International Existing Building Code.

2. Wind and Earthquake Loads: Minimum Design Loads and Associated Criteria for Buildings and Other Structures, American Society of Civil Engineers, ASCE 7-16.

3. Structural Concrete: Building Code Requirements for Reinforced Concrete, American Concrete Institute, ACI 318-14.

4. Structural Masonry: Building Code Requirements for Masonry Structures, reported by the Masonry Standards Joint Committee, TMS 402-16.

5. Structural Steel: Steel Construction Manual, American Institute of Steel Construction, Fourteenth Edition. Specification for Structural Steel Buildings, AISC 360-16.

6. Wood Framing: National Design Specification (NDS) For Wood Construction with 2015 Supplement, American Forest and Paper Association, ANSI/AWC NDS-2018, and Special Design Provisions for Wind and Seismic, ANSI/AWC SDPWS-15.

7. Wood Structural Panels: Panel Design Specification, American Plywood Association, APA PDS-12, Plywood Design Specification Supplements 1-5, and DOC PS 1 or PS 2.

8. Prefabricated Composite Wood Products: Products shall be proven by testing as demonstrated either by ICBO and NRB acceptance or through a test program meeting requirements of ASTM D 5055 for wood I-joists and ASTM D 5456 for Structural Composite Lumber (SCL).

9. Prefabricated Metal-plate-connected Wood Trusses: National Design Standard for Metal-plate-connected Wood Truss Construction, TPI 1-2014.

BUILDING MOVEMENTS

1. The building movements specified herein are anticipated to occur and shall be taken into account by the Contractor in the design, detailing, and installation of the building elements.

2. Spandrel beam deflections: Provisions shall be made in the building cladding for relative floor to floor vertical deflections of L/360 under live loading.

3. Lateral building drift: Provisions shall be made in building cladding and other architectural finishes for relative floor to floor lateral deflections of story height/400.

DEFERRED SUBMITTALS

1. The following Deferred Submittal items are required:
   a. Curtain wall systems and storefront systems
   b. Wood Trusses and I-joists

SUBMITTALS

1. Shop drawings shall be prepared for all structural items and submitted for review by the Engineer. Contract Drawings shall not be reproduced and used as shop drawings. All items deviating from the Contract Drawings or from previously submitted shop drawings shall be clouded.

2. The contractor shall review shop drawings for compliance with the contract documents and shall certify that he has done so by a stamp noting that the drawings have been "Approved" and which bears the signature (or initials) of an authorized representative of the contractor and the date. Submittals which do not reflect the contractor's approval, signature and date will be returned without review.

3. The contractor shall be responsible for delays caused by rejection of inadequate shop drawings.

4. Where review and return of shop drawings is required or requested, the engineer will review each submittal and, where possible, return within 2 weeks of receipt.

5. Corrections or comments on shop drawings or manufacturer's data sheets do not relieve the contractor from compliance with requirements of the plans and specifications. The engineer's review is for general conformance with the requirements of the contract documents. The contractor is responsible for confirming and correcting all quantities and dimensions, selecting fabrication processes and techniques of construction, and coordinating his work with that of all other contractors.

6. Refer to individual sections for specific submittal requirements.

DESIGN LOADS

1. Live Loads

a.	Office (not including partitions)	50 psf
b.	Public areas, corridors, lobbies	100 psf
c.	Mechanical Rooms	150 psf
d.	Storage (minimum)	125 psf
e.	Roof	20 psf
f.	Restrooms	50 psf
g.	Assembly areas and theaters	
	Auditoriums	100 psf
	Stages	100 psf
h.	Partition at areas with 80 psf live load or less	20psf
i.	Awnings	5 psf

2. Dead Loads include the self weight of the structural elements and the following superimposed loads:

a.	Ceiling and Mechanical at roof	10 psf
b.	Roofing and rigid insulation	15 psf

3. Roof Snow Loads

a.	Ground Snow Load, P_g	5 psf

4. Earthquake Loads

a. Seismic Lateral Load on Structural Frame is based on the following:

i)	Seismic Importance Factor, I	1.0
ii)	Risk Category	II
iii)	Mapped Spectral Response Accelerations	
	S_S	0.051
	S_1	0.029
iv)	Site Class	B
v)	Spectral Response Coefficients	
	S_{DS}	0.03
	S_{D1}	0.015
vi)	Seismic Design Category	A
vii)	Basic Seismic-Force-Resisting System: sheathed with wood strucutral panels rated for shear resistance	Light-frame (wood) walls
viii)	Design Base Shear	9.9 kips
ix)	Seismic Response Coefficient, C_S	0.00461
x)	Response Modification Factor, R	6.5
xi)	Analysis Procedure	Equivalent Lateral Force Procedure

5. Wind Loads

1. Wind Lateral Load on Structural Frame is based on the following:

i)	*Ultimate* Design Wind Speed (3-sec. gust), V_{ult}	115 mph
	Nominal Design Wind Speed, V_{asd}	89 mph
ii)	Risk Category	II
iii)	Wind Exposure Category	C
iv)	Internal Pressure Coefficient, GC_{pi}	±0.18
v)	Component & Cladding *Ultimate* Design Pressures:	

Effective Area:	≤ 10 ft²	(Overhangs)
Zone 1	+18.8 psf; -44.1 psf	-57.2 psf
Zone 2e	+18.8 psf; -44.1 psf	-57.2 psf
Zone 2n	+18.8 psf; -70.3 psf	-83.5 psf
Zone 2r	+18.8 psf; -70.3 psf	-83.5 psf
Zone 3e	+18.8 psf; -70.3 psf	-99.2 psf
Zone 3r	+18.8 psf; -82.1 psf	-108.2 psf
Zone 4	+31.0 psf; -33.6 psf	
Zone 5	+31.0 psf; -41.5 psf	

Effective Area:	50 ft²	(Overhangs)
Zone 1	+16 psf; -37.9 psf	-55.5 psf
Zone 2e	+16 psf; -37.9 psf	-55.5 psf
Zone 2n	+16 psf; -50.1 psf	-71 psf
Zone 2r	+16 psf; -50.1 psf	-71 psf
Zone 3e	+16 psf; -50.1 psf	-69.6 psf
Zone 3r	+16 psf; -52 psf	-73.2 psf
Zone 4	+27.7 psf; -30.4 psf	
Zone 5	+27.7 psf; -35.0 psf	

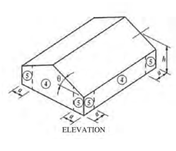
Effective Area:	>100 ft²	(Overhangs)
Zone 1	+16 psf; -33.1 psf	-54.3 psf
Zone 2e	+16 psf; -33.1 psf	-54.3 psf
Zone 2n	+16 psf; -41.2 psf	-65.5 psf
Zone 2r	+16 psf; -41.2 psf	-65.5 psf
Zone 3e	+16 psf; -41.2 psf	-56.6 psf
Zone 3r	+16 psf; -52 psf	-57.9 psf
Zone 4	+26.3 psf; -28.9 psf	
Zone 5	+26.3 psf; -32.2 psf	

NOTE: Wall pressures for Zones 4 & 5 are based on ASCE 7-16, Figure 30.3-1.
Roof pressures for Zones 1, 2e, 2n, 2r, 3e & 3r are based on ASCE 7-16, Figure 30.3-2C. "h" = 21.52 feet; "a" = 4.5 feet

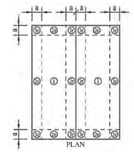
a. Calculate the effective area for each component & cladding element, as defined by ASCE 7, depending on length and location. Effective area shall be the maximum of the following:

Effective Area = Length x Tributary Width (OR) Length x (Length/3)

b. Interpolation of uplift pressures is allowed between effective areas.
or quantity shall be reported to the Architect immediately for verification of the structural design.



Wall Zones
ASCE 7-16 Fig. 30.3-1



Roof Zones
ASCE 7-16 Fig. 30.3-2C

9. Floor and roof live loads noted above have been reduced in accordance with the building code.

CONCRETE FOOTINGS

1. Concrete footing design is based on an allowable net bearing capacity of 3500 psf in accordance with the geotechnical report by Geotechnical Solutions dated July 24, 2023

2. Bearing stratum shown on the footing details is clayey-silt with gravel stone fragments and cobbles.

3. Footings not specifically located on the plan shall be located on centerline of pilaster or column above. Where no pilaster or column occurs, locate on centerline of wall or beam.

4. Provide dowels from footings into concrete above using same bar size and number as shown for pilaster or column above. Where no pilaster or column occurs, use 4-#7 dowels. Extend dowels 30 bar diameters into pier and wall, beam, pilaster or column u.n.o.

5. Footing excavations shall be to neat lines and shall be free of loose or wet materials.

6. Footing reinforcing and concrete shall be placed immediately after excavations are complete; in no case shall a footing be excavated that cannot be placed by the end of the workday.

7. See plans and schedules for footing sizes, reinforcing and depths.

8. Reinforcing steel shop drawings shall include placing drawings for templates to set dowels in footings.

9. All footings shall be inspected by a representative of a qualified geotechnical laboratory in order to ensure that the proposed bearing material has been reached in accordance with the recommendations given in the geotechnical report and that the footing has been constructed to specified size, with detailed reinforcing, and to specified tolerances.

TESTING LABORATORY SERVICES

1. Work specified herein shall be performed by a qualified independent Testing Laboratory, selected and paid by the Owner.

2. Filling and Backfilling operation:

   a. Make in place compaction tests for moisture content, moisture density relationship, and density of materials in place. Perform test once for each lift.

3. Footing excavation: Inspect the excavations to determine that the proper bearing stratum is obtained and utilized for bearing and that excavations are properly clean and dry before concrete is placed.

4. Concrete inspection and testing:

   a. Secure composite samples of concrete at the jobsite in accordance with ASTM C172.

   b. Mold and cure three specimens from each sample in accordance with ASTM C31. Test specimens in accordance with ASTM C39. Two specimens shall be tested at 28 days for acceptance and one shall be tested at seven days for information.

   c. Perform one strength test (three cylinders) for each pour.

   d. Make one slump test for each set of cylinders following the procedural requirements of ASTM C143 and C172.

5. Concrete Reinforcement: Inspect all concrete reinforcing steel and embedded metal assemblies prior to placement of concrete for compliance with Contract Documents and shop drawings. All instances of non-compliance shall be immediately brought to the attention of the contractor for correction, and if uncorrected, reported to the engineer.

6. Expansion Anchors: Provide continuous inspection of expansion bolt installation to ensure that holes are of the specified size, and that bolts are properly installed including application of minimum installation torques.

7. Structural steel, steel joists, and joist girders: Field inspection of proper erection of all members, visual examination of all field welding, visual inspection of all bolts, inspection of all shop fabricated members upon arrival at the jobsite for conformance with accepted fabrication and erection drawings, verification of welder's certificates.

BUILDING PAD PREPARATION

1. Structural fill material shall have a plasticity index between 7 and 22.

2. Prior to placing fill material, remove all organic and other deleterious material from the existing subgrade for a distance of 3'-0" beyond building line. Existing site soil shall be removed to a depth on 15" below the existing grade and replaced with Select Fill. All exposed surfaces shall then be scarified to a depth of 6", watered as required and recompacted as defined by ASTM D 698 (Standard Proctor Test).

3. Structural fill shall be placed in 9 inch loose lifts, watered as required and compacted as defined in ASTM D 698.

4. Compaction and moisture content of subgrade and each lift of structural fill shall be inspected and approved by a qualified engineering technician, supervised by a Geotechnical Engineer.

5. Slab on grade shall be placed over min. 15" structural fill.

6. Provide a 15 mil polyolefin vapor barrier. Place vapor barrier in accordance with manufacturer's recommendation on top of structural fill.

7. Building pad preparation information is based on a geotechnical report provided by Geotechnical Solutions dated July 24, 2023.

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City of Dripping Springs
STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION

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REVISION HISTORY

ISSUED FOR PERMIT & CONSTRUCTION

aec A TYLin Company
FIRM REG.# F-1985
STATE OF TEXAS
KARINA TRIBBLE
109642
LICENSED
PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
GENERAL NOTES

Sheet Number
SI.01

CAST IN PLACE CONCRETE

1. Cast in place concrete shall meet the following requirements:

Class	28 Day Strength	Aggregate Type	Size	Slump (at point of placement)	Use
A	4000 psi	NW C33	1"	5"-7"	ALL NEW CONCRETE

2. Fly ash shall not be used in architecturally exposed concrete.
3. Provide 5 percent plus or minus 1 1/2 percent of entrained air in concrete permanently exposed to the weather and elsewhere at the contractors option.
4. Lightweight concrete shall have a maximum cured density of 120 pounds per cubic foot.
5. Horizontal construction joints in concrete pours shall be permitted only where indicated on the drawings. All vertical construction joints shall be made in the center of spans in accordance with the typical details. Contractor shall submit proposed locations for construction joints not shown on drawings for review by the Architect and Structural Engineer. Additional construction joints may require additional reinforcing as specified by the Engineer which shall be provided by the contractor at no additional cost to the owner.
6. Embedded conduits, pipes, and sleeves shall meet the requirements of ACI 318-14, Section 20.7 and 26.8, including the following:
   a. Conduits and pipes embedded within a slab, wall, or beam (other than those passing through) shall not be larger in outside dimension than 1/3 the overall thickness of the slab, wall or beam in which they are embedded.
   b. Conduits, pipes and sleeves shall not be spaced closer than three diameters or widths on center.
7. Concrete pours shall not exceed 5000 square feet or 100 linear feet on each side without prior approval by the Architect for each pour.
8. Submittal: Submit proposed mix designs in accordance with ACI 301, chapter 3.9. Each proposed mix design shall be accompanied by a record of past performance based on at least 30 consecutive strength tests, or by three laboratory trial mixtures with confirmation tests.

SLAB ON GRADE

1. Slab on grade shall be poured in strips not to exceed 30'-0".
2. Provide control joints or construction joints at the centerlines of all columns and at 15 feet on center maximum in both directions. Provide additional joints such that the resulting aspect ratio does not exceed 1:1.5
3. Tooled, sawcut, or preformed joints shall be 1/4 the depth of the slab. Sawcut joints must be made within 12 hours after the slab has been placed.
4. Metal keyway forms or bulkheads shall be removed prior to placement of adjacent pours.
5. Refer to "Building Pad Preparation" section for fill requirements.
6. Erection equipment that imposes any concentrated load in excess of 2,000 lbs acting over a 2'-6"x2'-6" area may not be used on the slab-on-grade. Equipment used that will exceed this loading shall be staged away from the building slab and means for doing so shall be included in base bids.

CONCRETE REINFORCING

1. Reinforcing steel shall be deformed new billet steel bars in accordance with ASTM A615 Grade 60.
2. Detailing of reinforcing steel shall conform to the American Concrete Institute Detailing Manual.
3. All hooks and bends in reinforcing bars shall conform to ACI detailing standards unless shown otherwise.
4. Provide reinforcing bars in accordance with the bar bending diagram if bar types are specified. In unscheduled beams, slabs, columns and walls detail reinforcing as follows:
   a. Lap top reinforcing bars at mid span.
   b. Lap bottom reinforcing bars at the supports.
   c. Lap vertical bars in columns and walls only at floor lines, unless noted otherwise.
   d. Refer to lap splice schedule for splice length requirement.
   e. Reinforcement labeled as continuous shall be lap spliced 38 bar diameters as a minimum, unless otherwise noted.
   f. Provide standard hooks in top bars at cantilever and discontinuous ends of beams, walls and slabs.
   g. Provide corner bars for all horizontal bars at the inside and outside faces of intersecting beams or walls. Corner bars are not required if top, bottom, or horizontal bars are hooked.
5. Welding of reinforcing steel will not be permitted.
6. Heat shall not be used in the fabrication or installation of reinforcement.
7. Reinforcing steel clear cover shall be as follows:

a.	Grade beams -	1 1/2" top, 3" bottom, 2" side (formed), 3" side (placed against earth)
b.	Drilled piers -	3" bottom, 3" sides
c.	Walls -	2"
d.	Columns -	1 1/2"
e.	Slabs above grade -	1"
f.	Beams above grade -	1 1/2"
g.	Concrete joists -	1"

8. Submittal: Submit shop drawings for fabrication, bending, and placement of concrete reinforcement. Comply with ACI 315 "Details and Detailing of Concrete Reinforcement". Do not reproduce the Contract Drawings for use as shop drawings.

CONCRETE JOINT SEALANT

1. Concrete joint sealant includes routing, sawcutting, surface preparation and application of waterproof concrete joint sealant. Sealant used where exposed to pedestrian or vehicle traffic shall be suited for traffic. Repair deteriorated concrete adjacent to crack or joint as required.
2. Joint sealing shall be performed by workers qualified to perform the work. As a minimum, the foreman shall have not less than two years experience with structural concrete repairs.
3. Joints shall be sealed with a waterproof concrete joint sealant product from one of the following manufactureres (or an equivalent product submitted to the engineer for approval):
   a. Sto
   b. Euclid
   c. Master Builders
   d. Dayton Superior
4. Existing concrete shall be prepared as recommended by the manufacturer including but not limited to the following:
   a. Remove any existing joint sealant from crack or joint
   b. Saw cut or route if necessary to clean joint,
   c. Repair damage concrete as required,
5. Apply joint sealant in accordance with the manufacturers directions.
6. Apply sealant within working time limits and temperatures identified by the manufacturer.

ADHESIVE DOWELS

1. Adhesive dowelling system shall be one of the following products: Hilti HIT-HY 200-R, or Hilti HIT-RE 500 V3 Install dowels in accordance with the manufacturer's instructions.
2. Clean out holes with compressed air after drilling holes.
3.

Rebar Size	Hole Diameter	Embedment Depth
#4	5/8"	4 1/2"
#5	3/4"	6"

4. Prior to drilling holes for dowels, locate existing reinforcing steel with a Pachometer (R-Meter) or by drilling 1/4" diameter pilot holes. Relocate bolt holes as required to avoid existing reinforcement.
5. Abandoned holes shall be completely filled with adhesive dowelling compound.

EXPANSION ANCHORS

1. Expansion anchors shall only be used where specified on the drawings. The contractor shall obtain approval from the engineer of record prior to using the anchors for missing or misplaced cast-in-place anchors.
2. Unless otherwise noted, size and depth of the expansion anchors specified in the drawings are based on the Hilti Fastening System products - Hilti Kwik Bolt 3 for general applications, and Kwik Bolt TZ for overhead applications.
3. Substitution of expansion anchor products with similar capacities shall be submitted to the engineer of record for approval.
4. Expansion anchors of the size and embedment shown on the Drawings shall be installed in accordance with the Contract Documents, the manufacturer's recommendations, and the manufacturer's current ICBO report for the anchor. If conflicts exist between these referenced documents, the most stringent requirements shall govern.
5. The Contractor shall locate all existing reinforcing steel and other embedded items contained in the concrete using non-destructive methods and shall position anchor locations to avoid conflicts with existing embedded items. Anchor locations can be adjusted by a maximum of 1 1/2" from detailed locations to avoid conflicts, unless noted otherwise.
6. Based on field verified locations of reinforcing steel and embedded items, the Contractor shall create templates for each anchor group. Submit template dimensions for review prior to fabrication of connection plates.
7. Holes for anchors shall be drilled in a continuous operation using the bit type and size recommended by the anchor manufacturer. Holes shall be drilled perpendicular to the concrete surface and shall not be enlarged or redirected at any point along its length. All debris shall be blown out of the holes with compressed air after drilling.
8. All abandoned holes shall be filled with non-shrink grout.
9. Holes in connection plates shall be no more than 1/16" larger than the anchor diameter. If larger holes are required for erection purposes, Contractor shall provide 1/4" x 3" x 3" plate washers sufficiently welded to the connection plate to transfer the specified load.
10. Installation of expansion anchors shall be continuously inspected by the testing agency to ensure that holes are of specified size, and that bolts are properly installed including application of minimum installation torques.

ADHESIVE ANCHORS

1. Adhesive anchors shall only be used where specified on the drawings. The contractor shall obtain approval from the engineer of record prior to using the anchors for missing or misplaced cast-in-place anchors.
2. Unless otherwise noted, size and depth of the adhesive anchors specified in the drawings are based on HAS rods epoxy doweled with HIT-HY 200-R or HIT-RE 500 V3, Hilti Fastening Systems.
3. Substitution of adhesive anchor products with similar capacities shall be submitted to the engineer of record for approval.
4. Adhesive anchors of the size and embedment shown on the Drawings shall be installed in accordance with the Contract Documents, the manufacturer's recommendations, and the manufacturer's current ICBO report for the anchor. If conflicts exist between these referenced documents, the most stringent requirements shall govern.
5. The Contractor shall locate all existing reinforcing steel and other embedded items contained in the concrete using non-destructive methods and shall position anchor locations to avoid conflicts with existing embedded items. Anchor locations can be adjusted by a maximum of 1 inch from detailed locations to avoid conflicts, unless noted otherwise.
6. Based on field verified locations of reinforcing steel and embedded items, the Contractor shall create templates for each anchor group. Submit template dimensions for review prior to fabrication of connection plates.
7. Holes for anchors shall be drilled in a continuous operation using the bit type and size recommended by the anchor manufacturer. Holes shall be drilled perpendicular to the concrete surface and shall not be enlarged or redirected at any point along its length. All debris shall be blown out of the holes with compressed air after drilling.
8. All abandoned holes shall be filled with non-shrink grout.
9. Holes in connection plates shall be no more than 1/16" larger than the anchor diameter. If larger holes are required for erection purposes, Contractor shall provide 1/4" x 3" x 3" plate washers sufficiently welded to the connection plate to transfer the specified load.
10. Installation of adhesive anchors shall be continuously inspected by the testing agency to ensure that holes are of specified size, and that bolts are properly installed.

STRUCTURAL STEEL

1. Structural Steel shall conform to ASTM A992 or A572, grade 50 except where A36 is noted on plan, except that miscellaneous plates, angles, and channels may be A572, grade 50 or A36. Steel pipe shall conform to ASTM Specification A 501 or ASTM A 53, Type E or S, Grade B. Steel tube shall conform to ASTM Specification A 500, Grade B, F_y 46 ksi or ASTM A1085.
2. Anchor rods shall conform to ASTM F1554 grade 36 ksi.
3. Column base plates shall be grouted with a non-shrink, high strength nonmetallic grout conforming to ASTM C827, and shall have a compressive strength at 28 days of 5000 psi. Pre-grouting of base plates will not be permitted.
4. Studs shall be Nelson studs type S3L (Fu=65 ksi) or acceptable equal. Studs shall be made from cold drawn steel conforming to ASTM A108.
5. Deformed bar anchors shall be Nelson D2L or KSM deformed bar anchors (or acceptable equal) and shall be made from cold drawn wire per STM A490 conforming to ASTM A108 with minimum yield strength of 70 Ksi. Anchors shall be automatically and welded with suitable welding equipment in the shop or in the field. Welding shall be in accordance with the recommendations of Nelson Stud Company or KSM Welding Company.
6. Structural steel detailing, fabrication, and erection shall conform to the AISC "Specification for Steel Buildings" and the AISC "Code of Standard Practice for Steel Buildings and Bridges". Typical connection details are indicated in the drawings. The fabricator shall prepare drawings based on these details. If alternate connection designs are used, the fabricator shall have a registered professional engineer prepare the connection designs. Such connection shall bear the engineer's seal and shall be submitted with shop drawings.
7. Splicing of structural steel members is prohibited without prior approval of the Engineer as to location and type of splice to be made. Any member having splice not shown and detailed on shop drawings will be rejected.
8. All welds denoted as moment connection or full penetration weld shall be ultrasonically or x-ray certified by an independent testing agency.
9. Contractor shall coordinate structural steel fireproofing requirements. All interior structural steel, including steel joists, scheduled or indicated to receive spray applied fireproofing shall be delivered to the project site unprimed. Steel exposed to corrosive conditions after installation shall be primed with a protective coating which does not diminish the bond between the spray applied fireproofing, and the steel substrate. Any primer, and/or coating applied to structural steel shall be approved for use in the applicable U.L. Fire Resistance Assembly used on the project. Contractor shall protect any unprimed structural steel from detrimental effects of corrosion, as required, until the steel is enclosed and protected by the new construction.
10. Shop painting: Paint structural steel with one coat of manufacturer's standard red oxide primer applied at a rate to provide a uniform dry film thickness of 2.5 mils.
11. Contractor must fabricate and erect steel in accordance with OSHA Safety requirements, 29 CF part 1926 Safety for Steel Erection, Final Rule.
12. Submittal: Provide drawings showing details for fabrication and shop assembly of members, erection plans, and details. Include details of connections, camber, weld profiles and sizes and spacing. Shop and erection drawings shall not be made using reproductions of the contract drawings.

TIMBER FRAMING

1. Unless otherwise noted, all structural framing lumber shall be clearly marked No. 2 Southern Yellow Pine or Douglas Fir-Larch, except that non-loadbearing interior walls may be stud grade Southern Yellow Pine, Douglas Fir-Larch, or Spruce-Pine-Fir.
2. Studs shall be 2x6's at 16" on center, typical, unless noted otherwise.
4. All wood stud walls shall be full height without intermediate plate line unless detailed otherwise.
5. All load bearing walls shall have solid 2x blocking at 4'-0" o.c. maximum vertically. End nail with 2-16d nails or side toe nail with 2-16d nails.
6. Provide double studs at all wall corners and on each side of all openings, unless noted or detailed otherwise.
7. Floor sheathing: 3/4" APA rated tongue and groove sheathing with an Exposure 1 rating ((or)) 3/4" grade C-D tongue and groove plywood with exterior glue. Floor sheathing shall be glued to the wood support members with a wet use adhesive, in addition to being nailed to the supports with 10d ring shank nails at 6" on center at supported edges and 12" on center at intermediate supports. Stagger joints in sheathing.
8. Roof sheathing: 1/2" APA rated sheathing with an exposure 1 rating ((or)) 1/2" grade C-D plywood with exterior glue. Panels shall be continuous over two or more spans with the long dimension oriented perpendicular to the framing members. Nail with 8d common nails at 6" on center at supported edges and 12" on center at intermediate supports. Stagger joints in sheathing.
9. All corners of wall framing shall be braced by a 4'-0" wide x 1/2" panel of APA rated sheathing with an exposure 1 rating extending from the top plate to the sill plate. Where wall is taller than 8'-0", provide multiple panels as required to extend from sill plate to top plate. Provide 2x blocking as required to support all panel edges. Nail with 8d common nails at 6" on center at supported edges and 12" on center at intermediate supports.
10. Solid 2x blocking or bandboard shall be provided at supports and cantilever ends of all wood joists, and between supports in rows not exceeding 8'-0" apart.
11. All framing members framing into the side of a header shall be attached using metal joist hangers of type "LU" as manufactured by the Simpson Company or equal. The hanger shall be sized and installed in accordance with the manufacturers recommendations for the size of joist supported.
12. Nailing and attachment of all framing members and sheathing shall be as specified in the Uniform Building Code Nailing Schedule (table 25Q) unless noted otherwise in the drawings. Common wire nails or spikes, or galvanized box nails shall be used for all framing unless noted otherwise.
13. Place a single plate at the bottom and a double plate at the top of all stud walls. Exterior sill plates shall be bolted to the foundation with 1/2" anchor bolts with a minimum embedment of 8" spaced at 4'-0" on center. Provide a minimum of two bolts per plate segment. Sill plates in contact with concrete or masonry shall be pressure treated with a preservative.
14. As an alternate, plates may be attached to concrete foundation elements with power actuated fasteners. Provide washers at least 0.08 inches thick, and 1.1 inches square or 1.425 inches in diameter at each fastener. Fasteners shall be 3" long and shall have a minimum shank diameter of 0.145 inches. Provide two fasteners located 6 and 10 inches from the end of each sill plate piece, and then at a maximum spacing of 18 inches on center maximum at exterior walls and at interior party walls. At interior non-load bearing partitions, fasteners may be spaced at 36" on center, maximum. Fasteners shall be Hilti X-DNI 72P8S36 pins or equal. Submit manufacturer's information on fastener to be used prior to start of construction.
15. Provide double joists under all interior partition walls oriented parallel to the joists.
16. All bolts and lag screws shall have standard washers. All anchor and expansion bolts used in wood to concrete connections in crawlspace areas shall be hot dip galvanized or stainless steel.
17. Refer to the architectural drawings for additional wood framing members. Provide additional wood framing members shown on the architectural drawings even though they may not be shown on the structural drawings.

COMPOSITE WOOD MEMBERS

1. Where noted on the drawings, joists shall be TJI series engineered wood joists, and beams shall be "Microllam LVL (E=1,900ksi)" or "Parallam PSL (E=2000ksi)" beams as indicated on plan and manufactured by the Trus Joist Weyerhaeuser Corporation.
2. Do not notch joists or beams. Drill holes through webs of engineered wood members for mechanical, electrical or plumbing services in accordance with the recommendations of the engineered wood product manufacturer.
3. Multiple wood beams up to three members thick shall be nailed together with three rows of 16d nails at 12" on center. Four or more multiple wood beams and any multiple wood beams utilizing beams thicker than 1 3/4" shall be bolted together with 1/2" diameter bolts top and bottom at supports and ends of the beam, then at 24" on center, staggered top and bottom for the full length of the beam.
4. Where multiples of two 1 3/4' Microllam LVL beams are noted on the drawings, contractor may provide single 3 1/2" beams in lieu of double 1 3/4" beams.
5. Provide web stiffeners where required by the manufacturer for the specified support condition.
6. Connectors for double 1 3/4" beams or single 3 1/2" beams shall be Simpson "HHUS410" face mounted hangers, typical, u.n.o

PREFABRICATED METAL PLATE CONNECTED WOOD TRUSSES

1. Trusses shall be designed by the Contractor in accordance with the Truss Plate Institute "National Design Standard for Metal Plate Connected Wood Truss Construction" (ANSI/TPI 1-02).
2. Truss members shall be clamped in a mechanical or hydraulic jig with sufficient pressure to bring members into reasonable contact at all joints during application of connector plates.
3. Provide adequate erection bracing in accordance with Truss Plate Institute publication HIB-91.
4. Truss Manufacturer shall provide permanent bracing as required by the design of the trusses. Erection bracing may remain in place as permanent bracing where it does not interfere with the architectural finishes.
5. All timber truss members shall be Southern Yellow Pine with a maximum moisture content of 19%. Chord members shall be No. 2 or better and web members shall be No. 3 or better.
6. Connection plates shall be manufactured by a WTCA member plate manufacturer. Plates shall be 20 gauge minimum, ASTM A653 grade 33 steel, with a G60 galvanized coating.
7. Trusses shall be designed in accordance with the following requirements:
   a. Top chords shall be designed to resist the local bending induced by the floor or roof uniform load on the top chord.
   b. Limit live load deflection of floor trusses to L/360. Total load deflections shall be limited to L/240.
   c. Truss members and connections shall be proportioned with a maximum Load Duration Factor as follows:

Dead Load	0.9
Occupancy Live Load	1.0
Snow Load	1.15
Construction Load	1.25
Wind/Seismic Load	1.6

   d. Trusses shall be designed for the superimposed dead and live loads as noted in the Structural Notes and as indicated on the drawings. Dead loads shall not be less than the following:

Roof	10 psf

   e. Trusses shall be designed for the superimposed wind loads in accordance with the specified building code and the specified basic wind speed, exposure, and importance factor. Increase member sizes or provide additional bridging as required to resist uplift forces.
8. Connect roof trusses to bearing wall or beam support at each end with a type H3 framing tie as manufactured by the Simpson Company or approved equal, u.o.n.
9. Refer to mechanical drawings for size and location of mechanical openings.
10. Submittal: Provide shop drawings and calculations prepared and signed by a professional engineer licensed in the state of Texas. Submittal package shall include each individual truss design drawing with design loads, the truss placement diagram for the project, the truss member permanent bracing specification. Refer to IBC section 2303.4.1 for additional requirements.

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STATE OF TEXAS
KARINA TRIBBLE
109642
LICENSED
PROFESSIONAL ENGINEER

01/17/2025

Architexas No.
2314

Date
January 17, 2025

Sheet Name
GENERAL NOTES

Sheet Number
SI.01

SPECIAL INSPECTIONS

1. Special Inspections shall be performed in accordance with Chapter 17 of the 2018 International Building Code (IBC) by a Special Inspector hired by the Owner to perform the Special Inspections listed below. The Special Inspector shall be qualified by an approved agency according to the City's building official to perform the special inspections for which they will be undertaking. The Contractor shall coordinate with and notify the Special Inspector of all required tests and inspections listed in the following tables. The Special Inspector shall be responsible to verify that the items detailed in the Construction Documents were built accordingly and shall prepare, sign, and furnish inspection reports to the building official and the Architect for all time spent at the site. The Inspector shall bring discrepancies to the immediate attention of the General Contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and to the Architect prior to the completion of that phase of the work. These special inspections are in addition to the other inspections listed in these Structural Notes or Project Specifications.

2. Where structural members and assemblies are shop fabricated, the Special Inspector shall verify that the fabricator maintains detailed fabrication and quality control procedures that provide a basis for inspection control of the workmanship and the fabricator's ability to conform to the Construction Documents and Referenced Standards, unless the fabricator is registered and approved to perform such work without special inspection.

IBC18.SI.00

REQUIRED SPECIAL INSPECTIONS OF CONCRETE CONSTRUCTION (IBC Table 1705.3)				
SPECIAL INSPECTION TYPE	INSPECTION FREQUENCY		REFERENCED STANDARD [a]	IBC REFERENCE
	CONTINUOUS	PERIODIC		
1. Inspect reinforcement, including prestressing tendons, and verify placement	--	X	ACI 318: Ch. 20, 25.2, 25.3, 26.6.1-26.6.3	1908.4
2. Reinforcing bar welding:			AWS D1.4 ACI 318: 26.6.4	--
a. Verify weldability of reinforcing bars other than ASTM A706	--	X		
b. Inspect single-pass fillet welds, maximum 5/16"	--	X		
c. Inspect all other welds	X	--		
3. Inspect anchors cast in concrete	--	X	ACI 318: 17.8.2	--
4. Inspect anchors post-installed in hardened concrete members [b]				
a. Adhesive anchors installed in horizontally or upwardly inclined orientations to resist sustained tension loads	X	X	ACI 318: 17.8.2.4	--
b. Mechanical anchors and adhesive anchors not defined in 4.a	X	X	ACI 318: 17.8.2	--
5. Verifying use of required design mix	--	X	ACI 318: Ch. 19, 26.4.3, 26.4.4	1904.1, 1904.2, 1908.2, 1908.3
6. Prior to concrete placement, fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete	X	--	ASTM C172 ASTM C31 ACI 318: 26.5, 26.12	1908.10
7. Inspect concrete and shotcrete placement for proper application techniques	X	--	ACI 318: 26.5	1908.6, 1908.7, 1908.8
8. Verify maintenance of specified curing temperature and techniques	--	X	ACI 318: 26.5.3-26.5.5	1908.9
12. Inspect formwork for shape, location and dimensions of the concrete members being formed	--	X	ACI 318: 26.11.1.2(b)	--

[a] Where applicable, see Section 1705.12, Special Inspections for seismic resistance.

[b] Specific requirements for special inspection shall be included in the research report for the anchor issued by an approved source in accordance with 17.8.2 in ACI 318, or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to the commencement of the work.

IBC18.SI.05-Concrete

REQUIRED SPECIAL INSPECTIONS OF WOOD (IBC 1705.5)		
SPECIAL INSPECTION TYPE	INSPECTION FREQUENCY	
	CONTINUOUS	PERIODIC
1. Fabrication process of prefabricated wood structural elements and assemblies shall be in accordance with IBC 1704.2.5 and local amendments	--	X
2. Inspect wood structural panel sheathing construction for the following:		
a. Grade and thickness shown on approved construction documents	--	X
b. Nominal size of framing members at adjoining panel edges, per approved construction documents	--	X
c. Nail or staple diameter and length, per approved construction documents	--	X
d. Number of fastener lines and the spacing between fasteners in each line and at edge margins, per approved construction documents	--	X

IBC18-21.SI.09-Wood

REQUIRED SPECIAL INSPECTIONS OF SOILS (IBC Table 1705.6)		
SPECIAL INSPECTION TYPE	INSPECTION FREQUENCY	
	CONTINUOUS	PERIODIC
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity	--	X
2. Verify excavations are extended to proper depth and have reached proper material	--	X
3. Perform classification and testing of compacted fill materials	--	X
4. During fill placement, verify use of proper materials and procedures in accordance with the provisions of the approved geotechnical report. Verify densities and lift thicknesses during placement and compaction of compacted fill	X	--
5. Prior to placement of compacted fill, inspect subgrade and verify that site has been prepared properly	--	X

IBC18-21.SI.10-Soils

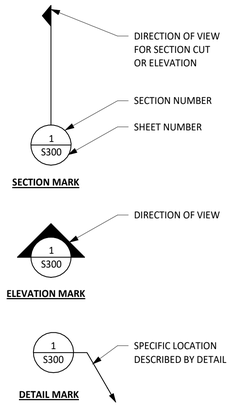
STRUCTURAL ABBREVIATIONS

ADDITIONAL	ADD'L.	MANUFACTURE(R)	MFR.
ADJACENT	ADJ.	MASONRY	MAS.
AGGREGATE	AGGR.	MATERIAL	MAT'L
ALTERNATE	ALT.	MECHANICAL	MECH'(L).
ANCHOR ROD	A.R.	METAL	MTL.
ARCHITECT(URAL)	ARCH'(L).	MEZZANINE	MEZZ.
AIR CONDITIONER	A/C	MIDDLE	MID.
AIR HANDLING UNIT	AHU	MISCELLANEOUS	MISC.
APPROXIMATE(LY)	APPROX.	MOMENT	M.
AXIAL LOAD	P	MOMENT CONNECTION(S)	M.C.
BACK FACE	B.F.	NEAR FACE	N.F.
BEAM	BM.	NOMINAL	NOM.
BEARING	BRG.	NON-SHRINK	N.S.
BETWEEN	BTWN.	NORMAL WEIGHT	N.W.
BLOCKING	BLKG.	NOT IN CONTRACT	N.I.C.
BLOCK-OUT	B.O.	NOT TO SCALE	N.T.S.
BOTTOM	BOT.		
BOTTOM OF	B.O.	ON CENTER	O.C.
BOTTOM OF STEEL	B.O.S.	OPENING(S)	OPNG(S).
BRICK LEDGE	BR. L.	OPPOSITE	OPP.
BRIDGING	BRDG.	OPPOSITE HAND	O.H.
BUILDING	BLDG.	ORIENTED STRAND BOARD	OSB
BUILDING LINE	B.L.	OUTSIDE FACE	O.F.
		OUTSIDE DIAMETER	O.D.
CAST-IN-PLACE	C.I.P.		
CENTER LINE	C.L. OR ℄	PARALLEL	PAR.
CENTER LINE OF STEEL	C.L.S.	PARALLEL STRAND LUMBER	PSL
CENTER OF GRAVITY	C.G.	PARTIAL JOINT PENETRATION	P.J.P.
CLEAR(ANCE)	CLR.	PENETRATION	PEN.
COLUMN	COL.	PERPENDICULAR	PERP.
COMPLETE JOINT PENETRATION	C.J.P.	PIECE	PC.
COMPRESSION	C OR COMP.	PLATE	PL. OR ℗
CONCRETE	CONC.	PLYWOOD	PLYWD.
CONCRETE MASONRY UNIT	CMU	POINT	PT.
CONNECTIONS	CONX(S).	POST-TENSION(ED)	P.T.
CONTINUOUS	CONT.	POUND(S) X1000	KIP(S)
CONTRACTOR	CONTR.	POUNDS PER LINEAR FOOT	PLF
CONTROL JOINT	CTL. J.	POUNDS PER SQUARE FOOT	PSF
CONSTRUCTION	CONST.	POUNDS PER CUBIC FOOT	PCF
CONSTRUCTION JOINT	C.J.	POUNDS PER CUBIC YARD	PCY
COVER PLATE	COV. PL.	PRECAST CONCRETE	P/C
		PREFABRICATED	PREFAB.
DEFORMED BAR ANCHOR(S)	DBA('S).	PRELIMINARY	PRELIM.
DETAIL	DET.	PRESSURE	PRESS.
DEAD LOAD	D.L.	PROJECT(ION)	PROJ.
DIAGONAL	DIAG.		
DIAMETER	DIA.	RADIUS	R
DIMENSION(S)	DIM(S).	REFER TO / REFERENCE	REF.
DIRECTION	DIR.	REINFORCE(ING)(ED)(MENT)	REINF.
DRAWING(S)	DWG(S).	REMAINDER	REM.
DOUBLE	DBL.	REQUIRE	REQ.
DOUBLE EXTRA STRONG	XXS	REQUIRED	REQ'D
DOWEL(S)	DWL(S).	RETURN	RET.
		ROOF DRAIN	R.D.
EACH	EA.	ROUGH OPENING	R.O.
EACH FACE	E.F.	ROUND	RND.
EACH WAY	E.W.		
ELECTRICAL	ELEC.	SCHEDULE(D)	SCHED.
ELEVATION	EL.	SECTION	SECT.
ELEVATOR	ELEV.	SHEAR FORCE	V
EMBEDMENT	EMBED.	SHEET	SHT.
ENGINEER	ENGR.	SIMILAR	SIM.
EQUAL	EQ.	SPACE(S)(ING)	SPA.
EQUIPMENT	EQUIP.	SPECIFICATION(S)	SPEC(S).
EXPANSION	EXP.	SPECIFIED	SPEC'D
EXPANSION JOINT	E.J.	SQUARE	SQ.
EXISTING	EXIST.	STAINLESS STEEL	S.S.
EXTERIOR	EXT.	STANDARD	STD.
EXTRA STRONG	XS	STEEL	STL.
		STIFFENER	STIFF
FACE TO FACE	F. TO F.	STRAIGHT	STR.
FABRICATE(ION)(OR)	FAB.	STIRRUPS	STIR.
FAR SIDE	F.S.	STRUCTURE OR STRUCTURAL	STRUCT.
FINISH(ED)	FIN('D).	SUPPORT(S)	SUPT(S)
FINISHED FLOOR	F.F.		
FIREPROOF	F.P.	TENSION	T
FLANGE	FLG.	THICK(NESS)	THK.
FLOOR	FL.	TONGUE AND GROOVE	T&G
FLOOR DRAIN	F.D.	TOP AND BOTTOM	T&B
FOOTING	FTG.	TOP OF BEAM	T.O. BM.
FOUNDATION	FDN.	TOP OF FOOTING	T.O. FTG.
		TOP OF PIER	T.O. PIER
GALVANIZED	GALV.	TOP OF PIER CAP	T.O. P.C.
GENERAL	GEN.	TOP OF STEEL	T.O.S.
GLUE LAMINATED TIMBER	GLULAM	TOP OF STRUCTURAL CONCRETE	T.O.S.C.
GRADE	GR.	TOP OF WALL	T.O.W.
GRADE BEAM	GR.BM.	TREATED	TRTD.
		TYPICAL	TYP.
HOT DIP(PED)	H.D.		
HEADED STUD(S)	H.S.	UNLESS OTHERWISE NOTED	U.O.N.
HEADER	HDR.		
HEIGHT	HT.	VERTICAL	VERT.
HORIZONTAL	HORIZ.	VOLUME	VOL.
HOOK	HK.		
		WATER STOP	W.S.
INSIDE DIAMETER	I.D.	WELDED WIRE MESH	W.W.M.
INSIDE FACE	I.F.	WIDE FLANGE	W.F.
INTERIOR	INT.	WIND BRACE	WB
INTERMEDIATE	INTERM.	WIND LOAD	W.L.
		WITH	W/
JOINT	JT.	WITHOUT	W/O
JOIST(S)	JST(S).	WATER PROOFING	W.P.
		WORK POINT	W.P.
LAMINATED VENEER LUMBER	LVL	WOOD	WD.
LAMINATED STRAND LUMBER	LSL		
LIGHTWEIGHT	LWT.		
LIVE LOAD	L.L.		
LONGITUDINAL	LONG.		
LONG LEG HORIZONTAL	LLH		
LONG LEG VERTICAL	LLV		
LONG SIDE HORIZONTAL	LSH		
LONG SIDE VERTICAL	LSV		

MATERIALS LEGEND

- EXISTING CONSTRUCTION
- CONCRETE
- STEEL IN SECTION
- PLYWOOD IN SECTION
- CMU
- BRICK OR STONE IN SECTION
- GROUT/SAND
- EARTH (UNDISTURBED)
- EARTH/FILL (COMPACTED)
- ROCK
- MECH. UNIT OR ZONE

DRAFTING SYMBOLS



PLAN/DETAIL DESIGNATION

(#) PLAN NAME/DETAIL TITLE
SCALE:

STRUCTURAL DRAWING TYPES

S1 . . . . GENERAL NOTES & PIER PLAN
S2 . . . . PLANS/FOUNDATION CONSTRUCTION
S3 . . . . CONCRETE CONSTRUCTION
S4 . . . . MASONRY CONSTRUCTION
S5 . . . . STEEL CONSTRUCTION
S6 . . . . WOOD CONSTRUCTION

Item 2.

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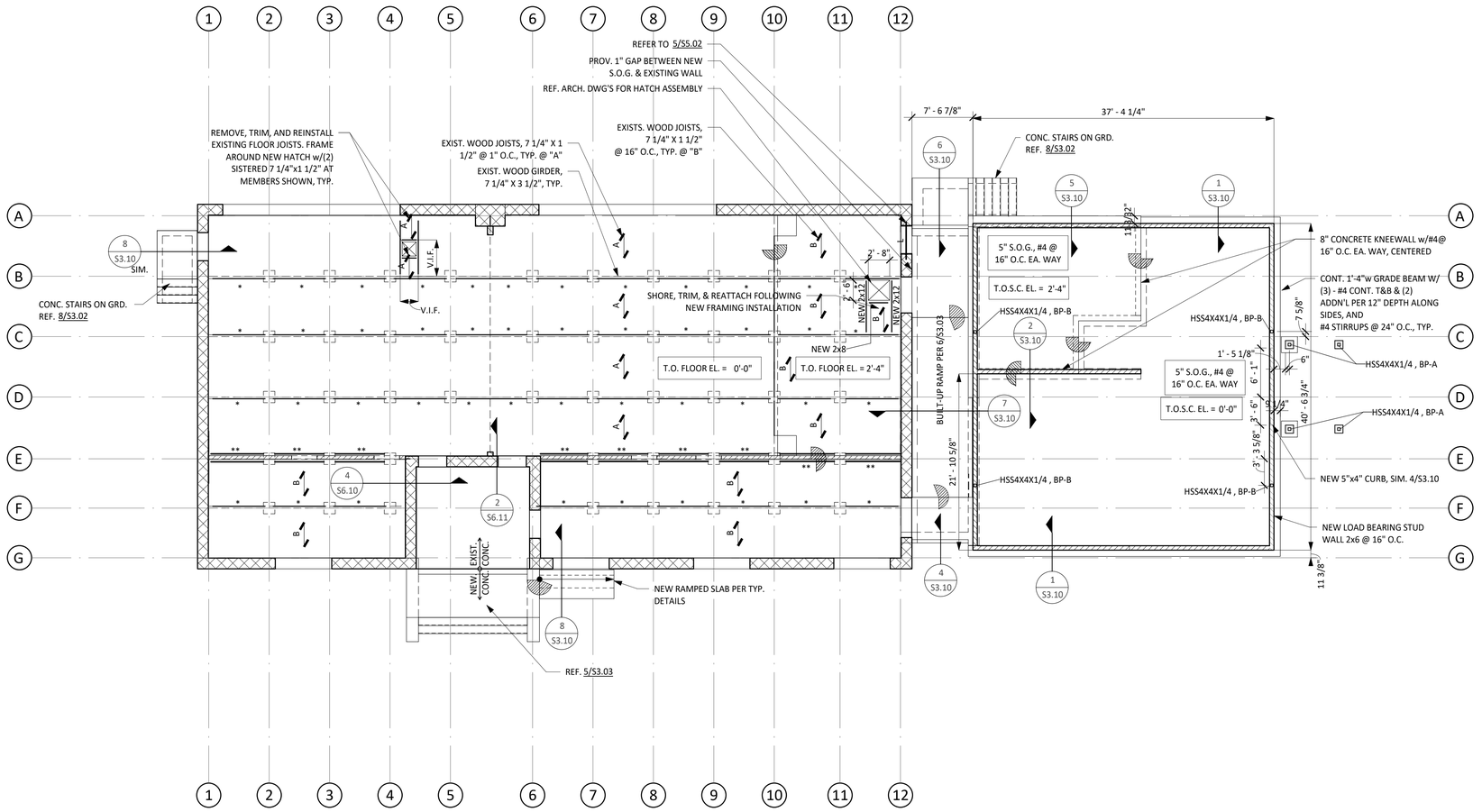
STATE OF TEXAS
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PROFESSIONAL ENGINEER

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Date January 17, 2025

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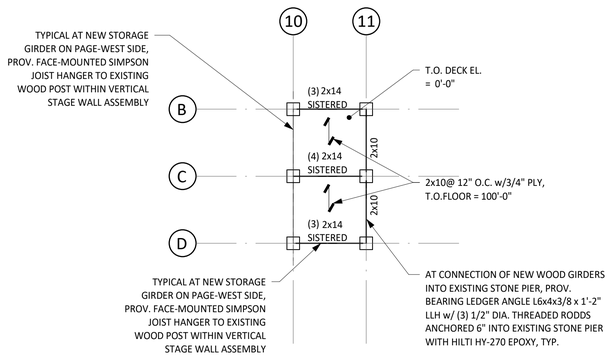
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1 LEVEL 1 FRAMING PLAN

SCALE: 1/8" = 1'-0"

PLAN NORTH



2 BELOW-STAGE NEW STORAGE FRAMING PARTIAL PLAN

SCALE: 1/8" = 1'-0"

FRAMING PLAN LEGEND:

- INDICATES EXISTING LOAD BEARING MASONRY WALL
- INDICATES STRUCTURAL CONCRETE SLAB STEP
- INDICATES STRUCTURAL CONCRETE SLOPE CHANGE
- INDICATES STRUCTURAL CONCRETE SLOPE EXTENTS
- INDICATES STRUCTURAL SLAB OR DECK SPAN
- INDICATES EXIST. OR NEW WOOD STUD WALL
- L — INDICATES LOOSE ANGLE LINTEL ABOVE NEW OPENING IN MASONRY WALL, REF. 5/S5.02

FOUNDATION PLAN NOTES:

1. TOP OF STRUCTURAL CONCRETE ELEVATION IS DENOTED AS FOLLOWS UNLESS OTHERWISE NOTED:
   - T.O.S.C. EL.=XXX'-XX" (AREA ELEVATION)
   - T.O.S.C. EL.=XXX'-XX" (SPOT ELEVATION)
2. FOR FINISH FLOOR ELEVATIONS (F.F. EL.), REFER TO ARCHITECTURAL DRAWINGS. ELEVATIONS NOTED ON PLAN ARE FOR REFERENCE ONLY. REFER TO AND VERIFY ALL DIMENSIONS AND ELEVATIONS w/ ARCHITECTURAL DRAWINGS.
3. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF FLOOR RECESSES, DROPS AND SLOPES NOT DIMENSIONED ON PLAN.
4. REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR LOCATIONS AND DIMENSIONS OF PENETRATIONS NOT SHOWN OR DIMENSIONED ON PLAN.
5. AT " * ", REINFORCE EXISTING WOOD GIRDER PER 7/S6.10.
6. AT " ** ", REINFORCE EXISTING WOOD GIRDER PER 6/S6.10.

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109642
LICENSED PROFESSIONAL ENGINEER

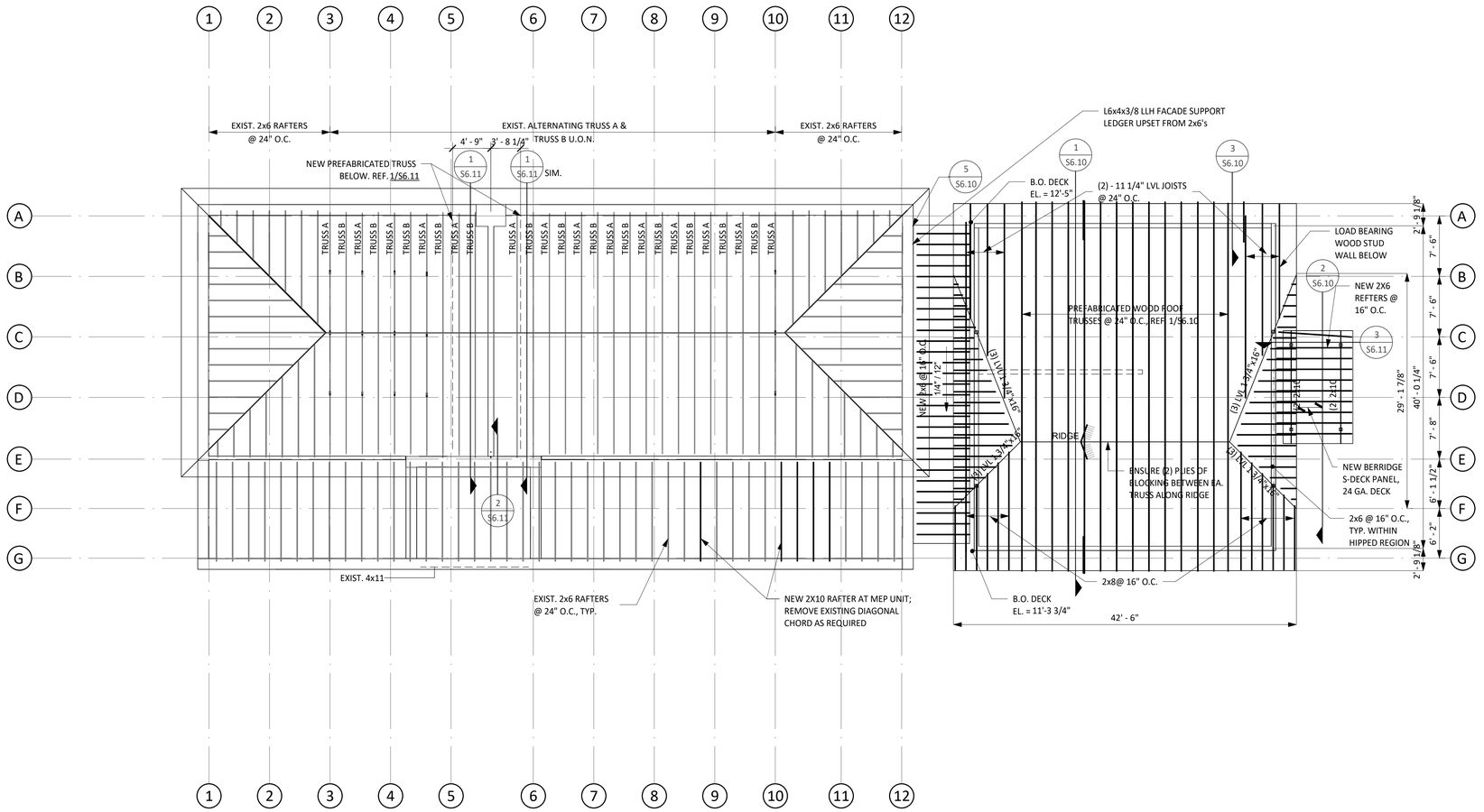
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Architexas No. 2314

Date January 17, 2025

Sheet Name
LEVEL 1 FRAMING PLAN

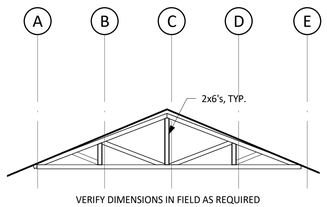
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S2.01



PLAN NORTH

1 ROOF FRAMING PLAN

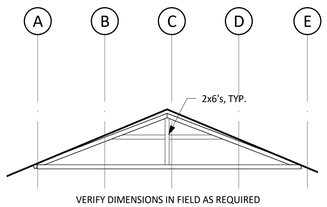
SCALE: 1/8" = 1'-0"



VERIFY DIMENSIONS IN FIELD AS REQUIRED

2 EXISTING TRUSS A TYPICAL ELEVATION

SCALE: 1/8" = 1'-0"



VERIFY DIMENSIONS IN FIELD AS REQUIRED

3 EXISTING TRUSS B TYPICAL ELEVATION

SCALE: 1/8" = 1'-0"

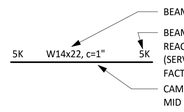
NOTE: EXISTING TRUSS TYPES SHOWN FOR INFORMATION ONLY. NO WORK REQUIRED U.O.N.

FRAMING PLAN LEGEND:

- INDICATES EXISTING LOAD BEARING MASONRY WALL
- INDICATES STRUCTURAL CONCRETE SLAB STEP
- INDICATES STRUCTURAL CONCRETE SLOPE CHANGE
- INDICATES STRUCTURAL CONCRETE SLOPE EXTENTS
- INDICATES STRUCTURAL SLAB OR DECK SPAN
- INDICATES EXIST. OR NEW WOOD STUD WALL
- L — INDICATES LOOSE ANGLE LINTEL ABOVE NEW OPENING IN MASONRY WALL, REF. 5/S5.02

ROOF PLAN NOTES:

1. TOP OF STRUCTURAL STEEL ELEVATION (BOTTOM OF DECK) IS DENOTED AS FOLLOWS UNLESS OTHERWISE NOTED:
   - T.O.S. EL.=XXX'-XX" (AREA ELEVATION)
   - T.O.S. EL.=XXX'-XX" (SPOT ELEVATION)
2. T.O.S.C. EL. 100'-0" = MSL EL. 472.83'
3. FOR FINISH FLOOR ELEVATIONS (F.F. EL.), REFER TO ARCHITECTURAL DRAWINGS. ELEVATIONS NOTED ON PLAN ARE FOR REFERENCE ONLY. REFER TO AND VERIFY ALL DIMENSIONS AND ELEVATIONS w/ ARCHITECTURAL DRAWINGS.
4. REFER TO THE ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF ROOF SLOPES NOT DIMENSIONED ON PLAN.
5. REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR LOCATIONS AND DIMENSIONS OF ROOF PENETRATIONS NOT SHOWN OR DIMENSIONED ON PLAN.
6. STEEL BEAMS ARE NOTED ON PLAN AS FOLLOWS:



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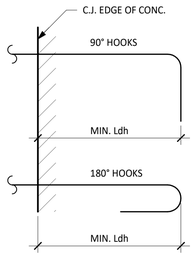
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Sheet Name ROOF FRAMING PLAN

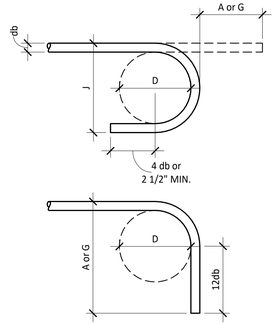
Sheet Number S2.01



HOOK DEVELOPMENT LENGTH SCHEDULE, Ldh						
BAR SIZE	3000 psi	4000 psi	5000 psi	6000 psi	7000 psi	8000 psi
#3	9"	8"	7"	6"	6"	6"
#4	11"	10"	9"	8"	8"	7"
#5	1'-2"	1'-0"	11"	10"	9"	9"
#6	1'-5"	1'-3"	1'-1"	1'-0"	11"	11"
#7	1'-8"	1'-5"	1'-3"	1'-2"	1'-1"	1'-0"
#8	1'-10"	1'-7"	1'-5"	1'-4"	1'-3"	1'-2"
#9	2'-1"	1'-10"	1'-8"	1'-6"	1'-5"	1'-4"
#10	2'-4"	2'-1"	1'-10"	1'-8"	1'-7"	1'-6"
#11	2'-7"	2'-3"	2'-0"	1'-10"	1'-9"	1'-7"

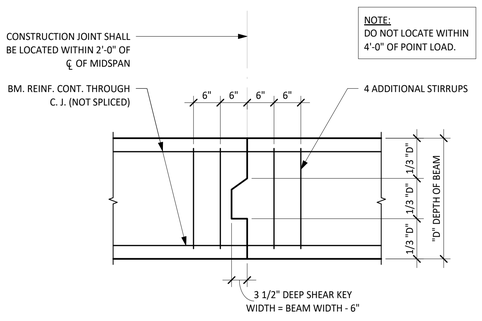
NOTES:

1. TABULATED VALUES ARE BASED ON THE GRADES PER THE GENERAL NOTES REINFORCING BARS AND NORMAL WEIGHT CONCRETE.
2. FOR TABULATED BARS SIZES ONLY:
   A. IF CONCRETE COVER PER ACI 318-14, SECTION 25.4.3.2, TABLE 25.4.3.2, THEN A MODIFICATION FACTOR OF 0.7 MAY BE APPLIED BUT THE LENGTH MUST NOT BE LESS THAN 8 x db NOR 6 IN.
   B. IF HOOK IS ENCLOSED IN TIES OR STIRRUPS PER ACI 318-14, SECTION 25.4.3.2, TABLE 25.4.3.2, THEN A MODIFICATION FACTOR OF 0.8 MAY BE APPLIES BUT THE LENGTH MUST NOT BE LESS THAN 8 x db NOR 6 IN.
3. FOR EPOXY-COATED HOOKS, MULTIPLY THE TABULATED VALUES BY 1.2.
4. FOR LIGHTWEIGHT CONCRETE, INCREASE THE TABULATED VALUES BY 1/3.



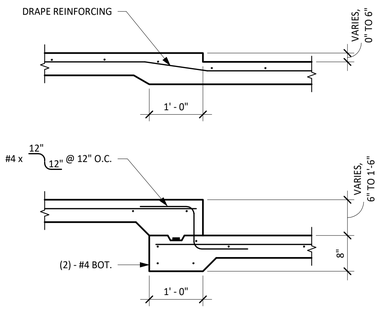
STANDARD HOOK SCHEDULE				
BAR SIZE	D	180° HOOK		90° HOOK
		A or G	J	A or G
#3	2 1/4"	5"	3"	6"
#4	3"	6"	4"	8"
#5	3 3/4"	7"	5"	10"
#6	4 1/2"	8"	6"	12"
#7	5 1/4"	10"	7"	1'-2"
#8	6"	11"	8"	1'-4"
#9	9 1/2"	1'-3"	11 3/4"	1'-7"
#10	10 3/4"	1'-5"	1'-1 1/4"	1'-10"
#11	12"	1'-7"	1'-2 3/4"	2'-0"

TYPICAL DETAIL
1 STANDARD HOOK SCHEDULE
NO SCALE

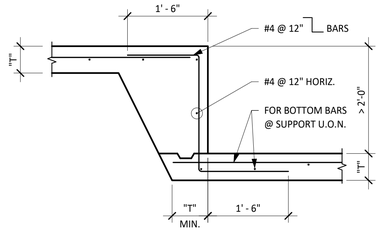


ELEVATION

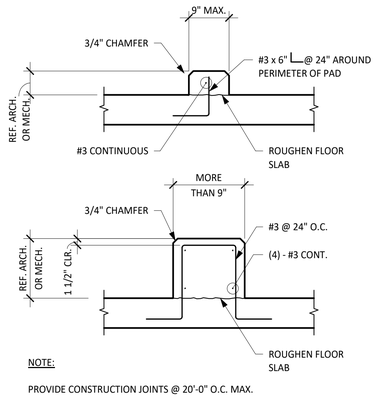
TYPICAL DETAIL
7 BEAM CONSTRUCTION JOINT
NO SCALE



TYPICAL DETAIL
2 DROP IN SLAB-ON-GRADE ≤ 1' - 6"
NO SCALE

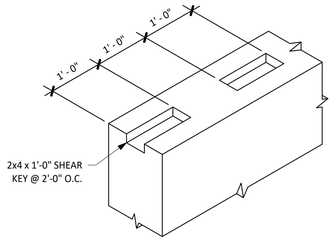


TYPICAL DETAIL
3 DROP IN SLAB-ON-GRADE GREATER THAN 2 FT
NO SCALE

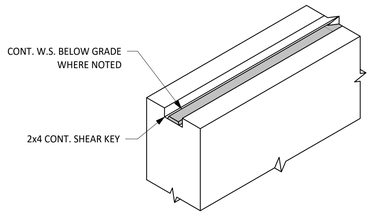


NOTE:
PROVIDE CONSTRUCTION JOINTS @ 20'-0" O.C. MAX.

TYPICAL DETAIL
4 SLAB-ON-GRADE OR STRUCTURAL SLAB MECHANICAL CURB
NO SCALE



INTERMITTENT ABOVE GRADE



CONTINUOUS BELOW GRADE

GRADE BEAM SHEAR KEY AT HORIZONTAL JOINT
5 SCALE: 3/4" = 1'-0"

REINFORCEMENT SPLICE LENGTH SCHEDULE												
	f'c=3000 psi CONCRETE		f'c=4000 psi CONCRETE		f'c=5000 psi CONCRETE		f'c=6000 psi CONCRETE		f'c=7000 psi CONCRETE		f'c=8000 psi CONCRETE	
CLASS / BAR SIZE	"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"	"A"	"B"
#3	1'-5"	1'-10"	1'-3"	1'-7"	1'-1"	1'-5"	1'-0"	1'-4"	1'-0"	1'-4"	1'-0"	1'-4"
#4	1'-10"	2'-5"	1'-7"	2'-1"	1'-5"	1'-10"	1'-4"	1'-8"	1'-3"	1'-7"	1'-2"	1'-6"
#5	2'-4"	3'-0"	2'-0"	2'-7"	1'-10"	2'-4"	1'-8"	2'-1"	1'-6"	2'-0"	1'-5"	1'-10"
#6	2'-9"	3'-7"	2'-5"	3'-1"	2'-2"	2'-9"	2'-0"	2'-7"	1'-10"	2'-4"	1'-8"	2'-2"
#7	4'-1"	5'-3"	3'-6"	4'-6"	3'-1"	4'-1"	2'-10"	3'-8"	2'-8"	3'-5"	2'-6"	3'-2"
#8	4'-7"	6'-0"	4'-0"	5'-2"	3'-7"	4'-7"	3'-3"	4'-3"	3'-0"	3'-11"	2'-10"	3'-8"
#9	5'-2"	6'-10"	4'-6"	5'-10"	4'-0"	5'-3"	3'-8"	4'-9"	3'-5"	4'-5"	3'-2"	4'-1"
#10	5'-10"	7'-7"	5'-1"	6'-7"	4'-6"	5'-10"	4'-1"	5'-4"	3'-10"	4'-11"	3'-7"	4'-8"
#11	6'-6"	8'-5"	5'-7"	7'-3"	5'-0"	6'-6"	4'-7"	5'-11"	4'-3"	5'-6"	4'-0"	5'-2"

NOTES:

1. WHERE SPLICE TYPE IS NOT INDICATED, USE CLASS "B" SPLICE.
2. LAP LENGTHS LISTED ABOVE APPLY UNDER THE FOLLOWING CONDITIONS:
   A. BEAM & COLUMN BARS ARE SPACED AT LEAST 1 BAR DIAMETERS O.C. WITH CLEAR COVER NOT LESS THAN 1 BAR DIAMETER.
   B. WALL & SLAB BARS ARE SPACED AT LEAST 2 BAR DIA. O.C.
   C. FOR UNCOATED AND ZINC-COATED (GALVANIZED) REINFORCEMENT.
   D. FOR REINFORCEMENT THAT CONFORMS DEFORMED NEW BILLET STEEL BARS IN ACCORDANCE TO ASTM A615 WITH GRADES PER THE GENERAL NOTES.
3. WHERE CLEAR COVER OR CLEAR SPACING FOR MASONRY REINF. IS LESS THAN 5 BAR DIAMETERS, INCREASE SPLICE LENGTHS SHOWN BY MULTIPLYING LENGTHS BY MAX. RATIO OF 5 BAR DIAMETERS TO CLEAR COVER OR SPACING.
4. FOR HORIZ. TOP BARS w/ 12" OF CONCRETE CAST BELOW, MULTIPLY TABULATIONS BY 1.3.
5. WHERE A LARGER BAR LAPS A SMALLER BAR, THE SMALLER SCHEDULED LAP LENGTH APPLIES U.O.N.
6. REFER TO "CONCRETE REINFORCING" SECTION OF THE GENERAL NOTES FOR FURTHER INFORMATION.
7. FOR MASONRY REINFORCEMENT SPLICE LENGTH SCHEDULE, SEE MASONRY DETAILS.
8. FOR LIGHTWEIGHT CONCRETE, INCREASE THE TABULATED VALUES BY 1/3.

TYPICAL DETAIL
6 LAP SPLICE SCHEDULE
NO SCALE

DOWEL SCHEDULE			
			
MARK	SIZE	A	B
DWL A	#4	8"	3'-0"
DWL B	#4	2'-6"	3'-0"
DWL C	#4	-	4'-0"
DWL D	#4	8"	6'-0"
DWL E	#4	-	6'-0"

NOTES:

1. SCHEDULED DOWELS ARE MARKED "DWL" ON THE SECTIONS AND DETAILS.
2. DOWEL SPACING TO BE THE SAME AS SLAB OR WALL REINFORCEMENT UNLESS OTHERWISE NOTED ON DETAILS.

TYPICAL DETAIL
8 STANDARD DOWEL SCHEDULE
NO SCALE

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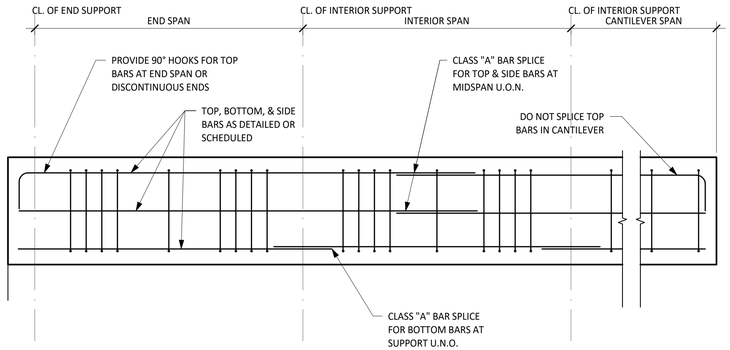


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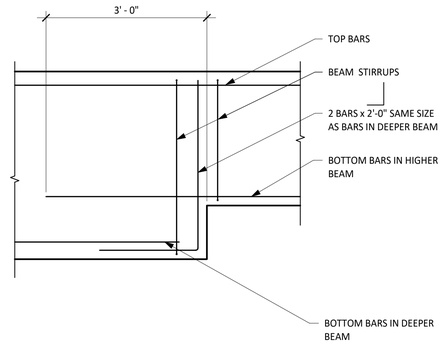
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CONCRETE TYPICAL DETAILS

Sheet Number
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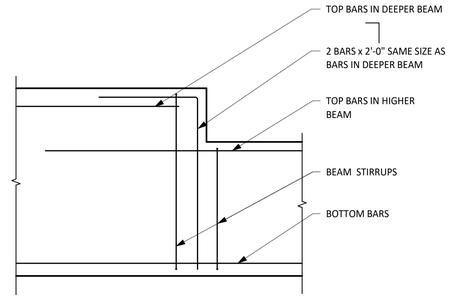
1 TYPICAL DETAIL GRADE BEAM REINFORCING

NO SCALE



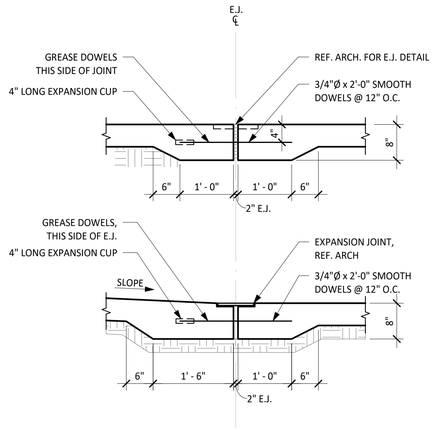
2 TYPICAL DETAIL STEP IN BOTTOM GRADE BEAM

NO SCALE



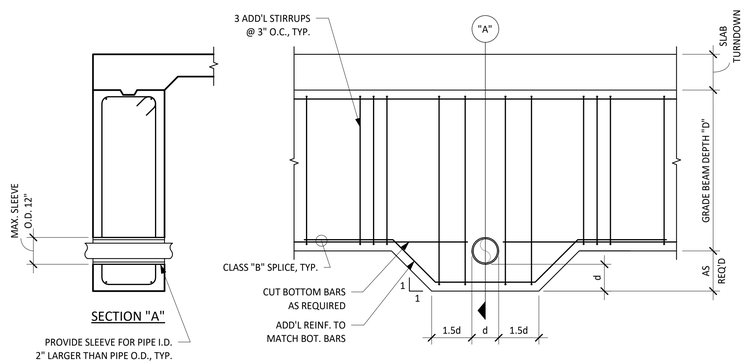
3 STEP IN TOP GRADE BEAM

SCALE: 3/4" = 1'-0"



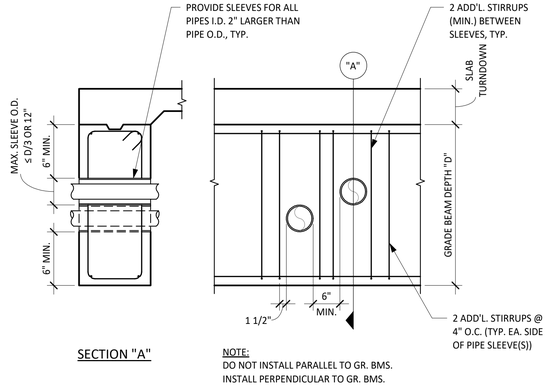
4 TYPICAL DETAIL EXPANSION JOINT

NO SCALE



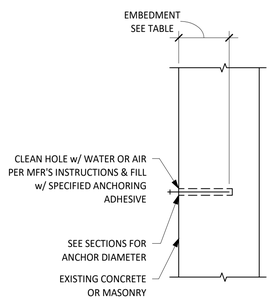
5 TYPICAL DETAIL HORIZONTAL PENETRATIONS THROUGH BOTTOM OF GRADE BEAM

NO SCALE



6 TYPICAL DETAIL HORIZONTAL PIPE PENETRATIONS THROUGH GRADE BEAM

NO SCALE



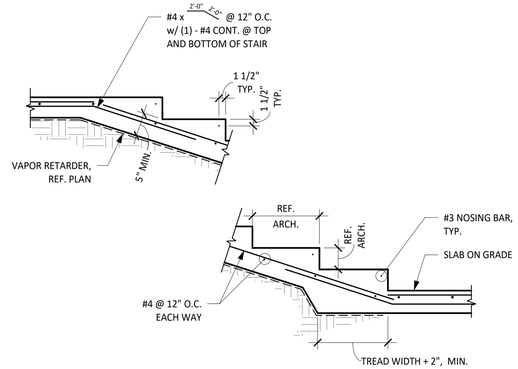
ADHESIVE ANCHOR NOTES:

1. REFER TO GENERAL NOTES FOR ADHESIVE ANCHOR TYPE.
2. LOCATE EXISTING REINFORCING STEEL IN THE CONCRETE USING NON-DESTRUCTIVE METHODS & POSITION ANCHOR LOCATIONS TO AVOID CONFLICTS WITH EXISTING REINFORCING. ANCHOR LOCATIONS CAN BE ADJUSTED BY A MAXIMUM OF 1 1/2" FROM DETAILED LOCATIONS TO AVOID CONFLICTS, UNLESS NOTED OTHERWISE.
3. BASED ON FIELD VERIFIED LOCATIONS OF REINFORCING STEEL & EMBEDDED ITEMS, THE CONTRACTOR SHALL CREATE TEMPLATES FOR EACH ANCHOR GROUP.
4. ALL ABANDONED HOLES SHALL BE FILLED WITH NON-SHRINK GROUT.
5. HOLES IN CONNECTION PLATES SHALL BE NO MORE THAN 1/16" LARGER THAN THE ANCHOR DIAMETER. IF LARGER HOLES ARE REQUIRED FOR ERECTION PURPOSES, PROVIDE 1/4"x3x3 PLATE WASHERS CONTINUOUSLY WELDED TO THE CONNECTION PLATE.

ANCHOR INSTALLATION INFORMATION			
ANCHOR DIAMETER	1/2"	5/8"	3/4"
HOLE DIAMETER	9/16"	3/4"	7/8"
EMBEDMENT FOR HAS STD.	4 1/2"	5 5/8"	6 3/4"
MAX. TORQUE (ft.-lbs)	30	60	100

7 ADHESIVE ANCHOR FOR SOLID AND GROUTED MASONRY AND CONCRETE

SCALE: 3/4" = 1'-0"



8 TYPICAL DETAIL CONCRETE STAIRS ON GRADE

NO SCALE

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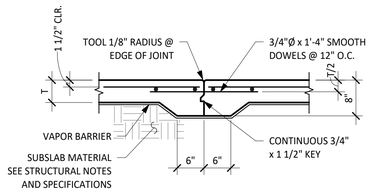
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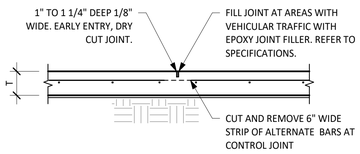
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Sheet Name
CONCRETE TYPICAL DETAILS

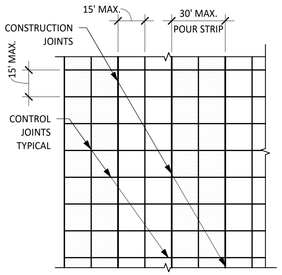
Sheet Number
S3.00



CONSTRUCTION JOINT



CONTROL JOINT



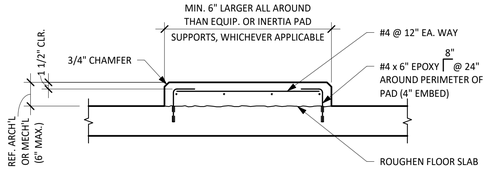
POUR STRIP LAYOUT

NOTES:

1. SEE PLAN FOR THICKNESS OF SLAB (T) AND REINFORCING.
2. PROVIDE A CONSTRUCTION OR A CONTROL JOINT ON THE CENTERLINES OF COLUMNS, U.O.N.
3. SLABS SHALL BE POURED IN A STRIP PATTERN AND CUT IN A JOINT PATTERN w/ WIDTHS NOT EXCEEDING THOSE SHOWN, U.O.N. CONTRACTOR SHALL SUBMIT JOINT PATTERNS FOR REVIEW.
4. IF METAL FORMS ARE USED, REMOVE THEM BEFORE POURING ADJACENT SLAB.
5. FOR SLABS WITH THICKNESS (T) GREATER THAN 6", THICKENED EDGES ARE NOT REQUIRED AT JOINTS.
6. INFILL STRIPS CAN BE PLACED AFTER INITIAL SLAB STRIPS HAVE CURED FOR 3 DAYS.

1 TYPICAL DETAIL SLAB-ON-GRADE

NO SCALE



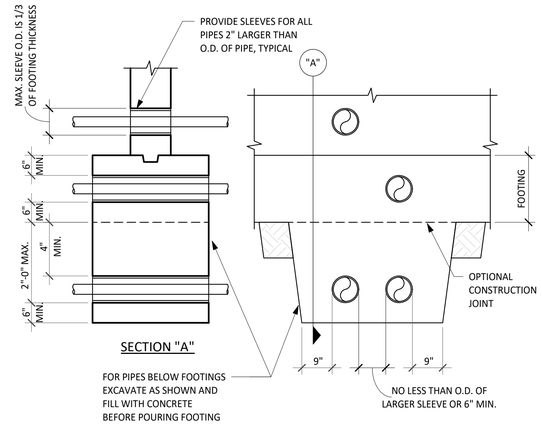
EQUIPMENT PAD

NOTES:

1. PADS PER DETAIL TO BE PROVIDED UNDER EQUIPMENT SUPPORTED ON SLAB-ON-GRADE OR ELEVATED SLABS.
2. COORDINATE MECHANICAL PAD SIZE, LOCATION AND EMBEDDED ITEMS WITH MEP DRAWINGS AND EQUIPMENT MANUFACTURER.

2 TYPICAL DETAIL MECHANICAL PAD

NO SCALE



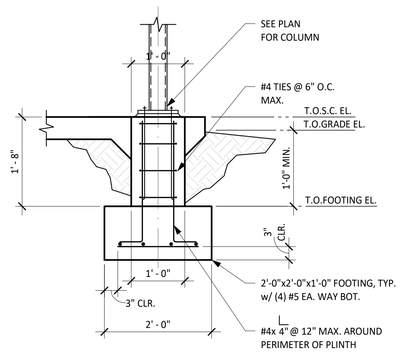
SECTION "A"

NOTES:
DO NOT PASS PIPES THROUGH ISOLATED FOOTINGS.
1. WHERE PIPES ARE MORE THAN 2'-0" BELOW FOOTING.

2. BACKFILL WITH SOIL AS SPECIFIED.

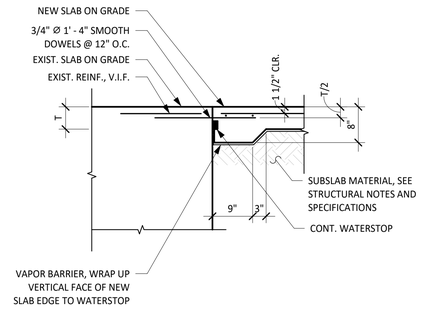
3 PIPES AND TRENCHES AT FOOTING

SCALE: 3/4" = 1'-0"



4 ISOLATED EXTERIOR STEEL PORCH COLUMN FOOTING

SCALE: 3/4" = 1'-0"



NOTES:

1. SEE PLAN FOR THICKNESS OF SLAB (T) AND REINFORCING.
2. IF METAL FORMS ARE USED, REMOVE THEM BEFORE POURING ADJACENT SLAB.

5 TYPICAL DETAIL NEW TO EXISTING SLAB ON GRADE INTERFACE

NO SCALE

Item 2.

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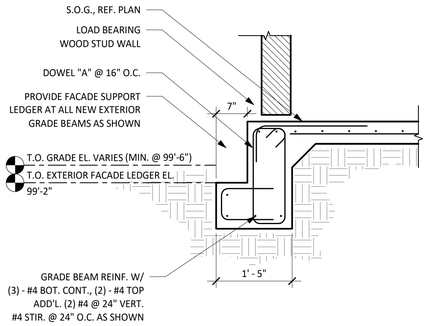
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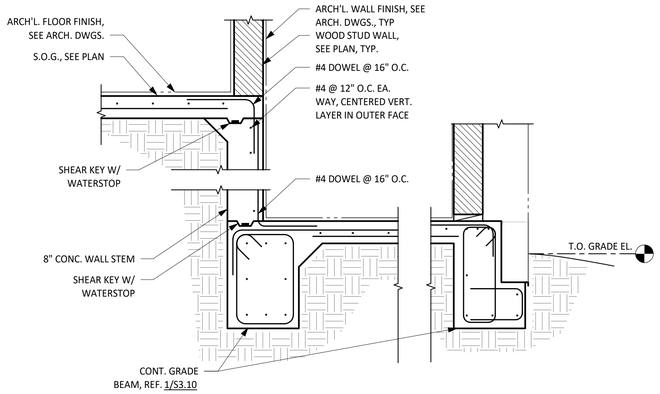
Sheet Name
CONCRETE TYPICAL DETAILS

Sheet Number
S3.00



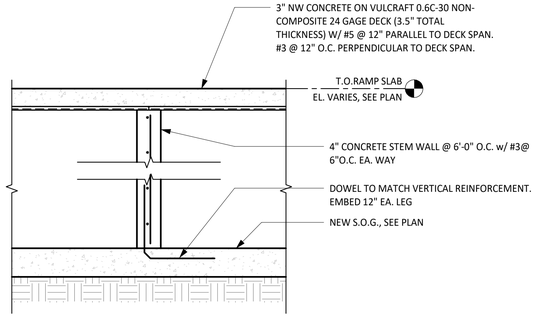
1 NEW CONCRETE GRADE BEAM

SCALE: 3/4" = 1'-0"



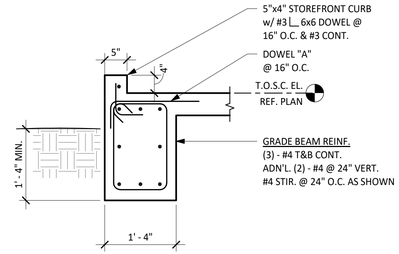
2 STEP IN NEW S.O.G. GREATER THAN 1'-0" ELEVATION DIFFERENCE

SCALE: 3/4" = 1'-0"



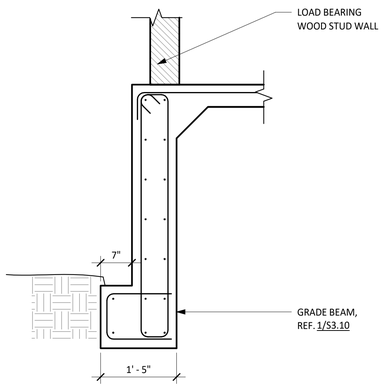
3 TYPICAL BUILT UP CONCRETE RAMP DETAIL

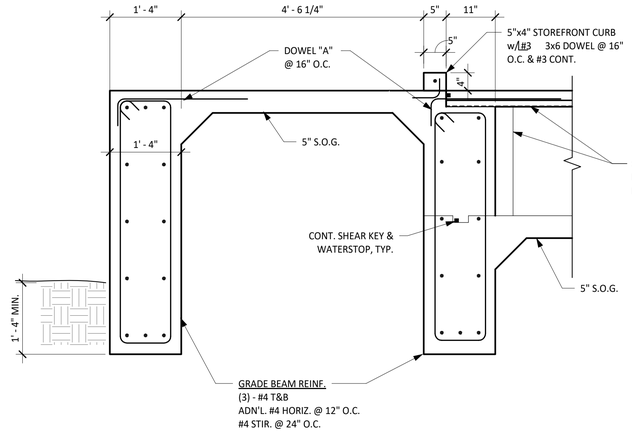
SCALE: 1" = 1'-0"



4 FOUNDATION AT STOREFRONT

SCALE: 3/4" = 1'-0"



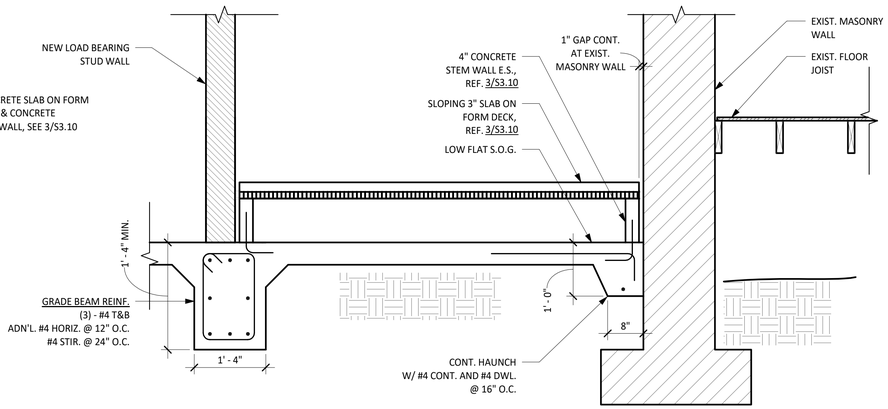


5 FOUNDATION AT HIGH SLAB

SCALE: 3/4" = 1'-0"

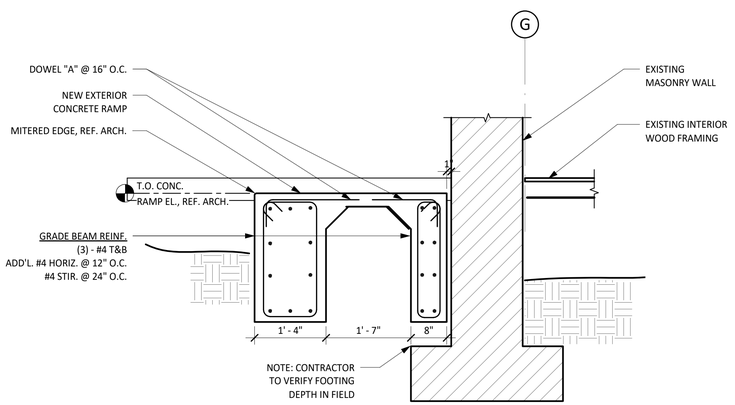
6 FOUNDATION AT STEPS

SCALE: 3/4" = 1'-0"



7 DETAIL - FOUNDATION AT NEW RAMP

SCALE: 3/4" = 1'-0"



8 DETAIL AT NEW RAMP OR STAIRS

SCALE: 3/4" = 1'-0"

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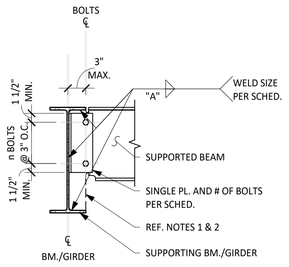
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01/17/2025

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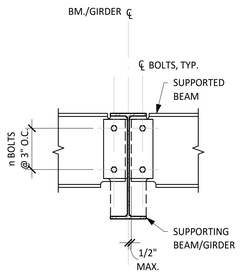
Sheet Number
S3.10



NOTE:

IF SUPPORTED BEAM IS LESS THAN 1/2 OF BOLTS TO CONNECTION AT GIRDER, EXTEND TAB PLATE TO BOTTOM FLANGE AT PERIMETER CONDITION.

A ONE-SIDED CONNECTION - BEAMS TO GIRDER



NOTE:

REF. DETAIL "A" FOR INFO NOT SHOWN

B TWO-SIDED CONNECTION - BEAMS TO GIRDER

STANDARD SINGLE PLATE CONNECTION					
BEAM SIZE	NO. OF ROWS OF BOLTS(n)	BOLT DIAMETER	PLATE THICKNESS	WELD SIZE A	MAX. BEAM REACTION (KIPS)
W8	2	3/4"	1/4"	1/4"	12
W10	2	↓	↓	↓	16
W12	3	↓	↓	↓	24
W14	3	↓	5/16"	↓	30
W16	4	↓	↓	↓	40
W18	5	↓	↓	↓	50
W21	6	7/8"	3/8"	↓	73
W24	7	↓	↓	↓	85
W27	8	↓	↓	↓	97
W30	8	↓	↓	↓	97
W33	8	↓	↓	5/16"	97
W36	10	↓	1/2"	↓	140
W40	10	↓	↓	↓	140
W44	10	↓	↓	↓	140

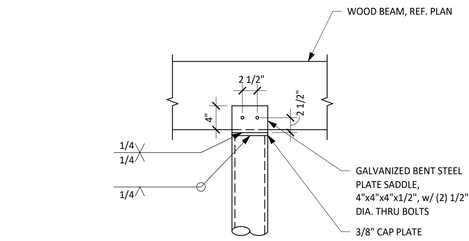
NOTES:

1. ALL OTHER CONNECTIONS DEVIATING FROM TYPICAL CONNECTIONS SHALL BE DESIGNED AND DETAILED BY A PROFESSIONAL ENGINEER WORKING UNDER THE GUIDANCE OF THE CONTRACTOR. REF. GENERAL NOTES UNDER "STRUCTURAL STEEL CONNECTIONS."
2. NOTED REACTIONS ARE FOR SERVICE LOADS.
3. BOLTS ARE A325N WITH STANDARD HOLES.
4. SCHEDULED SHEAR PLATE CONNECTIONS APPLY TO RIGHT ANGLE CONNECTIONS AND SKEWED CONNECTIONS UP TO 30" FROM RIGHT ANGLE.
5. BEAM CONNECTIONS ARE "STANDARD" UNLESS OTHERWISE NOTED ON PLAN.
6. WORKLINES ARE ON CENTERLINES OF BEAMS AND COLUMNS, U.O.N.
7. WELD CAPACITY BASED ON Exx = 70 KSI.
8. CONTRACTOR RESPONSIBLE FOR MEETING ALL O.S.H.A. REQUIREMENTS.

C SINGLE PLATE CONNECTION SCHEDULE

1 SCHEMATIC SINGLE-PLATE FRAMING CONNECTIONS

SCALE: 1" = 1'-0"

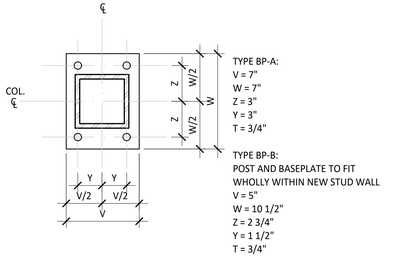


NOTES:

1. SEE ROOF PLAN FOR ROOF SLOPE. SLOPE CAP PLATES ACCORDINGLY.
2. STIFFENER PLATES SHALL BE EQUAL IN THICKNESS TO THE COLUMN WALL THICKNESS OR BEAM WEB THICKNESS, WHICHEVER IS GREATER.
3. CONNECT INTERSECTING BEAMS TO STIFFENER PLATES USING BOLTS IN SINGLE SHEAR DESIGNED FOR ECCENTRIC BEAM REACTION.

2 CAP PLATE - BOLTED CONNECTION

SCALE: 1" = 1'-0"

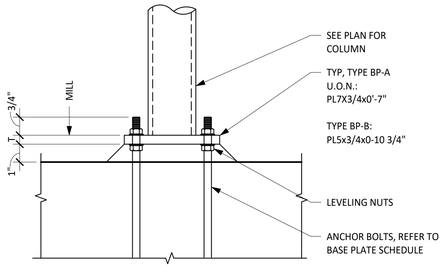


NOTES:

1. WELD TO BE 1/16" SMALLER THAN THICKNESS OF TUBE.
2. SEE DETAIL 4/S5.02 FOR BASE PLATE ELEVATION.

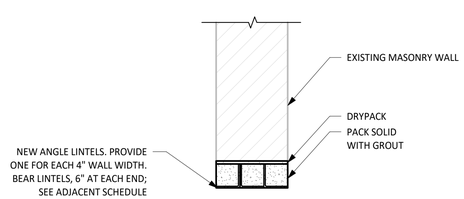
3 BASE PLATE - 4 BOLTS (PIPE)

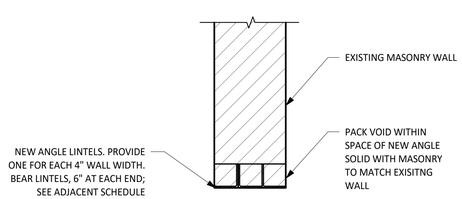
SCALE: 1" = 1'-0"



4 COLUMN BASE PLATE (PIPE) SCHEDULE

SCALE: 1" = 1'-0"





ALTERNATE AT ARCHITECTURALLY EXPOSED MASONRY WALL FINISH

MASONRY LOOSE LINTEL SCHEDULE	
OPENING	LINTEL SIZE
< 5' - 0"	L4 x 3 1/2 x 1/2 LLV
5' - 0" TO 7' - 0"	L6 x 4 x 5/16 LLV
> 7' - 0"	L6 x 4 x 3/8 LLV

NOTE:

1. LINTEL ANGLES SHALL BE HOT DIP GALVANIZED.
2. PROVIDE 3/8" GAP IN MORTAR AT ENDS OF ANGLE. FORM GAP WITH BACKER ROD.
3. PROVIDE 8" BEARING AT EACH END OF LINTEL ANGLE.

5 NEW LINTELS IN EXISTING MASONRY WALL

SCALE: 1" = 1'-0"

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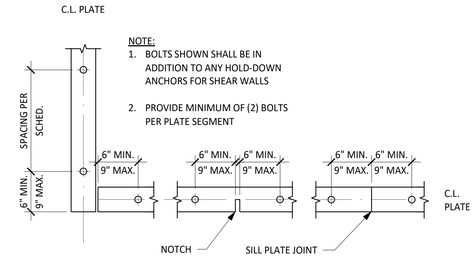
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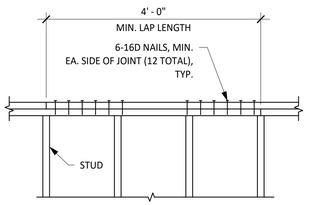
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STEEL TYPICAL DETAILS

Sheet Number
S5.01



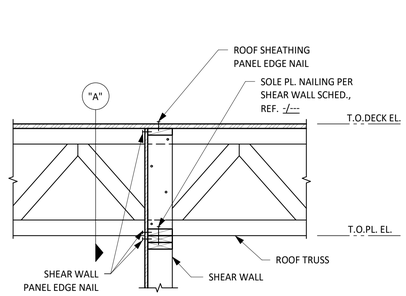
TYPICAL DETAIL
SILL PLATE BOLT LAYOUT

1 NO SCALE

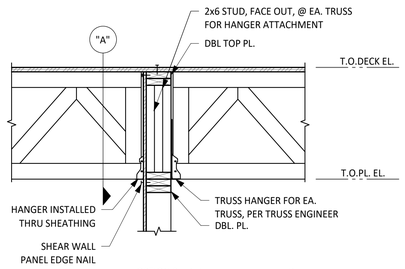


TYPICAL DETAIL
DOUBLE TOP PLATE SPLICE NAILING

2 NO SCALE



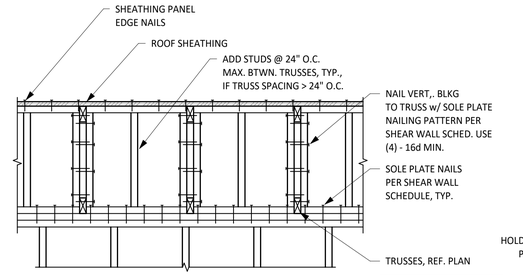
OPTION 1 (FOR TRUSS DEPTH < TRUSS SPACING)



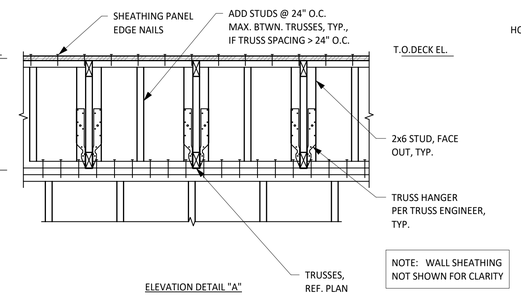
OPTION 2 (FOR ALL TRUSS DEPTHS)

TYPICAL DETAIL
INTERIOR SHEAR WALL CONNECTION AT ROOF

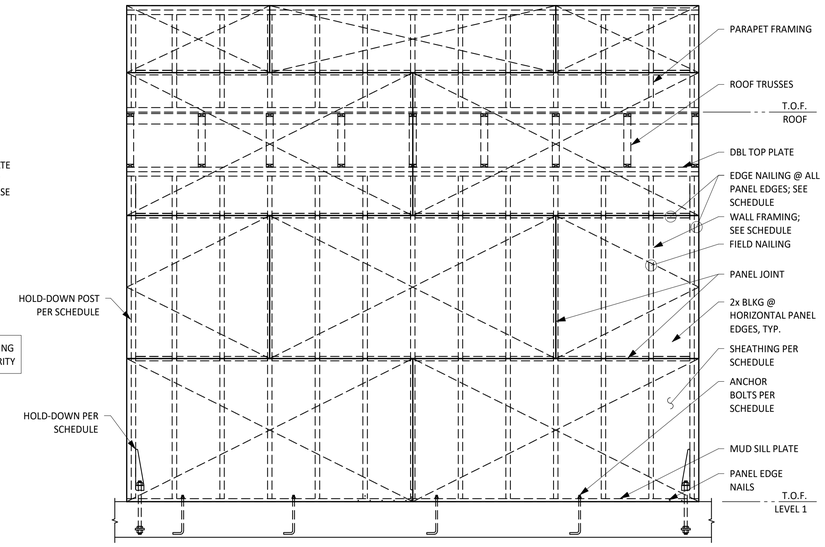
3 NO SCALE



ELEVATION DETAIL "A"

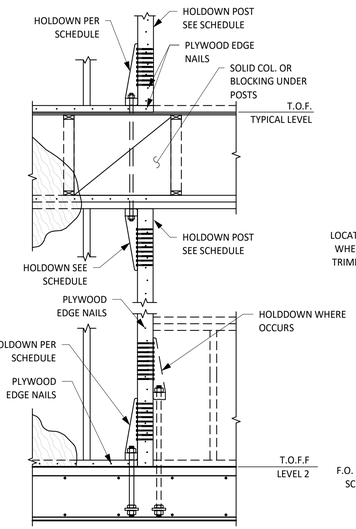


ELEVATION DETAIL "A"

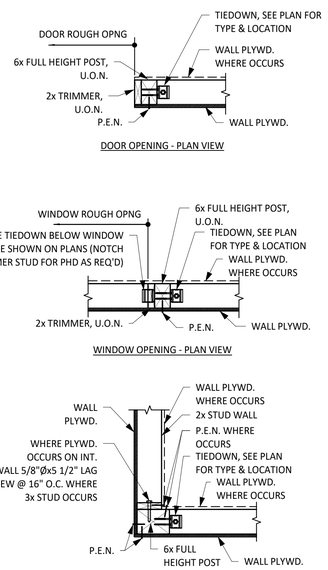


TYPICAL DETAIL
SHEARWALL ELEVATION

6 NO SCALE



END OF SHEAR WALL - ELEVATION



MARK	HOLDOWN TYPE	HOLDOWN ANCHOR BOLT	POST	CAPACITY (LBS)
T1	HDU2-SDS2.5	5/8"Ø THRD. ROD W/ 3"x3"x1/4" PL WASHER	FOR 2x4 WALL, 3x4 FOR 2x6 WALL, 3x6	3075
T2	HDU4-SDS2.5	5/8"Ø THRD. ROD W/ 3"x3"x1/4" PL WASHER	FOR 2x4 WALL, 4x4 FOR 2x6 WALL, 3x6	4565
T3	HDU5-SDS2.5	7/8"Ø THRD. ROD W/ 3"x3"x1/4" PL WASHER	FOR 2x4 WALL, 4x6 FOR 2x6 WALL, 4x6	5645
T4	HDU8-SDS2.5	7/8"Ø THRD. ROD W/ 3 1/2"x3 1/2"x1/4" PL WASHER	FOR 2x4 WALL, 4x6 FOR 2x6 WALL, 4x6	6970
T5	HDU11-SDS2.5	7/8"Ø THRD. ROD W/ 3"x3"x1/4" PL WASHER	FOR 2x4 WALL, 4x6 FOR 2x6 WALL, 6x6	9535

NOTE: SCHEDULED HOLDOWNS ARE PRE-DEFLECTED STEEL HOLDOWN ANCHORS BY "SIMPSON STRONG-TIE."

TYPICAL DETAIL
SHEARWALL HOLDOWN SCHEDULE

4 NO SCALE

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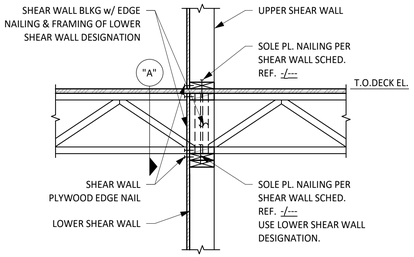
01/17/2025

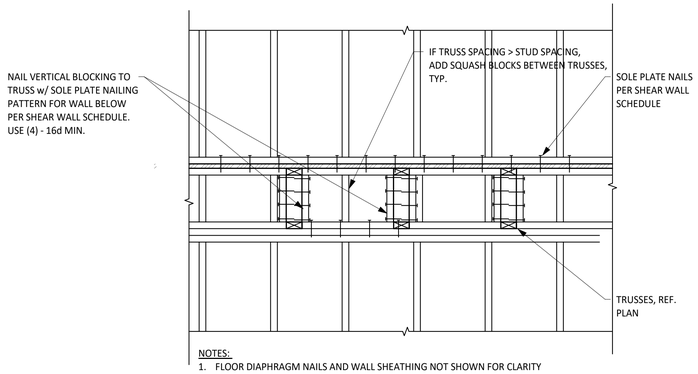
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Date
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Sheet Name
WOOD TYPICAL DETAILS

Sheet Number
S6.0





NOTES:

1. FLOOR DIAPHRAGM NAILS AND WALL SHEATHING NOT SHOWN FOR CLARITY
2. WHERE A PENETRATION > 4" IN DIAMETER OCCURS IN A SHEATHING PANEL BETWEEN TRUSSES, DOUBLE THE NUMBER OF PANEL EDGE, SOLE PLATE, AND BLOCKING NAILS IN AN ADJACENT PANEL. IF DOUBLING THE NAILS WOULD REDUCE THE SPACING TO LESS THAN 3", USE 3" NOMINAL BLOCKS AT ALL PANEL EDGES, ADD A SHEATHING PANEL TO THE OPPOSITE FACE OF THE WALL, AND DOUBLE THE SOLE PLATE AND BLOCKING NAILS ONLY.

ELEVATION DETAIL "A"

1 TYPICAL DETAIL
INTERIOR SHEAR WALL AT FLOOR TRUSSES

NO SCALE

Item 2.

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STATE OF TEXAS
KARINA TRIBBLE
109642
LICENSED
PROFESSIONAL ENGINEER

01/17/2025

Architexas No.
2314

Date
January 17, 2025

Sheet Name
WOOD TYPICAL DETAILS

Sheet Number
S6.00

NAILING SCHEDULE	
CONNECTION	NAILING
1. FLOOR JOIST TO BAND JOIST, FACE NAIL	3-16d
2. FLOOR JOIST TO SILL PLATE OR GIRDER, TOE NAIL	3-8d
3. BRIDGING TO JOISTS, TOE NAIL OR END NAIL EACH END	2-8d
4. SILL PLATE TO BAND JOIST OR BLOCKING, FACE NAIL	16d AT 16" O.C.
5. TOP PLATE TO STUD, END NAIL	2-16d
6. STUD TO SILL PLATE	4-8d TOE NAIL OR 2-16d EACH END
7. DOUBLE STUDS, FACE NAIL	16d AT 24" O.C. MAX.
8. DOUBLE TOP PLATES, FACE NAIL	16d AT 16" O.C.
9. TOP PLATES AND INTERSECTIONS, FACE NAIL	2-16d OR 3-10d
10. TOP PLATES AND LAPS, FACE NAIL	8-16d
11. CONTINUOUS HEADER-TWO PIECES	16d AT 16" O.C. ALONG EACH EDGE
12. CEILING JOISTS TO PLATE, TOE NAIL	3-8d
13. CEILING JOISTS, LAPS OVER PARTITIONS, FACE NAIL	3-16d
14. CEILING JOISTS TO PARALLEL RAFTERS, FACE NAIL	3-16d
15. RAFTER TO PLATE, TOE NAIL	3-8d
16. 3/4" LET-IN BRACE TO EACH STUD AND PLATES, FACE NAIL	2-8d
17. BUILT-UP CORNER STUDS	16d AT 24" O.C.
18. BUILT-UP GIRDER AND BEAMS, THREE MEMBERS	20d AT 32" O.C. AT TOP AND BOTTOM (STAGGERED) 2-20d AT ENDS

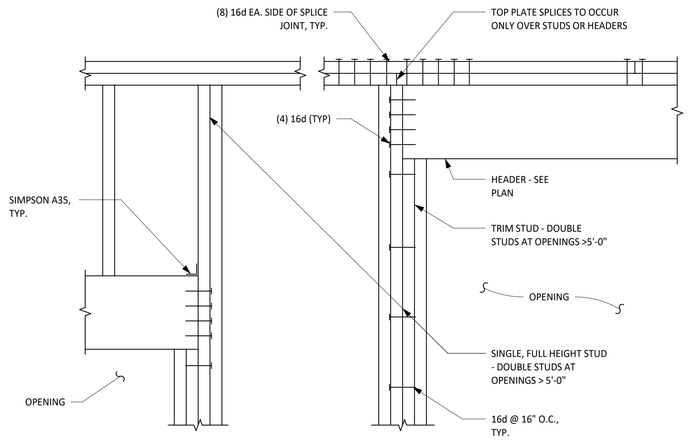
NOTES:
1. PROVIDE NAILING CONNECTIONS INDICATED IN SCHEDULE UNLESS DETAILED OR NOTED OTHERWISE.

TYPICAL WOOD DETAIL
1 NAILING SCHEDULE
NO SCALE

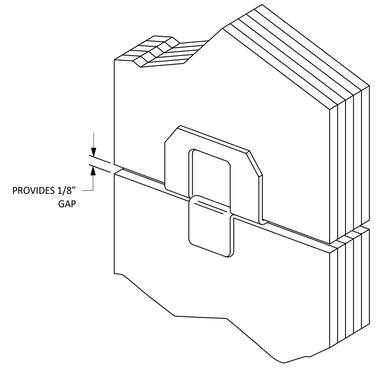
WOOD CONSTRUCTION CONNECTOR NOTES:

1. ALL WOOD CONSTRUCTION CONNECTORS SHOWN ARE SIMPSON STRONG-TIE CONNECTORS MANUFACTURED BY SIMPSON STRONG-TIE COMPANY, INC. (OR APPROVED EQUIVALENT). BEFORE SUBSTITUTING ANOTHER BRAND, CONFIRM LOAD CAPACITY BASED ON RELIABLE PUBLISHED TESTING DATA OR CALCULATIONS AND SUBMIT TO ARCHITECTURAL ENGINEERS COLLABORATIVE.
2. ALL SPECIFIED FASTENERS SHALL BE INSTALLED ACCORDING TO THE DETAILS AND THE MANUFACTURER'S INSTRUCTIONS. ALL HOLES IN CONNECTORS SHALL BE PROPERLY NAILED TO THE WOOD STRUCTURE. CONTACT ARCHITECTURAL ENGINEERS COLLABORATIVE FOR FASTENERS NOT SHOWN. INCORRECT FASTENER QUANTITY, SIZE, TYPE, MATERIAL, OR FINISH MAY CAUSE THE CONNECTION TO FAIL.
3. BOLT HOLES SHALL BE A MINIMUM OF 1/32" AND A MAXIMUM OF 1/16" LARGER THAN THE BOLT DIAMETER.
4. INSTALL ALL SPECIFIED FASTENERS BEFORE LOADING THE CONNECTION.
5. USE PROPER SAFETY EQUIPMENT.
6. WELDING GALVANIZED STEEL MAY PRODUCE HARMFUL FUMES; FOLLOW PROPER WELDING PROCEDURES AND SAFETY PRECAUTIONS. WELDING SHOULD BE IN ACCORDANCE WITH AWS STANDARDS.
7. PNEUMATIC OR POWDER-ACTUATED FASTENERS MAY DEFLECT AND INJURE THE OPERATOR OR OTHERS. NAIL GUNS MAY BE USED TO INSTALL CONNECTORS, PROVIDED THE CORRECT QUANTITY AND TYPE OF NAILS ARE PROPERLY INSTALLED IN THE NAIL HOLES. GUNS WITH NAIL HOLE-LOCATING MECHANISMS SHOULD BE USED. FOLLOW THE MANUFACTURER'S INSTRUCTIONS AND USE THE APPROPRIATE SAFETY EQUIPMENT.
8. UNLESS OTHERWISE NOTED, BOLTS AND NAILS SHALL NOT BE COMBINED. SIMILARLY, WELDS SHALL NOT BE COMBINED WITH BOLTS OR NAILS.
9. 8d, 10d, 12d, 16d AND 20d SPECIFY COMMON NAILS AND MAY NOT BE REPLACED WITH BOX OR SINKER NAILS UNLESS OTHERWISE SPECIFIED.
10. BOLTS SHALL BE ASTM A307, GRADE A OR BETTER.
11. UNLESS OTHERWISE NOTED, BENDING STEEL IN THE FIELD MAY CAUSE FRACTURES AT THE BEND LINE. FRACTURED STEEL WILL NOT CARRY LOAD AND MUST BE REPLACED.
12. A FASTENER THAT SPLITS THE WOOD WILL NOT SUPPORT THE DESIGN LOAD. IF THE WOOD HAS A TENDENCY TO SPLIT, PRE-BORE HOLES TO 3/4 OF THE NAIL DIAMETER PER THE NDS.

TYPICAL WOOD DETAIL
2 WOOD CONSTRUCTION CONNECTOR NOTES
NO SCALE

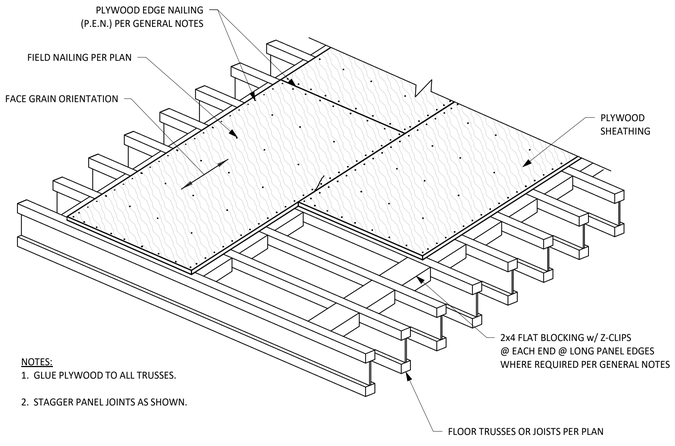


TYPICAL WOOD DETAIL
3 WALL FRAMING AT OPENING
NO SCALE



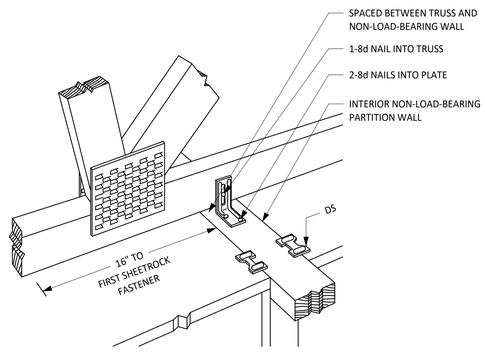
NOTES:
1. USE CLIPS FOR UNBLOCKED DIAPHRAGMS IF NO TONGUE AND GROOVE IN SHEATHING IS SPECIFIED.
2. INSTALL 2 EQUALLY SPACED BETWEEN TRUSSES

TYPICAL WOOD DETAIL
4 SIMPSON STRONG-TIE PSCL
NO SCALE



NOTES:
1. GLUE PLYWOOD TO ALL TRUSSES.
2. STAGGER PANEL JOINTS AS SHOWN.

TYPICAL WOOD DETAIL
5 FLOOR AND ROOF DIAPHRAGM NAILING WITH BLOCKING
NO SCALE



TYPICAL WOOD DETAIL
6 SIMPSON STRONG-TIE STCT AT INTERIOR NON-LOAD-BEARING WALLS
NO SCALE

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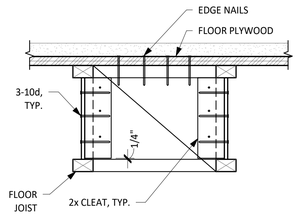
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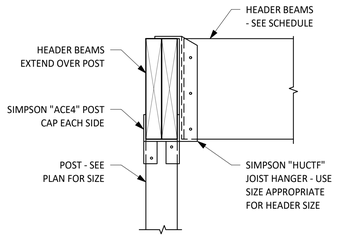
Sheet Name
WOOD TYPICAL DETAILS

Sheet Number
S6.02



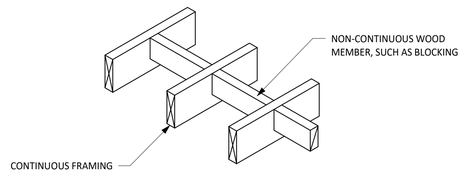
TYPICAL WOOD DETAIL
I-JOIST BLOCKING

1 NO SCALE



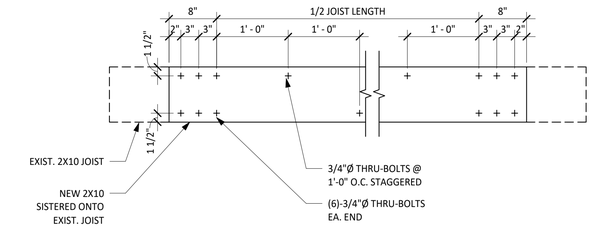
TYPICAL WOOD DETAIL
POST CAP

2 NO SCALE



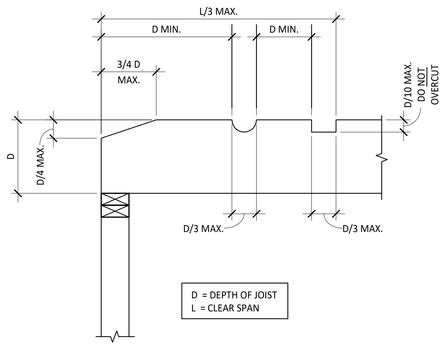
TYPICAL WOOD DETAIL
BLOCKING

3 NO SCALE



TYPICAL DETAIL - WOOD JOIST SISTERING

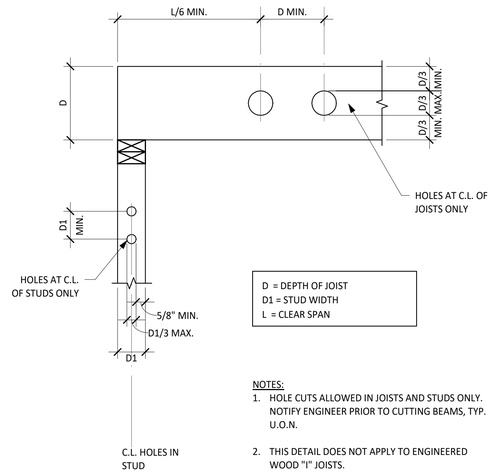
4 NO SCALE



1. NOTCH CUTS ALLOWED IN TOP OF JOISTS ONLY. NOTIFY ENGINEER PRIOR TO CUTTING BEAMS, TYP. U.O.N.
2. THIS DETAIL DOES NOT APPLY TO ENGINEERED WOOD "I" JOISTS.

TYPICAL WOOD DETAIL
NOTCHES IN WOOD

5 NO SCALE



NOTES:
1. HOLE CUTS ALLOWED IN JOISTS AND STUDS ONLY. NOTIFY ENGINEER PRIOR TO CUTTING BEAMS, TYP. U.O.N.
2. THIS DETAIL DOES NOT APPLY TO ENGINEERED WOOD "I" JOISTS.

TYPICAL WOOD DETAIL
HOLES IN WOOD

6 NO SCALE

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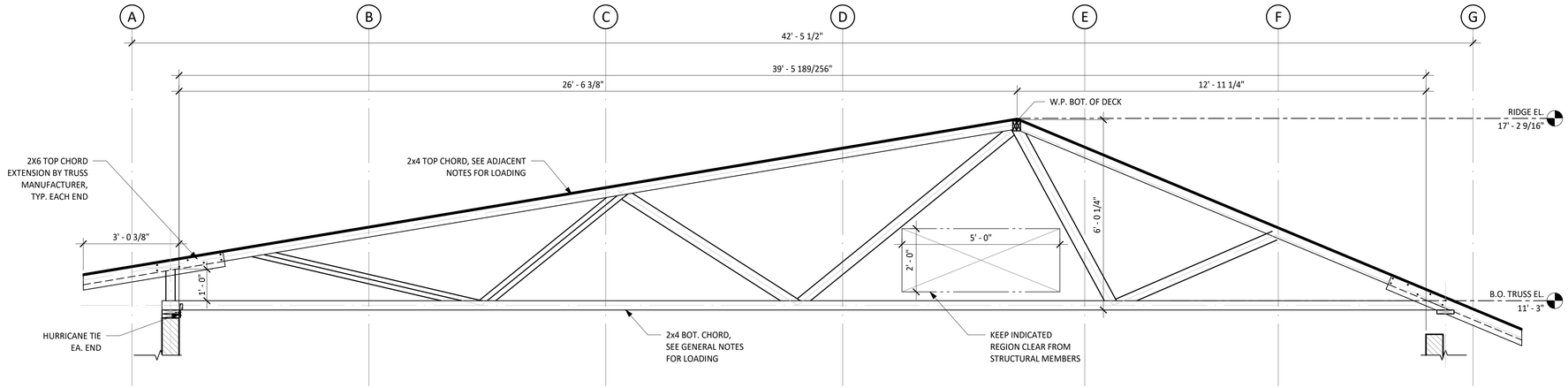
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2314

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January 17, 2025

Sheet Name
WOOD TYPICAL DETAILS

Sheet Number
S6.04



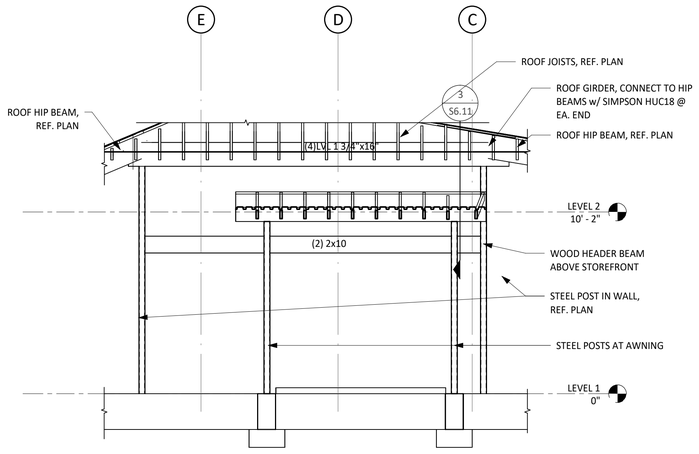
NOTE:
CONFIGURATION SHOWN IS A SCHEMATIC REFERENCE ONLY. FINAL DESIGN OF ROOF TRUSS IS PART OF DELEGATED DESIGN TO ROOF TRUSS FABRICATOR. PROV. SIGN/SEALED DRAWINGS AND CALCULATIONS FOR EOR REVIEW.

DESIGN LOADING:

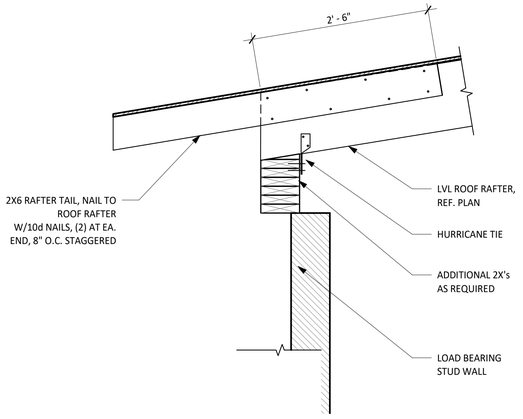
DISTRIBUTED LOADING:
DEAD: 20LB/FT
LIVE: 20LB/FT
WIND: DESIGN FOR C&C WIND LOAD AS REQUIRED PER "DESIGN LOAD" SECTION OF THE GENERAL NOTES, INCLUDING ZONE 1, 2r,2n,2e,3r,&3e ZONE OVERHANG LOADING AS REQUIRED.

POINT LOADING:
AT RIDGE PEAK (SHOWN AS "W.P. BOT. OF DECK"), HIP BEAMS WILL BE SUPPORTED AS SHOWN ON PLAN AT TRUSSES ON EA. END OF THE UPPER ROOF RIDGE ONLY.
DEAD: 750LB
LIVE: 700LB
WIND: 700LB

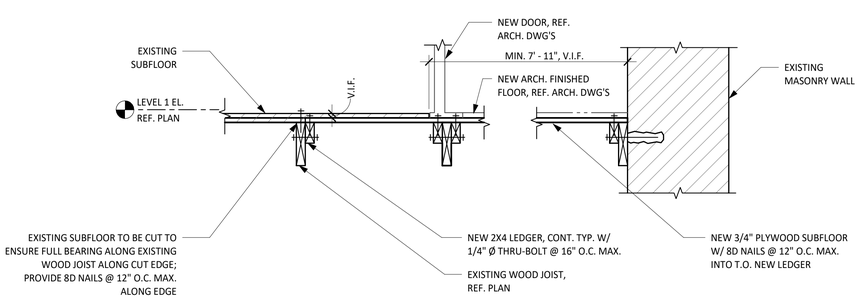
1 ELEVATION - NEW TYPICAL ROOF TRUSS
SCALE: 1/2" = 1'-0"



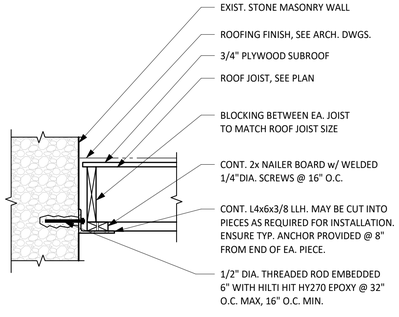
2 ELEVATION - NORTH FRAMING
SCALE: 1/4" = 1'-0"



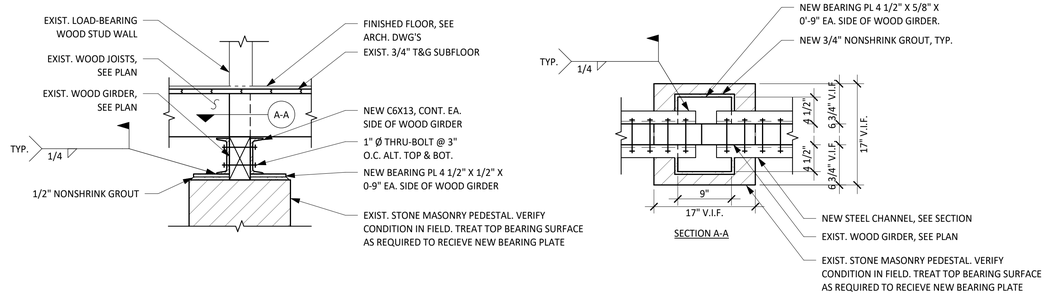
3 DETAIL - LVL ROOF RAFTER OVERHANG
SCALE: 1" = 1'-0"



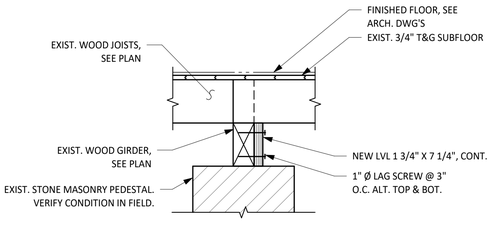
4 DETAIL - FRAMING AT LOWERED FLOOR
SCALE: 1" = 1'-0"



5 DETAIL - FLOOR JOIST SUPPORT AT STONE MASONRY WALL
SCALE: 1" = 1'-0"



6 DETAIL - REINFORCEMENT OF EXISITNG WOOD GIRDER BELOW WOOD BEARING WALL
SCALE: 1" = 1'-0"



7 DETAIL - REINFORCEMENT OF TYP. EXISTING WOOD GIRDER
SCALE: 1" = 1'-0"

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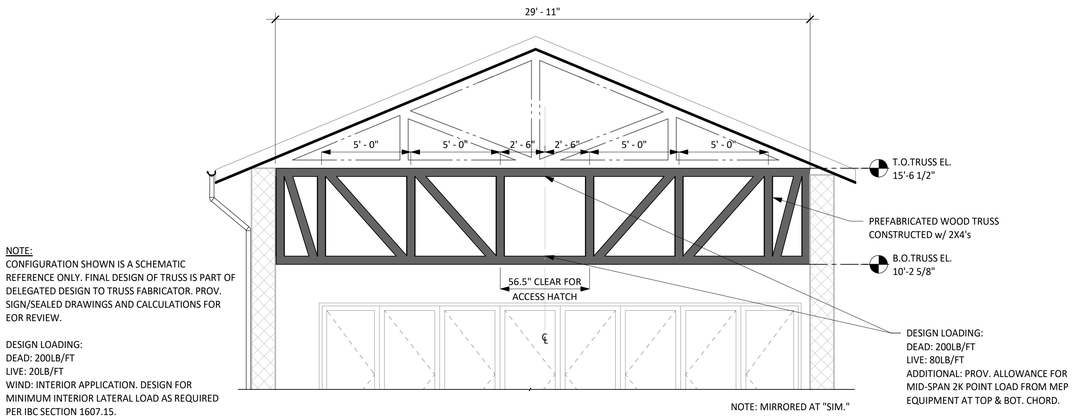
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WOOD DETAILS

Sheet Number
S6.1

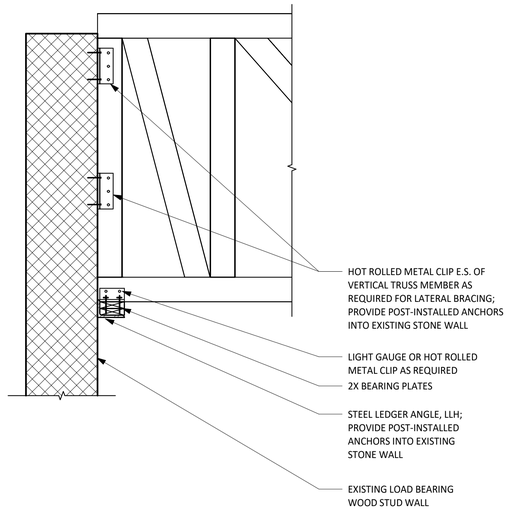
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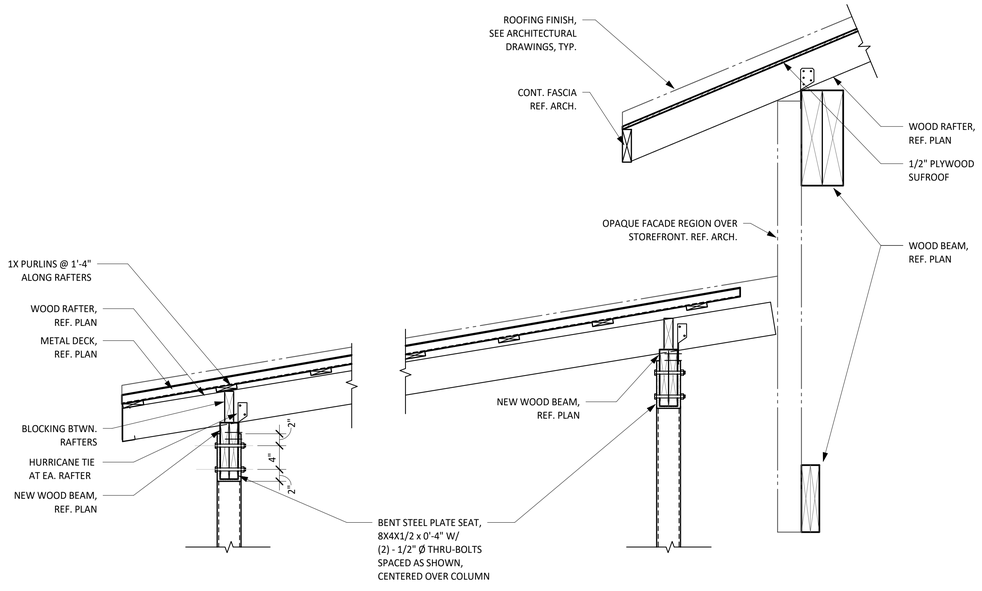
DESIGN LOADING:
DEAD: 200LB/FT
LIVE: 20LB/FT
WIND: INTERIOR APPLICATION. DESIGN FOR MINIMUM INTERIOR LATERAL LOAD AS REQUIRED PER IBC SECTION 1607.15.

1 ELEVATION - NEW WOOD TRUSS ASSEMBLY AT MEP ENCLOSURE
SCALE: 1/4" = 1'-0"



NOTE:
CONNECTION OF THE WOOD TRUSS INTO THE EXISTING RUBBLE MASONRY WALL IS THE RESPONSIBILITY OF THE PREFABRICATED WOOD TRUSS DESIGNER AS PART OF THE DELEGATED DESIGN SCOPE. CONNECTION SHOWN ABOVE IS FOR SCHEMATIC REFERENCE ONLY.

2 DETAIL - TRUSS BEARING
SCALE: 3/4" = 1'-0"



3 DETAIL - FRAMING AT NORTH AWNING
SCALE: 1" = 1'-0"

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Sheet Name
WOOD DETAILS

Sheet Number
S6.XX

MECHANICAL SYMBOLS AND ABBREVIATIONS

NOTE: SELDOM ARE ALL SYMBOLS AND ABBREVIATIONS USED IN THE DRAWINGS; REFERENCE ONLY THOSE THAT ARE APPLICABLE.

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
	FLAT OVAL DUCT SECTION
	ROUND DUCT SECTION
30x24	DUCT SECTION, POSITIVE PRESSURE, FIRST FIGURE IS TOP
30x24	DUCT SECTION, NEGATIVE PRESSURE, FIRST FIGURE IS TOP
30x24	DUCT SIZE, FIRST FIGURE IS SIDE SHOWN.
30x24ø	FLAT OVAL DUCTWORK, FIRST FIGURE IS SIDE SHOWN
UP	CHANGE OF ELEVATION - UP OR DOWN
A.D.	ACCESS DOORS, VERTICAL OR HORIZONTAL
	ACOUSTICAL LINING (INSULATION)
	DEMOLITION DUCTWORK
	EXISTING DUCT
	EXISTING UNDERGROUND RETURN AIR DUCT
	FLEXIBLE CONNECTION
	FLEXIBLE DUCT (SINGLE LINE REPRESENTATION)
	FLEXIBLE DUCT (DOUBLE LINE REPRESENTATION)
V.D.	MANUAL VOLUME DAMPER
M V.D.	MOTORIZED VOLUME DAMPER
F.D.	FIRE DAMPER (WITH ACCESS DOOR)
S.F.D.	SMOKE/FIRE DAMPER (WITH ACCESS DOOR) (OPTIONAL DSD AS INDICATED)
	REFRIGERANT SIGHT GLASS
FD SD	DETECTORS, FIRE AND / OR SMOKE
	DIRECTION OF AIR FLOW
24/8 12/8	DUCT TRANSITION
	ELBOWS WITHOUT TURNING VANES
	ELBOWS WITH TURNING VANES
V.D.	BRANCH DUCT WITH HEEL TAP AND DAMPERS (RETURN DUCT FLOW IS REVERSE)
A 300	AIR DEVICE TYPE "A", 300 CFM
A 200	LINEAR SLOT DEVICE TYPE "A", 200 CFM
A 200	SUPPLY GRILLE OR REGISTER, SIDEWALL TYPE "A", 200 CFM.
_RA_	RETURN/EXHAUST AIR DEVICE, TYPE "RA"
_A_	RETURN/EXHAUST GRILLE OR REGISTER, SIDEWALL, DEVICE TYPE "A"
	ROOF VENTILATOR, SUPPLY
	ROOF VENTILATOR, EXHAUST

DUCTWORK SYMBOLS

SYMBOL	DESCRIPTION
	ROOF HOOD
	FAN COIL (2 OR 4 PIPE)
	IN-LINE CENTRIFUGAL FAN

CONTROLS

SYMBOL	DESCRIPTION
T	THERMOSTAT
T	THERMOSTAT, REMOTE BULB
T	TEMPERATURE SENSOR
H	HUMIDISTAT
H	HUMIDITY SENSOR
F	FIRESTAT

PIPING GENERAL

SYMBOL	DESCRIPTION
F.S.	FLOW SWITCH
P.S.	PRESSURE SWITCH
	STRAINER, WYE WITH DRAIN VALVE
	STRAINER - VERTICAL BASKET TYPE
F.D.	FLOOR DRAIN
	AUTOMATIC AIR VENT PIPED TO DRAIN
	MANUAL AIR VENT PIPED TO DRAIN
	GAUGE COCK
	PRESSURE GAUGE WITH GAUGE COCK
	FLOW VENTURI
	FLOW METER (PITOT OR ORIFICE)
	NEW PIPING
	EXISTING PIPING
	PIPING TO BE DEMOLISHED
D R	PIPE RISE (R) OR DROP (D)
	FLOW - IN DIRECTION OF ARROW
SUPPLY	WATER SUPPLY PIPING (2 PIPE)
RETURN	WATER RETURN PIPING (2 PIPE)
	RISER DOWN (ELBOW)
	RISER UP (ELBOW)
	RISE OR DROP
	BRANCH CONNECTION OUT OF TOP

DRAWING SYMBOLS

SYMBOL	DESCRIPTION
	NEW TO EXISTING CONNECTION
	SECTION ARROW - SECTION 1, SHEET M100
DETAIL SCALE	DETAIL OR PLAN NUMBER 1, SHEET M500 (SCALE AS INDICATED)
	EQUIPMENT MARK
ROOM ###	ROOM & NUMBERS
	KEY NOTES

VALVES

SYMBOL	DESCRIPTION
	AUTOMATIC FLOW CONTROL VALVE
	CALIBRATED BALANCING VALVE
F.M.	COMBINATION BALANCING AND FLOW METER
	EXPANSION VALVE
	VALVE, SELF-OPERATING
	PRESSURE REDUCING VALVE
	PRESSURE RELIEF VALVE
T&P	TEMPERATURE AND PRESSURE RELIEF VALVE
M	THREE WAY VALVE (AUTOMATIC)
M	TWO WAY VALVE (AUTOMATIC)
	NON-SLAM CHECK VALVE
	BALL VALVE
M.S.	BALL VALVE (MEMORY STOP)
	OUTSIDE STEM AND YOKE GATE VALVE
	GATE VALVE
	FLOAT VALVE
	GLOBE VALVE
	BUTTERFLY VALVE
S	SOLENOID VALVE
	HOSE VALVE (UTILITY PURPOSES)
	THERMOSTATIC EXPANSION VALVE
	SWING CHECK VALVE
	VALVE IN RISER (TYPE AS SPEC'D OR NOTED)
	PLUG VALVE

PIPING GENERAL

SYMBOL	DESCRIPTION
	BRANCH CONNECTION OUT OF BOTTOM
	BRANCH CONNECTION OUT OF SIDE
	CAP ON END OF PIPE
	PLUGGED TEE
MD	PUMP
	CONCENTRIC REDUCER
	ECCENTRIC REDUCER
	UNION (SCREWED)
	UNION (FLANGED)
P.A.	PIPE ANCHOR
	BLADDER TYPE TEMP. OR PRESS. TEST PORT (WITH COVER)
	MECHANICAL GROOVED PIPE COUPLING
	FLEXIBLE PIPE CONNECTOR
	THERMOMETER (STRAIGHT SCALE)
	THERMOMETER OR CONTROL TEST BULB WELL
	THERMOSTAT

COOLING

SYMBOL	DESCRIPTION
CHWS	CHILLED WATER SUPPLY
CHWR	CHILLED WATER RETURN
CWS	CONDENSOR WATER SUPPLY
CWR	CONDENSOR WATER RETURN
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RHG	REFRIGERANT HOT GAS
HGB	HOT GAS BYPASS
MUW	MAKE-UP WATER
D	DRAIN LINE

HEATING

SYMBOL	DESCRIPTION
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
HPS	HIGH PRESSURE STEAM CONDENSATE
LPS	LOW PRESSURE STEAM CONDENSATE
PCR	PUMPED CONDENSATE RETURN
S15	STEAM SUPPLY (PRESSURE AS INDICATED)
BFW	BOILER FEED WATER
	THERMOSTATIC TRAP
	FLOAT AND THERMOSTATIC TRAP

ABBREVIATIONS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
ABV	ABOVE	ENT	ENTERING	OH	OVERHEAD
AC	ABOVE CEILING	EQUIP.	EQUIPMENT	PD	PRESSURE DROP
ACC	AIR COOLED CHILLER	ERV	ENERGY RECOVERY VENTILATOR	PLBG	PLUMBING
AD	ACCESS DOOR	ESP	EXTERNAL STATIC PRESSURE	PRESS	PRESSURE
AFF	ABOVE FINISHED FLOOR	EWT	ENTERING WATER TEMPERATURE	PSI	POUNDS PER SQUARE INCH, GAUGE
AHU	AIR HANDLING UNIT	EXH	EXHAUST	PTAC	PACKAGE TERMINAL AIR CONDITIONER
APPROX.	APPROXIMATE	EXIST	EXISTING	PVC	POLYVINYL CHLORIDE
AV	AIR VENT	F	FAHRENHEIT	RA	RETURN AIR
ARCH.	ARCHITECTURAL	FA	FRESH AIR	REFRIG.	REFRIGERATION
B	BOILER	FC	FAN COIL	RHD	RELIEF HOOD
BDD	BACK DRAFT DAMPER	FD	FIRE DAMPER	RH	RELATIVE HUMIDITY
BF	BELOW FLOOR	FPM	FEET PER MINUTE	RTU	ROOF TOP UNIT
BLDG.	BUILDING	FS	FLOW SWITCH	SA	SUPPLY AIR
BHP	BRAKE HORSEPOWER	FT	FEET	SCH	SCHEDULE
BTU	BRITISH THERMAL UNIT	GAL	GALLON(S)	SD	SMOKE DAMPER
CFM	CUBIC FEET PER MINUTE	GALV	GALVANIZED	SF	SQUARE FOOT
CH	CHILLER	GPM	GALLONS PER MINUTE	SHT	SHEET
CI	CAST IRON	HB	HOSE BIBB	SP	STATIC PRESSURE
CLG	CEILING	HD	HEAD	SPEC	SPECIFICATION
CO	CLEANOUT	HDT	HORIZONTAL DRAW THRU	STD	STANDARD
CONC	CONCRETE	HP	HORSEPOWER	STL	STEEL
COND	CONDENSATE	HTR	HEATER	SW	SWITCH
CONNX/CONX.	CONNECTION	H2O	WATER	T/A	THROW AWAY (FILTERS)
CONT	CONTINUATION	HW	HOT WATER	T-STAT	THERMOSTAT
CP	CENTRAL PLANT	HZ	HERTZ	TEMP	TEMPERATURE
℄	CENTERLINE	ID	INSIDE DIAMETER	TSH	TOTAL SENSIBLE HEAT
CT	COOLING TOWER	INV	INVERT	TXV	THERMOSTATIC EXPANSION VALVE
CU	CONDENSING UNIT	IN	INCHES	TYP	TYPICAL
CHW	CHILLED WATER	IN WG	INCHES OF WATER	UF	UNDER FLOOR
CWP	CHILLED WATER PUMP	JST	JOIST	UG	UNDERGROUND
DDC	DIRECT DIGITAL CONTROLS	KW	KILOWATT	UH	UNIT HEATER
DG	DOOR GRILLE	L	LENGTH	UL	UNDERWRITER'S LABORATORIES
DI	DUCTILE IRON	LAT	LEAVING AIR TEMPERATURE	V	VENT
DIA	DIAMETER	LVR	LOUVER	VB	VALVE BOX
DB	DRYBULB	MAX	MAXIMUM	VCP	VITRIFIED CLAY PIPE
DN	DOWN	MD	MANUAL DAMPER	VEL	VELOCITY
DSD	DUCT SMOKE DETECTOR	MECH	MECHANICAL	VENT	VENTILATE
DWG	DRAWING	MIN	MINIMUM	VOL	VOLUME
DX	DIRECT EXPANSION	MOBD	MOTORIZED OPPOSED BLADE DAMPER	VOLT	VOLTAGE
EA	EXHAUST AIR	MTD	MOUNTED	VTR	VENT THRU ROOF
EAT	ENTERING AIR TEMPERATURE	NA	NOT APPLICABLE	W	WIDE, WIDTH
EDH	ELECTRIC DUCT HEATER	NC	NORMALLY CLOSED	WB	WET BULB
EF	EXHAUST FAN	NIC	NOT IN CONTRACT	W.C.	WATER COLUMN
EG	EXHAUST GRILLE	NO	NORMALLY OPEN	W/	WITH
ELECT	ELECTRICAL	NTS	NOT TO SCALE	W/O	WITHOUT
ELEV	ELEVATION	OA	OUTSIDE AIR		ANGLE IRON
EMCS	REFRIGERANT MONITORING CONTROL SYSTEM	OBD	OPPOSED BLADE DAMPER		

COMMISSIONING PLAN

PROJECT IS EXEMPT FROM COMMISSIONING PER IECC 408.2 EXEMPTION NO. 1.

THE TOTAL MECHANICAL EQUIPMENT COOLING CAPACITY IS LESS THAN 480,000 BTUH AND LESS THAN 600,000 BTUH HEATING CAPACITY.

Item 2.

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STATE OF TEXAS
MAESAN A. CARLEY
144997
LICENSED
PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314

Date January 17, 2025

Sheet Name
MECHANICAL SYMBOLS & ABBREVIATIONS

Sheet Number
M000

1079

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MECHANICAL GENERAL NOTES (APPLIES TO ALL PAGES):

1. THE "EXISTING" MECHANICAL LAYOUTS INDICATED ON THESE DOCUMENTS ARE BASED ON THE INFORMATION AVAILABLE AND MAY BE INCOMPLETE. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY ACTUAL CONDITIONS AND MAKE SUITABLE ADJUSTMENTS AS NECESSARY, TO ACCOMMODATE NEW WORK. CONDITIONS DIFFERENT TO THOSE INDICATED SHALL BE INCORPORATED INTO THE CONSTRUCTION DOCUMENTS. NOTE THAT ANY UNCOVERED SYSTEMS MUST BE CAREFULLY IDENTIFIED PRIOR TO MODIFICATIONS.
2. CONTRACTOR SHALL COORDINATE HIS WORK WITH THE OTHER TRADES AND INCLUDE ANY MODIFICATIONS NEEDED TO ACCOMMODATE THEIR WORK.
3. FIELD VERIFY EXACT LOCATIONS AND SIZES OF EXISTING EQUIPMENT.
4. IN-FILL ANY OPEN WALL PENETRATIONS ABOVE THE CEILING, FROM CRAWL SPACE, OR THROUGH DECK SLAB THAT ARE CREATED BY THE REMOVAL OF ANY PIPING, CONDUIT, OR EQUIPMENT. FIRE CAULK ALL PENETRATIONS THROUGH NEW AND EXISTING FIRE RATED WALLS TO ENSURE INTEGRITY OF RATED AND NON RATED WALLS. IN-FILL PIPING PENETRATIONS NEW AND ABANDONED WITH POURABLE SEALANT. ALL PENETRATIONS SHALL BE INSPECTED PRIOR TO CONCEALMENT.
5. OWNER SHALL HAVE FIRST PRIORITY OVER ANY SALVAGED EQUIPMENT DURING THE DEMOLITION PROCESS. CONTRACTOR SHALL COORDINATE WITH OWNER TO DETERMINE WHAT ITEMS, IF ANY, THE OWNER WOULD LIKE TO KEEP.

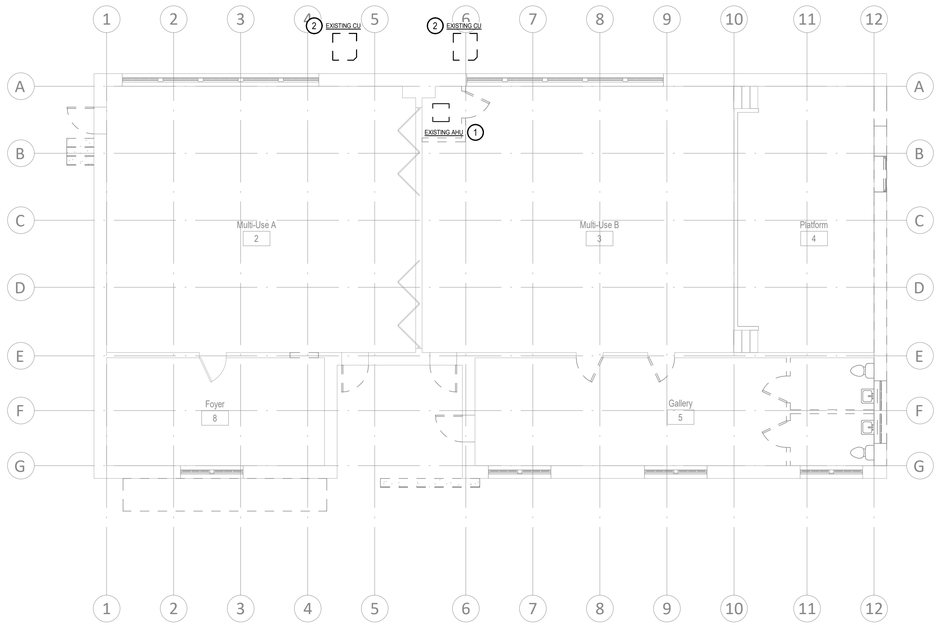
MECHANICAL DEMOLITION KEYED NOTES:

1. DEMOLISH ALL EXISTING MECHANICAL EQUIPMENT IN CLOSET AND ALL ASSOCIATED DUCTWORK, AIR DEVICES, PIPING, HANGERS, AND SUPPORTS.
2. DEMOLISH EXISTING OUTDOOR CONDENSING UNITS AND ASSOCIATED CONCRETE PADS, PIPING, AND SUPPORTS.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES:

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES. GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.



1 MD101 MECHANICAL LEVEL 1 DEMOLITION PLAN

1/8" = 1'-0"

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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STATE OF TEXAS
MAESAN A. CARLEY
14997
LICENSED
PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
MECHANICAL LEVEL 1 DEMOLITION PLAN

Sheet Number
MD101

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MECHANICAL GENERAL NOTES:

1. TURNING VANES NOT SHOWN. ALL MITERED DUCTWORK ELBOWS SHALL HAVE TURNING VANES.
2. THERMOSTATS SHOWN ON MECHANICAL PIPING PLAN FOR CLARITY.
3. ALL DUCTWORK LOACTED IN EXISTING BUILDING TO FIT WITHIN EXISTING TRUSSES. EXISTING TRUSSES SHALL NOT BE MODIFIED.
4. DUCTWORK EXPOSED OUTSIDE OF MECHANICAL FURR DOWN SHALL BE PAINTED PER GENERAL MEP NOTES.

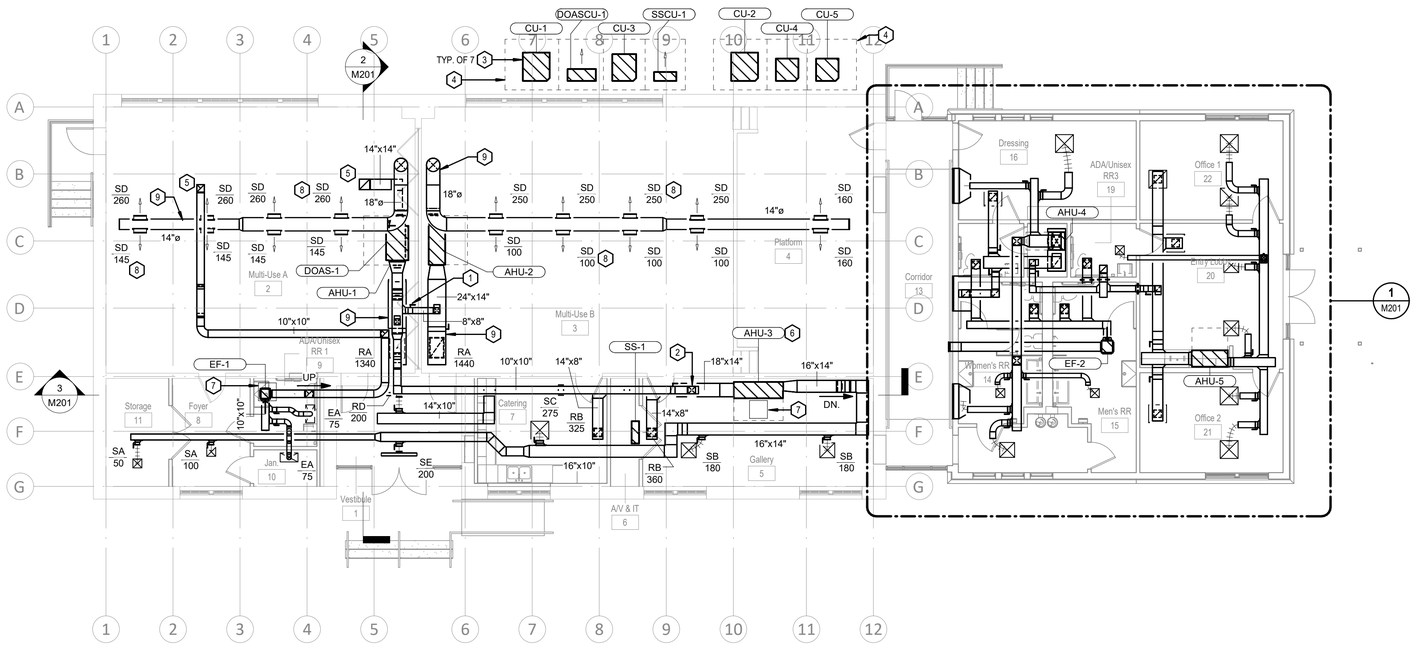
MECHANICAL KEYED NOTES:

1. BALANCE AIRFLOW BALANCING DAMPER TO 280 CFM.
2. BALANCE AIRFLOW BALANCING DAMPER TO 90 CFM.
3. PROVIDE 5-1/2 INCH CONCRETE EQUIPMENT PAD. CONCRETE PAD TO BE SIZED TO INCLUDE ELECTRICAL DICONNECT. EQUIPMENT PAD TO EXTEND AT LEAST 4" PAST EQUIPMENT FOOTPRINT.
4. EQUIPMENT CLEARANCE SHOWN IN DASHED LINE. TYPICAL OF ALL MECHANICAL EQUIPMENT.
5. DUCTWORK DOWN FROM ROOF HOOD. SEE ROOF PLAN FOR CONTINUATION.
6. EXACT AHU LOCATION TO BE COORDINATED WITH EXISTING TRUSSES. CENTER UNIT ON CLEAR SPACE BETWEEN TRUSSES.
7. PROVIDE CEILING ACCESS PANEL MINIMUM 24" X 24" IN SIZE. COORDINATE EXACT LOCATION OF ACCESS PANEL SUCH THAT EXISTING STRUCTURE DOES NOT OBSTRUCT OPENING.
8. DRUM LOUVERS TO BE MOUNTED ON SPIRAL DUCTWORK 30 DEGREES BELOW HORIZONTAL. TYPICAL OF ALL DRUM LOUVERS.
9. ALL DUCTWORK ASSOCIATED WITH AHU-1 AND AHU-2 TO BE SINGLE WALL, INTERNALLY LINED. DUCTWORK DIMENTIONS NOTED ON PLANS REFERS TO FREE AREA OF AIRFLOW.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES:

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES. GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
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   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.



1 M101 MECHANICAL LEVEL 1 PLAN

1/8" = 1'-0"

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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STATE OF TEXAS
MAESAN A CARLEY
144997
LICENSED
PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
MECHANICAL LEVEL 1 PLAN

Sheet Number
M101

MECHANICAL PIPING GENERAL NOTES:

1. EQUIPMENT CLEARANCE SHOWN IN DASHED LINE. TYPICAL OF ALL MECHANICAL EQUIPMENT.
2. ALL PIPING ROUTING IS APPROXIMATE AND SHALL BE COORDINATED IN THE FIELD.
3. ROUTE REFRIGERANT PIPING TIGHT TO STRUCTURE WHERE POSSIBLE.
4. ALL PIPING SHALL BE INSULATED PER INSULATION SPECIFICATION.
5. CONTRACTOR SHALL COORDINATE INTERIOR / EXTERIOR PIPING HANGERS AND SUPPORTS WITH EXISTING STRUCTURE TO MINIMIZE THE AMOUNT OF PENETRATIONS MADE IN THE EXISTING STONE FACADE

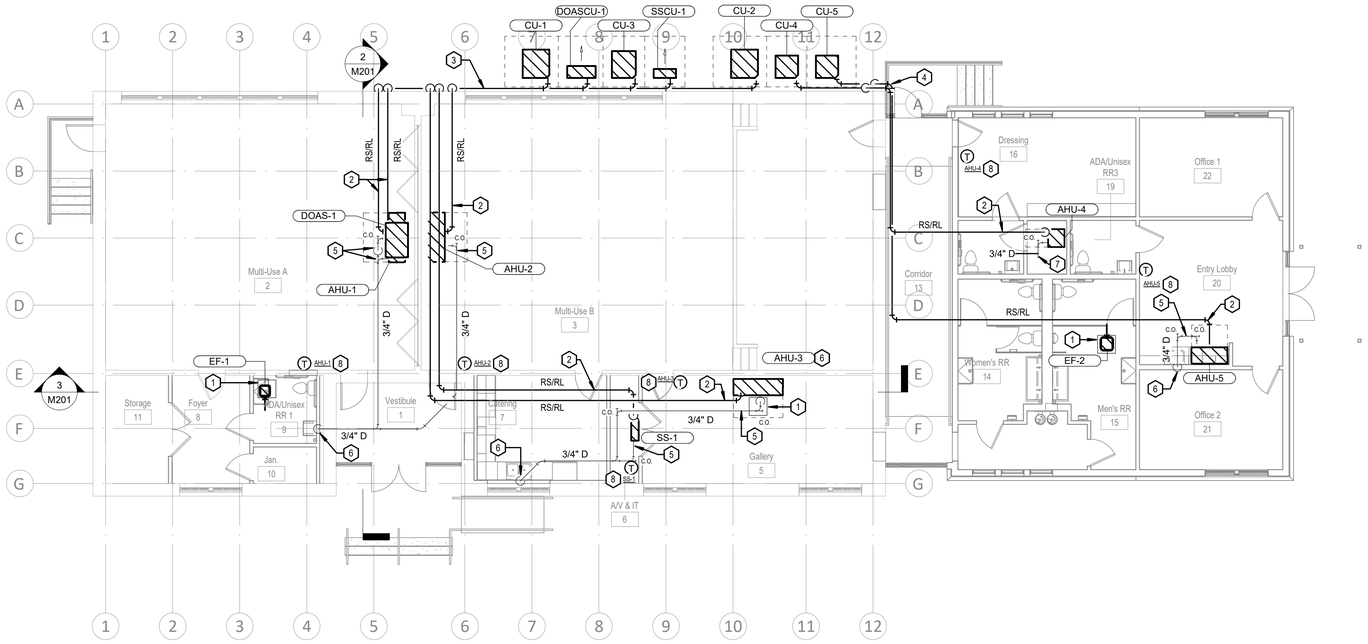
MECHANICAL KEYED NOTES:

1. PROVIDE CEILING ACCESS PANEL MINIMUM 24" X 24" IN SIZE. COORDINATE EXACT LOCATION OF ACCESS PANEL SUCH THAT EXISTING STRUCTURE DOES NOT OBSTRUCT OPENING.
2. APPROXIMATE ROUTING FOR RS/RL SHOWN IN SINGLE LINE FOR CLARITY. MANUFACTURER TO SIZE REFRIGERANT PIPING.
3. ROUTE MULTIPLE REFRIGERANT LINES STACKED ON EXTERIOR OF BUILDING UNTIL PENETRATION INTO MECHANICAL PLENUM SPACE. CONTRACTOR SHALL MINIMIZE THE AMOUNT OF PENETRATIONS MADE INTO THE FACADE.
4. ROUTE MULTIPLE REFRIGERANT LINES STACKED ALONG EXTERIOR OF BUILDING UNTIL PENETRATION INTO EXPANSION. CONTRACTOR SHALL MINIMIZE THE AMOUNT OF PENETRATIONS MADE INTO THE FACADE.
5. ROUTE INSULATED COPPER CONDENSATE, TRAPPED PER DETAIL, AS SHOWN. CONTRACTOR SHALL FIELD VARIFY THE NEED FOR AN INLINE CONDENSATE PUMP.
6. ROUTE CONDENSATE LINE DOWN TO SINK TAIL PIECE. COORDINATE WITH PLUMBING DETAILS.
7. ROUTE CONDENSATE TO FLOOR SINK IN MECH ROOM. COORDINATE WITH PLUMBING FOR EXACT LOCATION.
8. THERMOSTAT TO BE MOUNTED AT 48" AFF PER ADA REQUIREMENTS,

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES:

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES. GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.



1 M101P MECHANICAL PIPING LEVEL 1 PLAN

1/8" = 1'-0"

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION

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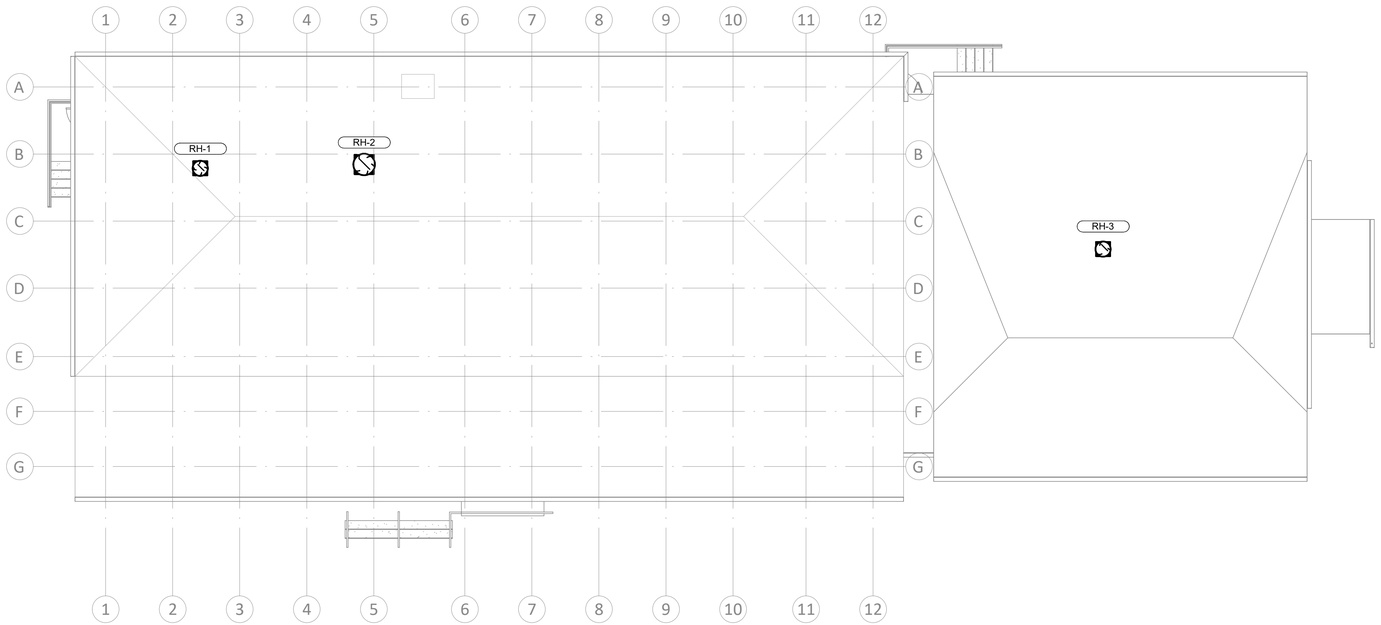
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MAESAN A CARLEY
144997
LICENSED
PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
MECHANICAL PIPING LEVEL 1 PLAN

Sheet Number
M101P

1/16/2025 1:04:28 PM



1 M102 MECHANICAL ROOF PLAN
1/8" = 1'-0"

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES:

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
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   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

0' 4' 8' 16' 32'
SCALE: 1/8"=1'-0"

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01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
MECHANICAL ROOF PLAN

Sheet Number
M102

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MECHANICAL KEYED NOTES:

1. BALANCE OUTSIDE AIRFLOW BALANCING DAMPER TO 100 CFM.
2. BALANCE OUTSIDE AIRFLOW BALANCING DAMPER TO 150 CFM.
3. DUCTWORK DOWN FROM ROOF HOOD. SEE ROOF PLAN FOR ROOF HOOD LOCATION.
4. WIND DRIVEN RAIN RESISTANT EXHAUST LOUVER WITH MINIMUM 0.9 SQFT FREE AREA. REFER TO DETAILS FOR CONNECTION. REFER TO ARCHITECTURAL FOR LOUVER SPECIFICATIONS.
5. FIELD FABRICATE LINEAR SLOT DIFFUSER PLENUM EXTENTION.
6. BALANCE OUTSIDE AIRFLOW BALANCING DAMPER TO 280 CFM.
7. PROVIDE FILTER FRAME AT RETURN GRILLE.
8. BALANCE OUTSIDE AIRFLOW BALANCING DAMPER TO 90 CFM.
9. PROVIDE CEILING ACCESS PANEL MINIMUM 24" X 24" IN SIZE. COORDINATE EXACT LOCATION OF ACCESS PANEL SUCH THAT EXISTING STRUCTURE DOES NOT OBSTRUCT OPENING.
10. CENTER UNIT WITHIN CLEAR OPENING OF PREFABRICATED STRUCTURE FOR MAINTENANCE ACCESS TO UNIT. COORDINATE WITH STRUCTURAL.
11. LOCATE UNIT BETWEEN EXISTING TRUSSES. COORDINATE WITH STRUCTURAL.
12. AIR DEVICE PLENUM EXPOSED IN DRESSING ROOM TO BE SINGLE WALL INTERNALLY LINED. MOUNT LINEAR SLOT DIFFUSER AS HIGH AS POSSIBLE. COORDINATE WITH ARCHITECT FOR PAINT COLOR.

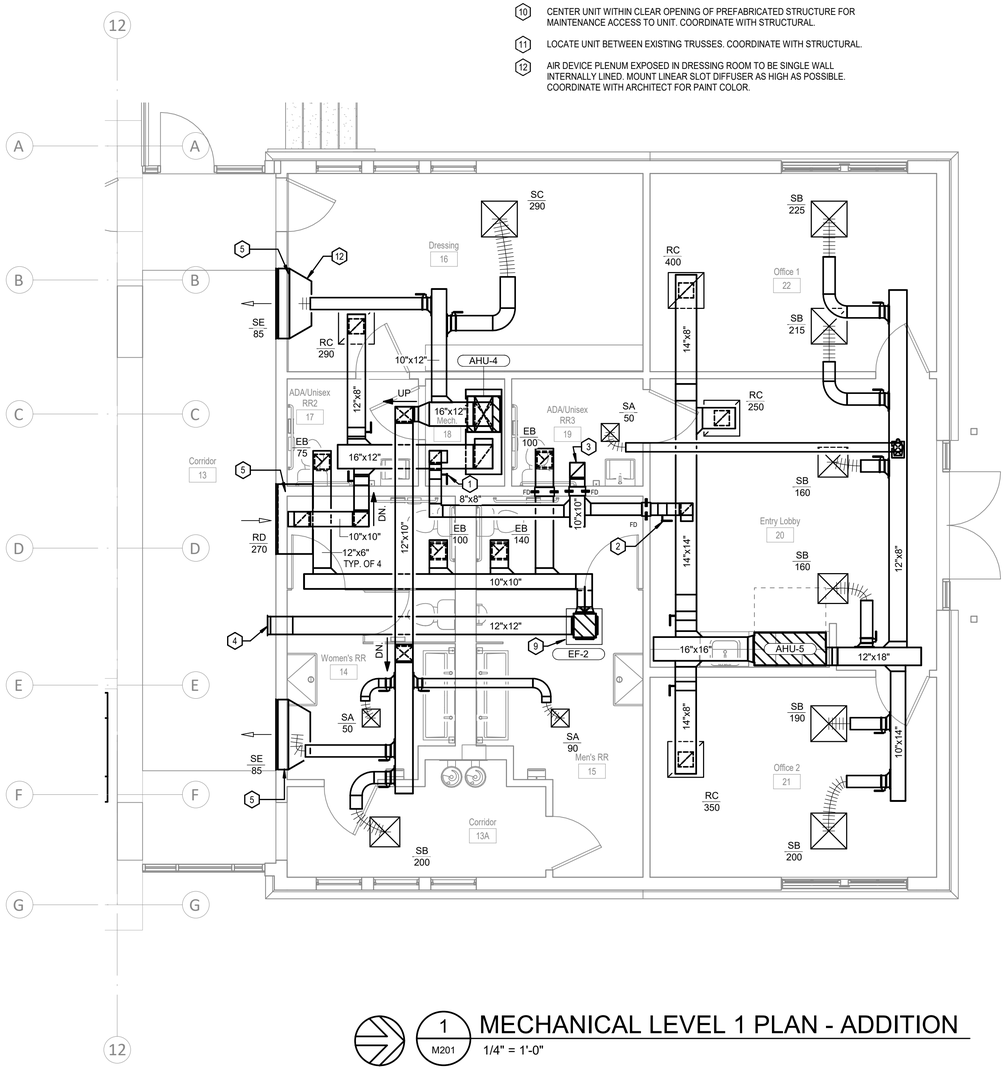
MECHANICAL GENERAL NOTES:

1. TURNING VANES NOT SHOWN. ALL MITERED DUCTWORK ELBOWS SHALL HAVE TURNING VANES.
2. THERMOSTATS SHOWN ON MECHANICAL PIPING PLAN FOR CLARITY.
3. ALL DUCTWORK LOACTED IN EXISTING BUILDING TO FIT WITHIN EXISTING TRUSSES. EXISTING TRUSSES SHALL NOT BE MODIFIED.
4. DUCTWORK EXPOSED OUTSIDE OF MECHANICAL FURR DOWN SHALL BE PAINTED PER GENERAL MEP NOTES.

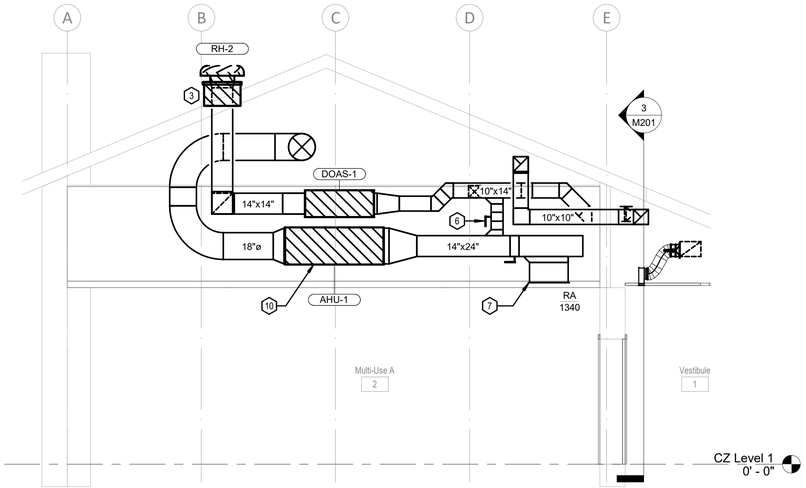
GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES:

EXISTING BUILDING:

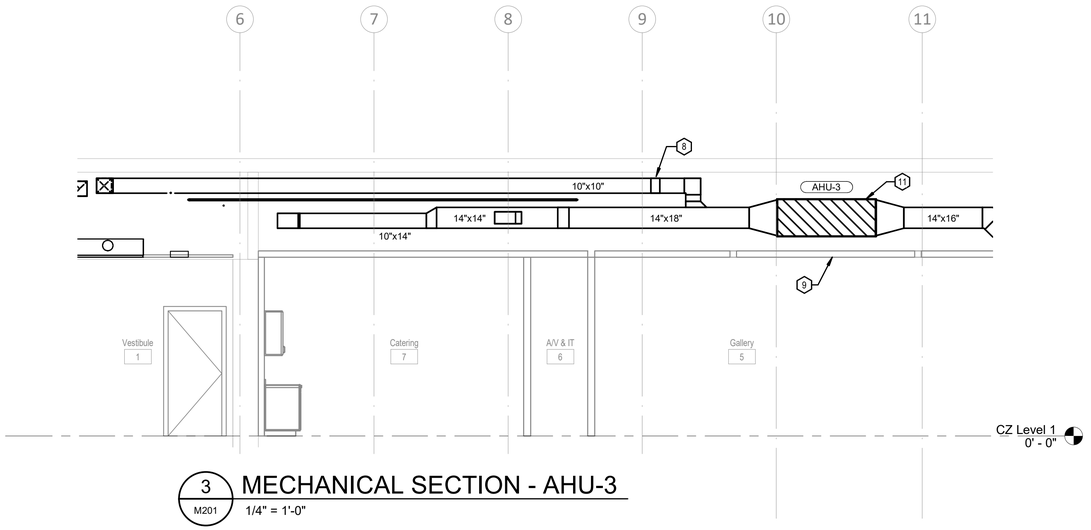
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1 M201 MECHANICAL LEVEL 1 PLAN - ADDITION
1/4" = 1'-0"



2 M201 MECHANICAL SECTION - MULTI-USE 1
1/4" = 1'-0"



3 M201 MECHANICAL SECTION - AHU-3
1/4" = 1'-0"

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PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
MECHANICAL ENLARGED PLANS & SECTION VIEWS

Sheet Number
M201

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DOAS SCHEDULE

INDOOR UNIT	
MARK	DOAS-1
TOTAL CFM	650
AIRFLOW MODULATION	CONSTANT
OA CFM	650
ESP ("WG)*	0.4
FAN MOTOR (V / PH)	230 / 1
AUXILIARY HEAT TYPE	SCR ELEC.
MCA / MOCP	1.9 / 15
COOLING	
EAT (°F) (DB / WB)	100.3 / 74.3
LAT (°F) (DB / WB)	55.0 / 55.0
MAX FACE VEL. (FPM)	500
TOTAL OUTPUT (MBH)	51.0
SENS OUTPUT (MBH)	32.4
REHEAT / AUXILIARY HEAT	
TYPE	SCR ELEC.
LAT (°F) (DB)	70
TOTAL CAPACITY (kW)	3
ELECTRICAL SERVICE (V / PH)	230 / 1
MCA / MOCP	16.3 / 20
HEATING	
TYPE	HEAT PUMP
EAT (°F) (DB)	22.4
LAT (°F) (DB)	70.0
TOTAL CAPACITY (MBh)	30.5
OUTDOOR UNIT	
TAG	DOASCU-1
REGRIGERANT TYPE	R-410A
SEER	16
COMPRESSOR TYPE	INVERTER
ABMIENT T (COOLING MODE)	105
AMBIENT T (HEATING MODE)	20
ELECTRICAL SERVICE (V/PH)	230 / 1
MCA / MOCP	29.1 / 35
REFERENCE	
MANUFACTURER INDOOR/OUTDOOR SECTION	DAIKIN
AIR HANDLING UNIT MODEL	FXMQ48MFVJU
AHU/CU WEIGHTS (LBS)	190 / 225
CONDENSING UNIT MODEL	RXTQ60TAVJUA
NOTES	1-8

DOAS SCHEDULE NOTES:

1. MANUFACTURE TO SIZE REFRIGERANT LINES.
2. SCR HEAT STRIP TO BE FIELD MOUNTED IN DUCT WORK.
3. SCR HEAT STRIP TO HAVE SEPARATE POWER SUPPLY FROM INDOOR UNIT. COORDINATE WITH ELECTRICAL.
4. PROVIDE WITH AMBIENT CONTROL KIT.
5. PROVIDE WITH MERV 8 FILTERS.
6. PROVIDE INDOOR UNIT WITH AUXILLARY STAINLESS STEEL DRAIN PAN AND EMERGENCY OVERFLOW CUT OFF SWITCH.
7. PROVIDE WITH FIELD INSTALLED COIL GUARD.
8. UNIT TO BE PROGRAMMED TO RUN CONTINUOSLY DURING OCCUPIED HOURS.

SPLIT-SYSTEM SCHEDULE

INDOOR UNIT						
TAG	AHU-1	AHU-2	AHU-3	AHU-4	AHU-5	
AREA SERVED	MULTI-USE A	MULTI-USE B	ENTRY / GALLERY / CATERING	DRESSING / RR	OFFICE	
AIR MODULATION	CONSTANT	CONSTANT	CONSTANT	CONSTANT	CONSTANT	
TOTAL CFM	1625	1725	975	800	1150	
OUTSIDE AIR CFM	0	0	0	100	150	
EXTERNAL STATIC PRESSURE (IN. W.G.)	0.5	0.5	0.5	0.5	0.5	
FAN MOTOR (HP / V / PH)	0.75 / 240 / 1	0.75 / 240 / 1	0.5 / 240 / 1	0.5 / 240 / 1	0.5 / 240 / 1	
UNIT MCA / MOCP	45.3 / 50	45.3 / 50	28.7 / 30	28.7 / 30	28.7 / 30	
COOLING COIL						
TYPE	DX A/C	DX A/C	DX A/C	DX A/C	DX A/C	
ENT. AIR (DB/WB)	77.8 / 62.2	78.1 / 62.6	78.4 / 59.9	80.8 / 63.6	77.7 / 62.2	
LEV. AIR (DB/WB)	55.0 / 55.0	55.0 / 55.0	55.0 / 55.0	55.0 / 55.0	55.0 / 55.0	
TOTAL CAPACITY (MBh)	45.1	55.9	33.1	26.5	35.3	
SENSIBLE CAPACITY (MBh)	39.1	48.3	31.9	22.9	31.0	
HEATING COIL						
TYPE	ELEC.	ELEC.	ELEC.	ELEC.	ELEC.	
ENT. AIR (DB)	68.7	68.7	67.8	63.3	63.9	
LEV. AIR (DB)	85.0	85.0	85.0	85.0	85.0	
TOTAL CAPACITY (kW)	7.5	7.5	5.0	5.0	5.0	
OUTDOOR UNIT						
MARK	CU-1	CU-2	CU-3	CU-4	CU-5	
AMB. TEMP. (°F DB/WB)	105 / 78	105 / 78	105 / 78	105 / 78	105 / 78	
LOW AMB. CONT. (°F)	20	20	20	20	20	
S.E.E.R.2	14.5	14.5	15.2	15.2	15.0	
REFRIGERANT	R-454B	R-454B	R-454B	R-454B	R-454B	
ELECTRICAL SERVICE (V / PH)	240 / 1	240 / 1	240 / 1	240 / 1	240 / 1	
UNIT MCA / MOCP	30.7 / 50	30.7 / 50	16.2 / 25	16.2 / 25	19.0 / 30	
REFERENCE						
MANUFACTURER	JCI	JCI	JCI	JCI	JCI	
INDOOR UNIT MODEL	JMC16C2SN1, CTF60C5CHS1	JMC16C2SN1, CTF60C5CHS1	JMC12B2SN1, CTF36B5ADS1	JMC12B2SN1, CTF36B5ADS1	JMC12B2SN1, CTF36B5CDS1	
WIEGHT LBS.	150	150	110	110	100	
OUTDOOR UNIT MODEL	XC460E2S11	XC460E2S11	XC430E2S11	XC430E2S11	XC436E2S11	
WEIGHT LBS.	250	250	170	170	200	
NOTES	1-8	1-8	1-8	1-8	1-8	

CONSTANT VOLUME SPLIT-SYSTEM SCHEDULE NOTES:

1. PROVIDE STARTERS AS REQUIRED.
2. MANUFACTURER TO SIZE REFRIGERANT LINES.
3. SECURE AHU TO STRUCTURE WITH ALL THREAD AND SPRING ISOLATORS.
4. PROVIDE WITH MANUFACTURER'S 7-DAY PROGRAMMABLE T-STAT WITH AUTOMATIC CHANGE OVER. PROVIDE THERMOSTAT WITH LOCKABLE ENCLOSURE.
5. PROVIDE WITH RAWAL APR VALVE.
6. PROVIDE WITH LOW AMBIENT CONTROL KIT
7. PROVIDE WITH AUXILIARY DRAIN PAN AND EMERGENCY OVERFLOW CUT OFF SWITCH
8. PROVIDE WITH HAIL GUARDS.

CONTROLS: AHU-1, AHU-2, AND AHU-3 SHALL INDIVIDUALLY OPERATE PER THE MANUFACTURER'S SUPPLIED 7 DAY PROGRAMMABLE THERMOSTAT, HARD WIRED TO EACH RESPECTIVE UNIT. AHU-1, AHU-2, AND AHU-3'S SUPPLY FANS SHALL ALL RUN CONTINUOUSLY PER A USER DEFINED OCCUPANT SCHEDULE, REMAINING ON EVEN WHEN THEIR RESPECTIVE COMPRESSORS ARE OFF. DOAS-1 SHALL OPERATE CONTINUOUSLY PER THE SAME OCCUPANT SCHEDULE WHILE THE AHU FANS ARE OPERATING. EXHAUST FAN EF-1 SHALL OPERATE CONTINUOUSLY WHENEVER DOAS-1'S SUPPLY FAN IS RUNNING.

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Item 2.

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Sheet Name
MECHANICAL SCHEDULES

Sheet Number
M301

FLEX DUCT SCHEDULE

CFM RANGE	SIZE (DIAMETER)*
<50 - 100	6
101 - 250	8
251 - 400	10
401 - 650	12
651 - 900	14
901 - 1300	16
1301 - 1800	18
1801 - 2300	20

*ALL FLEX DUCT SHALL BE SIZED IN ACCORDANCE WITH FLEX DUCT SCHEDULE. PROVIDE RIGID REDUCER AT NECK OF AIR DEVICE, VAV INLET DUCT, ETC. TO TRANSITION FROM FLEX DUCT SIZE TO DIFFUSER INLET AND / OR EQUIPMENT CONNECTION SIZE. FLEX DUCT NOT TO EXCEED 6FT LENGTH.

AIR DEVICE SCHEDULE

MARK	MODEL	SIZE	THROW (@ 100 FPM)	CFM RANGE	INLET	# SLOTS	O.B.D. REQ'D. ?	P.D. ("WG) *	MAX. NC	REFERENCE	NOTES
SA	ASCD	12" x 12"	3 FT	0-100	6"ø	N/A	NOTE 2	0.04	25	PRICE	1,2
SB	ASCD	20" x 20"	4 FT	101-250	8"ø	N/A	NOTE 2	0.06	25	PRICE	1,2
SC	ASCD	24" x 24"	6 FT	251-400	10"ø	N/A	NOTE 2	0.05	25	PRICE	1,2
SD	AHCD2	19" x 8"	26 FT	0-260	18" x 6"	N/A	YES	1.50	25	PRICE	2,5,7
SE	SDS100	48" LONG	5 FT	0-200	7"ø	2	NOTE 2	0.05	30	PRICE	1,2,4
RA	630FF	32" x 22"	-	0-1800	30" x 20"	N/A	NOTE 2	0.11	30	PRICE	2,6
RB	80	12" x 12"	-	0-500	10" x 10"	N/A	NOTE 2	0.11	30	PRICE	2
RC	80	24" x 24"	-	0-500	10" x 10"	N/A	NOTE 2	0.11	30	PRICE	2
RD	SDR100	48" LONG	-	0-300	48" x 3"	2	NOTE 2	0.10	30	PRICE	1,2
EA	80SR	24" x 12"	-	0-75	6"ø	N/A	NOTE 2	0.10	25	PRICE	2,3
EB	80	12" x 12"	-	0-500	10" x 10"	N/A	NOTE 2	0.10	30	PRICE	2

* AT MAX. CFM

AIR DEVICE SCHEDULE KEYED NOTES:

1. FIELD INSULATE PLENUM BOX OR BACKSIDE OF DIFFUSER.
2. PROVIDE REMOTE CABLE OPERATED VOLUME DAMPER WHERE DAMPER IS INACCESSIBLE FOR BALANCING.
3. PROVIDE WITH 24" x 12" TOP INLET INTEGRATED PLENUM, PLENUM INLET SIZE AS SCHEDULED
4. PROVIDE WITH PRICE SLOT PLENUM SDA OR APROVED EQUAL.
5. ANGLE DRUM BLADES 15 DEGREES FROM FULL OPEN POSITION FOR AIRFLOW SPREAD. DRUMS TO BE MOUNTED ON SPIRAL DUCTWORK 30 DEGREES BELOW HORIZONTAL.
6. PRIVIDE WITH FILTER FRAME TO FIT 20" X 30" X 1" FILTERS.
7. ALL EXPOSED DRUM LOUVERS AND FRAME TO BE BLACK.

AIR DEVICE SCHEDULE GENERAL NOTES:

1. ALL AIR DEVICES TO BE ALUMINUM, WHITE FINISH UNLESS NOTED OTHERWISE.
2. REFER TO REFLECTED CEILING PLANS FOR CEILING TYPES. ALL AIR DEVICES MOUNTED IN A DRYWALL CEILING SHALL HAVE A MOUNTING FRAME.
3. FOR 2-WAY DISCHARGE, THROWS LISTED REFLECT AIRFLOW IN A SINGLE DIRECTION.
4. P.D. ("WG) REFLECTS "TOTAL" PRESSURE (STATIC AND DYNAMIC).
5. THROW, P.D. AND MAX NC TAKEN AT MAX VALUE OF CFM RANGE.
6. SIZE FLEX DUCT OR HARD DUCT CONNECTION TO AIR DEVICE INLET PER AIR DEVICE SCHEDULED INLET SIZE UNLESS OTHERWISE INDICATED.
7. FLEX DUCT LENGTH CONNECTING DUCT TO AIR DEVICE NOT TO EXCEED 6'-0" IN LENGTH.
8. NC VALUES OF "-" INDICATE AN NC LEVEL BELOW 15.

MINI SPLIT-SYSTEM SCHEDULE

TAG	SS-1 / SSCU-1	
SERVICE	IT	
TOTAL CAPACITY (BTU / HR)	8,490	
REFRIGERANT	R-32	
SEER2	21	
INDOOR UNIT		
EAT (°F) (DB / WB)	80.0 / 67.0	
CFM (LOW - HIGH)	244-417	
ELEC. SERVICE (V / PH / MCA / MOCP)	FED FROM OUTDOOR	
OUTDOOR UNIT		
AMB. SUMMER TEMP. (DB / WB) (°F)	105 / 78	
AMB WINTER TEMP (DB) (°F)	25	
ELEC SERVICE (V / PH / MCA / MOCP)	208 / 1 / 7 / 15	
REFERENCE		
MANUFACTURER	DAIKIN	
INDOOR UNIT MODEL	FTKF09AXVJU	
OUTDOOR UNIT MODEL	RKF09AXVJU	
NOTES	1 - 5	

SPLIT-SYSTEM SCHEDULE NOTES:

1. PROVIDE STARTERS AS REQUIRED.
2. MANUFACTURER TO SIZE REFRIGERANT LINES.
3. PROVIDE MANUFACTURER-STANDARD THERMOSTAT.
4. PROVIDE MANUFACTURER'S INLINE CONDENSATE PUMP.
5. PROVIDE WITH METAL HAIL GUARD.

ROOF HOOD SCHEDULE

MARK	CFM	THROAT AREA (SF)	MAX. S.P. DROP ("WG)	SERVICE	REFERENCE	THROAT WIDTH	DAMPER INTERLOCK	NOTES
RH-1	150	0.4	0.05	EXHAUST	GREENHECK GRSR-8	8"ø	EF-1	1,2,4,5
RH-2	650	1	0.05	INTAKE	GREENHECK GRSI-16	16"ø	DOAS-1	1,2,4,6
RH-3	250	1	0.05	INTAKE	GREENHECK GRSI-10	10"ø	BACKDRAFT	1,2,3

ROOF HOOD SCHEDULE NOTES:

1. PROVIDE WITH MANUFACTURER'S STD. GALV. ROOF CURB.
2. PROVIDE WITH MANUFACTURER'S STD. ALUM. INSECT SCREEN.
3. PROVIDE WITH BAROMETRIC DAMPER.
4. PROVIDE WITH MOTORIZED DAMPER AND DAMPER TRAY. REFER TO DETAIL.
5. INTERLOCK MOTORIZED DAMPER TO BE OPEN WHEN EF-1 IS RUNNING.
6. INTERLOCK MOTORIZED DAMPER TO BE OPEN WHEN DOAS-1 IS RUNNING.

FAN SCHEDULE

TAG	TYPE	MANUFACTURER	MODEL	SERVICE	CFM	SP ("WG)	MAX BHP	HP	V / PH	MAX SONES	DRIVE	CONTROL	NOTES
EF-1	INLINE	GREENHECK	SQ-70-VG	EXHAUST	150	0.30	0.03	1/15	115 / 1	10	DIRECT	INTERLOCK	1,2,3,5
EF-2	INLINE	GREENHECK	SQ-90-VG	EXHAUST	415	0.30	0.06	1/6	115 / 1	10	DIRECT	INTERLOCK	1,2,4,5

EXHAUST FAN SCHEDULE NOTES:

1. PROVIDE BACKDRAFT DAMPER.
2. PROVIDE MANUFACTURER-STANDARD VG MOTOR.
3. INTERLOCK EXHAUST FAN OPERATION WITH DOAS-1.
4. INTERLOCK EXHAUST FAN OPERATION WITH AHU-4.
5. PROVIDE WITH SIDE DISCHARGE. REFER TO PLANS.

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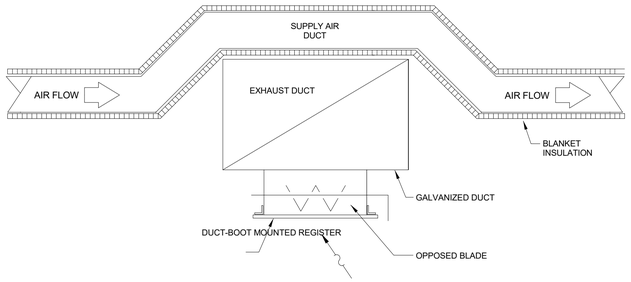
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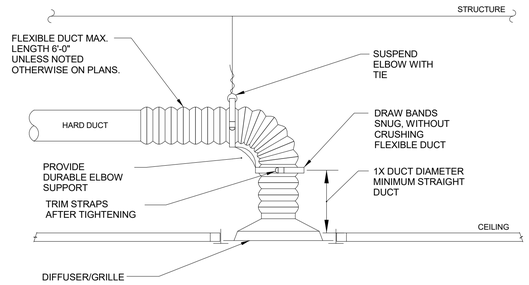
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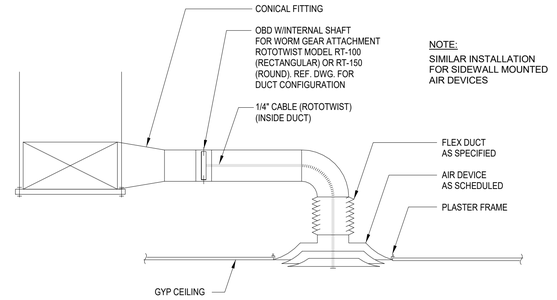


1 M501 DUCT CROSS OVER DETAIL
NOT TO SCALE



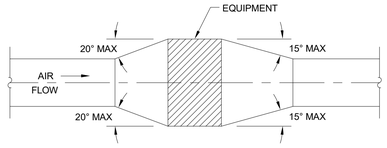
NOTES:
1. TO ATTACH FLEX DUCT TO THE HARD DUCT, TAPE THE INNER LINER TO THE HARD DUCT THEN ATTACH WITH TWO NYLON TIE WRAPS; ONE FOR THE INNER LINER AND ONE FOR THE OUTER SHELL. FOLD THE OUTER SHELL INSIDE ITSELF SO IT HAS NEAT EDGES PRIOR TO TIE WRAPPING.
2. HART AND COOLEY "SMARTFLOW" ELBOW, THERMAFLEX "FLEXFLOW", AND TITUS "FLEXRIGHT" ARE ACCEPTABLE PRODUCTS FOR DURABLE ELBOW SUPPORT.

2 M501 DIFFUSER/GRILLE CONNECTION DETAIL
NOT TO SCALE



NOTE:
SIMILAR INSTALLATION FOR SIDEWALL MOUNTED AIR DEVICES

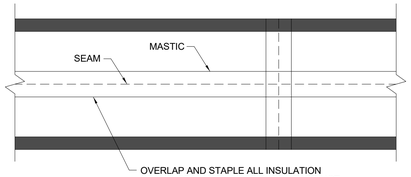
3 M501 REMOTE CABLE OPERATED DAMPER W/ GRILLE ACCESS
NOT TO SCALE



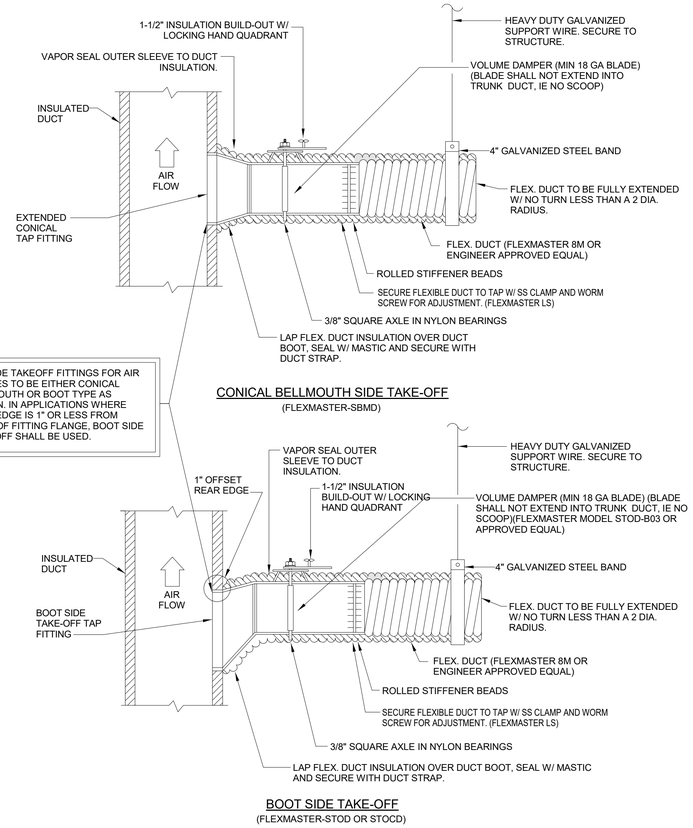
PLAN OR ELEVATION

NOTE:
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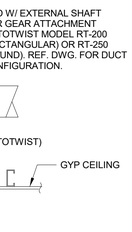
4 M501 DUCT MOUNTED EQUIPMENT
NOT TO SCALE



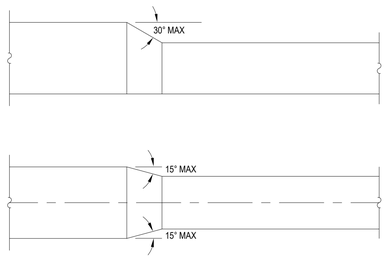
5 M501 DUCT INSULATION SEAMS / MASTIC
NOT TO SCALE



8 M501 SIDE TAKE-OFF DETAILS
NOT TO SCALE



6 M501 REMOTE CABLE OPERATED DAMPER
NOT TO SCALE



NOTE:
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7 M501 DUCT TRANSITION DETAIL
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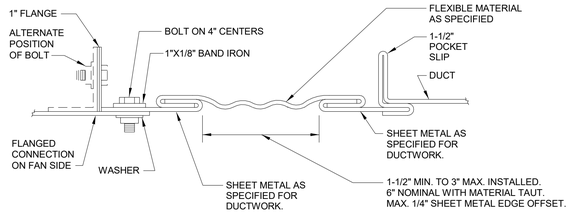
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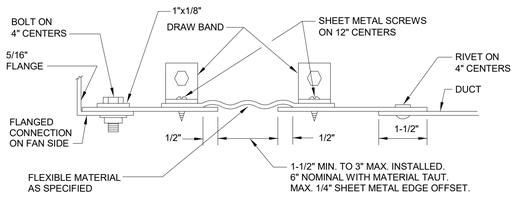
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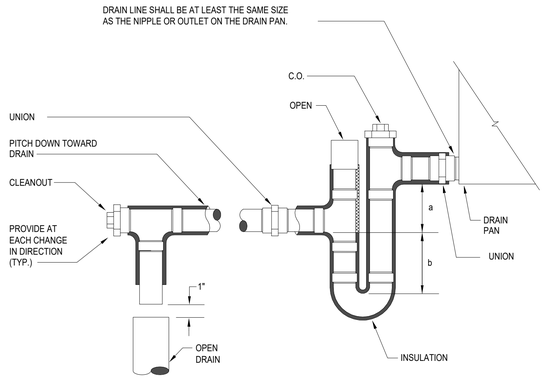
RECTANGULAR FLEXIBLE CONNECTION



ROUND FLEXIBLE CONNECTION

TO BE INSTALLED AT ALL BUILDING EXPANSION JOINTS AND ALL HVAC UNIT CONNECTIONS. CONTRACTOR IS RESPONSIBLE FOR LOCATION AND QUANTITY.

1 M502 **DUCT FLEXIBLE CONNECTION DETAILS**
NOT TO SCALE

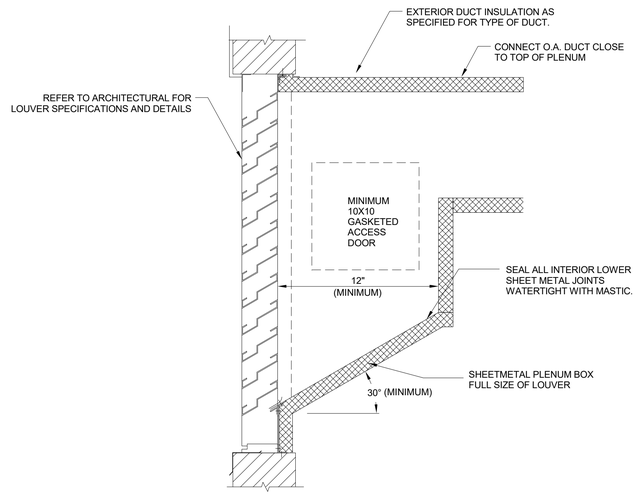


UNIT TOTAL STATIC PRESS.	a	b
0"-1"	1"	2"
1"-2"	2"	3"
2"-3"	3"	4"
3"-4"	4"	5"
4"-5"	5"	6"

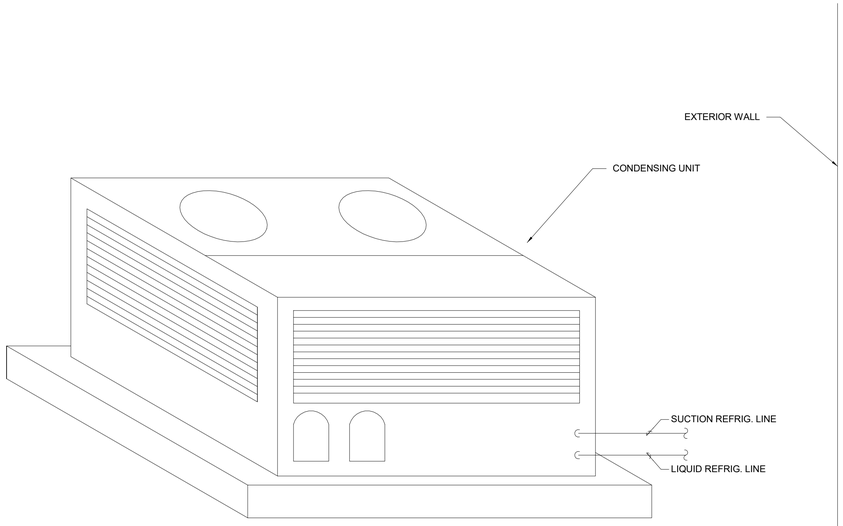
NOTES:
1. FOR DEPTH OF SEAL, SEE SCHEDULE BELOW.
2. LOCATE TRAP SO AS TO BE ACCESSIBLE FOR CLEANING.
3. ALL FITTING TO BE DWV.
4. ALL CONDENSATE TO BE ROUTED TO SANITARY OR DRY-WELL AS INDICATED ON PLANS.

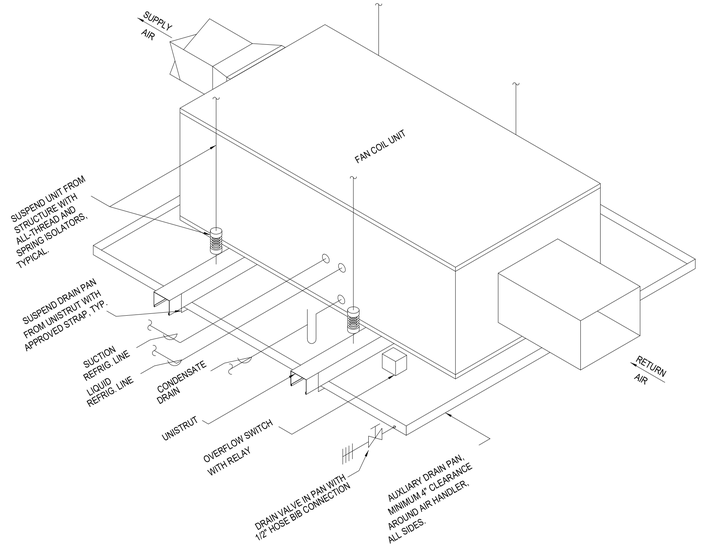
REFERENCE FINAL UNIT SUBMITTAL FOR UNIT TOTAL STATIC PRESSURE.

2 M502 **TYPICAL DRAIN TRAP DETAIL**
NOT TO SCALE



3 M502 **LOUVER PLENUM DETAIL**
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4 M502 **TYPICAL SPLIT DX FAN COIL UNIT WITH CONDENSING UNIT**
NOT TO SCALE

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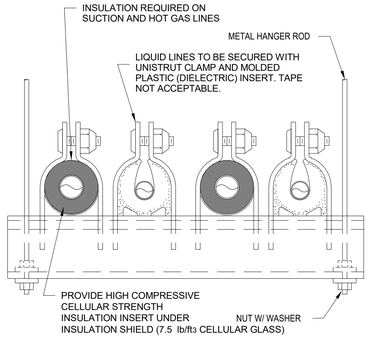
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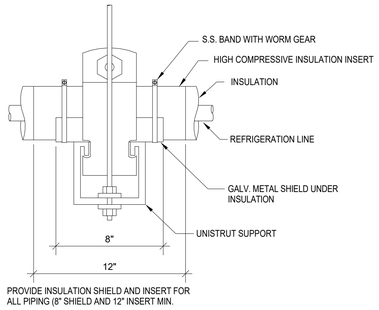
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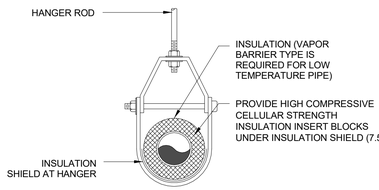




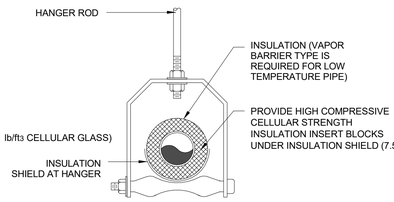
1 M503

TYPICAL HANGER DETAIL FOR MULTIPLE INSULATED REFRIGERATION LINES

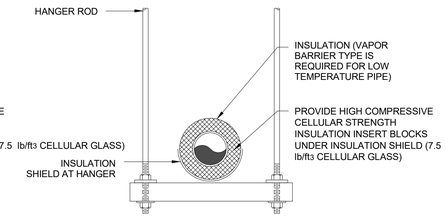
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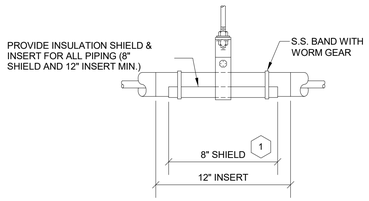
SECTION VIEW



SECTION VIEW

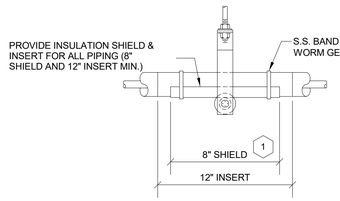


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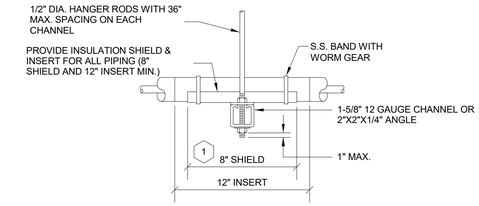
SIDE VIEW

ADJUSTABLE CLEVIS HANGER



SIDE VIEW

ADJUSTABLE ROLLER HANGER



SIDE VIEW

TRAPEZE HANGER FOR UP TO 1000 LB. UNIFORM LOAD

MAXIMUM PIPE/TUBING SUPPORT SPACING, FEET																	
NOM. SIZE	THRU 3/4"	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14	16	18	20	24
PIPE	7 FT	7	7	9	10	10	10	10	10	10	10	5	5	5	5	5	5	5
TUBING	5 FT	6	7	8	8	9	10	12	13	14	16	-	-	-	-	-	-	-
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																		

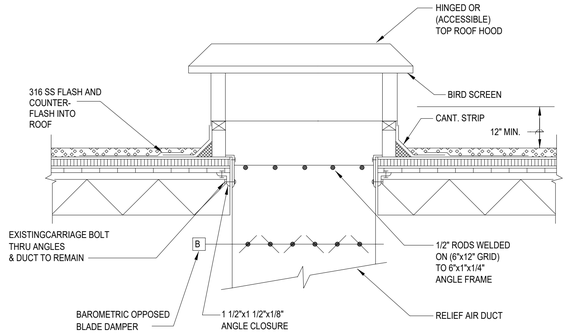
NOTES:

1 COORDINATE SHIELD LENGTHS WITH PRE-INSULATED PIPE MANUFACTURER.

2 M503

TYPICAL PIPE HANGERS

NOT TO SCALE



NOTE:

LOUVERED TYPE SHOWN; OVERHUNG TYPE ARE ALSO PERMISSABLE.

3 M503

ROOF HOOD AND DAMPER ASSEMBLY

NOT TO SCALE

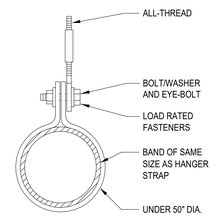
ROUND DUCT HANGER SIZING AND SPACING SCHEDULE				
MAX. DUCT DIA.	ROD	STRAP	MAX. LOAD LBS.	MAX. SPACING FT.*
10"	ONE 3/8"	ONE 3" x 22 GA.	260	12'
18"	ONE 3/8"	ONE 3" x 22 GA.	260	12'
24"	ONE 3/8"	ONE 3" x 22 GA.	260	12'
36"	ONE 3/8"	ONE 3" x 22 GA.	320	12'
50"	TWO 3/8"	TWO 3" x 20 GA.	700	8'
60"	TWO 3/8"	TWO 3" x 18 GA.	1320	8'
84"	TWO 1/2"	TWO 3" x 16 GA.	2500	8'

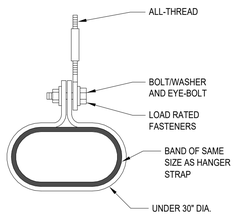
* MAX. SPACING TO BE MAINTAINED. CONTRACTOR TO PROVIDE ADDITIONAL STRAP/SECUREMENTS TO CONCEAL DUCT JOINT CONNECTIONS/SEAMS.

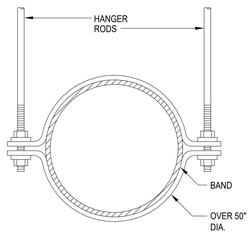
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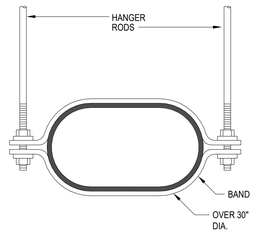
1. TABULATED DATA FROM SMACNA ALLOWS FOR DUCT REINFORCING AND INSULATION, BUT NO EXTERNAL LOAD.

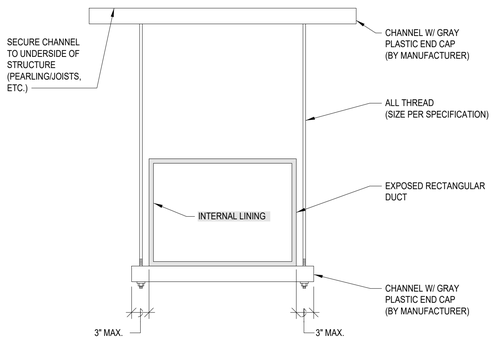
2. STRAPS SHALL NOT BE USED ON EXPOSED DUCTWORK TO SECURE TO STRUCTURE. ALL-THREAD TO CONNECT TO STRAP AND EXTEND TO STRUCTURE.











4 M503

EXPOSED DUCT HANGER DETAIL

NOT TO SCALE

1/16/2025 1:04:33 PM

Item 2.

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REVISION HISTORY

No.	Description	Date

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STATE OF TEXAS
MAESAN A. CARLEY
144997
LICENSED
PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
MECHANICAL DETAILS

Sheet Number
M503

SYMBOLS LEGEND

(FIRE SENSING, EXTINGUISHING, ALARM, CONTROL, AND INDICATING EQUIPMENT)

FCP	FIRE CONTROL PANEL
GAP	GRAPHIC ANNUNCIATOR PANEL
HSSD	HIGH-SENSITIVITY SMOKE DETECTION PANEL
F	CLEAN AGENT PURGE PANEL
SD P	PHOTOELECTRIC SMOKE DETECTOR
SD I	IONIZATION SMOKE DETECTOR
SD D	PHOTOELECTRIC DUCT/HVAC EQUIPMENT - MOUNTED SMOKE DETECTOR
HD	HEAT DETECTOR (RATE OF RISE)
SR	SHUTDOWN RELAY
F	BUILDING FIRE ALARM MANUAL PULL STATION
P T A	CLEAN AGENT MANUAL RELEASE WITH ABORT SWITCH AND COUNTDOWN TIMER
15CD	BUILDING ALARM STROBE LIGHT - LABELED "FIRE" (WITH CANDELA RATING).
75CD	CLEAN AGENT STROBE LIGHT - LABELED "AGENT" (WITH CANDELA RATING).
	HSSD (SAMPLING TUBE) DETECTOR
F 200	CLEAN AGENT ROOM MANUAL RELEASE
A	CLEAN AGENT ABORT SWITCH

(RFP)	"RFP" INDICATED A DEVICE LOCATED IN THE RAISED FLOOR PLENUM, OR INDICATING AN ALARM FROM A DEVICE LOCATED IN THE RAISED FLOOR PLENUM.
B	HSSD ALARM BELL, LABELED "HSSD"
75CD	BUILDING ALARM (INCLUDES FIRE SPRINKLER SYSTEM ALARMS) MULTI-SIGNAL SYNCHRONIZED HORN/STROBE LABELED "FIRE" (WITH CANDELA AND DBA RATINGS).
15CD	CLEAN AGENT ALARM (INCLUDES PREACTION FIRE SPRINKLER MULTI-SIGNAL SYNCHRONIZED HORN/STROBE LABELED "AGENT" (WITH CANDELA AND DBA RATINGS).
	QUICK-CLOSING DUCT DAMPER / ACTUATOR
	CLEAN AGENT STORAGE CONTAINER WITH RISER TO ABOVE CEILING
FM200	CLEAN AGENT STORAGE CONTAINER WITH DISCHARGE HEADS
	FIRE SPRINKLER (WET/DRY) SYSTEM ALARM VALVE ASSEMBLY
	FIRE SPRINKLER PREACTIONO SYSTEM ALARM VALVE ASSEMBLY (WITH RELEASE CONTROL PANEL)
TS	TAMPER SWITCH
FS	FLOW SWITCH
PS	PRESSURE SWITCH
DL	DOOR LOCK
	CLEAN AGENT DISCHARGE HEAD (CEILING TYPE) (NUMBER "2" INDICATES HIGH/LOW DROP)
WD	WATER DETECTION ALARM PANEL
	ALARM BELL

FIRE PROTECTION GENERAL NOTES

1. ENTIRE BUILDING SHALL BE EQUIPPED WITH AN AUTOMATIC WET PIPE SPRINKLER SYSTEM DESIGNED AND INSTALLED IN COMPLIANCE WITH THE LATEST EDITION OF NFPA.

2. SPRINKLER COVERAGE DENSITY SHALL BE HYDRAULICALLY CALCULATED FOR LIGHT HAZARD DENSITY, EXCEPT WHERE OTHERWISE INDICATED AND/OR REQUIRED BY NFPA 13.

3. ALL NEW SPRINKLER HEADS IN FINISHED AREAS SHALL BE SEMI-RECESSED HEADS.

4. IN ROOMS WITH LAY-IN 2'X4' CEILING TILES, SPRINKLER HEADS SHALL BE CENTERED IN SHORT DIMENSION AND AT 1/4, 1/2, OR 3/4 OF THE LONG DIMENSION. IN ROOMS WITH 2'X2' CEILING TILES, SPRINKLER HEADS SHALL BE CENTERED IN BOTH DIMENSIONS.

5.ALL RECOMMENDATIONS IN NFPA 13 (INDICATED AS SHOULD) SHALL BE CONSIDERED AS MANDATORY ("SHALL")

6. THE FIRE SPRINKLER CONTRACTOR SHALL COORDINATE HIS WORK WITH ALL THE OTHER TRADES (MECHANICAL, ELECTRICAL, ETC.) AND SHALL PERFORM ANY MODIFICATIONS NECESSARY TO ACCOMMODATE THEIR WORK AT NO ADDITIONAL COST TO THE OWNER.

7. ALL PIPING 2 1/2" AND SMALLER SHALL BE NFPA 13 APPROVED SCHEDULE 40 STEEL, THREADED (NOT MECHANICAL JOINT): REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

GENERAL NOTES (APPLY TO ALL SHEETS):

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE.
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS:
   - A. RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS.
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTRIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METALS FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE.
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE.
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS.
   - B. FOR BELOW GRADE PENETRATION PROVIDE WATER TIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL.
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT.
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELECTATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

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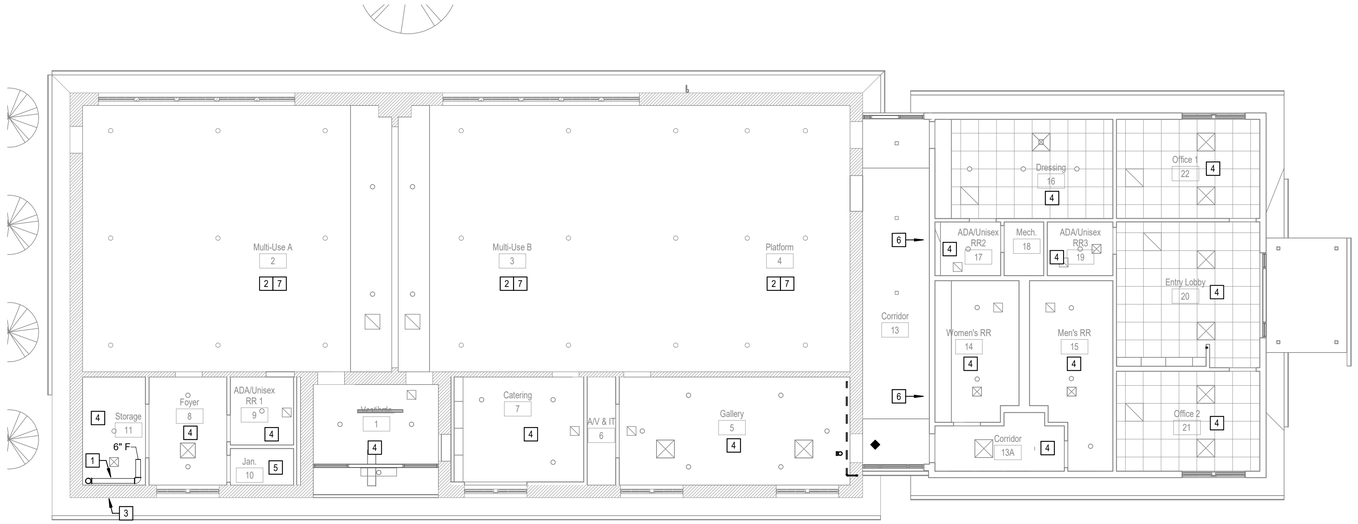
STATE OF TEXAS
MAESAN A CARLEY
144997
LICENSED
PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
FIRE PROTECTION LEGENDS AND DETAILS

Sheet Number
FP001

1/16/2025 5:34:26 PM



1 FP101 FIRE PROTECTION LEVEL 1 PLAN

1/8" = 1'-0"

FIRE PROTECTION GENERAL NOTES:

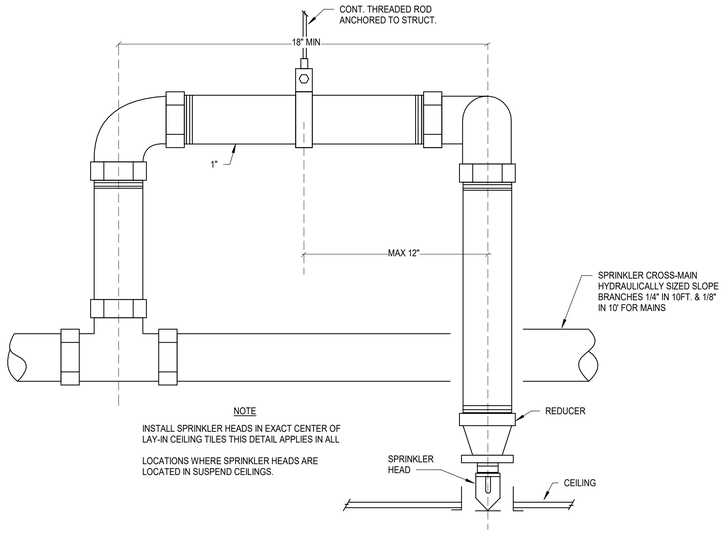
1. NEW FIRE SPRINKLER SYSTEM. WORK SHALL BE IN COMPLIANCE WITH THE LATEST EDITION OF NFPA. 13 AND 14.
2. ALL OFFICE TYPE OCCUPANCIES TO BE CONSIDERED LIGHT HAZARD UNLESS OTHERWISE NOTED.
3. NEW SPRINKLER HEADS IN FINISHED AREAS SHALL BE SEMI-RECESSED HEADS.
4. ALL RECOMMENDATIONS IN NFPA 13 (INDICATED AS SHOULD) SHALL BE CONSIDERED AS MANDATORY ("SHALL")
5. THE FIRE SPRINKLER CONTRACTOR SHALL COORDINATE THEIR WORK WITH ALL THE OTHER TRADES (MECHANICAL, ELECTRICAL, ETC.) AND SHALL PERFORM ANY MODIFICATIONS NECESSARY TO ACCOMMODATE THEIR WORK AT NO ADDITIONAL COST TO THE OWNER.
6. ALL PIPING 2 1/2" AND SMALLER SHALL BE NFPA 13 APPROVED SCHEDULE 40 STEEL, THREADED (NOT MECHANICAL JOINT): REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
7. REFER TO CIVIL PLANS FOR REMOTE FDC LOCATION NEAR THE MAIN ENTRANCE.

FIRE PROTECTION KEYED NOTES:

1. AUTOMATIC SPRINKLER CONTROL ASSEMBLY. REFER TO DETAIL 2/FP101.
2. PROVIDE UPRIGHT PENDANT SPRINKLER HEADS ABOVE EXISTING WOOD FURRING STRIPS.
3. ROUTE SPRINKLER CONTROL ASSEMBLY DRAIN THROUGH WALL TO SPLASH BLOCK.
4. PROVIDE CONCEALED SPRINKLER HEADS.
5. PROVIDE UPRIGHT PENDANT SPRINKLER HEADS.
6. PROVIDE CONCEALED SIDE WALL SPRINKLER HEADS, CUSTOM COLOR TO MATCH WALL.
7. PROVIDE PENDANT SPRINKLER HEADS FOR COVERAGE BELOW EXISTING WOOD FURRING STRIPS. SPRINKLER HEADS TO BE BETWEEN WOOD FURRING STRIPS.

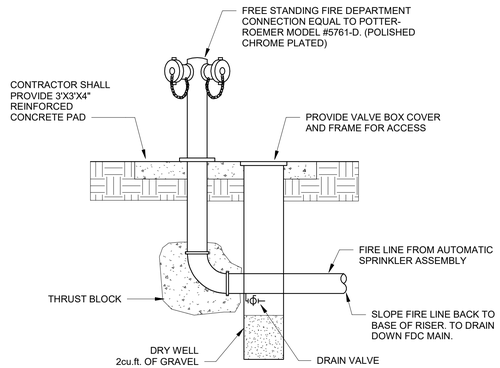
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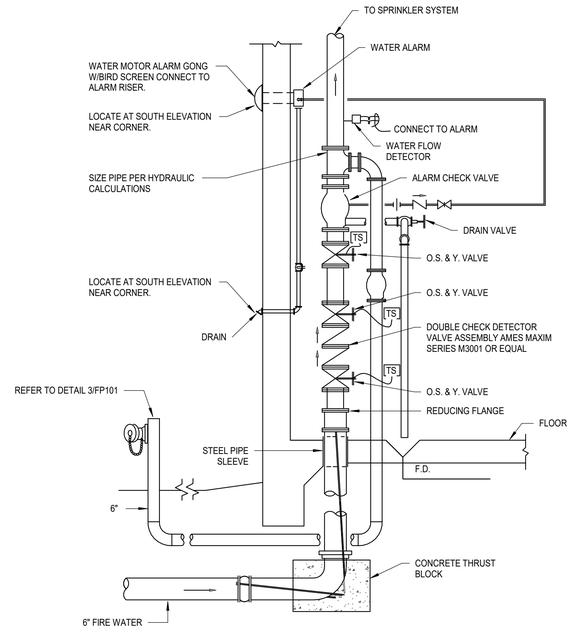
4 FP101 SPRINKLER IN CEILING DETAIL

NOT TO SCALE



3 FP101 REMOTE FIRE DEPARTMENT CONNECTION

NOT TO SCALE



NOTE:
FLOW TEST NOT RECEIVED DURING DESIGN. CONTRACTOR TO VERIFY FLOW TEST AND HYDRAULICALLY SIZE PRIOR TO STARTING WORK.

2 FP101 AUTOMATIC SPRINKLER CONTROL SCHEMATIC

NTS

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

City of Dripping Springs
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144997
LICENSED
PROFESSIONAL ENGINEER
01/17/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
FIRE PROTECTION FLOOR PLAN

Sheet Number
FP101

1/16/2025 5:34:27 PM

PLUMBING SYMBOLS AND ABBREVIATIONS

NOTE: SELDOM ARE ALL SYMBOLS AND ABBREVIATIONS USED IN THE DRAWINGS; REFERENCE ONLY THOSE THAT ARE APPLICABLE.

SYMBOL	DESCRIPTION
	GAS COCK OR PLUG VALVE
	PRESSURE RELIEF VALVE
T&P	TEMPERATURE AND PRESSURE RELIEF VALVE
VAC BREAK	VACUUM BREAKER
F.S.	FLOW SWITCH
FD-#	FLOOR DRAIN, (TYPE)
FS-#	FLOOR SINK, (TYPE)
P.S.	PRESSURE SWITCH
	GATE VALVE
T.S.	TAMPER SWITCH
	O.S.&Y VALVE
	BUTTERFLY VALVE
	SOLENOID VALVE
PIV	POST INDICATOR VALVE
	SWING CHECK VALVE
	NON-SLAM CHECK VALVE
	BALL VALVE
	PIPE RISE (R) OR DROP (D)
	FLOW - IN DIRECTION OF ARROW
	CAP ON END OF PIPE
	CONCENTRIC REDUCER

SYMBOL	DESCRIPTION
YCO	YARD CLEANOUT OR CLEANOUT TO GRADE
	VALVE IN RISER (TYPE AS SPEC'D OR NOTED)
	PLUMBING FIXTURES
3	NOTES (NEW CONSTRUCTION)
#	DEMOLITION NOTES
HW-#	EQUIPMENT IDENTIFICATION
P-4A	PLUMBING FIXTURE AND EQUIPMENT MARK
CW 1 / RD 2	PLUMBING RISER
G	GAS METER
	UNION (FLANGED)
CO	CLEANOUT PLUG
FCO	FLOOR CLEANOUT
	CONNECT TO EXISTING (PROVIDE AND INSTALL ALL NECESSARY TRANSITION FITTINGS)
	DETAIL REFERENCE NUMBER ON SHEET
	SHEET NUMBER
4" RD-1	PRIMARY ROOF DRAIN (OUTLET SIZE)
6" EOD-1	SECONDARY (EMERGENCY OVERFLOW DRAIN) ROOF DRAIN (OUTLET SIZE)

SYMBOL	DESCRIPTION
X" CW	COLD WATER PIPING
X" HW	HOT WATER PIPING
X" HWR	HOT WATER RETURN PIPING
X" V	VENT PIPING
X" 120 HW	120° HOT WATER PIPING
X" 140 HW	140° HOT WATER PIPING
X" 120 HWR	120° HOT WATER RETURN PIPING
X" 140 HWR	140° HOT WATER RETURN PIPING
X" CA	COMPRESSED AIR PIPING
X" MA	MEDICAL AIR PIPING
X" MV	MEDICAL VACUUM PIPING
X" O2	MEDICAL OXYGEN PIPING
X" NO	MED NITROUS OXIDE PIPING
X" N	MED NITROGEN PIPING
X" WAGD	WASTE ANESTHETIC GAS DISPOSAL PIPING
X" A-EX	COMBUSTION AIR EXHAUST
X" A-IN	COMBUSTION AIR INTAKE

SYMBOL	DESCRIPTION
X" AW	WASTE PIPING (ACID RESISTANT)
X" AV	VENT PIPING (ACID RESISTANT)
	"CHEMICAL-WASTE PIPING"
X" F	FIRE PROTECTION PIPING
X" AS	AUTOMATIC SPRINKLER
X" SW	SOFT WATER PIPING
X" DI	DEIONIZED WATER PIPING
X" GW	GREASE WASTE PIPING
X" GV	GREASE VENT PIPING
X" TP	TRAP-PRIMER PIPING (1/2" COPPER)
X" PD	PUMPED DRAIN PIPING
X" TW	TEMPERED WATER PIPING
X" S	SANITARY SEWER PIPING (WASTE)
X" D	DRAIN PIPING
X" DV	DRAIN VENT PIPING
X" G	NATURAL GAS PIPING
X" G MP	NATURAL GAS PIPING (MED PRESS)
X" RD	ROOF DRAIN PIPING (PRIMARY SYSTEM)
X"EOD	ROOF DRAIN PIPING (SECONDARY "EMERGENCY OVERFLOW DRAIN" SYSTEM)
X" SD	SITE STORM DRAIN PIPING

GENERAL NOTES (APPLY TO ALL SHEETS):

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE.
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS:
   - A. RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS.
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTRIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METALS FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE.
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE.
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS.
   - B. FOR BELOW GRADE PENETRATION PROVIDE WATER TIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL.
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT.
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELECTATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

PLUMBING GENERAL NOTES (APPLY TO ALL SHEETS):

1. ALL MATERIALS AND CONSTRUCTION PROCEDURES PERTAINING TO THE WORK DESCRIBED IN THESE DRAWINGS SHALL CONFORM TO THE REQUIREMENTS OF ALL AUTHORITIES HAVING JURISDICTION.

2. CONTRACTORS SHALL OBTAIN AND MAKE PROVISION FOR ALL PERMITS, INSPECTIONS, AND TESTS REQUIRED BY AUTHORITIES HAVING JURISDICTION.

3. CONTRACTORS SHALL BE SOLELY RESPONSIBLE FOR VERIFYING ACTUAL CONDITIONS AT THE SITE AND NOTING ALL DISCREPANCIES TO THE OWNER PRIOR TO WORK COMMENCEMENT; THEREAFTER, THE CONTRACTOR ACCEPTS FULL RESPONSIBILITY FOR ALL EXISTING CONDITIONS AND SHALL BE SOLELY RESPONSIBLE FOR MAKING ALL SUITABLE ADJUSTMENTS NECESSARY TO ACCOMMODATE NEW WORK AT NO ADDITIONAL COST TO THE OWNER; ANY SUCH ADJUSTMENTS SHALL BE COORDINATED WITH THE OWNER AND ARCHITECT.

4. CONTRACTORS SHALL INCORPORATE ALL DISCREPANCIES AND ADJUSTMENTS INTO THE CONSTRUCTION DOCUMENTS.

5. CONTRACTORS SHALL COORDINATE ALL WORK WITH OTHER TRADES AND INCLUDE ALL NECESSARY MODIFICATIONS TO ACCOMMODATE THEIR WORK.

6. CONTRACTORS SHALL COORDINATE ALL WORK WITH THE OWNER.

7. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A MINIMUM OF ONE YEAR FROM THE DATE OF INSTALLATION.

8. CONTRACTORS SHALL BE SOLELY RESPONSIBLE FOR THE SAFETY OF THEIR EMPLOYEES AND SUBCONTRACTORS AND ALL OTHER PERSONS IN THE AREAS OF CONSTRUCTION. CONTRACTORS SHALL ALSO BE RESPONSIBLE FOR THE SAFETY OF ALL PROPERTY BEING ERECTED.

9. PLUMBING SERVICES THAT INTERFERE WITH ANY NEW ARCHITECTURAL WORK SHALL BE RELOCATED AS NECESSARY.

NOTE:
EXISTING PIPING, FITTINGS AND EQUIPMENT WILL BE INDICATED WITH A LIGHTER LINE WEIGHT THAN NEW WORK.

SYMBOL	DESCRIPTION
ABV	ABOVE
AC	ABOVE CEILING
AD	ACCESS DOOR
ADA	AMERICANS WITH DISABILITIES ACT
ADJUST	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AP	ACCESS PANEL
ASSY	ASSEMBLY
AV	AIR VENT
AVTR	ACID VENT THRU ROOF
BF	BELOW FLOOR
BV	BALL VALVE
CI	CAST IRON
CLG	CEILING
CO	CLEANOUT
CONG	CONCRETE
COND	CONDENSATE
CONNX	CONNECTION
CONT	CONTINUATION
C.W.B.F.	COLD WATER PIPING BELOW FLOOR
C.W.O.H.	COLD WATER PIPING OVERHEAD
DEMO	DEMOLISH
DIAG	DIAGRAM
D	DRAIN
D.I.	DUCTILE IRON
DN	DOWN
DV	DRAIN VENT
DWG, DRWG	DRAWING
EWH	ELECTRIC WATER HEATER
ELECT	ELECTRICAL
ELEV	ELEVATION
EOD	EMERGENCY OVERFLOW DRAIN
EXIST	EXISTING
EXT	EXTENTION
FCO	FLOOR CLEANOUT
FD	FLOOR DRAIN
F.F.	FINISHED FLOOR
FIN	FINISHED
FLR	FLOOR
FS	FLOOR SINK
FT	FEET
GAL(S)	GALLON(S)
GALV	GALVANIZED
GPM	GALLONS PER MINUTE
GTRV	GREASE VENT THRU ROOF
GWH	GAS WATER HEATER
GV	GREASE VENT

SYMBOL	DESCRIPTION
HB	HOSE BIBB
HC	HANDICAPPED
HD	HUB DRAIN
HTR	HEATER
H.W.B.F.	HOT WATER PIPING BELOW FLOOR
H.W.O.H.	HOT WATER PIPING OVERHEAD
INV	INVERT
IN	INCHES
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
MTD	MOUNTED
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN
NTS	NOT TO SCALE
OFD	OVERFLOW ROOF DRAIN
OH	OVERHEAD
PA	PIPE ANCHOR
PD	PRESSURE DROP
PLBG	PLUMBING
PRESS	PRESSURE
PSI	POUNDS PER SQUARE INCH, GAUGE
PVC	POLYVINYL CHLORIDE
REC	RECEIVED
REQ	REQUIRED
RD	ROOF DRAIN
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
SA	SHOCK ARRESTER
SHT	SHEET
SPEC(S)	SPECIFICATION(S)
SAN	SANITARY WASTE
SS	SANITARY SEWER
STAT	STATIC
TEMP	TEMPERATURE
TMV	THERMOSTATIC MIXING VALVE
TP	TRAP PRIMER OR T.P. SUPPLY
TYP	TYPICAL
UG	UNDERGROUND
V	VENT
VCP	VITRIFIED CLAY PIPE
VIR	VALVE IN RISER
VTR	VENT THROUGH ROOF
WA	WATER HAMMER ARRESTER
WH	WALL HYDRANT
W/	WITH
W/O	WITHOUT
WCO	WALL CLEANOUT
YCO	YARD CLEANOUT

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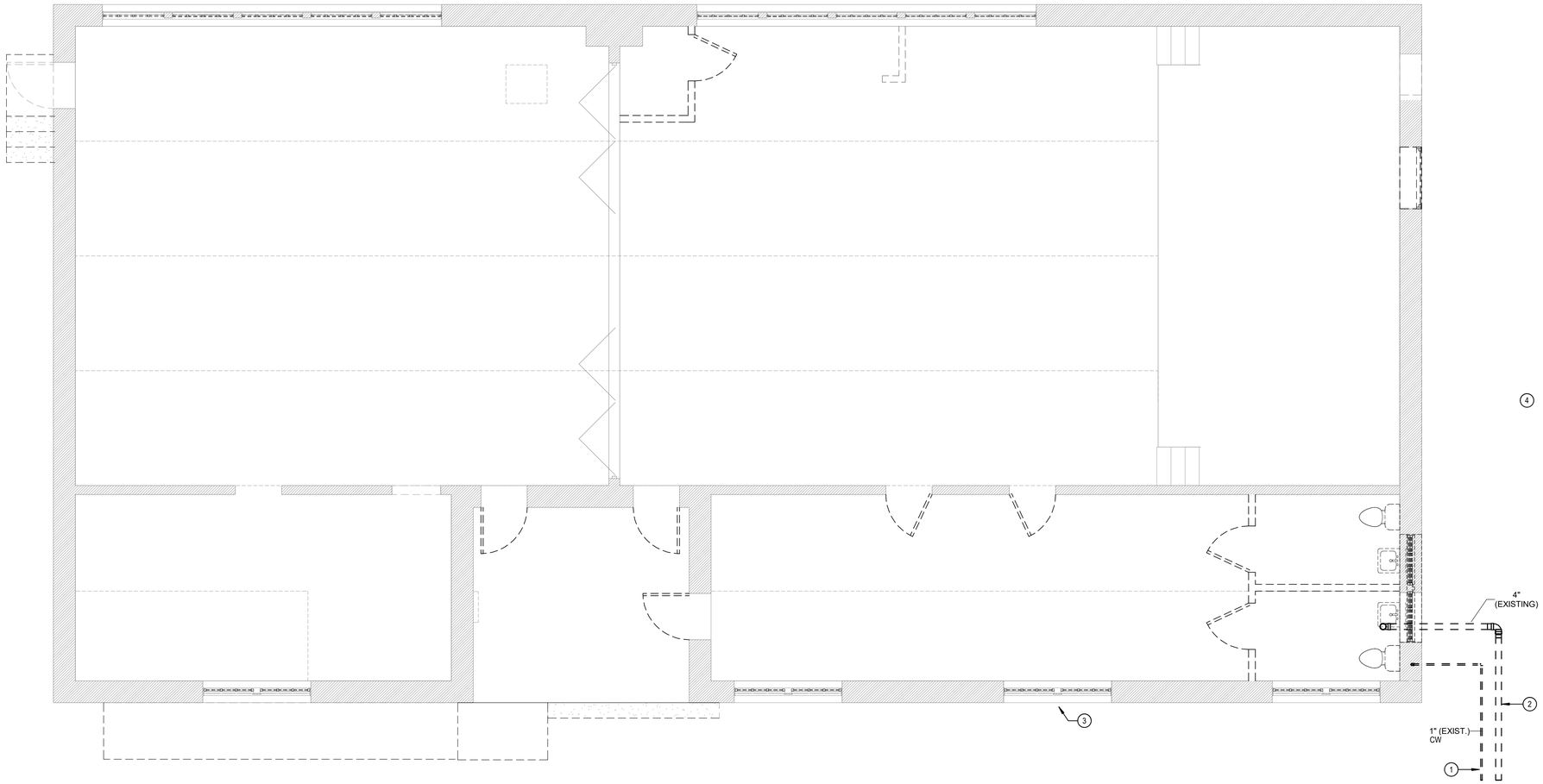
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PLUMBING SYMBOLS & ABBREVIATIONS

Sheet Number
P000

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PLUMBING KEYED NOTES:

1. EXISTING WATER LINE TO BE REMOVED BACK TO MAIN. REFER TO CIVIL FOR CONTINUATION.
2. EXISTING SANITARY WASTE TO REMOVED.
3. EXISTING OUTSIDE DRINKING FOUNTAIN TO BE REMOVED. REMOVE EXISTING WATER LINE CONNECTION BACK TO MAIN AND CAP.
4. REMOVE PROPANE TANK AND COORDINATE WITH OWNER.



1 PD100 PLUMBING UNDERFLOOR DEMOLITION PLAN

1/4" = 1'-0"

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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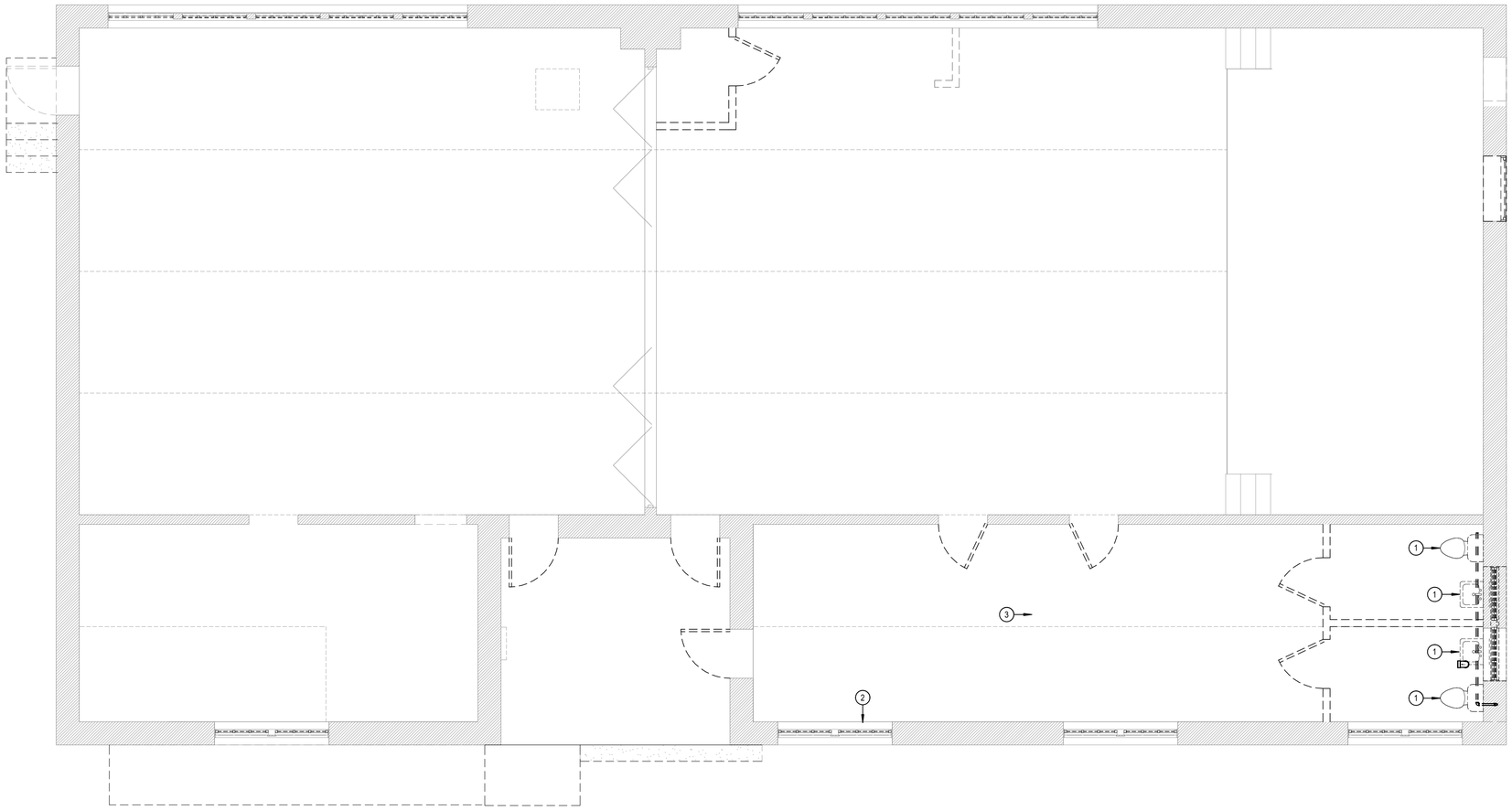
Sheet Name
PLUMBING UNDERFLOOR DEMOLITION PLAN

Sheet Number
PD100

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PLUMBING KEYED NOTES:

1. EXISTING PLUMBING FIXTURES AND ALL ASSOCIATED TO DEMOLISHED.
2. DEMOLISH EXISTING PIPE BACK TO MAIN.
3. DEMOLISH EXISTING FLOOR CLEANOUT BACK TO MAIN.



1 PD101 PLUMBING LEVEL 1 DEMOLITION PLAN

1/4" = 1'-0"

0' 2' 4' 8' 16'

SCALE: 1/4"=1'-0"

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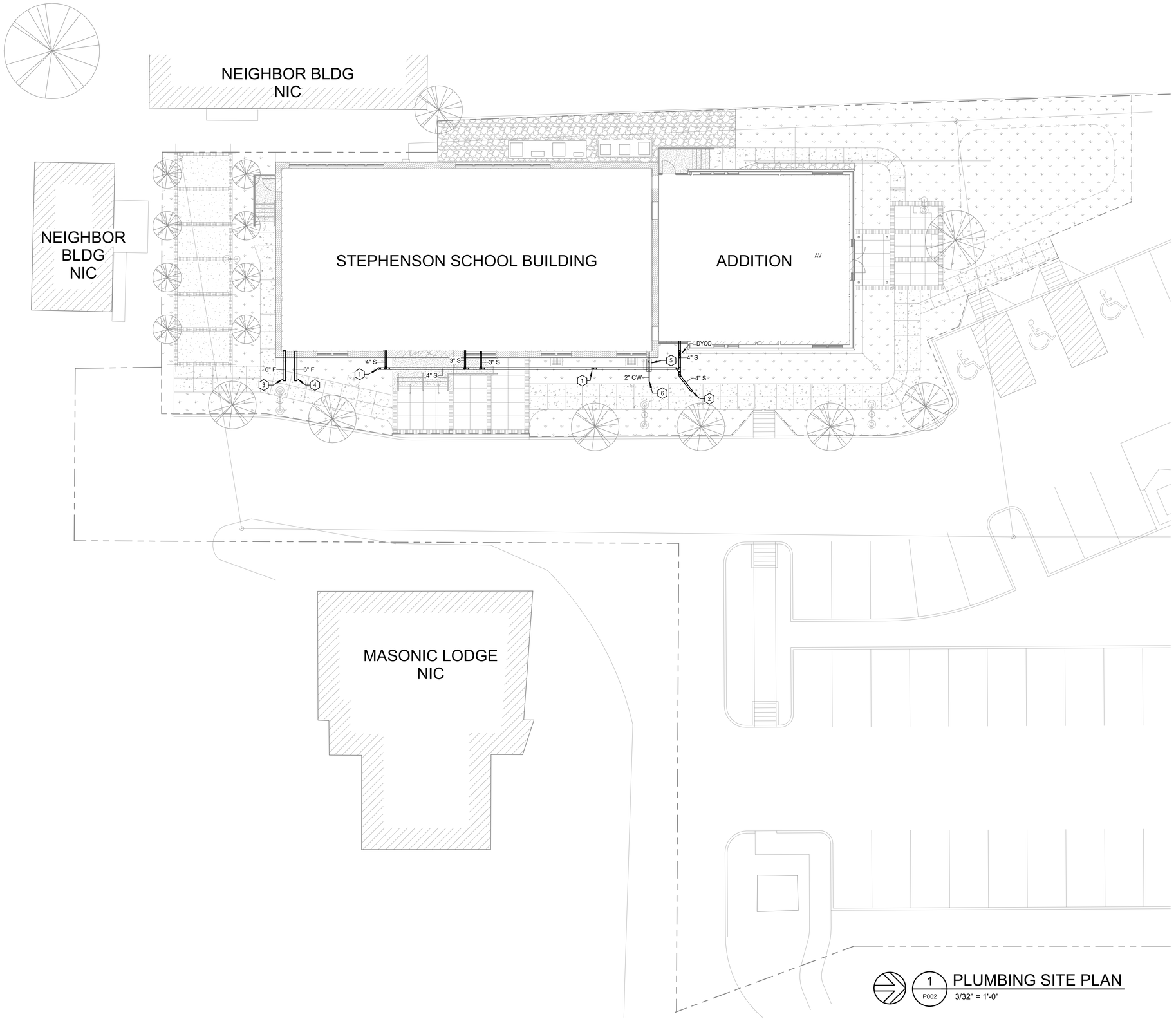
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PLUMBING LEVEL 1 DEMOLITION PLAN

Sheet Number
PD101

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PLUMBING KEYED NOTES:

1. CLEANOUT AT GRADE.
2. 4" WASTE LINE. 4'-0" B.F.F. REFER TO CIVIL FOR CONTINUATION.
3. 6" FIRE LINE. 3'-0" B.F.F. REFER TO CIVIL FOR CONTINUATION.
4. 6" FIRE LINE TO REMOTE FDC. 3'-0" B.F.F. REFER TO CIVIL FOR CONTINUATION.
5. PROVIDE SHUT-OFF VALVE IN RECESSED VALVE BOX. PROVIDE BACKFLOW PREVENTER IN PROTECTIVE ENCLOSURE.
6. 2" DCW LINE. REFER TO CIVIL FOR CONTINUATION.

GENERAL NOTES:

1. CONTRACTOR TO VERIFY ELECATION OF INCOMING UTILITY CONNECTIONS. COORDINATE LOCATION OF BELOW GRADE WATER AND SANITARY LINES AT EAST SIDE OF BUILDING WITH STRUCTURAL CONCRETE PORCH, RAMP, AND STAIRS.

1 P002 PLUMBING SITE PLAN
3/32" = 1'-0"

0' 5' 10' 20' 40'

SCALE: 3/32"=1'-0"

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Sheet Name
PLUMBING SITE PLAN

Sheet Number
P002

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GENERAL NOTES:

1. CONTRACTOR TO VERIFY ELECATION OF INCOMING UTILITY CONNECTIONS. COORDINATE LOCATION OF BELOW GRADE WATER AND SANITARY LINES AT EAST SIDE OF BUILDING WITH STRUCTURAL CONCRETE PORCH, RAMP, AND STAIRS.

PLUMBING SHEET GENERAL NOTES:

A. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS PRIOR TO STARTING NEW WORK.

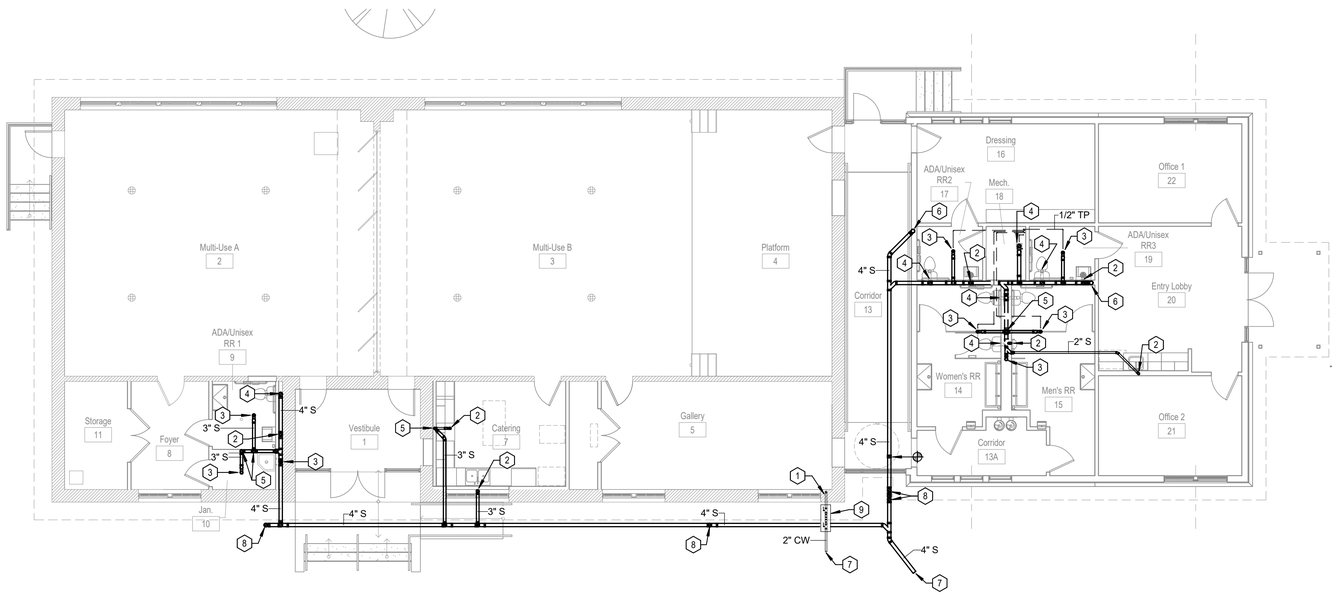
B. CONTRACTOR TO COORDINATE DOWNTIME OF EXISTING FACILITIES WITH OWNER PRIOR TO WORK.

C. ROUTE ALL WASTE PIPING WITH A SLOPE OF 1/4" PER FOOT FOR EACH SYSTEM 3" AND SMALLER. SLOPE ALL PIPING 4" AND GREATER SHALL BE SLOPED AT 1/8" PER FOOT.

D. ALL WASTE RECEPTORS (FLOOR SINKS/DRAINS OR HUB DRAINS SHALL BE PROTECTED BY A TRAP PRIMER. IF NO TRAP PRIMER IS INDICATED THE TRAP MUST BE PROTECTED BY A TRAP GUARD SIMILAR TO THOSE MANUFACTURED BY "PROSET" UNLESS OTHER WISE NOTED.

PLUMBING KEYED NOTES:

1. 2 1/2" CW UP.
2. 2" SAN FROM ABOVE.
3. 3" SAN FROM ABOVE.
4. 4" SAN FROM ABOVE.
5. 2" VENT UP.
6. UP TO WCO.
7. REFER TO CIVIL FOR CONTINUATION.
8. UP TO COG.
9. PROVIDE SHUT-OFF VALVE AND BACKFLOW PREVENTER IN RECESSED VALVE BOX.



1 P100 PLUMBING UNDERFLOOR PLAN
1/8" = 1'-0"

0' 4' 8' 16' 32'
SCALE: 1/8"=1'-0"

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PLUMBING UNDERFLOOR PLAN

Sheet Number
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PLUMBING SHEET GENERAL NOTES:

A. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS PRIOR TO STARTING NEW WORK.

B. CONTRACTOR TO COORDINATE DOWNTIME OF EXISTING FACILITIES WITH OWNER PRIOR TO WORK.

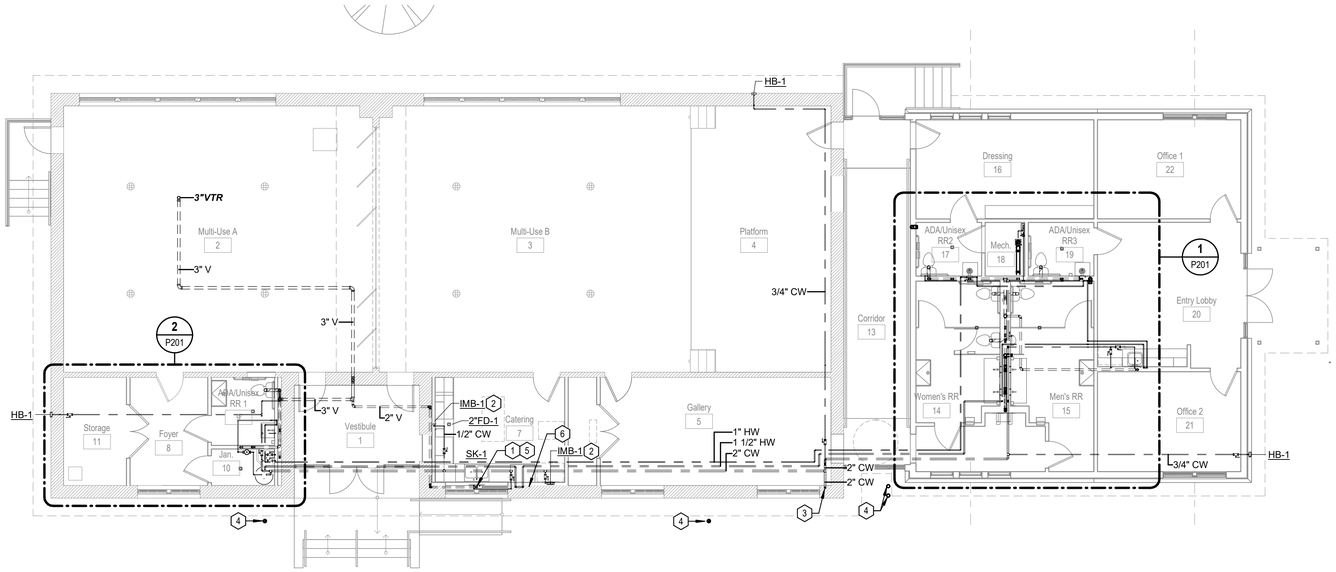
C. ROUTE ALL WASTE PIPING WITH A SLOPE OF 1/4" PER FOOT FOR EACH SYSTEM 3" AND SMALLER. SLOPE ALL PIPING 4" AND GREATER SHALL BE SLOPED AT 1/8" PER FOOT.

D. ALL WASTE RECEPTORS (FLOOR SINKS/DRAINS OR HUB DRAINS SHALL BE PROTECTED BY A TRAP PRIMER. IF NO TRAP PRIMER IS INDICATED THE TRAP MUST BE PROTECTED BY A TRAP GUARD SIMILAR TO THOSE MANUFACTURED BY "PROSET" UNLESS OTHER WISE NOTED.

E. PROVIDE SHOCK ARRESTORS UPSTREAM OF LAST TWO CONNECTIONS.

PLUMBING KEYED NOTES:

1. 1/2" CW & HW DOWN IN WALL. 2" SAN AND 2" VENT. ROUTE PIPING AROUND WINDOW.
2. ROUTE 1/2" CW DOWN IN WALL TO ICE MAKER BOX AND CONNECT. PROVIDE BACKFLOW PREVENTOR AND TYPE A SHOCK ARRESTOR UPSTREAM OF CONNECTION.
3. 2" CW FROM BELOW.
4. CLEANOUT AT GRADE.
5. CONNECT DISHWASHER DRAIN TO WASTE UNDERNEATH SINK.
6. ROUGH-IN AND CONNECT 1/2" HW TO DISHWASHER.



1 P101 PLUMBING LEVEL 1 PLAN

1/8" = 1'-0"

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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PLUMBING LEVEL 1 PLAN

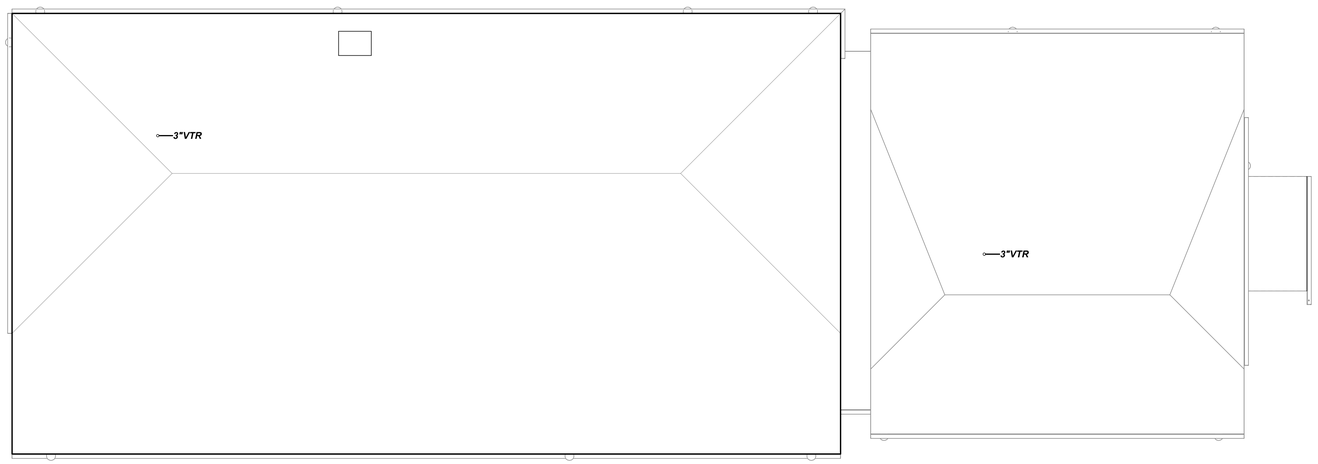
Sheet Number
P101

PLUMBING SHEET GENERAL NOTES:

A. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS PRIOR TO STARTING NEW WORK.

B. CONTRACTOR TO COORDINATE DOWNTIME OF EXISTING FACILITIES WITH OWNER PRIOR TO WORK.

C. ROUTE ALL WASTE PIPING WITH A SLOPE OF 1/4" PER FOOT FOR EACH SYSTEM 3" AND SMALLER. SLOPE ALL PIPING 4" AND GREATER SHALL BE SLOPED AT 1/8" PER FOOT.



1 P102 PLUMBING ROOF PLAN

1/8" = 1'-0"

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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Sheet Name
PLUMBING ROOF PLAN

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P102

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PLUMBING SHEET GENERAL NOTES:

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B. CONTRACTOR TO COORDINATE DOWNTIME OF EXISTING FACILITIES WITH OWNER PRIOR TO WORK.

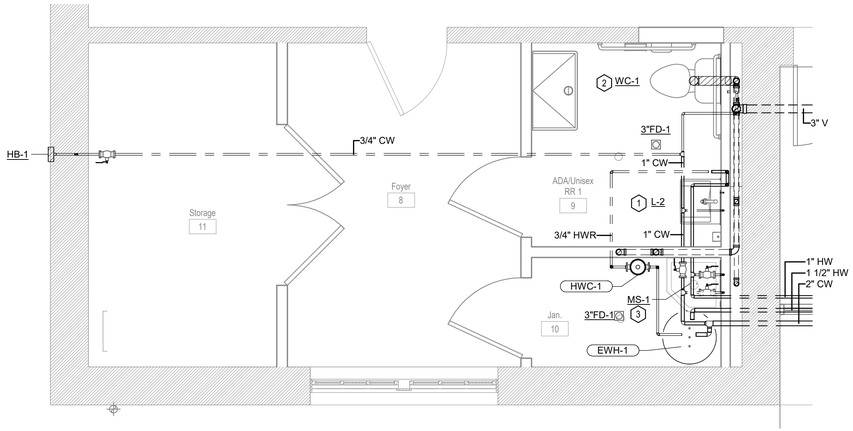
C. ROUTE ALL WASTE PIPING WITH A SLOPE OF 1/4" PER FOOT FOR EACH SYSTEM 3" AND SMALLER. SLOPE ALL PIPING 4" AND GREATER SHALL BE SLOPED AT 1/8" PER FOOT.

D. ALL WASTE RECEPTORS (FLOOR SINKS/DRAINS OR HUB DRAINS SHALL BE PROTECTED BY A TRAP PRIMER. IF NO TRAP PRIMER IS INDICATED THE TRAP MUST BE PROTECTED BY A TRAP GUARD SIMILAR TO THOSE MANUFACTURED BY "PROSET" UNLESS OTHER WISE NOTED.

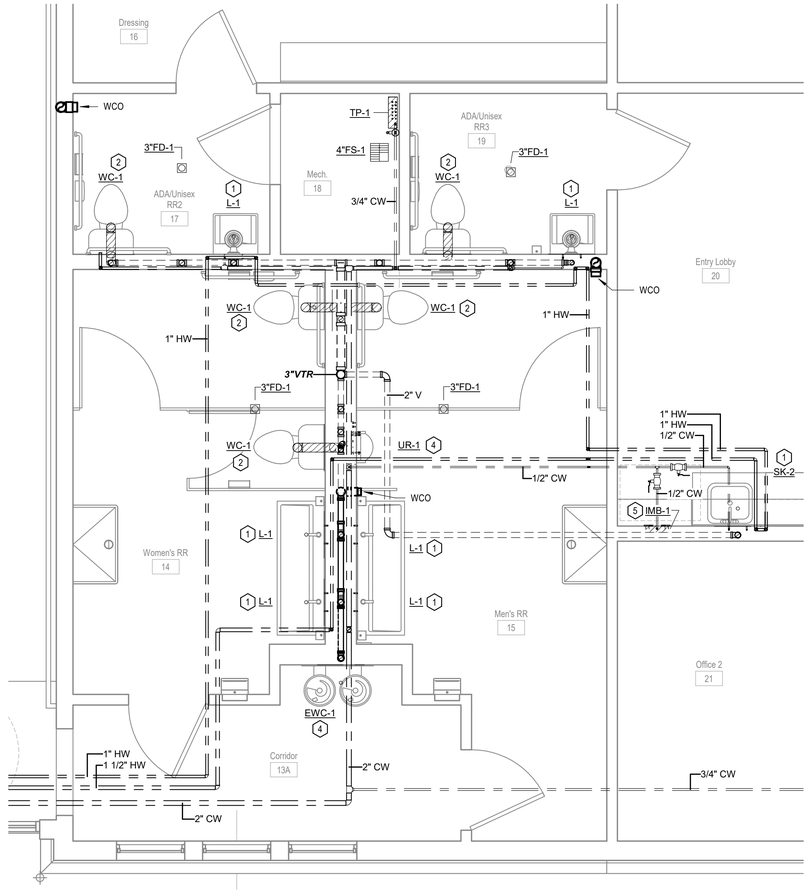
E. PROVIDE SHOCK ARRESTORS UPSTREAM OF LAST TWO CONNECTIONS.

PLUMBING KEYED NOTES:

1. ROUGH-IN AND CONNECT PLUMBING FIXTURE. 1/2" CW/HW. 2" SAN. 2" VENT.
2. ROUGH-IN AND CONNECT PLUMBING FIXTURE. 1" CW. 4" SAN. 2" VENT.
3. ROUGH-IN AND CONNECT PLUMBING FIXTURE. 3/4" CW AND HW. 3" SAN. 2" VENT.
4. ROUGH-IN AND CONNECT PLUMBING FIXTURE. 1/2" CW. 2" SAN. 2" VENT.
5. ROUTE 1/2" CW DOWN IN WALL TO ICE MAKER BOX AND CONNECT. PROVIDE BACKFLOW PREVENTOR AND TYPE A SHOCK ARRESTOR UPSTREAM OF CONNECTION.



2 P201 PLUMBING ENLARGED PLAN
3/8" = 1'-0"



1 P201 PLUMBING ENLARGED PLAN
3/8" = 1'-0"

0' 2.5' 5' 10'

SCALE: 3/8"=1'-0"

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Sheet Name
PLUMBING ENLARGED PLANS

Sheet Number
P201

PLUMBING FIXTURE SCHEDULE

MARK	DESCRIPTION	WASTE	VENT	TRAP	WATER (COLD)	WATER (HOT)	FLOW RATE	MANUFACTURER / MODEL (BASIS OF DESIGN)	FAUCET / FLUSH VALVE (BASIS OF DESIGN)
EWC-1	ELECTRIC WATER COOLER	2"	2"	-	1/2"	-	0.25	ELKAY / LZWS-EDFP217K	-
IMB-1	ICE MAKER BOX	-	-	-	1/2"	-	-	OATEY / 39140	-
L-1	LAVATORY	2"	1 1/2"	1 1/2"	1/2"	1/2"	0.35	BRADLEY / LVAD2-C1-EM	CHICAGO 2500-E2805ABCP
L-2	LAVATORY - WALL HUNG	2"	1 1/2"	1 1/2"	1/2"	1/2"	0.35	AMERICAN STANDARD / DECORUM 9024.001EC	CHICAGO 2500-E2805ABCP
MS-1	MOP SINK	3"	2"	3"	3/4"	3/4"	2	STERN WILLIAMS / SB-850	T&S BRASS / B-2465
SK-1	2-COMP SINK	2"	1 1/2"	1 1/2"	1/2"	1/2"	0.5	ELKAY / ECTSRAD33226TBG	LKAV3032 - CR
SK-2	SINGLE COMP SINK	2"	1 1/2"	1 1/2"	1/2"	1/2"	0.5	ELKAY / ECTRUD151550	LKAV3032 - CR
UR-1	URINAL	2"	1 1/2"	-	3/4"	-	1.0	AMERICAN STANDARD / DECORUM	AMERICAN STANDARD / 6045.051.002
WC-1	ADA WATER CLOSET	4"	2"	-	1"	-	1.6	AMERICAN STANDARD / Cadet Two-Piece Elongated EverClean	TANK TYPE

PLUMBING DRAIN SCHEDULE

MARK	DESCRIPTION	SERVICE	GRATE DIMENSION	OUTLET DIAMETER	MANUFACTURER	MODEL
2"FD-1	COATED CAST-IRON FLOOR DRAIN W/ BOTTOM OUTLET, CLAMPING COLLAR, AND POLISHED NICKEL-BRONZE STRAINER.	RESTROOM	5"	2"	ZURN	Z415N
3"FD-1	COATED CAST-IRON FLOOR DRAIN W/ BOTTOM OUTLET, CLAMPING COLLAR, AND POLISHED NICKEL-BRONZE STRAINER.	RESTROOM	5"	3"	ZURN	Z415N
4"FS-1	COATED CAST-IRON FLOOR SINK, 8" DEEP, WITH EPOXY FINISH, ANCHORING FLANGE,CLAMPING COLLAR, SEEPAGE HOLES, EPOXY BUCKET AND 3/4 GRATE	MECHANICAL	12"X12"	4"	ZURN	Z-1901

NOTES:
1. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. ALL FLOOR DRAINS SHALL INCLUDE AN ANCHORING FLANGE AND PRIMER TAP.
3. INSULATE BODY, TAILPIECE AND P-TRAP OF ALL FLOOR DRAINS SERVING HVAC EQUIPMENT.

PUMP SCHEDULE

MARK	SERVICE	DESCRIPTION	G.P.M.	HEAD (FT.)	MAX. STABLE DELIVERY	SHUT-OFF HEAD (FT. W.)	INLET / OUTLET SIZE	MOTOR HP / V / Ø	MOTOR R.P.M.	MANUFACTURER	MODEL NUMBER	NOTES
HWC-1	HOT WATER	HOT WATER CIRCULATION	5	10	16	9	3/4"	1/15HP / 115 / 1	2800	BELL & GOSSET	NBF-12/LW	1,2

ELECTRIC WATER HEATER SCHEDULE

MARK	STORAGE (GALLONS)	RECOVERY RATE @ 100°F (GALLONS PER HOUR)	HEIGHT	WIDTH	DEPTH	KW	VOLTS	PHASE	HERTZ	REMARKS
EWH-1	40	37	54.75"	22"	28"	9	240	1	60	A.O. SMITH DSE-40A-9kW

SHOCK ARRESTOR SCHEDULE

MARK	WSFU RATING	P.D.I. CROSS REFERENCE	MANUFACTURER
SA-A	1-11	A	PRECISION PLUMBING PRODUCTS
SA-B	12-32	B	PRECISION PLUMBING PRODUCTS
SA-C	33-60	C	PRECISION PLUMBING PRODUCTS
SA-D	61-113	D	PRECISION PLUMBING PRODUCTS
SA-E	114-154	E	PRECISION PLUMBING PRODUCTS
SA-F	155-330	F	PRECISION PLUMBING PRODUCTS

NOTES:
PROVIDE SHOCK ARRESTORS AT ENDS OF DCW AND DHW PIPING RUNS; AT ALL QUICK-CLOSING FIXTURES SUCH AS SHOWERS, FLUSHVALVES, SOLENIODS VALVES, SINGLE-HANDED FAUCETS, AND SENSOR OPERATED FAUCETS; AND, FOR ALL GROUPS OF FIXTURES. SHOCK ARRESTORS SHALL BE PLACED AS CLOSE AS POSSIBLE TO THE LAST FIXTURE ON EACH PIPE RUN. SHOCK ARRESTORS SHALL BE ACCESSIBLE.

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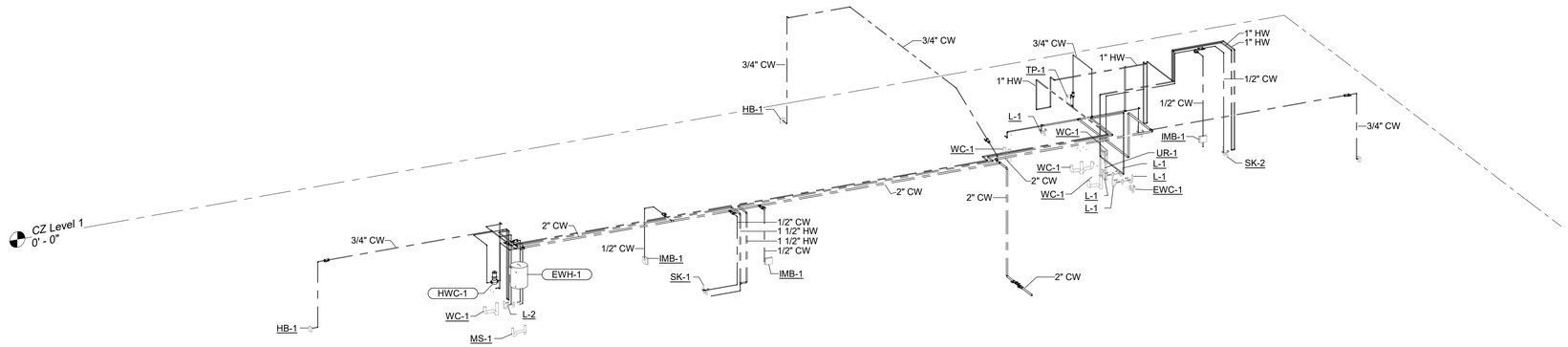
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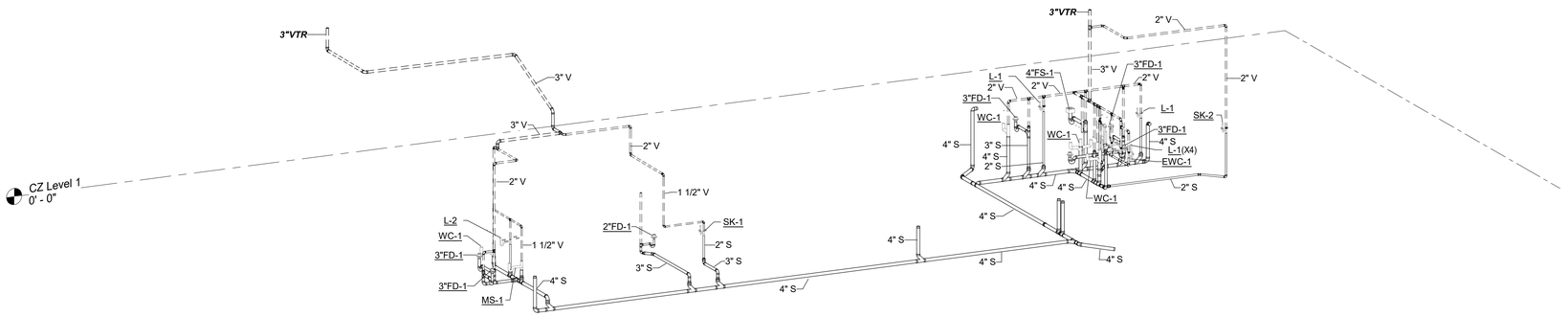
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PLUMBING SCHEDULES

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P301



1 P401 PLUMBING RISER - DOMESTIC WATER



2 P401 PLUMBING RISER - SANITARY WASTE AND VENT

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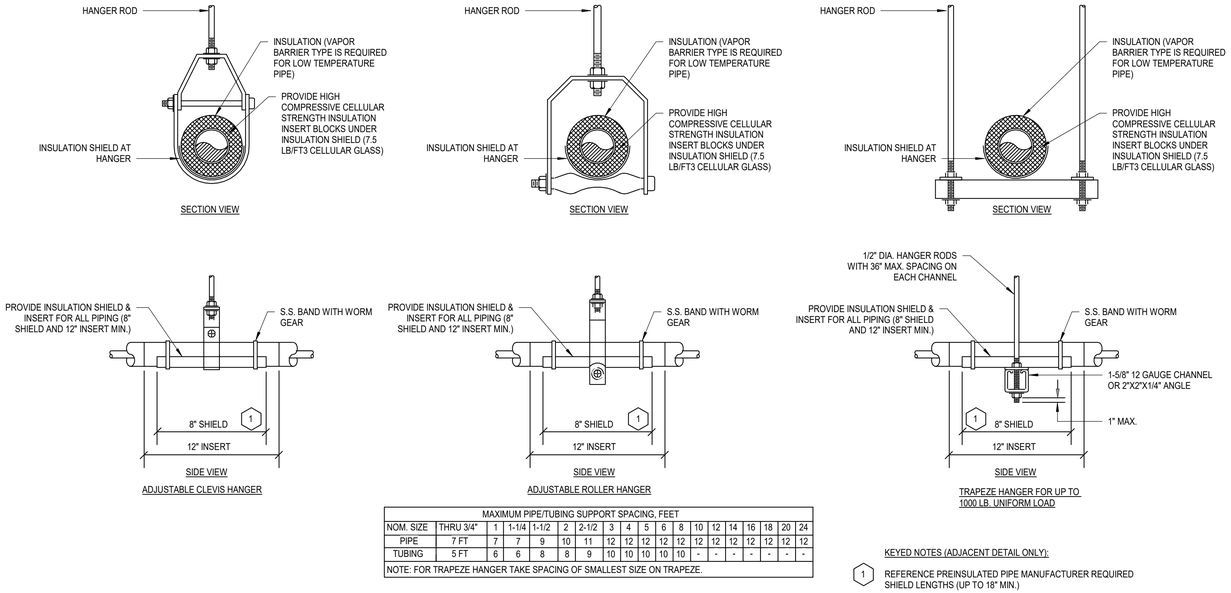
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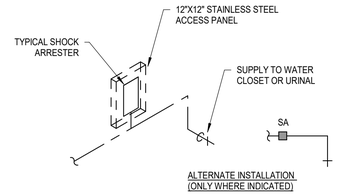


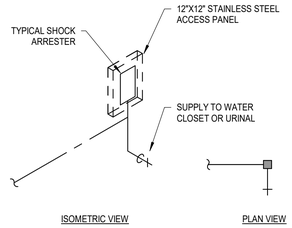
MAXIMUM PIPE/TUBING SUPPORT SPACING, FEET																	
NOM. SIZE	THRU 3/4"	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14	16	18	20	24
PIPE	7 FT	7	7	9	10	11	12	12	12	12	12	12	12	12	12	12	12	12
TUBING	5 FT	6	6	8	8	9	10	10	10	10	10	-	-	-	-	-	-	-
NOTE: FOR TRAPEZE HANGER TAKE SPACING OF SMALLEST SIZE ON TRAPEZE.																		

1 TYPICAL PIPE HANGERS

P501

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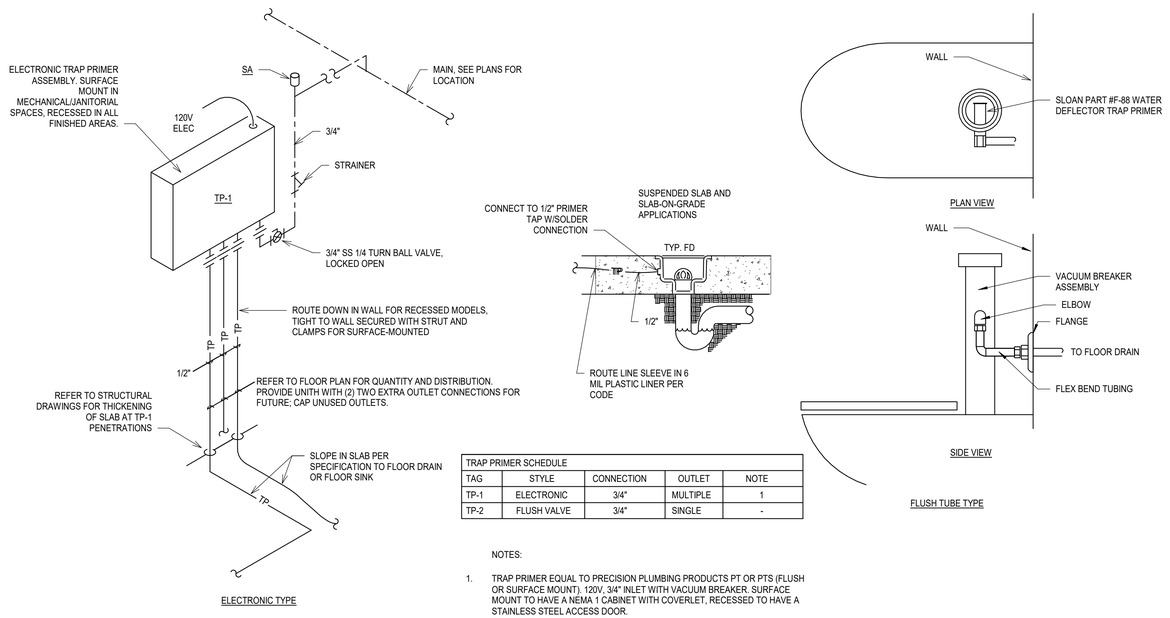




2 TYPICAL SHOCK ARRESTER

P501

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TRAP PRIMER SCHEDULE				
TAG	STYLE	CONNECTION	OUTLET	NOTE
TP-1	ELECTRONIC	3/4"	MULTIPLE	1
TP-2	FLUSH VALVE	3/4"	SINGLE	-

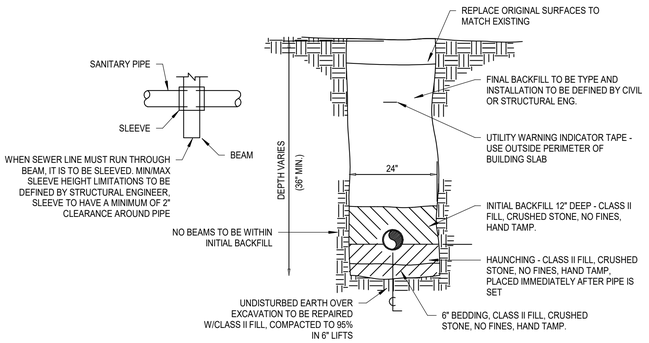
NOTES:

1. TRAP PRIMER EQUAL TO PRECISION PLUMBING PRODUCTS PT OR PTS (FLUSH OR SURFACE MOUNT). 120V, 3/4" INLET WITH VACUUM BREAKER. SURFACE MOUNT TO HAVE A NEMA 1 CABINET WITH COVERLET, RECESSED TO HAVE A STAINLESS STEEL ACCESS DOOR.

3 TYPICAL TRAP PRIMERS

P501

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4 TYPICAL TRENCHES

P501

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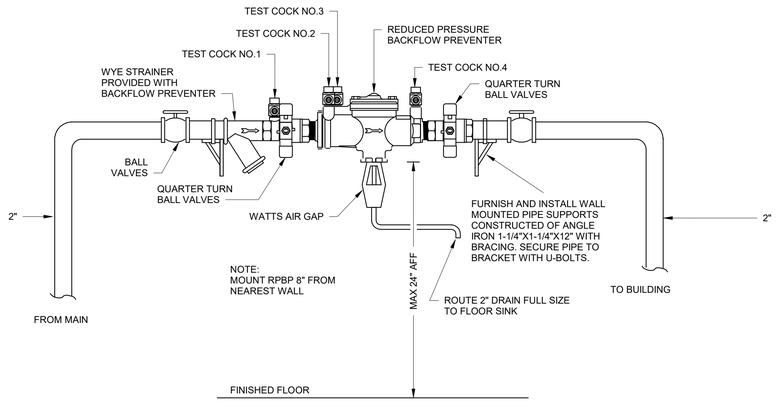
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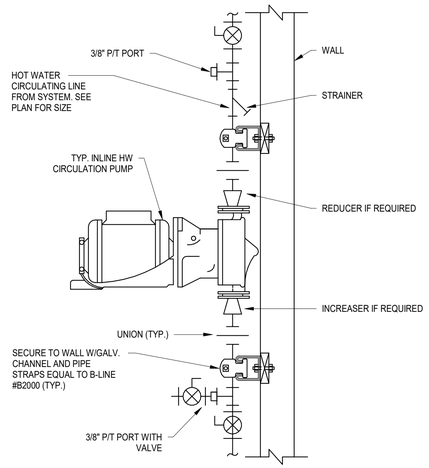
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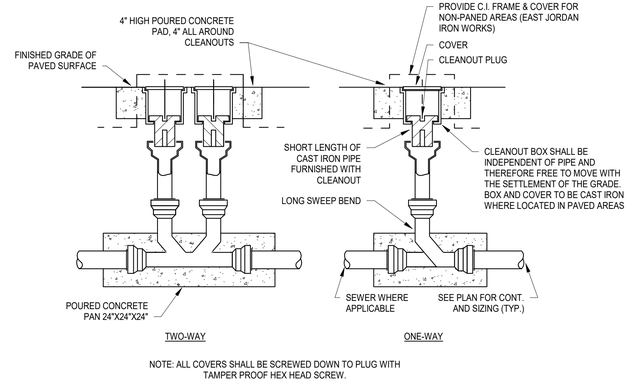
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1 P502 BACKFLOW PREVENTOR MOUNTING SCHEMATIC
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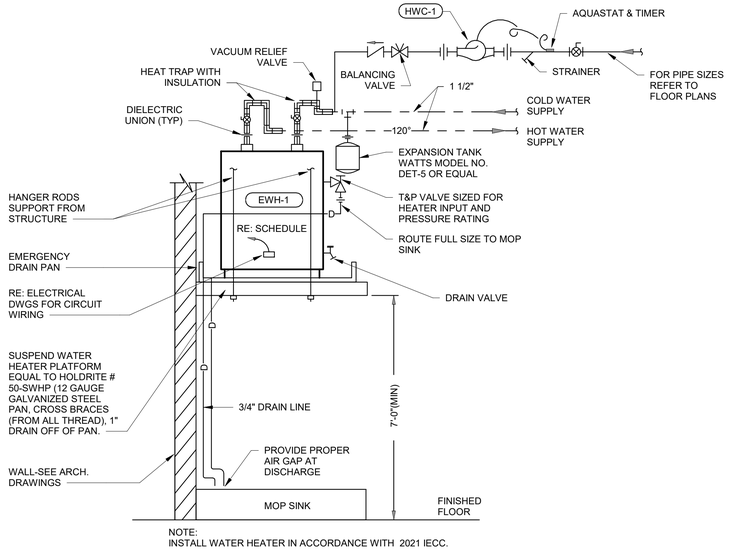


2 P502 INLINE CIRCULATION PUMP
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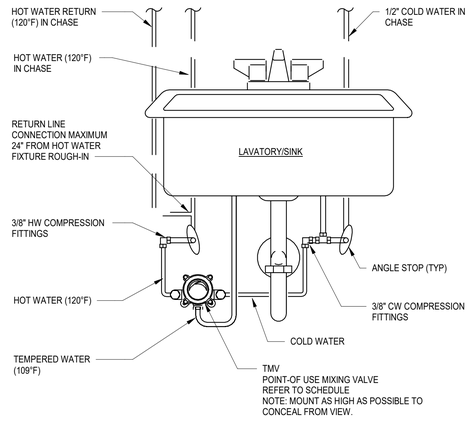
NOTE: ALL COVERS SHALL BE SCREWED DOWN TO PLUG WITH TAMPER PROOF HEX HEAD SCREW.

3 P502 TYPICAL YARD CLEANOUT
NOT TO SCALE



NOTE:
INSTALL WATER HEATER IN ACCORDANCE WITH 2021 IECC.

4 P502 WATER HEATER DETAIL
NOT TO SCALE



NOTE:

1. HOT AND COLD WATER PIPE ROUTING FROM BELOW FLOOR IS SIMILAR.

5 P502 POINT-OF-USE MIXING VALVE DETAIL
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ELECTRICAL SYMBOLS AND ABBREVIATIONS

(SOME SYMBOLS MAY NOT BE APPLICABLE TO THIS PROJECT)

SYMBOLS

GENERAL

- MOTOR, HP AS INDICATED
- CONTROLLER TO BE FURNISHED UNDER DIVISION 15 AND INSTALLED UNDER DIVISION 16
- DISCONNECT SWITCH
- COMBINATION MOTOR STARTER/DISCONNECT SWITCH
- G — GROUNDING REFERENCE POINT
- J — JUNCTION BOX, CEILING MOUNTED
- J — JUNCTION BOX, WALL MOUNTED
- PC WP — PHOTO CELL; WP= WEATHERPROOF AND SHALL BE INSTALLED FACING NORTH DIRECTION, UON
- R — RELAY
- TC — TIME CLOCK
- C — CONTACTOR
- BELL
- BUZZER
- C — CEILING MOUNTED CLOCK
- C WG — WALL MOUNTED CLOCK; WG INDICATED WIRE GUARD
- C WG — WALL MOUNTED DOUBLE FACE CLOCK-HEIGHT AS DESIGNATED BY ARCHITECT; WG INDICATES WIRE GUARD
- H WP — HORN; WP = WEATHERPROOF
- T — TRANSFORMER AS INDICATED
- ATS — AUTOMATIC TRANSFER SWITCH
- EQUIPMENT CONNECTION
- 2 — KEYED NOTE NO. 2
- CH-1 — MECHANICAL EQUIPMENT DESIGNATION. REFER TO MECHANICAL EQUIPMENT SCHEDULES.

LUMINAIRES

- A / a — LUMINAIRE, CEILING OR WALL MOUNTED (SEE FIXTURE SCHEDULE). SUBSCRIPT INDICATES ASSOCIATED SWITCHING. CAPITAL LETTER INDICATES FIXTURE TYPE. "E" SUFFIX INDICATES BATTERY BACK-UP OR GENERATOR/UPS BACKED.
- FIXTURE CEILING MOUNTED (SEE FIXTURE SCHEDULE)
- FIXTURE WALL MOUNTED (SEE FIXTURE SCHEDULE)
- WALLWASH FIXTURE CEILING MOUNTED. ARROW INDICATES DIRECTION OF WASH.
- EXIT LIGHT, UNSWITCHED, BATTERY BACK-UP, SELF DIAGNOSTICS, CEILING MOUNTED WITH ARROWS AS INDICATED ON DRAWINGS. CONNECT TO EMERGENCY SYSTEM (IF AVAILABLE).
- EXIT LIGHT, UNSWITCHED, WALL MOUNTED, BATTERY BACK-UP, SELF DIAGNOSTICS, WITH ARROWS AS INDICATED ON DRAWINGS. CONNECT TO EMERGENCY SYSTEM (IF AVAILABLE).
- FIXTURE IS UNSWITCHED (NIGHT LIGHT). "E" SUFFIX INDICATES BATTERY BACKUP WITH DRIVER CONNECTED TO BATTERY BACKUP. FIXTURE MAY BE CONNECTED TO GENERATOR/UPS BACKUP SYSTEM.
- FIXTURE WITH ONE BALLAST CONNECTED TO EMERGENCY GENERATOR SYSTEM.
- EMERGENCY LIGHT, WALL MOUNTED, UNSWITCHED. CONNECTED TO EMERGENCY GENERATOR SYSTEM.
- POLE MOUNTED LUMINAIRE. SEE SCHEDULE OR NOTES FOR TYPE. ORIENT FIXTURE FOR CUT-OFF TOWARDS AREA TO BE LIT. ORIENT HOUSE SHIELD TOWARDS BUILDING. SEE DETAILS FOR POLE BASE. PROVIDE POLE BASE GROUND ROD.
- FLOOD LIGHT. ARROW INDICATES AIMING DIRECTION.
- TRACK LIGHT WITH HEADS AS INDICATED

RACEWAYS

- CONDUIT CONCEALED IN WALL OR CEILING WITH ONE PHASE (HOT), NEUTRAL AND GROUND CONDUCTOR UNLESS OTHERWISE NOTED
- CONDUIT UNDER FLOOR OR CAST IN STRUCTURE WITH ONE PHASE (HOT), NEUTRAL AND GROUND CONDUCTOR UNLESS OTHERWISE NOTED.
- SWITCH LEG
- P1A-2,4,6 — BRANCH CIRCUIT HOMERUN SUBSCRIPT "P1A" INDICATES PANEL AND 2,4,6 INDICATES BREAKER POSITION. MINNIMUM SIZE 3/4"C, 2#12 AND 1#12 GND. MIN.
- SURFACE RACEWAY (PANDUIT TWIN 70 OR WIREMOLD EQUIV)
- T — TELEPHONE
- BUS DUCT WITH TAKE OFF DEVICE

P.A. / INTERCOM

- IC — REMOTE INTERCOM STATION
- ICM — INTERCOM MASTER STATION
- S — SPEAKER, CEILING MOUNTED WITH BACKBOX AND GRILLE. SEE SPECIFICATIONS.
- S WG WP — SPEAKER, WALL MOUNTED.
- AMP — AMPLIFIER AND ASSOCIATED TUNERS, MIXERS, ETC., AS REQUIRED. REFER TO DETAILS AND SPECIFICATIONS.
- M MIC — MICROPHONE JACK
- CB — INTERCOM CALL BOX

PANEL AND RELATED ITEMS

- PANELBOARD (SEE SCHEDULE), SURFACE MOUNTED.
- PANELBOARD (SEE SCHEDULE), FLUSH MOUNTED.
- SWBD — SWITCHBOARD OR DISTRIBUTION BOARD
- MCC — MOTOR CONTROL CENTER
- TVSS — TRANSIENT VOLTAGE SURGE SUPPRESSOR.
- TELE — PLYWOOD TELEPHONE BACKBOARD: PROVIDE WALL MOUNTED WHITE PAINTED 4x8' PLYWOOD BACKBOARD, SURGE PROTECTION, SECONDARY GROUND, AND TWO QUAD RECEPTACLES AT THE BASE OF THE BACKBOARD.

OUTLETS

- COLOR BY ARCHITECT/OWNER SIMPLEX RECEPTACLE.
- DUPLEX RECEPTACLE, 20A, 1P, (5-20R) COLOR BY ARCHITECT/OWNER WITH COVER PLATE.
- WP, T, GFI, IG, TV — DUPLEX RECEPTACLE; GFI=GROUND FAULT INTERRUPTING, WP=WEATHERPROOF, T=TAMPER RESISTANT, IG=ORANGE ISOLATED GROUND, TV=TV RECEPTACLE WITH COMBINATION DUPLEX/RJ 45 JACK MODULAR PLATE MOUNTED 7'6" AFF, UON.
- C — CONTROLLED DUPLEX RECEPTACLE. DUPLEX TO HAVE TOP/BOTH RECEPTACLES(S) CONTROLLED AND INDICATED AS CONTROLLED ON THE RECEPTACLE. PROVIDE WITH A nLIGHT #NPP20 PL-BP (OR EQUAL) AND CONTROL THROUGH THE LOCAL OCCUPANCY SENSOR.
- DOUBLE DUPLEX (QUADRUPLEX) RECEPTACLE, COLOR BY ARCHITECT/OWNER, WITH COVERPLATE.
- RED DUPLEX RECEPTACLE WITH COLOR BY ARCHITECT/OWNER COVERPLATE. CONNECTED TO EMERGENCY POWER BRANCH.
- RED QUAD RECEPTACLE WITH COLOR BY ARCHITECT/OWNER COVERPLATE. CONNECTED TO EMERGENCY POWER BRANCH.
- SPECIAL PURPOSE RECEPTACLE. SEE PANEL SCHEDULES AND FLOOR PLAN NOTES FOR TYPE. RECEPTACLE SHALL BE FLUSH MOUNT. PROVIDE TWO GANG BACKBOX, PLASTER RING, AND STAINLESS STEEL PLATE.
- ROUND FLUSH FLOOR BOX WITH DUPLEX POWER, AND BRASS COVER PLATE. HUBBELL B2529 WITH SF3925 COVER.
- FLOOR BOX HUBBELL CFB6G30CR (OR EQUIV.). PROVIDE (1) 3/4" CONDUIT FOR POWER AND (1) 1" CONDUIT FOR DATA/IT EQUIPMENT AND (1) 1-1/2" CONDUIT FOR AUDIO/VIDEO. PROVIDE TWO (2) 20A SINGLE POLE DUPLEX RECEPTACLES, AND TWO (2) TWO SPACE MODULAR RJ-45 JACK PLATES. SEE FLOOR PLANS/SPECS FOR DATA FILL AND WHETHER IT CONDUIT IS TO ABOVE ACCESSIBLE CEILING , CABLE TRAY, OR BACK TO IDF/MDF/PHONE BOARD. PROVIDE FLOOR INSERT. COORDINATE FINISH OF COVER WITH ARCHITECT OR OWNER.
- PT — 8 INCH FIRE RATED POKE-THROUGH HUBBELL #S1R8PTFIT1 (OR EQUIV.). PROVIDE 3/4" CONDUIT FOR POWER WITH TWO(2) #S1R8PSPZ AND 1-1" CONDUIT FOR DATA/IT EQUIPMENT WITH ONE (1) S1R8CSPK AND 1-1/2" CONDUIT FOR AUDIO/VIDEO WITH ONE (1) S1R8CSPM. PROVIDE TWO (2) 20A SINGLE POLE DUPLEX RECEPTACLES, AND TWO (2) TWO SPACE MODULAR RJ-45 JACK PLATES. SEE FLOOR PLANS/SPECS FOR DATA FILL AND WHETHER IT CONDUIT IS TO ABOVE ACCESSIBLE CEILING, CABLE TRAY, OR BACK TO IDF/MDF/PHONE BOARD. PROVIDE FLOOR INSERT. COORDINATE FINISH OF COVER WITH ARCHITECT OR OWNER.
- TELEPHONE OUTLET: TWO GANG BOX, CONDUIT BUSHINGS, PLASTER RING, TWO (2) RJ-45 JACK MODULAR WALL PLATE, 1" CONDUIT TO ABOVE ACCESSIBLE CEILING.
- TELEVISION OUTLET: FEMALE COAX JACK, WALL PLATE, 3/4" CONDUIT TO ABOVE ACCESSIBLE CEILING, PLENUM RATED RG-59U BACK TO LOCAL (WITHIN 50 FEET) SPLITTER/TAP/CATV ENTRANCE OR PLENUM RATED RG-11U TO SPLITTER/TAP/CATV ENTRANCE IF RUN IS LONGER THAN 50 FEET.
- DATA OUTLET: TWO GANG BOX, CONDUIT BUSHINGS, PLASTER RING, TWO (2) RJ-45 JACK MODULAR WALL PLATE, 1" CONDUIT TO ABOVE ACCESSIBLE CEILING.
- COMBINATION DATA/POWER 2 GANG SPLIT BOX MOUNTED IN CEILING. PROVIDE 1" CONDUIT FROM BOX TO CABLE TRAY. PROVIDE 3/4" CONDUIT TO DUPLEX.

SWITCHES

- a — SINGLE POLE SWITCH, LOWERCASE SUBSCRIPT INDICATES NUMBER OF CONTROL ZONE WITHIN SWITCH.
- 2 — DOUBLE POLE SWITCH
- 3, 4 — SWITCH 3 = 3-WAY, 4 = 4-WAY
- a, b, c, d, x — MULTIPLE SWITCHES, GANGED.
- K — KEY OPERATED SWITCH
- P — SWITCH WITH PILOT LIGHT IN HANDLE (ON LIGHTED UNLESS OTHERWISE NOTED)
- WP — WEATHERPROOF SWITCH
- M, MT — MANUAL MOTOR STARTER SWITCH (T=THERMAL OVERLOAD SIZED FOR MOTOR)
- D a,b,c,x — DIMMER SWITCH WATTAGE RATING AS NOTED. LOWERCASE SUBSCRIPT INDICATES NUMBER OF CONTROL ZONE WITHIN SWITCH. LOW VOLTAGE DIMMERS TO BE LINE VOLTAGE DIMMERS TO BE IN MIN. 2 GANG BOX. PROVIDE HEAT SPACING IN BOX FOR MULTIPLE DIMMERS. PROVIDED WITH 0-10V CLASS 2 DIMMING WIRE TO POWER PACK.
- EP — EXPLOSION PROOF SWITCH
- T — TIMER SWITCH
- IR — WALL SWITCH INFRARED (LEGRAND #PW-100 OR EQUAL)
- OS, OS2, VS — WALL SWITCH DUAL TECHNOLOGY SENSOR WITH PUSH BUTTON OVERRIDE AND ADJUSTABLE FIELD OF VIEW (COLOR BY ARCHITECT). OS2 INDICATES DUAL MANUAL SWITCHING. "OS" DEVICE SHALL BE PROGRAMMED TO AUTO-ON, AUTO-OFF WITHIN 20 MINS (ADJ) OF ROOM BEING VACANT "VS" DEVICE SHALL BE PROGRAMMED TO MANUAL-ON, AUTO-OFF WITHIN 20 MINS (ADJ) OF ROOM BEING VACANT.
- OS D, VS D — DIMMABLE WALL SWITCH DUAL TECHNOLOGY SENSOR WITH PUSH BUTTON OVERRIDE AND ADJUSTABLE FIELD OF VIEW (COLOR BY ARCHITECT). "OS" DEVICE SHALL BE PROGRAMMED TO AUTO-ON, AUTO-OFF WITHIN 20 MINS OF ROOM BEING VACANT "VS" DEVICE SHALL BE PROGRAMMED TO MANUAL-ON, AUTO-OFF WITHIN 20 MINS OF ROOM BEING VACANT. PROVIDE WITH 0-10V CLASS 2 DIMMING CABLE
- LV, LV2 — LOW VOLTAGE LIGHT SWITCH COMPATIBLE WITH CEILING MOUNTED MOTION SENSOR. LV2=2 BUTTON STATION -PROVIDE W/ CAT 5e CABLES.
- OR — 2 HOUR OVERRIDE PUSHBUTTON
- BMS PC — CEILING MOUNTED DUAL TECHNOLOGY EXTENDED RANGE 360 DEGREE MOTION SENSOR. PC=INTERGATED PHOTOCELL; BMS= INTEGRATED AUX CONTACT. PROVIDE WITH A nPP20 POWER PACK FOR NON-DIMMING AND nPP16D POWER PACK FOR DIMMING

FIRE ALARM

- FACP — FIRE ALARM CONTROL PANEL
- FAEX — FIRE ALARM EXPANSION PANEL
- ANN — REMOTE FIRE ALARM ANNUNCIATOR
- NAC — AUXILIARY POWER BOOSTER PANEL
- F — MANUAL PULL STATION 48" AFF
- SD — SMOKE DETECTOR; DASHED INDICATES BELOW RAISED FLOOR
- SD, DSD — SMOKE DETECTOR, DUCT MOUNTED
- T — TEST SWITCH
- HD — HEAT DETECTOR
- FS — FLOW SWITCH
- TS — TAMPER SWITCH
- PS — PRESSURE SWITCH
- AV WP WG MH — FIRE ALARM AUDIO-VISUAL ANNUNCIATOR; WP=WEATHERPROOF; MH=MINI HORN; WG=WIRE GUARD
- V WP WG SS — FIRE ALARM VISUAL ANNUNCIATOR; WP=WEATHERPROOF; MH=MINI HORN; WG=WIRE GUARD; SS= SPEAKER STOBE; CLG= CEILING
- DH — MAGNETIC DOOR HOLDER
- PJ — FIRE FIGHTERS PHONE JACK

SITE UTILITY

- MH#1 — MANHOLE NUMBER 1; CMH-INDICATES COMMUNICATIONS MANHOLE.
- PB — PULLBOX OR HANDHOLE AS SPECIFIED ON DRAWINGS AND SPECIFICATIONS.
- PP — POWER POLE
- POLE MOUNTED TRANSFORMERS
- TB — TELEPHONE TERMINAL BOX
- AP — AERIAL PRIMARY
- AS — AERIAL SECONDARY
- AT — AERIAL TELEPHONE; CATV = CABLE TELEVISION.
- UP — UNDERGROUND PRIMARY
- US — UNDERGROUND SECONDARY
- UT — UNDERGROUND TELEPHONE/COMMUNICATIONS
- UE — UNDERGROUND ELECTRICAL

SECURITY

- SEC — SECURITY PANEL
- DC — DOOR CONTACT
- CAMERA — CCTV CAMERA WITH FIXED WIDE ANGLE LENS WALL MOUNTED TO SET CAMERA 6" BELOW CEILING.
- CAMERA PTZ — CCTV CAMERA; PT=PAN AND TILT; Z=ZOOM LENS
- CAMERA WP — EXTERIOR CAMERA IN WEATHERPROOF ENCLOSURE WITH ANTI-FOG HEATERS.
- DL — DOOR LOCK
- CR — CARD READER ACCESS, PROVIDE WITH 1" CONDUIT TO PLENUM SPACE
- D — DURESS PUSHBUTTON
- KP — KEYPAD

DISTRIBUTION

- MOLDED CASE CIRCUIT BREAKER
- DRAWOUT POWER CIRCUIT BREAKER AIR, VACUUM OR SF AS SPECIFIED
- DISCONNECT SWITCH
- FUSIBLE DISCONNECT SWITCH
- TRANSFORMER
- SHIELDED INSOLATION TRANSFORMER
- VM — VOLTMETER
- AM — AMMETER
- VS — VOLTMETER SELECTOR SWITCH
- AS — AMMETER SELECTER SWITCH
- ST — SHUNT TRIP
- M — CT AND METER
- GROUND ROD

ABBREVIATIONS

A	AMPERE(S)
AC	ABOVE COUNTER
A/C	AIR CONDITIONING
AIC	AMPERE INTERRUPTING CAPACITY
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AL , ALUM	ALUMINUM
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
CKT	CIRCUIT
CLG.	CEILING
COND	CONDUCTOR
CPU	CENTRAL PROCESSING UNIT
CT	CURRENT TRANSFORMER
DCP	DATA COLLECTION PANEL
DIA	DIAMETER
DC	DISCONNECT
DIST	DISTRIBUTION
DN	DOWN
DWGS	DRAWINGS
EC	EMPTY CONDUIT
EF	EXHAUST FAN
EQMT	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EXH	EXHAUST
EXP	EXPLOSION PROOF
EXTG	EXISTING
F/A , F.A.	FIRE ALARM
FLUOR	FLUORESCENT
FN	FULL NEUTRAL
FT	FEET, FOOT
GALV	GALVANIZED
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
GRD	GALVANIZED RIGID STEEL
HID	HIGH INTENSITY DISCHARGE
HP	HORSEPOWER
HOA	HAND OFF AUTOMATIC
HPS	HIGH PRESSURE SODIUM
HVAC	HEATING/VENTILATING/AIR CONDITIONING
HZ	HERTZ
ID	INSIDE DIAMETER
IG	ISOLATED GROUND
IMC	INTERMEDIATE STEEL CONDUIT
IN	INCHES
INCD	INCANDESCENT
JB	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAC	KILOVOLT AMPERE CAPACTIVE
KVAR	KILOVOLT AMPERE REACTIVE
KW	KILOWATT
KWH	KILOWATT HOUR
LPS	LOW PRESSURE SODIUM
MAX	MAXIMUM
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MH	METAL HALIDE
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MTD	MOUNTED
MTG	MOUNTING
MV	MERCURY VAPOR
MW	MICROWAVE
NA	NOT APPLICABLE
NC	NORMALLY CLOSED
NF	NONFUSIBLE
NL	NIGHT LIGHT
NO	NORMALLY OPEN
OC	ON CENTER
OFCI	OWNER FURNISHED CONTRACTOR INSTALLED
OH	OVERHEAD
P	POLE
PA	PUBLIC ADDRESS
PB	PUSHBUTTON
PBX	PRIVATE BUILDING EXCHANGE
PC	PULL CHAIN
P/C	PHOTO CELL
PDP	POWER DISTRIBUTION PANEL
PH , Ø	PHASE
PNL	PANELBOARD
PR	PAIR
PSI	POUNDS PER SQUARE INCH
PWR	POWER
QUAD	QUAD RECEPTACLE
REFR	REFRIGERATOR
S	SECURITY
S.C.	SPLIT CIRCUIT
SCC	STATUS COMMAND CENTER
SN	SOLID NEUTRAL
SQFT.	SQUARE FOOT
SW	SWITCH
SWBD	SWITCHBOARD
TC	TIME CLOCK
TELE	TELEPHONE
TSTAT	THERMOSTAT
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTABLE POWER SUPPLY
V	VOLT(S)
VEND	VENDING
VP	VAPOR PROOF
W	WIRE , WATT(S)
WP	WEATHERPROOF
XFMR	TRANSFORMER
XPD	TRANSPONDER
Y	WYE
Z	IMPEDANCE
Δ	DELTA
1P	ONE POLE
2P	TWO POLE
3P	THREE POLE

COMMISSIONING PLAN

REFER TO SPECIFICATIONS FOR PRE-COMMISSIONING AND COMMISSIONING SERVICES.

SYSTEMS TO BE COMMISSIONED ARE LIGHTING CONTROLS FOR INDOOR AND OUTDOOR LIGHTING.

REFER TO SPECIFICATION SECTIONS 019100 AND 260800 FOR ADDITIONAL REQUIREMENTS.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

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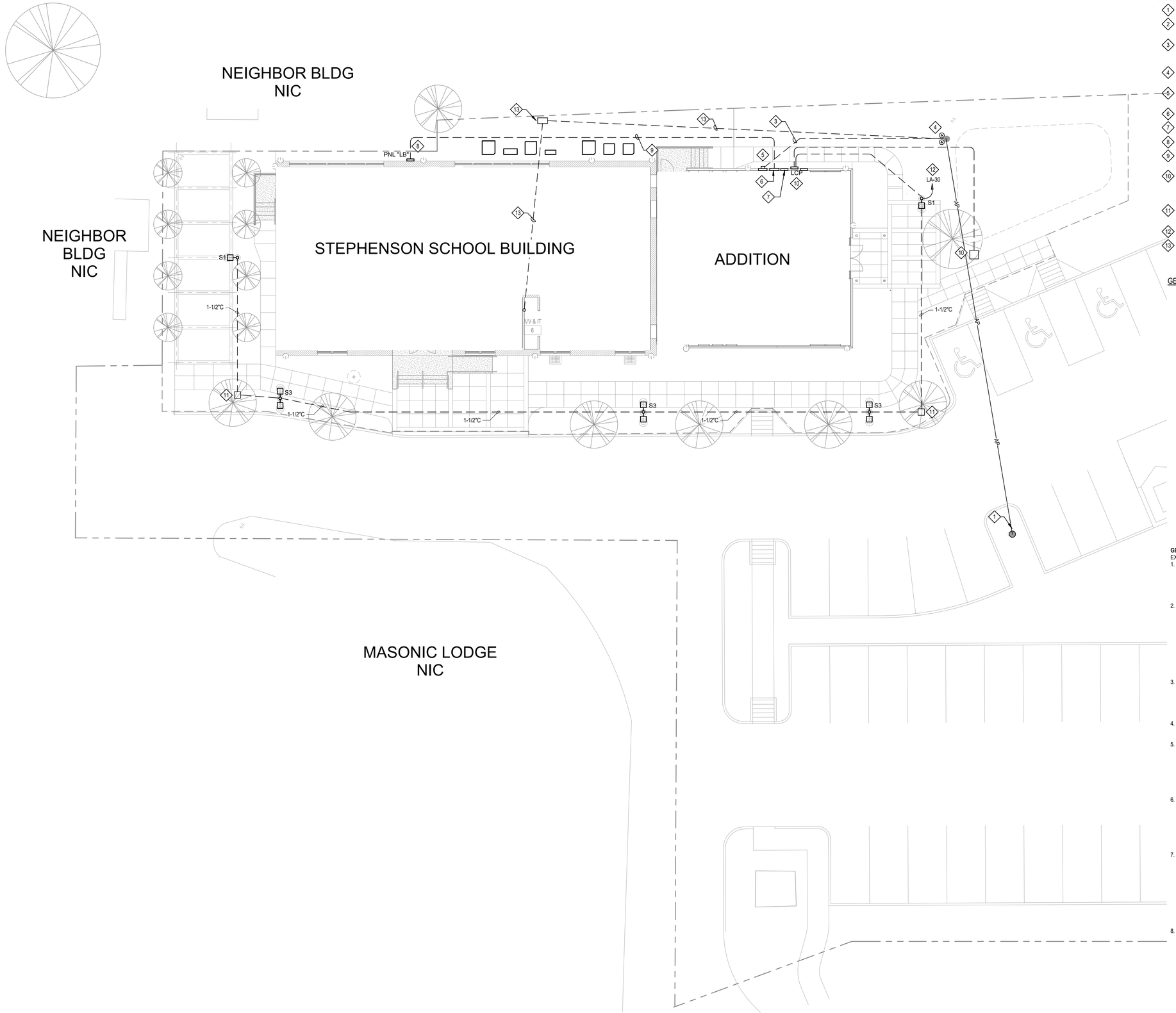
Architexas No. 2314

Date January 17, 2025

Sheet Name
ELECTRICAL SYMBOLS & ABBREVIATIONS

Sheet Number
E000

1104



ELECTRICAL LIGHTING KEYED NOTES:

1. RELCAOTED UTILITY POLE AND SINGLE PHASE OVERHEAD LINES TO REMAIN.
2. CONTRACTOR TO COORDINATE WITH UTILITY COMPANY FOR OVERHEAD TRANSFORMERS FOR A 800A, 240V/1P SERVICE.
3. PROVIDE TWO (2) 4"C FROM UTILITY POLE TO SERVICE DISCONNECT SWITCH AND UTILITY METER. REFER TO ONE-LINE DIAGRAM FOR MORE INFORMATION.
4. CONTRACTOR TO COORDINATE WITH UTILITIES TO PROVIDE A NEW RISER POWER TO MOUNT THE UTILITY TRANSFORMER.
5. UTILITY METER AND/OR TRANSOCKET. REFER TO SHEET E401 FOR MORE INFORMATION.
6. PANEL "DPA". REFER TO SHEET E401 FOR MORE INFORMATION.
7. PANEL "LA". REFER TO SHEET E401 FOR MORE INFORMATION.
8. PANEL "LB". REFER TO SHEET E401 FOR MORE INFORMATION.
9. ROUTE CONDUIT UNDERGROUND FROM PANEL "DPA" TO "LB". REFER TO SHEET E401 FOR MORE INFORMATION.
10. LCP. PROVIDE TWO(2) 1-1/2" CONDUIT ROUTED TO UNDERGROUND TRAFFIC RATED 24" X 24" X 6" QUAZITE PULL BOX. PROVIDE CONDUIT WITH MULE PULL TAPE AND CAP. COORDINATE FINAL LOCATION OF BOX WITH OWNER AND ARCHITECT BEFORE INSTALLATION.
11. PROVIDE A 18" X 18" X 18" TRAFFIC RATED QUAZITE PULL BOX LABELED "ELECTRICAL".
12. PROVIDE WITH 2#6, 1#6 GND IN 1-1/2"C.
13. PROVIDE A 36" X 36" X 36" TRAFFIC RATED PULL BOX LABELED "COMMUNICATIONS" PROVIDE WITH TWO (2) 4" CONDUITS FROM UTILITY POLE TO IT ROOM.

GENERAL SITE GROUNDING NOTES:

1. ALL GROUNDING SHALL BE INSTALLED IN ACCORDANCE WITH ARTICLE 250 OF THE CURRENT NEC WITH ALL CITY AMENDMENTS.

2. THE PERIMETER GROUND LOOP CONDUCTOR SHALL BE MINIMUM 4/0 STRANDED BARE COPPER, BURIED NOT LESS THAN 24 INCHES BELOW GRADE AND 36 INCHES FROM THE BUILDING. IT SHALL BE EXOTHERMICALLY WELDED (CAD) TO COLUMN GROUNDS AND PERIMETER GROUND RODS.

3. PERIMETER GROUND RODS SHALL BE MINIMUM ¾ INCH AND 10 FOOT LONG COPPER OR COPPER CLAD, BURIED VERTICALLY TO A MINIMUM DEPTH OF 10 FOOT 6 INCH BELOW GRADE. DRIVE ALL GROUND RODS INTO EXPOSED EARTH. IF DUE TO CONSTRUCTION, THE EARTH HAS BEEN DISTURBED AT THE GROUND ROD POINT, COMPACT THE LOCATION AND INSTALL GROUND ROD. GROUND RODS CAN BE HORIZONTAL 30" BELOW GRADE.

4. EXPOSED GROUNDING CONDUCTORS SHALL BE SUPPORTED BY MECHANICAL MEANS (BURNDY CLAMPS – 2 BOLT) AND PROPERLY PROTECTED FROM DAMAGE. ALL GROUNDING CONDUCTORS SHALL BE SLEEVED THROUGH BUILDING WALLS.

5. BOND THE GROUNDING SYSTEM TO THE WATER PIPE SYSTEM. IF THE WATER PIPING IS SUSPENDED BELOW THE STRUCTURE, BOND THE GROUND TO THE WATER PIPE AT THE GRADE POINT.

6. BOND BUILDING GROUND SYSTEM TO ALL BUILDING STEEL, TO INCLUDE BAR JOISTS OFF MASONRY WALLS. MECHANICAL BONDING CLAMPS ARE PERMITTED. ALL CONDUCTORS ON BEAMS SHALL BE SECURED 48" INTERVALS WITH MALLEABLE CABLE STRAPS. SAND AND CLEAN ALL BOLT-ON CONNECTIONS.

7. PROVIDE A LOCKABLE WEAHTER PROOF COVER FOR ALL EXTERIOR RECETPACLES.

8. ROUTE ALL EXTERIOR RECEPTACLE CONDUITS AT THE EXISTING PORTION OF THE BUILDING THROUGH THE CRAWL SPACE AND POKE THROUGH THE MASONRY WALLS. DO NOT SURFACE MOUNT ANY CONDUIT.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

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   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
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1 E001 — ELECTRICAL SITE PLAN
3/32" = 1'-0"

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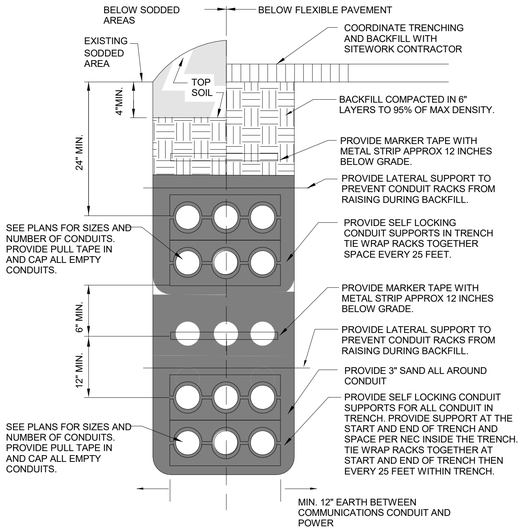
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Sheet Name
ELECTRICAL SITE PLAN

Sheet Number
E001

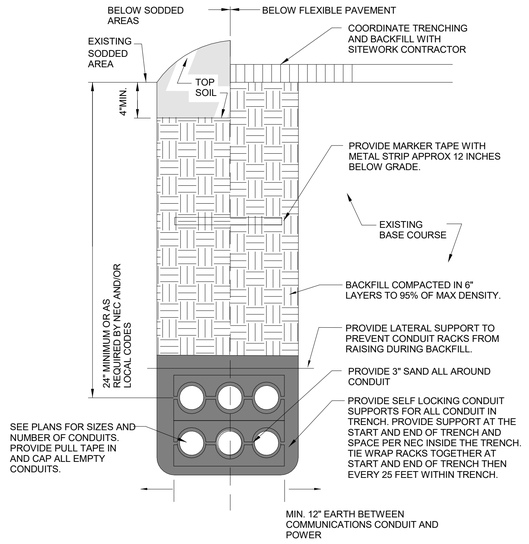


NOTE:

APPLIES TO ALL BURIED CONDUITS. BACKFILL APPLIES TO ALL AREAS NOT JUST ROADWAYS OR ADJACENT TO ROADWAY.

1 E401 BRANCH CIRCUIT COMMUNICATIONS BURIED CONDUIT DETAIL

NOT TO SCALE

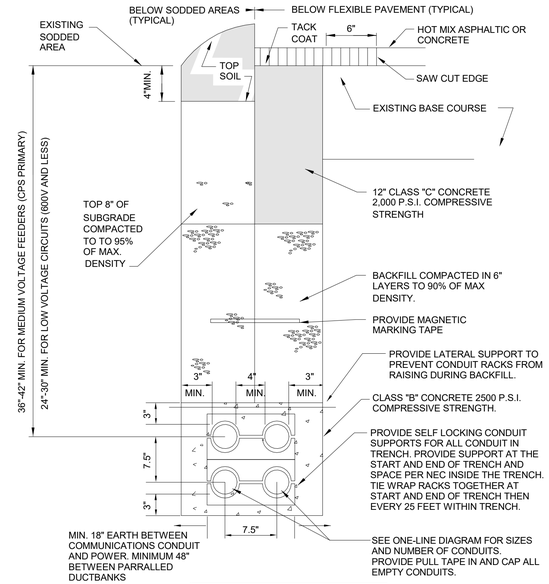


NOTE:

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2 E401 COMMUNICATIONS CONDUIT BURIAL DETAIL

NOT TO SCALE

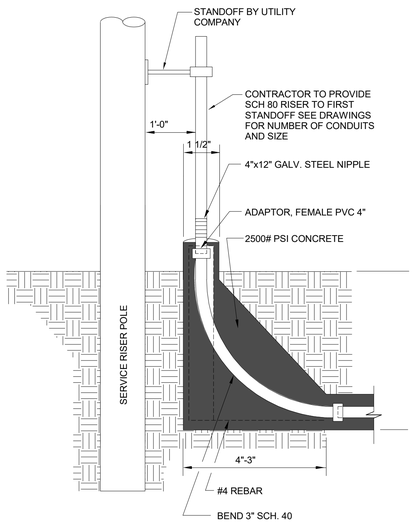


NOTE:

APPLIES TO ALL BURIED CONDUITS. BACKFILL APPLIES TO ALL AREAS NOT JUST ROADWAYS OR ADJACENT TO ROADWAY.

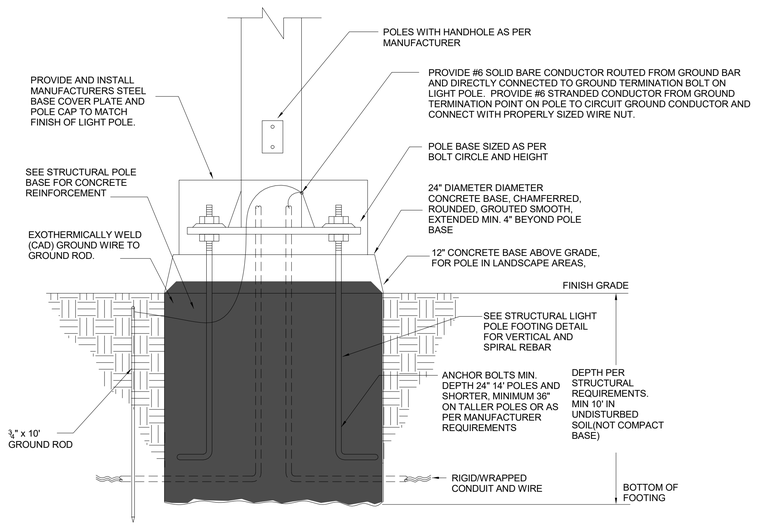
3 E401 POWER CONDUIT BURIAL DETAIL

NOT TO SCALE



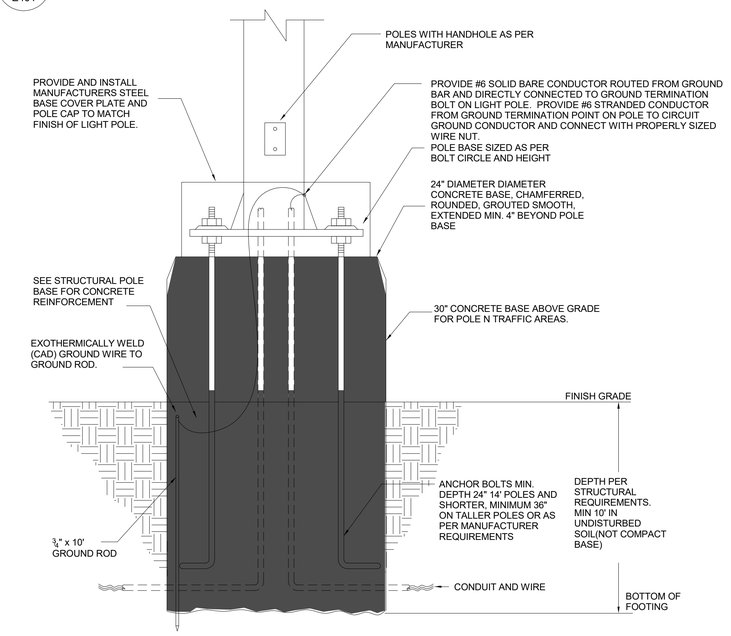
5 E0.02 CONCRETE ENCASEMENT RISER AT SERVICE POLE

NOT TO SCALE



4 E401 POLE BASE LADSCAPE AREAS (SEE NOTES FOR SIZE)

NOT TO SCALE



8 E401 POLE BASE TRAFFIC AREAS (SEE NOTES FOR SIZE)

NOT TO SCALE

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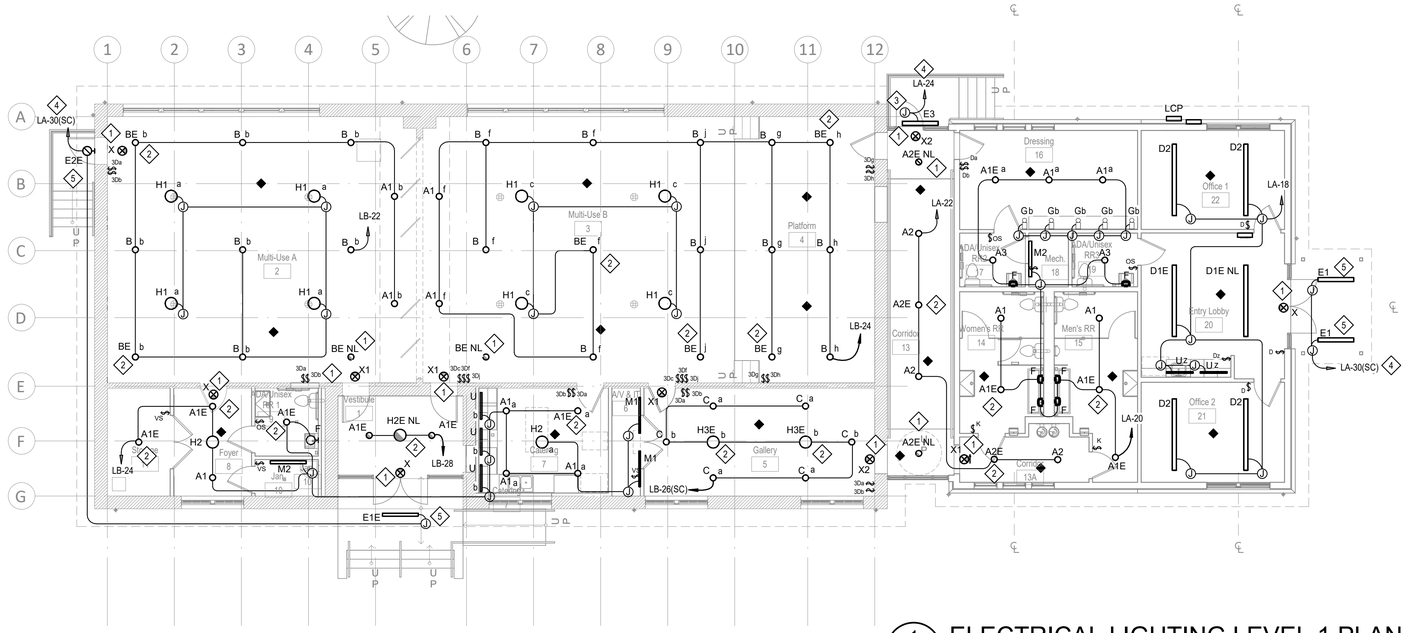
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Architexas No. 2314

Date January 17, 2025

Sheet Name
ELECTRICAL SITE PLAN DETAILS

Sheet Number
E002



1 E101 ELECTRICAL LIGHTING LEVEL 1 PLAN

1/8" = 1'-0"

ELECTRICAL LIGHTING KEYED NOTES:

1. EXIT SIGN AND/OR NIGHTLIGHT PROVIDE WITH AN ADDITIONAL UNSWITCHED HOT FROM SAME CIRCUIT WITHIN ROOM.
2. EGRESS FIXTURE. PROVIDE WITH AN ADDITIONAL UNSWITCH HOT FROM THE SAME CIRCUIT.
3. PROVIDE TYPE "E3" FIXTURE WITH A REMOTE BATTERY PACK, LOCATED ABOVE THE ACCESSIBLE CEILING IN THE CATER ROOM. PROVIDE WITH AN ADDITIONAL UNSWITCHED HOT FROM CIRCUIT TO BATTERY PACK AND FIXTURE.
4. ROUTE EXTERIOR CIRCUIT THROUGH THE PLENUM SPACE ABOVE THE INTERIOR CEILING SPACE. ROUTE CIRCUIT THROUGH THE LIGHTING CONTROL PANEL "LCP" TO CONTROL FIXTURES.
5. EXTERIOR EGRESS FIXTURE. PROVIDE WITH AN ADDITIONAL UNSWITCH HOT FROM THE SAME CIRCUIT FOR A 90 MIN BATTERY PACK.

ELECTRICAL LIGHTING GENERAL NOTES:

1. CONTRACTOR TO UTILZED EXISTING SWITCH LOCATIONS IS HISTORIC AREA WALLS WHENEVER POSSIBLE. MINIMIZE TRENCHING WITHIN HISTORIC MASONRY WALLS. COORDINATE WITH ARCHITECT PRIOR TO TRENCHING. DEVICE LOCATION GUIDELINES: LOCATE DEVICES ADJACENT TO THE DOOR FRAMES 4 INCHES TO THE EDGE OF THE DEVICES AT ADA HEIGHT GUIDELINES. CO-LOCATE SIMILAR DEVICES UNDER A COMMON FACEPLACE (EXAMPLE - MULTIPLE LIGHT SWITCHES). LOCATE ADDITIONAL DEVICES HORIZONTALLY ADJACENT TO EACH OTHER. COORDINATE SWITCH LOCATIONS IN ROOMS WITH ARCHITECT AND OTHER DEVICES (THERMOSTATS, FIRE ALARM, AND CALL BUTTONS). DO NOT STAGGER DEVICES. ONLY WHEN HORIZONTAL SPACE DOES NOT PERMIT, STACK DEVICES VERTICALLY WITH TWO INCHES BETWEEN FACEPLATES TO NO MORE THAN 72 INCHES AFF TO THE TOP OF THE FACEPLATE. COORDINATE LOCATIONS WITH ARCHITECTURAL ELEVATIONS. DEVICES SHALL BE MOUNTED AT SPECIFIC DEVICE MOUNTING HEIGHTS AS LISTED PER SPECIFICATIONS.

2. MINIMUM CIRCUIT SIZE IS 2 #12 AND 1 #12 GROUND IN ¾" CONDUIT. MAXIMUM FIXTURE WHIP LENGTH FROM ANY J-BOX 6 FEET. LIGHTING CIRCUITS JOINTS SHALL BE MADE UP IN OVERHEAD J-BOXES SECURED TO STRUCTURE WITH LIGHTING WHIPS FROM THE J-BOXES. FIXTURES DESIGNED TO BE QUICK-CLIPPED TOGETHER SHALL BE CONNECTED AS PER MANUFACTURER.

3. COORDINATE LIGHT LOCATIONS WITH OTHER CEILING ITEMS OR JOIST ITEMS PRIOR TO INSTALLATION. LIGHT LOCATIONS TAKE PRECEDENCE OVER AIR DEVICES.

4. PROVIDE SECONDARY SUPPORT WIRES FROM ALL FOUR (4) CORNERS OF THE LAY-IN FIXTURES TO THE STRUCTURE ABOVE. DO NOT SUPPORT FIXTURES FROM CEILING GRID WIRE SUPPORTS, PIPING, CONDUIT, SIDE WALLS, OR MECHANICAL EQUIPMENT. CEILING SPECIFICATIONS DO NOT SUPERCEDE THIS REQUIREMENT.

5. HATCHED FIXTURES ARE UNSWITCHED.

6. FIXTURES WITH "E" SUFFIX HAVE BATTERY BACK-UPS.

7. FIRESTOP ALL CONDUIT PENETRATIONS IN RATED WALLS. SEE ARCHITECTURAL FOR WALL RATINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO SHEET ROCK AND REPAIR.
PROVIDE FIRE RATED SLEEVES IN ALL FLOOR PENETRATIONS.

8. CONTRACTOR TO VERIFY FIXTURE VOLTAGE PRIOR TO INSTALLING ANY RELOCATED FIXTURE. COORDINATE WITH RCP FOR FIXTURE LOCATIONS.

9. SUSPENDED FIXTURES AT MULTI-SPACES TO BE MONUNTED ON UNISTRUT.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES
EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUTICORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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City of Dripping Springs
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STATE OF TEXAS
JONATHAN GARCIA
124661
LICENSED
ARCHITECT

Architexas No. 2314
Date January 17, 2025

Sheet Name
ELECTRICAL LIGHTING LEVEL 1 PLAN

Sheet Number
E101

1107

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LIGHTING FIXTURE SCHEDULE

MARK	MANUFACTURER/MODEL	DIMENSION	MOUNTING	FIXTURE VA	VOLTAGE	LUMENS	TEMP	DESCRIPTION	NOTES
A1/A1E	LITHONIA #LDN4-30/20-L04-AR-LSS-TRW-MVOLT-GZ10; E=ELR;	10.625"D X 9.75"L X 3.5"H	RECESSED	22.12 W	120 V	2006 LM	3000 K	4" LED CAN ROUND DOWNLIGHT	SEE BELOW
A2/A2E	LITHONIA #LDN4SQ-30/15-LS4-AR-LSS-TRXX-MVOLT-GZ10; E=ELR;	11.2"D X 9.5"L X 4"H	RECESSED	17.5 W	120 V	1249 LM	3000 K	4" LED CAN SQUARE DOWNLIGHT	SEE BELOW
A3/A3E	LITHONIA #LDN4-30/07-L04-AR-LSS-TRW-MVOLT-GZ10; E=ELR;	10.625"D X 9.75"L X 3.5"H	RECESSED	8.6 W	120 V	751.1 LM	3000 K	4" LED CAN ROUND DOWNLIGHT	SEE BELOW
B/BE	LITHONIA #LDN6CYL-30/40-L06-AR-LSS-MVOLT-GZ10-PM-DBL-		RECESSED	44.3 W	120 V	4008 LM	3000 K		SEE BELOW
C	LITHONIA #LDN4-30/15-LW4-AR-LSS-TRW-MVOLT-GZ10; E=ELR;	10.625"D X 9.75"L X 3.5"H	RECESSED	17.5 W	120 V	1512 LM	3000 K	4" LED CAN ROUND DOWNLIGHT	SEE BELOW
D1	FINELITE #HP-2-ID-8FT-S-H-830-WSO-DSO-96LG-120V-DC-FC-10%-FA50-C4-FE-FB; E=LGD18W	2.25"D X 8'L X 5"H	PENDANT @ 8' AFF	83.2 W	120 V	9752 LM	3000 K	I/D PENDANT LED LINEAR FIXTURE	SEE BELOW
D2	FINELITE #HP-2-ID-8FT-S-H-830-WSO-DSO-96LG-120V-DC-FC-10%-FA50-C4-FE-FB; E=LGD18W	2.25"D X 8'L X 5"H	PENDANT @ 8' AFF	62.4 W	120 V	7314 LM	3000 K	I/D PENDANT LED LINEAR FIXTURE	SEE BELOW
F	SPECTRUM LIGHTING #DB1009GV-15L-27K-EX-TF2-SP9012-EMCR-MWI-GA-WLKA-SP9012	8" DIA X 8.75" H	WALL MOUNTED AT 6'-6" AFF	40 W	120 V			DECO BATHROOM FIXTURE	SEE BELOW
G	ALUZ #A6-ZEMY-STN-6"-30K-GSFLW-DM-DRY-AB		BOTTOM OF FIXTURE @ 30" AFF	24 W	120 V		3000 K	MIRROR/MARQUEE FIXTURE	SEE BELOW
H1/H1E	SPECTRUM LIGHTING #SS16GV-27L-30K-EX-HM48"-MB; E=EMEN	15.9"DIA X 10.3"H	BOTTOM OF FIXTURE @ 10' AFF	18 W	120 V	1416 LM	3000 K	DAMP LOCATION LED FIXTURE	SEE BELOW
H2/H2E	SPECTRUM LIGHTING #SS14GV-27L-30K-EX-DC9-MB; E=EMEN	13.1"DIA X 11.4"H	BOTTOM OF FIXTURE @ 10' AFF	18 W	120 V	1416 LM	3000 K	DAMP LOCATION LED FIXTURE	SEE BELOW
H3/H3E	SPECTRUM LIGHTING #SS12GV-27L-30K-EX-DC9-MB; E=EMEN	11.7"DIA X 10.3"H	BOTTOM OF FIXTURE @ 10' AFF	18 W	120 V	1416 LM	3000 K	DAMP LOCATION LED FIXTURE	SEE BELOW
M1/M1E	LITHONIA #ZL1N-L24-3500LM-FST-MVOLT-30K-80CRI; E=E7W	2.2" W X 24" L X 2.125" H	WALL MOUNTED ABOVE DOOR	31 W	120 V	3586 LM	3500 K	2' UTILITY LED STRIP LIGHT	SEE BELOW
M2/M2E	LITHONIA #ZL1N-L48-5000LM-FST-MVOLT-30K-80CRI; E=E7W	2.2" W X 48" L X 2.125" H	WALL MOUNTED ABOVE DOOR	34 W	120 V	4417 LM	3500 K	4' UTILITY LED STRIP LIGHT	SEE BELOW
U	JUNO #UPS30-30K-90CRI	31"L X 4" W X 2"H	UNDER CABINET	9 W	120 V		3000 K	UNDERCABINET LED LIGHT	SEE BELOW
X	LITHONIA #EDG-1-R-EL	13"L X 8"H X 1.75"W	CEILING MOUNTED	2.5 W	120 V	N/A	N/A	LED EXIT SIGN WITH BATTERY PACK	SEE BELOW
	1								
E1	LINO-3-WP-4'-LS-27-80CRI-U-LV-R-FINISH-D-ES: PROVIDE WITH A 90 MINUTE BATTERY PACK	4" W X 4'L X 4" H	SURFACE MOUNTED	18.4 W	120 V	1524 LM	3000 K	WET LOCATION LED LINEAR FIXTURE	SEE BELOW
E2	SPECTRUM RLM CLASSIC WAREHOUSE DOME #WD1611GV-15L-27K-EX-TF2-CP104-PA17-MWI-GA-WLKA		WALL MOUNTED	10 W	120 V	1091 LM	3000 K	GOOSENECK LED FIXTURE	SEE BELOW
E3	VERS-06-SW-6.0HE-27-WET-ENC/TL-L2-WH-WIRING-FINISH-60"-E (MANUFACTURER TO PROVIDE ALL COMPONENTS FOR A COMPLETE WORKING FIXTURE)	4" W X 4'L X 4" H	SURFACE OR WALL MOUNTED	18.4 W	120 V	1,568 LM	3000 K	WET LOCATION LED LINEAR FIXTURE	
S1	AMERLUX #DPM-2D-2M-T4-600M-CLB; (B1-U0-G1) POLE: @EDR-8781-D2604-14-EXB-LT-CLB-FWHA		POLE MOUNTED BUG: B2-U0-G2	70 W	120 V	6,299 LM	3000 K	LED SITE POLE MOUNTED FIXTURE	SEE BELOW
S3	AMERLUX #DPM-2D-2M-T4-600M-CLB; TWO HEADS (B1-U0-G1) POLE: @EDR-8781-D2604-14-EXB-LT-CLB-FWHA		POLE MOUNTED BUG: B2-U0-G2	140 W	120 V	12,598LM 340 LM	3000 K	LED SITE POLE MOUNTED FIXTURE	

NOTES:
1. ALL FIXTURES SHALL BE SPEC GRADE UNLESS OTHERWISE NOTED.
2. ALL TOGGLE SWITCHES TO BE MOUNTED AT HEIGHTS TO COMPLY WITH ADA GUIDELINES UNLESS OTHERWISE NOTED.
3. LIGHTING FIXTURES SHALL BE COORDINATED WITH THE CEILING TYPE PRIOR TO ORDERING. ALL FIXTURES SHALL BE SUPPLIED WITH APPROVED MOUNTING DEVICES, HANGERS, MOUNTING FRAMES, AND TRIM FOR PROPER INSTALLATION IN THE CEILING OR SOFFIT SYSTEM BEING PROVIDED ON THIS PROJECT REGARDLESS OF THE CATALOG NUMBER. REFER TO ARCHITECTURAL REFLECTIVE CEILING PLAN/ELEVATIONS FOR ADDITIONAL MOUNTING INFORMATION.
4. ALL FIXTURES THAT HAVE A "E" SUFFIX ARE BATTERY BACK-UP. (EXAMPLE 'C1E'). ALL EMERGENCY BATTERY PACKS TO BE 1100 LUMEN FULL OUTPUT.
5. PROVIDE REMOTE BATTERY PACKS FOR FIXTURES IN HARD OR NON-ACCESSIBLE CEILINGS. MOUNT PACKS OVER ACCESSIBLE SPACES. REMOTE MOUNT DRIVERS/BATTERY PACKS ABOVE ACCESSIBLE CEILINGS FOR FIXTURES IN THE TOP OF STAIRWELLS.
6. ALL REMOTE BATTERY PACKS AND DRIVERS TO BE MOUNTED ON PLYWOOD BACKBOARD SECURED TO METAL WALL CHANNEL RACK. DO NOT MOUNT DIRECTLY TO WALL. GROUP TOGETHER.
7. ALL FIXTURES THAT HAVE A "D" SUFFIX ARE DIMMABLE AND REQUIRE DIMMING CONTROL AND DRIVERS.

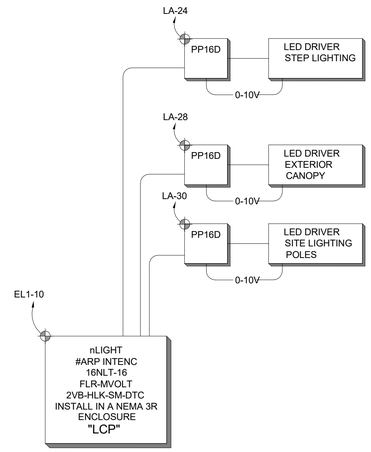
1 E6.01 — LIGHTING FIXTURE SCHEDULE
SCALE: NTS

	Occupancy Sensor				Time Clock					Wall Switch					Daylight Sensor			OTHER		
	Vacancy Mode	Occupancy Mode	Sensor Timeout Period (Minutes)	Dual Technology	Scheduled On At	Scheduled Off At	Schedule Override Switch	Manual (On/Off)	Manual Dimming	Key Switch	Scene Control	Graphical Touchscreen	Switching (On/Off)	Dimming	Target Light Level (FC)	Exterior Location	Plug Load Controls	Notes
MULTI-USE ROOMS	X		20 min	X				X	X								X	2
TYPICAL ENCLOSED OFFICES	X		20 min	X				X	X								X	2
GALLERY	X		20 min	X				X	X								X	3
TYPICAL JANITORS/STORAGE ROOM	X		20 min	X				X										4
SINGLE PERSON TOILET ROOM	X		20 min	X				X									X	7
LOBBIES/ENTRY/CORRIDORS/VESTIBULES		X	20 min	X				X	X									3
TYPICAL GROUPED RESTROOM		X	20 min	X						X								7
MDF,IDF, ELECT RM, FIRE RISER, MECH RM								X										1
EXTERNAL LIGHTS					NOTE 5	NOTE 5	X									X		5

1. LIGHTS SHALL BE MANUAL ON/MANUAL OFF PER IECC SAFETY EXCEPTION. APPLIES TO ALL FIRE RISE, ELECTRICAL, IDF, AND MDF ROOMS.
2. LIGHTS SHALL BE MANUAL ON/AUTO OFF AFTER 20 MINUTES OF NO OCCUPANCY DETECTED. APPLIES TO ALL ENCLOSED OFFICES, HUDDLE, AND FOCUS ROOMS.
3. LIGHTS SHALL BE AUTO ON/AUTO OFF AFTER 20 MINUTES OF NO OCCUPANCY DETECTED. PROVIDE WITH DAYLIGHT HARVESTING DIMMING WHERE NOTED ON PLANS.
4. LIGHTS SHALL BE MANUAL ON/AUTO OFF AFTER 20 MINUTES OF NO OCCUPANCY DETECTED.
5. LIGHTS CONTROLLED BY LIGHTING CONTROL PANEL (REF: 3/E102). COORDINATE SCHEDULE WITH OWNER. PROVIDE AN OVERRIDE LIGHT SWITCH.
6. LIGHTS SHALL BE MANUAL ON/AUTO OFF AFTER 20 MINUTES OF NO OCCUPANCY DETECTED. PROVIDE ZONED DIMMING PER LAYOUTS. APPLIES TO ALL MEETING, TRAINING, AND BOARD ROOMS.
7. LIGHTS SHALL BE AUTO ON/AUTO OFF AFTER 20 MINUTES OF NO OCCUPANCY DETECTED. PROVIDE A KEY SWITCH WHERE INDICATED ON PLANS.
8. LIGHTS SHALL BE MANUAL ON/AUTO OFF AFTER 20 MINUTES OF NO OCCUPANCY DETECTED. PROVIDE A GRAPHICAL TOUCHSCREEN CONTROLLER. COORDINATE WITH OWNER FOR SCENE CONTROL/AV INTEGRATION.

GENERAL NOTE:
1.) INSTALL ALL LIGHTING AND PLUG LOAD POWER PACKS ABOVE CEILING AT THE ENTRY DOOR LOCATION
2.) PROVIDE A SEPARATE PLUG LOAD POWER PACK FOR EACH CIRCUIT CALLED OUT WITHIN A ROOM. CONTROLLERS SHALL BE CONTROLLED THROUGH THE OCCUPANCY SENSOR.

2 E6.01 — LIGHTING CONTROLS MATRIX
SCALE: NTS



SEQUENCE OF OPERATION:

- EXTERIOR FIXTURES, SIGNAGE, AND SITE LIGHTING SHALL TURN ON A BY PHOTOCELL AS DUSK AND TURN OFF AT DAWN. FIXTURE SHALL DIM TO 30% MAX OUT PUT FROM MIDNIGHT TO 6 AM.

3 E6.01 — SCHOOL EXTERIOR LIGHTING CONTROL DIAGRAM
SCALE: NTS

6/3/2025 9:26:24 AM

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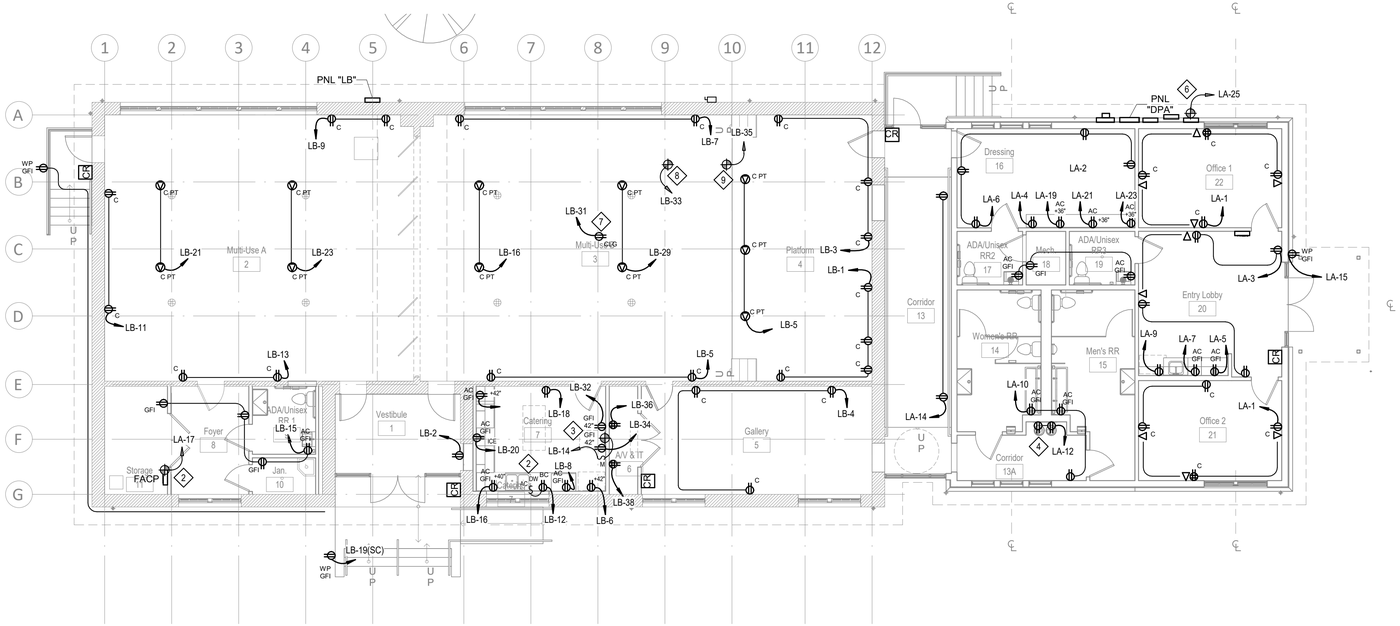
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STATE OF TEXAS
JONATHAN GARCIA
124661
LICENSED
ARCHITECT
06/03/2025

Architexas No. 2314
Date January 17, 2025

Sheet Name
LIGHTING FIXTURE SCHEDULE AND DETAILS

Sheet Number
E102



1 E201 ELECTRICAL POWER LEVEL 1 PLAN

1/8" = 1'-0"

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

GENERAL NOTES POWER SHEETS:

1. SEE ALL OTHER PLANS FOR ADDITIONAL DEVICES. SOME POWER CIRCUITING MAY BE ON OTHER PLANS. COORDINATE THE LOCATIONS OF DATA/CATV JACKS WITH THE RECEPTACLES. MOUNT ADJACENT TO EACH OTHER.

2. WHEN LOCATING SYSTEMS NEXT TO DOORS FOLLOW DEVICE LOCATION GUIDELINES. MOUNT AT ADA HEIGHT. PROVIDE MULTI-GANG BOXES FOR SIMILAR SYSTEMS. ALL DEVICE PLATES SHALL BE ORTHOGONAL WITH ADJACENT PLATES.

3. MINIMUM CIRCUIT SIZE IS 2 #12 AND 1 #12 GROUND IN 3/4" CONDUIT. ALL CONDUCTORS SHALL BE 75 DEGREE COPPER THHN INDOOR, THWN FOR EXTERIOR USAGE, COLOR CODED AS PER NEC AND LOCAL AMENDMENTS WITH SIZE, TEMPERATURE, AND VOLTAGE PERMANENTLY PRINTED ON THE JACKET. ALL JOINTS SHALL BE MADE UP USING SELF LOCKING, TWIST-ON, COLOR CODED, SQUARE WIRE SPRING GRAB, LONG SKIRT, WIRE CONNECTORS WITH SWEPT WINGS.

4. COORDINATE RECEPTACLE LOCATIONS WITH MILLWORK AND COUNTERS. DO NOT LOCATE RECEPTACLES BEHIND DRAWERS OR HIDDEN IN MILLWORK UNLESS SPECIFICALLY DIRECTED BY OWNER/ARCHITECT. REVIEW ARCHITECTURAL ELEVATIONS PRIOR TO RECEPTACLE ROUGH-INS. SEE ARCH ELEVATIONS IN BREAKROOMS FOR APPLIANCES AND RECEPTACLE MOUNTING LOCATIONS.

5. ALL RECEPTACLES SHALL BE SPEC GRADE, MINIMUM 20 AMP RATED. GFI RECEPTACLES SHALL HAVE TEST BUTTONS WITH INDICATOR LIGHTS. EXTERIOR RECEPTACLES SHALL BE LABELED WEATHER RESISTANT WITH WP COVERS CONFORMING TO WET LOCATION CORD CONNECTION. NEC 406. MOUNT RECEPTACLES 18" AFF, 6" ABOVE BACKSPLASH AT COUNTERS, 48" IN TOILET ROOMS, AT EQUIPMENT ROUGH-IN LOCATIONS FOR APPLIANCES, AND AS INDICATED FOR TV'S. PROVIDE GFI RECEPTACLES WITHIN SIX (6) FEET OF ALL SINKS, EXTERIOR RECEPTACLES, AND UNDERCOUNTER EQUIPMENT. OVERSIZED COVER PLATES ARE NOT ALLOWED. COORDINATE COLOR WITH OWNER/ARCHITECT. PROVIDE SPEC GRADE RECEPTACLES MOUNTED BEHIND WATER COOLERS WITH GFI CIRCUIT BREAKERS.

6. ALL EQUIPMENT SHALL HAVE AN INDIVIDUAL LOCAL DISCONNECTING MEANS, EITHER CORDED PLUG AND RECEPTACLE OR SWITCHED DISCONNECT. VERIFY FROM EQUIPMENT SUBMITTED OR RELOCATED IF DIRECT CONNECT OR RECEPTACLE. IF DIRECT CONNECT, PROVIDE SAFETY SWITCH LOCKABLE IN THE OPEN POSITION AS PER NEC. OTHERWISE PROVIDE RECEPTACLE CORD PLUG AS REQUIRED BY EQUIPMENT SUBMITTAL.

7. ON CIRCUITS GREATER THAN 20A, FEEDING MULTIPLE PIECES OF EQUIPMENT, PROVIDE FUSED DISCONNECTS (SIZED FOR EQUIPMENT PROTECTING).

8. PROVIDE INDIVIDUAL DISCONNECTS FOR ALL SMOKE FIRE DAMPERS AND VAV'S. NO EXCEPTIONS.

9. CONTRACTOR IS RESPONSIBLE FOR UPDATING THE CIRCUITING INFORMATION OF ELECTRICAL PANELS, HVAC CONTROLS, INTERCOM SWITCH BANKS, DATA/VOICE/VIDEO CABLING, AND ANY CIRCUITED SYSTEM INDICATING THE FINAL ROOM NUMBERING AND CIRCUIT NUMBER BASED UPON THE ACTUAL INSTALLATION.

10. FIRESTOP ALL CONDUIT PENETRATIONS IN RATED WALLS. SEE ARCHITECTURAL FOR WALL RATINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO SHEET ROCK AND REPAIR.

11. PROVIDE FIRE RATED SLEEVES IN ALL FLOOR PENETRATIONS.

12. CONNECT NO MORE THAN 6 RECEPTACLES TO ANY CIRCUIT. VERIFY AND TRACE RECEPTACLE COUNT PRIOR TO CONNECTING TO EXISTING CIRCUITS.

13. PROVIDE TAMPER PROOF RECEPTACLES FOR DUPLEX RECEPTACLES INSTALLED ON THIS PROJECT.

14. CONTACTOR TO PROVIDE ADDITIONAL CONDUIT AND JUNCTION BOX REQUIREMENTS FOR DATA, SECURITY AND AUDIO-VISUAL EQUIPMENT AND DEVICES. REFER TO TECHNOLOGY, SECURITY AND AV DRAWINGS FOR MORE INFORMATION.

15. PROVIDE A LOCKABLE WEATHER PROOF COVER FOR ALL EXTERIOR RECETPACLES.

16. ROUTE ALL EXTERIOR RECEPTACLE CONDUITS AT THE EXISTING PORTION OF THE BUILDING THROUGH THE CRAWL SPACE AND POKE THROUGH THE MASONRY WALLS. DO NOT SURFACE MOUNT ANY CONDUIT.

ELECTRICAL POWER KEYED NOTES:

1. FIRE ALARM PANEL WITH ANNUNCAITOR.
2. PROVIDE A DUPLEX OUTLET BELOW COUNTER FOR POWER TO DISHWASHER. CONNECT TO TOGGLE SWITCH LOCATED ABOVE COUNTER FOR LOCAL DISCONNECT SWITCH FOR DISHWASHER. COORDIANTE FINAL LOCATION OF TOGGLE SWITCH WITH ARCHITECT BEFORE ELECTRICAL ROUGH-IN. PROVIDE WITH A CLASS "A" GFI CIRCUIT BREAKER.
3. WARMER SHALL BE HAREWIRED AND PROVIDED WITH A MOTOR RATED SWITCH FOR DISCONNECTING MEANS. PROVIDE EQUIPMENT WITH A 6 FT LIQUID-TIGHT FLEXIBLE NON-METALLIC CONDUIT AS A DRIP LOOP FOR CLEANING PURPOSES.
4. PROVIDE WITH A CLASS "A" GFI CIRCUIT BREAKER.
5. INSTALL RECEPTACLE FLUSH IN CEILING.
6. PROPOSED IRRIGATION CONTROL PANEL, PROVIDED BY OTHERS. COORDINATE WITH LANDSCAPE ARCHITECT FOR ADDITIONAL CONDUIT REQUIREMENTS. COORDINATE FINAL LOCATION, SPECIFICATONS AND INFORMATION OF CONTROLLER WITH ARCHTIECT BEFORE ELECTRICAL ROUGH-IN.
7. PROJECTOR POWER. PROVIDE AND ADDITIONAL 1" CONDUIT FOR CONTROL, COORDINATE FINAL LOCATION OF CONTROLS SWITCH WITH ARCHITECT BEFORE ELECTRICAL ROUGH-IN. COORDINATE FINAL LOCATION OF PROJECTOR SCREEN WITH ARCHITECT AND TECH/AV CONSULTANT BEFORE ELECTRICAL ROUGH-IN..
8. PROJECTOR SCREEN POWER. PROVIDE WITH A MOTOR RATED SWITCH FOR DISCONNECTING MEANS LOCATED ADJACENT TO MOTOR. PROVIDE AND ADDITIONAL 1" CONDUIT FOR CONTROLS, COORDINATE FINAL LOCATION OF CONTROL SWITCH WITH ARCHITECT BEFORE ELECTRICAL ROUGH-IN. COORDINATE FINAL LOCATION OF PROJECTOR SCREEN WITH ARCHITECT AND TECH/AV CONSULTANT BEFORE ELECTRICAL ROUGH-IN
9. LIGHT BAR POWER. PROVIDE WITH A MOTOR RATED SWITCH FOR DISCONNECTING MEANS LOCATED ADJACENT TO MOTOR. PROVIDE AND ADDITIONAL 1" CONDUIT FOR CONTROLS, COORDINATE FINAL LOCATION OF CONTROL SWITCH WITH ARCHITECT BEFORE ELECTRICAL ROUGH-IN. COORDINATE FINAL LOCATION OF LIGHT BAR WITH ARCHITECT AND TECH/AV CONSULTANT BEFORE ELECTRICAL ROUGH-IN

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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ENGINEER

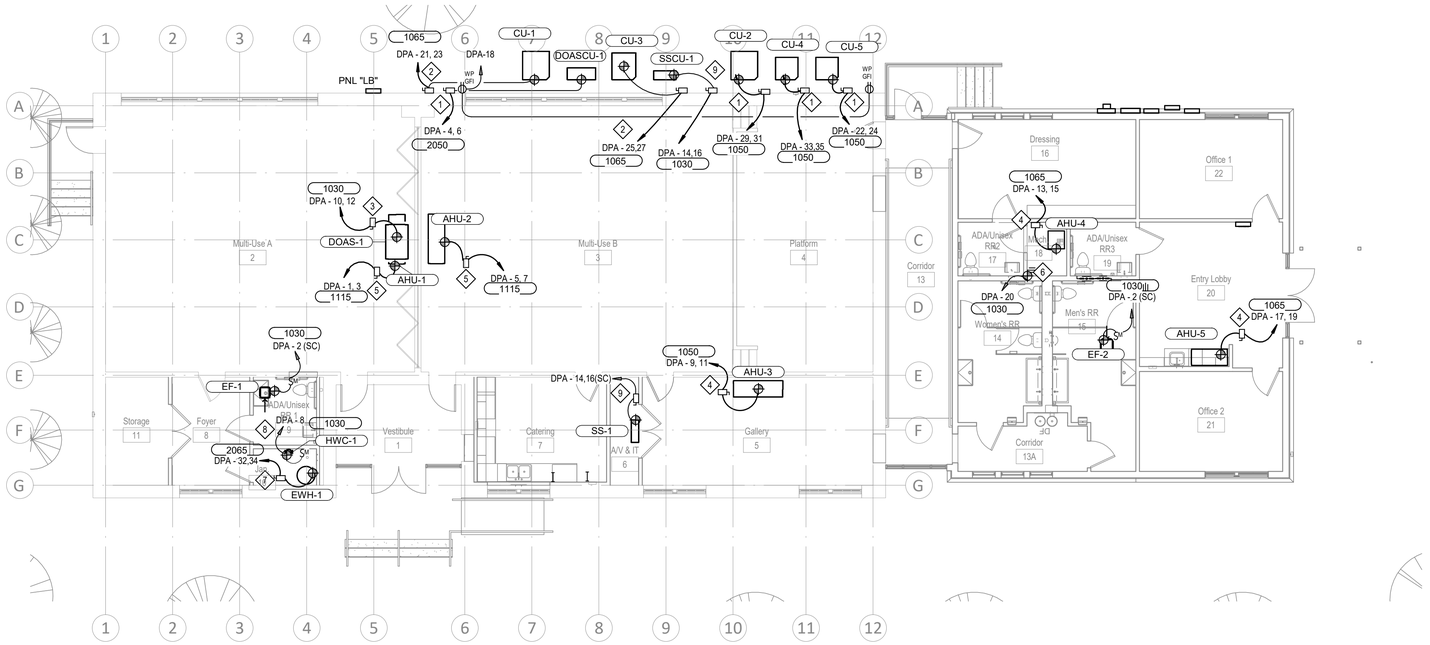
Architexas No. 2314
Date January 17, 2025

Sheet Name
ELECTRICAL POWER LEVEL 1 PLAN

Sheet Number
E201

1109

1/17/2025 10:38:00 AM



1 E202 ELECTRICAL MECHANICAL POWER LEVEL 1 PLAN

1/8" = 1'-0"

ELECTRICAL POWER KEYED NOTES:

1. DISCONNECT SWITCH: 30A/600V/2P/NEMA 3R/NF.
2. DISCONNECT SWITCH: 60A/600V/2P/NEMA 3R/NF.
3. DISCONNECT SWITCH: 30A/600V/2P/NEMA 1/NF.
4. DISCONNECT SWITCH: 60A/600V/2P/NEMA 1/NF.
5. DISCONNECT SWITCH: 100A/600V/2P/NEMA 1/NF.
6. ELECTRONIC TRAP PRIMER. COORDINATE FINAL LOCATION OF EQUIPMENT WITH PLUMBING DRAWING BEFORE INSTALLING THE ELECTRICAL ROUGH IN.
7. EWH. DISCONNECT SWITCH: 60A/600V/2P/NEMA 1/NF.
8. RE-CIRC PUMP. COORDINATE FINAL LOCATION OF EQUIPMENT WITH PLUMBING DRAWINGS BEFORE ELECTRICAL ROUGH IN.
9. REFER TO DETAILS 2/E202 FOR MORE INFORMATION MECHANICAL EQUIPMENT.

GENERAL EQUIPMENT NOTES:

1. PROVIDE DISCONNECTS (FUSED AND NON-FUSED) FULL RATING OF EQUIPMENT PROTECTED. COORDINATE SIZES WITH EQUIPMENT SUBMITTED. PROVIDE FUSED DISCONNECTS FOR ALL MULTIPLE PIECES OF EQUIPMENT ON THE SAME CIRCUIT. DISCONNECTS AND FUSES SHALL BE EQUAL TO OR GREATER THAN THE FEEDER/BREAKER SIZE. SIZE LOAD SIDE OF DISCONNECTS FOR EQUIPMENT AS LISTED.

2. ALL ROOFTOP FEEDERS SHALL BE IN CONDUIT. PROVIDE EMT FROM INTERIOR PANELS TO ROOF PENETRATION. SECURE TO STRUCTURE WITH BEAM CLAMPS (SINGLE) OR UNISTRUT (MULTIPLE). PROVIDE IMC ON ROOF FROM ROOF PENETRATIONS TO DISCONNECTS. ALL DISCONNECT TO EQUIPMENT CONDUIT CONNECTIONS SHALL COME OUT OF THE BOOTOM OF THE DISCONNECT. PROVIDE IMC FROM DISCONNECT TO WITHIN 5 FEET OF EQUIPMENT CONNECTION POINT. TRANSITION TO SEALTITE AND PROVIDE DRIP LEG FOR EQUIPMENT CONNECTION. SEALTITE SHALL HAVE LIQUID TIGHT FITTINGS. DO NOT USE CONDULETS.

3. SUPPORT ROOFTOP CONDUIT WITH NEOPRENE BLOCKS WITH INTEGRAL UNISTRUT. SPACE PER NEC. SECURE CONDUIT TO BLOCKS ON ROOF. GANG CONDUIT TOGETHER AS MUCH AS POSSIBLE.

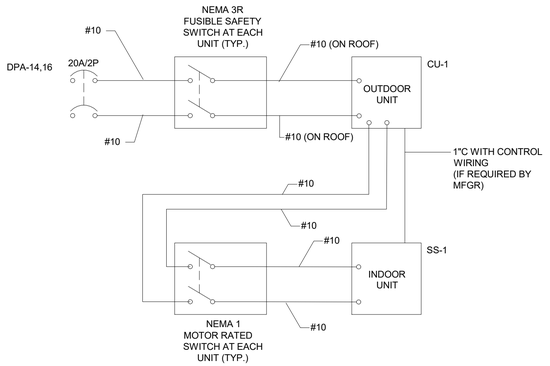
4. PENETRATE ROOFS AS PER ROOFING GUIDELINES OR ROOFING MANUFACTURER WARRANTY.

5. DO NOT MOUNT DISCONNECTS TO PARAPET WALLS UNLESS ALLOWED TO DO SO BY ARCHITECT/ENGINEER.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   - A. RUN PARALLEL TO WALLS AND BEAMS
   - B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   - B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   - A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   - C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   - A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.



. PROVIDE ALL WIRING IN 3/4" C, UON

2 E202 IDF MINI-SPLIT WIRING DIAGRAM

NOT TO SCALE

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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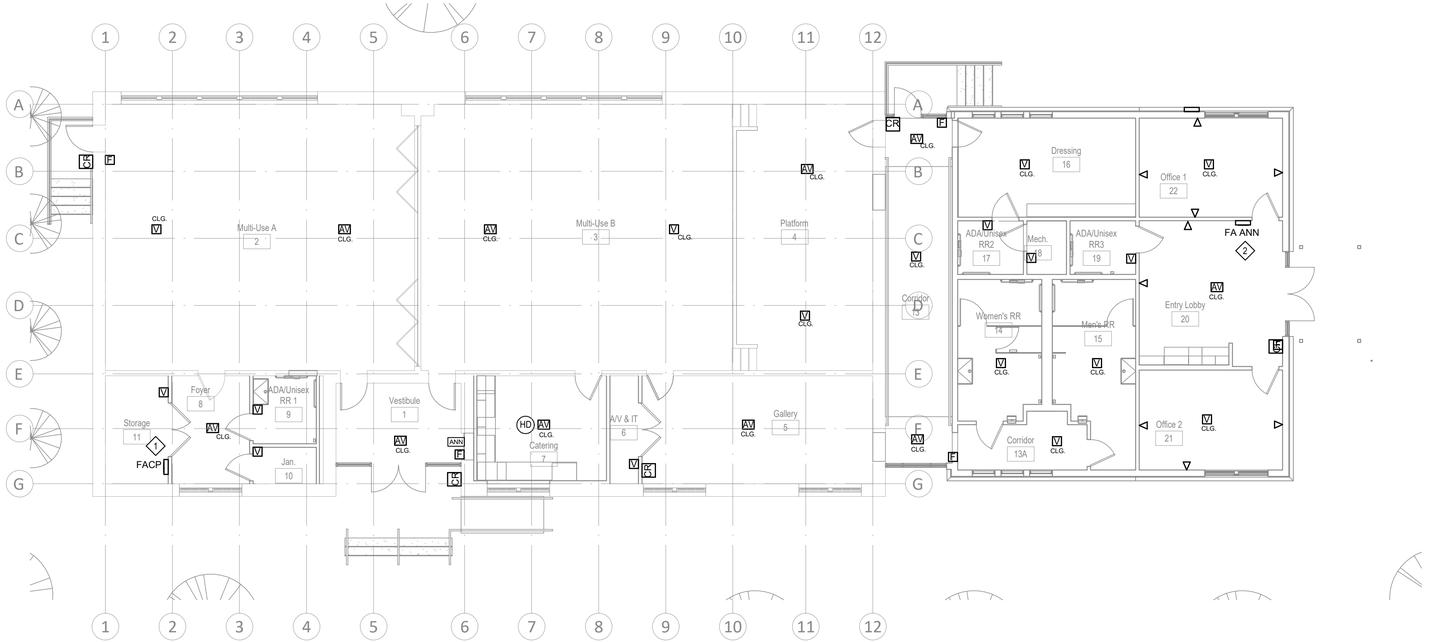
Architexas No. 2314

Date January 17, 2025

Sheet Name
ELECTRICAL MECHANICAL POWER LEVEL 1 PLAN

Sheet Number
E202

1/17/2025 10:38:01 AM



1 E302 ELECTRICAL SPECIAL SYSTEMS LEVEL 1 PLAN

1/8" = 1'-0"

GENERALSPECIAL SYSTENS NOTES:

(APPLIES TO ALL SPECIAL SYSTEMS SHEETS)

1. SEE ALL OTHER PLANS FOR ADDITIONAL DEVICES.

2. WHEN LOCATING SYSTEMS NEXT TO DOORS, FOLLOW DEVICE LOCATION GUIDELINES.

3. ALL CABLING SHALL BE IN CONDUIT IN EXPOSED SPACES REGARDLESS IF ALLOWED NOT TO BE IN CONDUIT BY OTHER SPECIFICATIONS UNLESS DIRECTED OTHERWISE BY THE ENGINEER. ALL CABLING TO BE SUPPORTED BY J-HOOKS WHEN NOT IN CONDUIT OR CABLE TRAY. DO NOT STRAP TO STRUCTURE. SEPARATE CABLING AND PROVIDE SEPARATE J-HOOKS FOR DATA, CONTROLS, PA, SECURITY, AND FIRE ALARM IF NOT IN CONDUIT. TIE WRAP CABLING TOGETHER EVERY 4-6 FEET. PROVIDE SERVICE LOOPS IN CABLING, TIE WRAPPED TOGETHER. SERVICE LOOP SHALL BE 24" MINIMUM.

4. PROVIDE CONDUIT SLEEVES THROUGH WALLS. ALL CONDUITS SHALL HAVE NYLON BUSHINGS ON THE ENDS. PROVIDE PULL STRINGS IN ALL EMPTY CONDUITS UNDER TWO (2) INCHES. PROVIDE MULE TAPE IN ALL EMPTY CONDUITS TWO (2) INCHES AND LARGER OR ANY CONDUIT RUNS LONGER THAN 100 FEET WITHOUT INTERMEDIATE PULL BOXES. SLEEVES LESS THAN 36 INCHES DO NOT REQUIRE PULL STRINGS.

5. FIRESTOP ALL CONDUIT PENETRATIONS IN RATED WALLS. PROVIDE INTUMESCENT FILL IN WALL CONDUIT SLEEVES IN RATED WALLS. SEE ARCHITECTURAL FOR WALL RATINGS. CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO SHEET ROCK AND REPAIR.

6. PROVIDE FIRE RATED SLEEVES WITH INTUMESCENT FILL IN ALL FLOOR PENETRATIONS.

7. ALL CABLING SHALL BE PLENUM RATED. ALL UNDERGROUND CABLING SHALL BE OUTDOOR RATED AS WELL AS PLENUM RATED. NO EXCEPTIONS.

8. PROVIDE TUBE TYPE DUCT SMOKE DETECTORS FOR ALL SMOKE FIRE DAMPERS. PROVIDE TUBE TYPE DUCT SMOKE DETECTORS IN EACH AIR HANDLING UNIT IN THE SUPPLY AND RETURN. ALL DUCT SMOKE DETECTORS SHALL HAVE THE FOLLOWING CHARACTERISTICS: MOUNTED IN THE DIRECTION OF AIR FLOW, ADDRESSABLE WITH SELF SENSITIVITY, RATED FOR THE AIR SPEED, AND HAVE REMOTE INDICATOR LIGHT TEST STATIONS. FIRE ALARM CONTRACTOR SHALL PROVIDE INTERFACE OF DUCT SMOKE DETECTORS AND FIRE ALARM PANEL. PROVIDE 24V POWER FROM FIRE ALARM PANEL.

9. PROVIDE LEXAN COVERS FOR ALL FIRE ALARM PULL STATIONS.

10. SEE SPECIFICATIONS FOR ADDITIONAL FIRE ALARM DEVICES AND MOUNTING HEIGHTS. MOUNT DEVICES IN ACCORDANCE WITH NFPA 72.

11. ALL SMOKE AND HEAT DETECTORS SHALL BE POWERED BY THE FIRE ALARM PANEL.

12. THE FIRE ALARM CONTROL PANEL SHALL SHUNT ALL AIR HANDLERS AND CLOSE ALL SMOKE FIRE DAMPERS IN THE EVENT OF A FIRE ALARM. PROVIDE RELAYS FOR ALL AIR HANDLERS AND SMOKE FIRE DAMPER CIRCUITS AND CONNECT TO FIRE ALARM SYSTEM.

13. PROVIDE COMBINATION RECEPTACLE AND CATV PLATE AND JACK IN TWO GANG BOX. MOUNT AT TV CEILING PLATE. PROVIDE CLOCK STYLE RECEPTACLE FOR ALL WALL MOUNTED TV'S. LOCATE RECEPTACLE CENTERED IN TV. COORDINATE WITH OWNER EQUIPMENT.

14. PROVIDE BLOCKING AND BRACING FOR CLOCKS. MOUNT SO TOP OF CLOCK IS WITHIN 6" OF CEILING.

15. ALL CONDUIT FOR FIRE ALARM DEVICES SHALL BE CUT INTO MASONARY WALL AND PATCH. REFER TO ARCHITECT FOR MORE DETAILS AND INSTALLATON REQUIREMENTS.

16. MOUNT CEILING DEVICE BETWEEN CEILING SLATS IN ACCORDANCE WITH ADJACENT GUIDELINES, RULES, AND REQUIREMENTS.

ELECTRICAL POWER KEYED NOTES:

1. FIRE ALARM PANEL CONTROL PANEL.
2. FIRE ALARM ANNUNCIATOR PANEL WITH A MIC FOR LIVE MESSAGES.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

EXISTING BUILDING:

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   - A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   - B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   - A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   - B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   - C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   - A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
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   - C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   - A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
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   - B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
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8. MEP SHOP DRAWINGS:
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124661
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Architexas No. 2314
Date January 17, 2025

Sheet Name
ELECTRICAL SPECIAL SYSTEMS LEVEL 1 PLAN

Sheet Number
E302

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ELECTRICAL FEEDER SCHEDULE

MARK	CONDUIT	CONDUCTORS
1020	1 - 1/2" Conduit	2 - #12 and 1 - #12 Ground
1030	1 - 3/4" Conduit	2 - #10 and 1 - #10 Ground
1050	1 - 3/4" Conduit	2 - #8 and 1 - #8 Ground
1065	1 - 3/4" Conduit	2 - #6 and 1 - #8 Ground
1085	1 - 1" Conduit	2 - #4 and 1 - #8 Ground
1100	1 - 1" Conduit	2 - #3 and 1 - #6 Ground
1115	1 - 1-1/4" Conduit	2 - #2 and 1 - #6 Ground
2020	1 - 1/2" Conduit	3 - #12 and 1 - #12 Ground
2030	1 - 3/4" Conduit	3 - #10 and 1 - #10 Ground
2050	1 - 3/4" Conduit	3 - #8 and 1 - #8 Ground
2065	1 - 3/4" Conduit	3 - #6 and 1 - #8 Ground
2085	1 - 1" Conduit	3 - #4 and 1 - #8 Ground
2100	1 - 1-1/4" Conduit	3 - #3 and 1 - #6 Ground
2115	1 - 1-1/4" Conduit	3 - #2 and 1 - #6 Ground
3020	1 - 3/4" Conduit	4 - #12 and 1 - #12 Ground
3030	1 - 3/4" Conduit	4 - #10 and 1 - #10 Ground
3050	1 - 3/4" Conduit	4 - #8 and 1 - #8 Ground
3065	1 - 1" Conduit	4 - #6 and 1 - #8 Ground
3085	1 - 1-1/4" Conduit	4 - #4 and 1 - #8 Ground
3100	1 - 1-1/4" Conduit	4 - #3 and 1 - #6 Ground
3115	1 - 1-1/4" Conduit	4 - #2 and 1 - #6 Ground
SD0020	1 - 3/4" Conduit	3 - #12 and 1 - #8 Ground
SD0030	1 - 3/4" Conduit	3 - #10 and 1 - #8 Ground
SD0050	1 - 3/4" Conduit	3 - #8 and 1 - #8 Ground
SD0065	1 - 3/4" Conduit	3 - #6 and 1 - #8 Ground
SD0085	1 - 1" Conduit	3 - #4 and 1 - #8 Ground
SD0100	1 - 1-1/4" Conduit	3 - #3 and 1 - #6 Ground
SD0115	1 - 1-1/4" Conduit	3 - #2 and 1 - #6 Ground
SD0130	1 - 1-1/2" Conduit	3 - #1 and 1 - #6 Ground
SD0150	1 - 1-1/2" Conduit	3 - #1/0 and 1 - #6 Ground
SD0175	1 - 2" Conduit	3 - #2/0 and 1 - #4 Ground
SD0200	1 - 2" Conduit	3 - #3/0 and 1 - #4 Ground
SD0230	1 - 2" Conduit	3 - #4/0 and 1 - #2 Ground
SD0255	1 - 2-1/2" Conduit	3 - #250 kcmil and 1 - #2 Ground
SD0310	1 - 3" Conduit	3 - #350 kcmil and 1 - #2 Ground
SD0380	1 - 3" Conduit	3 - #500 kcmil and 1 - #1/0 Ground
SD0420	1 - 3" Conduit	3 - #600 kcmil and 1 - #1/0 Ground
SD0460	2 - 2" Conduits	EACH with 3 - 4/0 and 1 - #2 Ground
SD0510	2 - 2-1/2" Conduits	EACH with 3 - #250 kcmil and 1 - #1 Ground
SD0570	2 - 2-1/2" Conduits	EACH with 3 - #300 kcmil and 1 - #1 Ground
SD0620	2 - 3" Conduits	EACH with 3 - #350 kcmil and 1 - #1/0 Ground
SD0670	2 - 3" Conduits	EACH with 3 - #400 kcmil and 1 - #1/0 Ground
SD0760	2 - 3" Conduits	EACH with 3 - #500 kcmil and 1 - #1/0 Ground
SD0855	3 - 2-1/2" Conduits	EACH with 3 - #300 kcmil and 1 - #2/0 Ground
SD1005	3 - 3" Conduits	EACH with 3 - #400 kcmil and 1 - #2/0 Ground
SD1140	3 - 3-1/2" Conduits	EACH with 3 - #500 kcmil and 1 - #3/0 Ground
SD1260	3 - 4" Conduits	EACH with 3 - #600 kcmil and 1 - #4/0 Ground

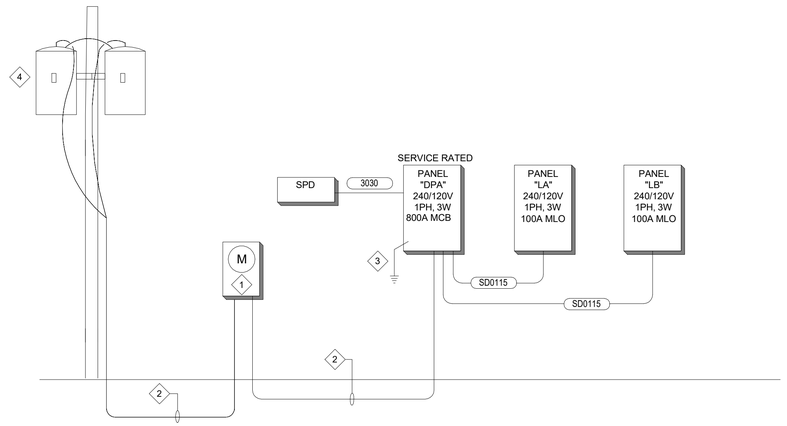
Notes:
1. Wet location (underground or outdoors) use THWN. Otherwise THHN.
2. Conduit Types; underground - schedule 40 PVC; indoors - EMT; outdoor exposed - IMC. Utility - riser poles (follow Utility guidelines or minimum schedule 80).
3. Provide transitions to conduit changes prior to different environment (ex. Transition from EMT to IMC prior to penetrating walls to the exterior).
4. Motor Connections shall be flexible non-metallic conduit for water equipment
5. All conduit penetrations in rated walls shall be firestopped.
6. See drawings for any special requirements.

NEW SERVICE LOAD ANALYSIS

PROJECT: CoDS STEPHENSON SCHOOL BUILDING
PROJECT NUMBER: CZ #230353
SQUARE FOOTAGE:
NEW DISTRIBUTION: 240 VOLT

TYPE	NEW CONNECTED	NEW DEMAND	
EQUIPMENT:	11200	47	Amps
RECEPTACLES:	26040	75	Amps
LIGHTING:	8392	44	Amps
AC/HEATING:	103229	430	Amps
CONTINUOUS MOTORS:	440	2	Amps
OTHERS:		0	Amps
TOTAL	149301	598	Amps

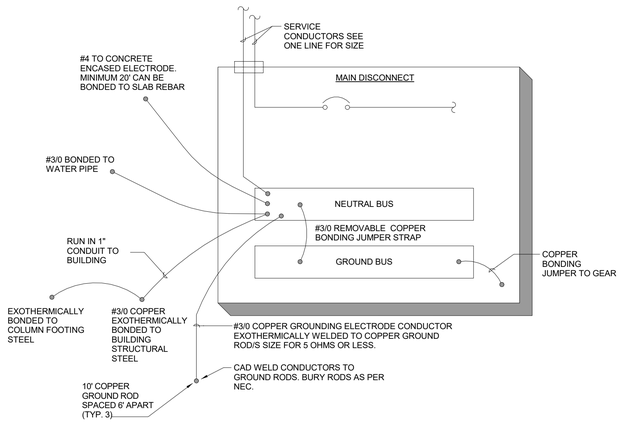
SERVICE VOLTAGE: 240 VOLT
SCHEDULED SERVICE AMPACITY: 800 AMP



1 E401 ELECTRICAL ONE-LINE DIAGRAM
NOT TO SCALE

ELECTRICAL ONE LINE KEYED NOTES:

1. PROVIDE METER AND OR TRANSOCKET PER UTILITY PROVIDER STANDARDS.
2. PROVIDE WITH TWO (2) SETS OF 3#600 KCMIL IN 4"C.
3. REFER TO DETAIL 2/E401 FOR MORE INFORMATION ABOUT GROUNDING AND BONDING.
4. EXISTING UTILITY PRIMARY OVERHEAD SERVICE.



2 E401 GROUNDING AND BONDING DETAIL
SCALE: N.T.S.

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Architexas No. 2314
Date January 17, 2025

Sheet Name
ELECTRICAL ONE-LINE DIAGRAM

Sheet Number
E401

1/17/2025 10:38:02 AM

PANEL DPA

LOCATION:	EXTERIOR WALL		VOLTAGE:	120/240	V	KAIC:	BUSSING SHALL BE FULLY RATED
MOUNTING:	SURFACE		PHASE:	1	P / 3W	CODES:	0=EQPT, 1=RCPT, 2=LTG, 3=A/C, 4=HEAT
ENCLOSURE:	NEMA 3R	STYLE: I-LINE	BUSSING:	800	A		5=CONTINUOUS MOTORS, 6=LRGST MOTOR
BRKR MTG:	BOLT-ON	(REF: SQUARE D)	MCB:	800	A	ACCESSORIES:	GROUND BUS, 42 SPACE
BREAKERS:	SERIES RATED. 60/75 DEGREE TERMINALS		MLO:		A		SERVICE RATED

CODE	BRKR	CIRCUIT USE	CKT	LOAD	A	B	LOAD	CKT	CIRCUIT USE	BRKR	CODE
4	100/2	AHU-1	1	9,703	X		200	2	EF-1, EF-2	20/1	5
4			3	9,703		X	3,026	4	DOASCU-1	35/2	4
4	100/2	AHU-2	5	9,703	X		3,026	6			4
4			7	9,703		X	240	8	RE-CIRCU PUMP	20/1	5
4	45/2	AHU-3	9	4,503	X		198	10	DOAS-1	15/2	3
4			11	4,503		X	198	12			3
4	60/2	AHU-4	13	5,470	X		728	14	SS-01 / SSCU-01	15/2	3
4			15	5,470		X	728	16			3
4	60/2	AHU-5	17	5,470	X		360	18	EXTERIOR RECEPT	20/1	1
4			19	5,470		X	200	20	ELECTRONIC TRAP PRIMER	20/1	0
3	50/2	CU-1	21	3,536	X		2,038	22	CU-5	30/2	3
3			23	3,536		X	2,038	24			3
3	50/2	CU-2	25	3,536	X			26			
3			27	3,536		X		28	SPD	30/3	
3	25/2	CU-3	29	1,664	X			30			
3			31	1,664		X	4,500	32	EWH-1	60/2	
3	30/2	CU-4	33	2,038	X		4,500	34			
3			35	2,038		X		36	PANEL "LA"	100/2	
		BUSSED SPACE	37			X		38			
		BUSSED SPACE	39			X		40	PANEL "LB"	100/2	
		BUSSED SPACE	41		X			42			

	EQPT VA	RCPT VA	LTG VA	AC/HEAT VA	MOTORS	CONN VA	FTL VA	PANEL VA	PHASE AMP
PHASE A	5900	13180	4096	51614	200	74990		72005	600
PHASE B	5300	12860	4296	51615	240	74311		71484	596
TOTAL	11200	26040	8392	103229	440	149301		143489	

PANEL DESIGN KVA:	143.49	PANEL SUBTOTAL:	598	AMPS
RESERVE CAPACITY KVA:	28.70	RESERVE CAPACITY:	120	AMPS
TOTAL KVA:	172.19	PANEL DESIGN CURRENT:	717	AMPS

PANEL LA

LOCATION:	EXTERIOR WALL		VOLTAGE:	120/240	V	KAIC:	BUSSING SHALL BE FULLY RATED
MOUNTING:	SURFACE		PHASE:	1	P / 3W	CODES:	0=EQPT, 1=RCPT, 2=LTG, 3=A/C, 4=HEAT
ENCLOSURE:	NEMA 3R	STYLE: NQOD	BUSSING:	225	A		5=CONTINUOUS MOTORS, 6=LRGST MOTOR
BRKR MTG:	BOLT-ON	(REF: SQUARE D)	MCB:	100	A	ACCESSORIES:	GROUND BUS, 42 SPACE
BREAKERS:	SERIES RATED. 60/75 DEGREE TERMINALS		MLO:		A		

CODE	BRKR	CIRCUIT USE	CKT	LOAD	A	B	LOAD	CKT	CIRCUIT USE	BRKR	CODE
1	20/1	OFFICE 1 RECEPT	1	900	X		180	2	DRESSING ABV CNT RECEPT	20/1	1
1	20/1	ENTRY LOBBY RECEPT	3	500		X	180	4	DRESSING ABV CNT RECEPT	20/1	1
0	20/1	ENTRY LOBBY REFRIGERATOR	5	800	X		720	6	DRESSING RECEPT	20/1	1
1	20/1	ENTRY LOBBY ABV CNT RECEPT	7	600		X	540	8	TLT / MECH REPCEPT	20/1	1
1	20/1	ENTRY LOOBY ABV CNT RECEPT	9	600	X		540	10	MEN/WOMWEN RESTROOM RECEPT	20/1	1
1	20/1	OFFICE 2 RECPT	11	900		X	600	12	EWC	20/1 - GFI	0
0	20/1	DOOR POWER	13	300	X		360	14	CORRIDOR RECEPT	20/1	1
1	20/1	EXTERIOR RECEPTACLES	15	360		X	360	16	EXTERIOR RECEPT	20/1	1
0	20/1 (NOTE 1)	FACP	17		X		600	18	LIGHTING	20/1	1
1	20/1	DRESSING ABV CNT RECEPT	19	180		X	600	20	LIGHTING	20/1	2
1	20/1	DRESSING ABV CNT RECEPT	21	180	X		300	22	LCP	20/1	2
1	20/1	DRESSING ABV CNT RECEPT	23	180		X	150	24	STEP LIGHTS	20/1	2
	20/1	IRRIGATION CONTROLLER	25	300	X			26	SPARE	20/1	2
	20/1	SPARE	27			X	300	28	EXTERIOR LIGHTING	20/1	2
	20/1	SPARE	29		X		300	30	EXTERIOR SITE LIGHTING	20/1	2
	20/1	SPARE	31			X	1,248	32	FUTURE SITE LIGHITNG	20/2	2
	20/1	SPARE	33		X		1,248	34			2
	20/1	SPARE	35			X	1,248	36	FUTURE SITE LIGHITNG	20/2	2
		PREPARED SPACE	37		X		1,248	38			2
		PREPARED SPACE	39			X		40	PREPARED SPACE		2
		PREPARED SPACE	41		X			42	PREPARED SPACE		

	EQPT VA	RCPT VA	LTG VA	AC/HEAT VA	MOTORS	CONN VA	FTL VA	PANEL VA	PHASE AMP
PHASE A	1400	4080	3096	0	0	8576		9350	78
PHASE B	600	3800	3546	0	0	7946		8833	74
TOTAL	2000	7880	6642	0	0	16522		18183	

PANEL DESIGN KVA:	18.18	PANEL SUBTOTAL:	76	AMPS
RESERVE CAPACITY KVA:	3.64	RESERVE CAPACITY:	15	AMPS
TOTAL KVA:	21.82	PANEL DESIGN CURRENT:	91	AMPS

PANEL LB

LOCATION:	EXTERIOR WALL		VOLTAGE:	120/240	V	KAIC:	BUSSING SHALL BE FULLY RATED
MOUNTING:	SURFACE		PHASE:	1	P / 3W	CODES:	0=EQPT, 1=RCPT, 2=LTG, 3=A/C, 4=HEAT
ENCLOSURE:	NEMA 3R	STYLE: NQOD	BUSSING:	100	A		5=CONTINUOUS MOTORS, 6=LRGST MOTOR
BRKR MTG:	BOLT-ON	(REF: SQUARE D)	MCB:	100	A	ACCESSORIES:	GROUND BUS, 42 SPACE
BREAKERS:	SERIES RATED. 60/75 DEGREE TERMINALS		MLO:		A		

CODE	BRKR	CIRCUIT USE	CKT	LOAD	A	B	LOAD	CKT	CIRCUIT USE	BRKR	CODE
1	20/1	STAGE RECEPT	1	540	X		360	2	ENTRY POWER	20/1	1
1	20/1	STAGE RECEPT	3	540		X	540	4	GALLERY RECEPT	20/1	1
1	20/1	MULTI-USE "B" RECEPT	5	360	X		800	6	CATER REFRIGERATOR	20/1	1
1	20/1	MULTI-USE "B" RECEPT	7	360		X	300	8	CATER ABV CNT RECEPT	20/1	1
1	20/1	MULTI-USE "A" RECEPT	9	360	X		300	10	CATER ABV CNT RECEPT	20/1	1
1	20/1	MULTI-USE "A" RECEPT	11	360		X	600	12	CATER DISHWASHER	20/1-GFI	1
1	20/1	MULTI-USE "A" RECEPT	13	360	X		800	14	WARMER	20/1	1
1	20/1	TLT/ FOYER, STORAGE RECEPPT	15	900		X	300	16	CATER ABV CNT RECEPT	20/1	1
1	20/1	DOOR OPERATOR	17	300	X		180	18	CATERING RECEPT	20/1	1
1	20/1	EXTERIOR RECEPT	19	360		X	600	20	CATERING ICE MACHINE	20/1	1
1	20/1	MULTI-USE "A" FLOOR BOX POWER	21	720	X		600	22	LIGHTING	20/1	2
1	20/1	MULTI-USE "A" FLOOR BOX POWER	23	720		X	600	24	LIGHTING	20/1	2
1	20/1	MULTI-USE "B" FLOOR BOX POWER	25	720	X		400	26	LIGHTING	20/1	2
1	20/1	MULTI-USE "B" FLOOR BOX POWER	27	720		X	150	28	ENTRY LIGHTING	20/1	2
1	20/1	STAGE FLOOR BOX POWER	29	1,080	X			30	SPARE	20/1	2
1	20/1	PROJECTOR	31	900		X	600	32	CATER RECEPTACLE	20/1	1
1	20/1	PROJECT SCREEN	33	900	X		600	34	CATER RECEPTALCE	20/1	1
1	20/1	LIGHT BAR	35	900		X	360	36	TECH ROOM QUAD	20/1	1
		PREPARED SPACE	37			X	360	38	TECH ROOM QUAD	20/1	1
		PREPARED SPACE	39			X		40	PREPARED SPACE		1
		PREPARED SPACE	41		X			42	PREPARED SPACE		

	EQPT VA	RCPT VA	LTG VA	AC/HEAT VA	MOTORS	CONN VA	FTL VA	PANEL VA	PHASE AMP
PHASE A	0	8740	1000	0	0	9740		8075	67
PHASE B	0	9060	750	0	0	9810		8012	67
TOTAL	0	17800	1750	0	0	19550		16088	

PANEL DESIGN KVA:	16.09	PANEL SUBTOTAL:	67	AMPS
RESERVE CAPACITY KVA:	3.22	RESERVE CAPACITY:	13	AMPS
TOTAL KVA:	19.31	PANEL DESIGN CURRENT:	80	AMPS

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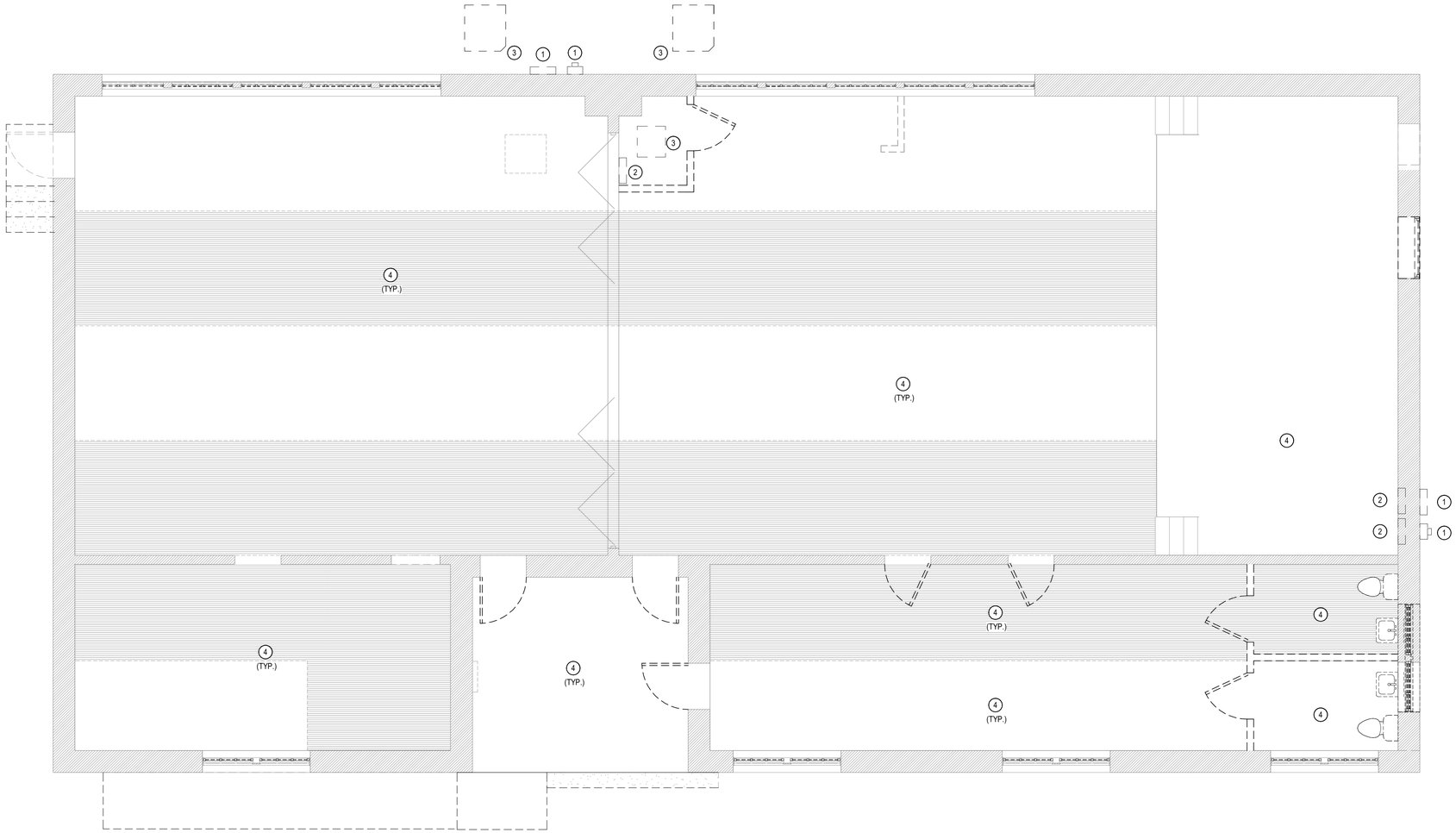
Architexas No. 2314

Date January 17, 2025

Sheet Name
ELECTRICAL PANEL SCHEDULE

Sheet Number
E501

1113



1 ED101 ELECTRICAL LEVEL 1 DEMOLITION PLAN

1/4" = 1'-0"

ELECTRICAL DEMOLITION KEYED NOTES:

1. REMOVE EXISTING ELECTRICAL SERVICE IN ITS ENTIRETY.
2. REMOVE EXISTING LOAD CENTERS/PANELS AND ASSOCIATED FEEDER AND BRANCH CIRCUITS.
3. EXISTING MECHANICAL EQUIPMENT TO BE DEMOLISHED, CONDUIT, AND ALL ASSOCIATED ELECTRICAL EQUIPMENT BACK TO SOURCE PANEL.
4. ALL EXISTING LIGHTING FIXTURES, LIGHTING CONTROLS, ELECTRICAL RECEPTACLES AND DEVICES, FIRE ALARM DEVICES AND DATA DROPS TO BE REMOVED. REMOVE ALL CONDUIT, CONDUCTORS, AND ASSOCIATE ELECTRICAL EQUIPMENT BACK TO SOURCE.

ELECTRICAL DEMOLITION KEYED NOTES:

1. SEE OTHER SHEETS FOR ADDITIONAL DEVICES

2. GENERAL: EXCEPT FOR ITEMS OR MATERIALS INDICATED TO BE REUSED, SALVAGED, REINSTALLED, OR OTHERWISE INDICATED TO REMAIN OWNER'S PROPERTY, REMOVE DEMOLISHED MATERIALS FROM PROJECT SITE AND LEGALLY DISPOSE OF THEM IN AN EPA-APPROVED LANDFILL. DO NOT ALLOW DEMOLISHED MATERIALS TO ACCUMULATE ON-SITE REMOVE FROM OWNER OCCUPIED AREAS DAILY. REMOVE AND TRANSPORT DEBRIS IN A MANNER THAT WILL PREVENT SPILLAGE ON ADJACENT SURFACES AND AREAS.

3. TRACE CIRCUITS FEEDING EXISTING TO-REMAIN PORTIONS OF THE BUILDING. DO NOT DEMOLISH CIRCUITS IN THESE AREAS. IF CIRCUITS ARE IN BOTH "TO REMAIN" AND "TO BE REMOVED" AREAS, DEMOLISH BACK TO NEAREST TO-REMAIN J-BOX.

4. DEMOLISH AND REMOVE EXISTING CONSTRUCTION ONLY TO THE EXTENT REQUIRED BY NEW CONSTRUCTION AND AS INDICATED. COMPLETE SELECTIVE DEMOLITION OPERATIONS ABOVE EACH FLOOR OR TIER BEFORE DISTURBING SUPPORTING MEMBERS ON THE NEXT LOWER LEVEL.

5. REMOVED AND SALVAGED ITEMS: CLEAN SALVAGED ITEMS, PACK OR CRATE ITEMS AFTER CLEANING. IDENTIFY CONTENTS OF CONTAINERS. STORE ITEMS IN A SECURE AREA UNTIL DELIVERY TO OWNER. TRANSPORT ITEMS TO OWNER'S STORAGE AREA DESIGNATED BY OWNER. PROTECT ITEMS FROM DAMAGE DURING TRANSPORT AND STORAGE.

6. REMOVED AND REINSTALLED ITEMS: CLEAN AND REPAIR ITEMS TO FUNCTIONAL CONDITION ADEQUATE FOR INTENDED REUSE. PAINT EQUIPMENT TO MATCH NEW EQUIPMENT. PACK OR CRATE ITEMS AFTER CLEANING AND REPAIRING. IDENTIFY CONTENTS OF CONTAINERS. PROTECT ITEMS FROM DAMAGE DURING TRANSPORT AND STORAGE. REINSTALL ITEMS IN LOCATIONS INDICATED. COMPLY WITH INSTALLATION REQUIREMENTS FOR NEW MATERIALS AND EQUIPMENT. PROVIDE CONNECTIONS, SUPPORTS, AND MISCELLANEOUS MATERIALS NECESSARY TO MAKE ITEM FUNCTIONAL FOR USE INDICATED.

7. EXISTING ITEMS TO REMAIN: PROTECT CONSTRUCTION INDICATED TO REMAIN AGAINST DAMAGE AND SOILING DURING SELECTIVE DEMOLITION. WHEN PERMITTED BY ARCHITECT, ITEMS MAY BE REMOVED TO A SUITABLE, PROTECTED STORAGE LOCATION DURING SELECTIVE DEMOLITION AND REINSTALLED IN THEIR ORIGINAL LOCATIONS AFTER SELECTIVE DEMOLITION OPERATIONS ARE COMPLETE.

8. COORDINATE ALL DEMO ACTIVITIES WITH OWNER AND ARCHITECT AND PROVIDE 10 DAYS NOTICE FOR ANY POWER OUTAGES.

0' 4' 8' 16' 32'

SCALE: 1/8"=1'-0"

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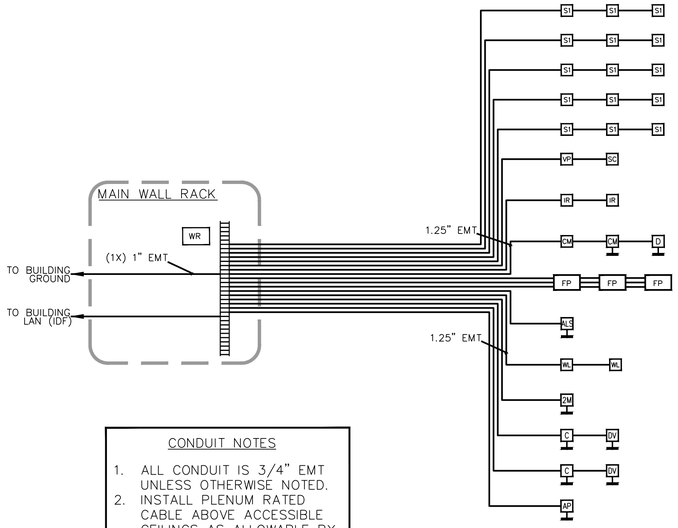
STATE OF TEXAS
JONATHAN GARCIA
124661
LICENSED
PROFESSIONAL ENGINEER

Architexas No. 2314
Date January 17, 2025

Sheet Name
ELECTRICAL LEVEL 1 DEMOLITION PLAN

Sheet Number
ED101

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CONDUIT NOTES

1. ALL CONDUIT IS 3/4" EMT UNLESS OTHERWISE NOTED.
2. INSTALL PLENUM RATED CABLE ABOVE ACCESSIBLE CEILINGS AS ALLOWABLE BY CODE. USE J-HOOKS OR CABLE TRAY AS AVAILABLE.

CONDUIT RISER DIAGRAM

120VAC 20 AMP OUTLETS ASSOCIATED WITH AUDIOVISUAL SYSTEMS

- CM — ONE (1) CIRCUIT TERMINATED ADJACENT TO EACH "CM" MEDIA INPUT LOCATION.
- DV — ONE (1) CIRCUIT TERMINATED ADJACENT TO EACH "DV" MEDIA INPUT LOCATION.
- FP — ONE (1) CIRCUIT TERMINATED ADJACENT TO EACH "FP" FLOOR POCKET LOCATION.
- SC — ONE (1) CIRCUIT TERMINATED ADJACENT TO EACH "SC" PLATE.
- VP — ONE (1) CIRCUIT TERMINATED ADJACENT TO THE "VP" PLATE.
- WR — TWO (2) CIRCUITS TERMINATED INSIDE THE "WR" EQUIPMENT RACK..

NOTES:

1. POWER OUTLETS INSIDE RACKS FURNISHED AND TERMINATED BY ELECTRICAL CONTRACTOR.
2. COORDINATE WITH ELECTRICAL CONTRACTOR FOR EXACT LOCATIONS AND TERMINATION OF AC POWER.
3. REFER TO SOUND SYSTEM SPECIFICATIONS UNDER "RELATED WORK BY OTHERS" FOR ADDITIONAL INFORMATION.
4. ALL CIRCUITS ARE 20 AMP 120VAC UNLESS OTHERWISE NOTED.
5. EQUIPMENT RACKS TO BE BONDED TO TECHNICAL GROUND SYSTEM.
6. FURNISH 120VAC HOUSE POWER TO THE PROJECTION SCREEN IN THE DINING/LIBRARY.

AUDIO VISUAL LEGEND

2M	ENCLOSURE: 1-GANG, 3-1/2" DEEP BOX MOUNTING: RECESSED IN WALL AT 1'-6" A.F.F. PANEL: SEE PLATE DETAILS DEVICE(S): 2 DEFAULT XLR AUDIO INPUTS
ALS	ENCLOSURE: 2-GANG, 3-1/2" DEEP BOX MOUNTING: RECESSED IN WALL AT 12'-0" A.F.F. PANEL: SEE PLATE DETAILS DEVICE(S): WIFI ACCESS POINT FOR AV NETWORK CONTROL.
AP	ENCLOSURE: 1-GANG, 3-1/2" DEEP BOX MOUNTING: RECESSED IN WALL AT 12'-0" A.F.F. PANEL: SEE PLATE DETAILS DEVICE(S): ASSISTED LISTENING DEVICE ANTENNA
C	ENCLOSURE: 1-GANG, 3-1/2" DEEP BOX MOUNTED HORIZONTALLY. MOUNTING: RECESSED IN WALL AT 4'-0" A.F.F. PANEL: SEE PLATE DETAILS DEVICE(S): 5" TOUCHSCREEN AUDIOVISUAL SYSTEM CONTROL
D	ENCLOSURE: 1-GANG, 3-1/2" DEEP BOX MOUNTED HORIZONTALLY. MOUNTING: RECESSED IN WALL AT 1'-6" A.F.F. PANEL: SEE PLATE DETAILS DEVICE(S): AV-NET WALL PLATE
CM CM	ENCLOSURE: 1-GANG, 3-1/2" DEEP BOX MOUNTED HORIZONTALLY. MOUNTING: RECESSED IN CEILING OR IN WALL AT 4'-0" A.F.F. PANEL: SEE PLATE DETAILS DEVICE(S): CAMERA PLATE
DV	ENCLOSURE: 3-GANG, 3-1/2" DEEP BOX MOUNTING: RECESSED IN WALL AT 1'-6" A.F.F. PANEL: SEE PLATE DETAILS DEVICE(S): HDMI AND BLUETOOTH INPUTS
FP	ENCLOSURE: ACE BACKSTAGE 134-SLBK WITH ISO104DDBBX 12" DEEP BACK BOX. MOUNTING: RECESSED IN PLATFORM AT LOCATIONS SHOWN. PANEL: SEE PLATE DETAILS DEVICE(S): PROGRAM AUDIO INPUTS, AV-NET, AC POWER
IR	ENCLOSURE: 1-GANG, 3-1/2" DEEP BOX MOUNTING: MOUNTED ON THE CEILING STRUCTURE. PANEL: SEE PLATE DETAILS DEVICE(S): INTERRUPTIBLE INFRARED SENSOR FOR AUTOMATED ROOM COMBINING
S1	ENCLOSURE: 2-GANG, 3-1/2" DEEP BOX MOUNTING: MOUNTED ON THE BUILDING STRUCTURE ABOVE THE SPEAKER PANEL: BLANK PLATE WITH PASS THROUGH HOLE & PROTECTIVE GROMMET DEVICE(S): STRUCTURE MOUNTED 70v SPEAKER CABLE PULL BOX
SC	ENCLOSURE: 1-GANG, 3-1/2" DEEP BOX MOUNTING: MOUNTED ON THE ELECTRIC DROP DOWN SCREEN AT THE MOTOR END PANEL: BLANK PLATE WITH PASS THROUGH HOLE & PROTECTIVE GROMMET DEVICE(S): SCREEN CONTROL CABLE PULL BOX
VP	ENCLOSURE: 2-GANG, 3-1/2" DEEP BOX MOUNTING: MOUNTED ON THE CEILING JOIST. PANEL: BLANK PLATE WITH PASS THROUGH HOLE & PROTECTIVE GROMMET DEVICE(S): VIDEO PROJECTOR CONNECTION PLATE
WL	ENCLOSURE: 2-GANG, 3-1/2" DEEP BOX MOUNTING: RECESSED IN WALL AT 12'-0" A.F.F. PANEL: SEE PLATE DETAILS DEVICE(S): WIRELESS MICROPHONE ANTENNA
WR	ENCLOSURE: WALL RACK; REFER TO SPECIFICATIONS MOUNTING: MOUNTED ON THE WALL CENTERED ON 4"-0" A.F.F. PANEL: STANDARD 19" RACK-MOUNTED EQUIPMENT. PROVIDE BLANK PANELS DEVICE(S): SOUND EQUIPMENT RACK
	ENCLOSURE: 8" X 8" X 36" WIRING TROUGH MOUNTING: SUSPEND FROM STRUCTURE ABOVE RACK LOCATIONS DEVICE: WIRING TROUGH FOR RACK CONNECTIVITY
	120 VOLT AC CONVENIENCE OUTLET.

ELECTRICAL & CONDUIT INSTALLATION NOTES (DIV. 26)

1. ALL 120VAC POWER CONDUCTORS, POWER DISTRIBUTION PANELS, JUNCTION BOXES, TERMINAL PANELS, CONDUITS, WIREWAYS, POWER RECEPTACLES AND ALL OTHER DEVICES ASSOCIATED WITH 120VAC POWER CIRCUITS SHALL BE FURNISHED, INSTALLED AND TERMINATED UNDER DIVISION 26 UNLESS OTHERWISE NOTED.
2. ALL CONDUIT SHOWN IS FOR AUDIO/VISUAL SYSTEM SIGNAL CABLE AND IS NOT RELATED TO ANY CONDUIT FOR AC POWER.
3. ALL CONDUIT IS 3/4" EMT UNLESS OTHERWISE NOTED.
4. ALL CONDUIT CONNECTIONS SHALL BE FURNISHED WITH NYLON BUSHINGS TO PREVENT DAMAGE TO CABLES FROM BURRED OR UNEVENLY CUT CONDUIT.
5. USE INSULATED BUSHINGS TO CONNECT CONDUIT TO EQUIPMENT RACKS, TO INSULATE CONDUIT GROUND FROM EQUIPMENT RACK GROUND SYSTEM.
6. KEEP 90° BENDS TO A MINIMUM. THE CONDUIT SYSTEM SHALL NOT HAVE MORE THAN THREE 90° BENDS OR THEIR EQUIVALENT BETWEEN PULL BOXES.
7. ALL PULL BOXES AND OUTLET BOXES SHALL BE AT LEAST 3-1/2" DEEP.
8. ALL CONDUIT RUNS IN EXCESS OF 100 FEET SHALL HAVE INTERMEDIATE JUNCTION BOXES EVERY 100 FEET OR THREE BENDS, WHICHEVER COMES FIRST.
9. ALL AUDIO/VISUAL SYSTEM RELATED JUNCTION BOXES SHALL REMAIN ACCESSIBLE AT ALL TIMES.
10. INSTALL NYLON PULL STRINGS IN ALL EMPTY CONDUITS.
11. CAULK OR OTHERWISE SEAL ALL PENETRATIONS THROUGH ACOUSTICAL PARTITIONS AND BARRIERS.
12. ELECTRICAL CONTRACTOR SHALL REFER TO ELECTRICAL DRAWINGS FOR ALL 120VAC CONDUIT SIZING.
13. ELECTRICAL CONTRACTOR SHALL REFER TO OTHER DRAWINGS FOR NON-AUDIO/VISUAL SYSTEM RELATED ELECTRICAL INFORMATION FOR THESE AREAS. AUDIO/VISUAL SYSTEM DRAWINGS DO NOT CONTAIN ALL ROOM ELECTRICAL REQUIREMENTS.
14. THE ELECTRICAL CONTRACTOR SHALL INSTALL AND WIRE ALL HIGH VOLTAGE DEVICES.
15. ALL POWER CIRCUITS SHALL BE 120VAC, 20 AMP DEDICATED CIRCUITS UNLESS OTHERWISE NOTED.
16. ELECTRICAL CONTRACTOR SHALL LABEL ALL CIRCUIT BREAKER POSITIONS IN ALL BREAKER PANELS.
17. INSTALL SEPARATE DEDICATED NEUTRAL CONDUCTOR FROM POWER DISTRIBUTION PANEL FOR EACH INDIVIDUAL CIRCUIT.
18. ALLOW MINIMUM 20% SPARE BREAKERS FOR EACH POWER DISTRIBUTION PANEL.
19. 120VAC POWER TO THE EQUIPMENT RACKS SHALL BE TERMINATED INSIDE THE RACKS TO AUDIO/VISUAL SYSTEM SUBCONTRACTOR-SUPPLIED ISOLATED GROUND PLUGMOLD PLUGSTRIPS OR ISOLATED GROUND QUAD CONVENIENCE OUTLETS.
20. CLEARLY LABEL BREAKER PANEL DOOR "AUDIO/VISUAL SYSTEM EQUIPMENT ONLY".
21. RECESSED LOUDSPEAKER ENCLOSURES AND FLOOR POCKETS SHALL BE FURNISHED BY THE AUDIO/VISUAL SYSTEMS CONTRACTOR AND BE INSTALLED UNDER DIVISION 26.
22. REFER TO "RELATED WORK IN OTHER SECTIONS" IN AUDIO/VISUAL SYSTEM SPECIFICATIONS FOR ADDITIONAL INFORMATION.
23. CONDUIT WILL BE REQUIRED BETWEEN ANY AND ALL LOUDSPEAKERS UNLESS THE LOUDSPEAKERS ARE ASSOCIATED WITH AN ACCESSIBLE CEILING PLENUM. WIRE NOT INSTALLED IN EQUIPMENT RACKS, NOT PORTABLE, OR NOT INSTALLED IN CONDUIT SHALL BE FIRE-RATED AND MEET ALL APPLICABLE CODES.
24. ALL CONDUIT THAT RUNS THROUGH SPACES WITH EXPOSED CEILING AREAS WILL RUN ALONG STRUCTURAL SUPPORTS AND BEAMS; NOT ACROSS EXPOSED AREAS BETWEEN STRUCTURAL SUPPORTS AND BEAMS.

GENERAL MEP, FIRE ALARM/DETECTION, COMMUNICATION, & A/V NOTES

EXISTING BUILDING:

1. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES, GENERAL:
   A. CONDUIT, PIPING, AND DEVICES ARE NOT TO BE EXPOSED IN ANY LOCATION UNLESS APPROVED BY ARCHITECT.
   B. ELECTRICAL BOXES AND ASSOCIATED ELEMENTS MUST BE RECESSED INTO WALLS, FLOORS, OR BASEBOARDS SO THAT COVER PLATES ARE FLUSH WITH THE FINISH SURFACE.
2. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WALLS:
   A. CONDUIT, WIRING, AND PIPING ARE TO BE CONCEALED BEHIND FINISH FACE OF PLASTER WALLS UNLESS NOTED OTHERWISE
   B. ROUTE CONDUIT INTO THE PLASTER AND MASONRY SO THAT A FULL APPLICATION OF LATH AND PLASTER SYSTEM IS INSTALLED OVER THE MATERIAL AND CONDUIT AND PIPING IS CONCEALED IN WALLS BEHIND THE PLASTER.
   C. AT MASONRY WALLS ROUTE MINIMUM DEPTH REQUIRED FOR INSTALLATION OF CONDUIT TO MAXIMUM 2-INCHES FOR HORIZONTAL RUNS AND 4 INCHES FOR VERTICAL RUNS. MINIMIZE HORIZONTAL RUNS WHEREVER POSSIBLE.
3. CONCEALMENT OF CONDUIT, PIPING, AND DEVICES AT WOOD FLOORS:
   A. PORTIONS OF WOOD FLOORING AT EXISTING BUILDING ARE SCHEDULED TO BE REMOVED. RUN ALL CONDUIT, PIPING, AND DISTRIBUTION LINES CONCEALED WITHIN CRAWLSPACE. REMOVE AND REINSTALL BASEBOARD AS REQUIRED FOR INSTALLATION OF THE WORK.
4. EXPOSED CONDUIT, PIPING, AND DEVICES AT CEILINGS: RUN CONDUIT AND PIPING CONCEALED IN ATTIC, WITHIN SCHEDULED FURR DOWNS AND SUSPENDED CEILINGS, AND BETWEEN EXISTING CEILING JOISTS.
5. EXPOSED CONDUIT, PIPING, AND DEVICES:
   A. RUN PARALLEL TO WALLS AND BEAMS
   B. GANG PIPING AND CONDUIT IN PARALLEL GROUPS WHERE POSSIBLE AND EQUIDISTANT TO EACH OTHER. WHEN GANGED PIPING IS BENT, IT MUST REMAIN EQUIDISTANT TO EACH OTHER.
   C. ALL EXPOSED DISTIBUTION SYSTEMS SHALL BE PAINTED TO MATCH ADJACENT FINISHES WITH THE EXCEPTION OF MECHANICAL ROOMS WHERE THEY MAY BE LEFT UNFINISHED.
6. NEW FASTENERS:
   A. ATTACHMENT OF MASONRY (I.E. CONDUIT, METAL FRAMING, WOOD FURRING, ETC.) MUST BE ATTACHED INTO MASONRY JOINTS UNLESS NOTED OTHERWISE. DO NOT DRILL THROUGH, PENETRATE OR ALTER IN ANY WAY THE ORIGINAL MATERIALS OR STRUCTURE UNLESS NOTED OTHERWISE
   B. REFER TO STRUCTURAL FOR ATTACHMENT REQUIREMENTS OF MEP EQUIPMENT TO STRUCTURE
7. PENETRATION AT MASONRY WALLS:
   A. CUT/CORE PLASTER AND MASONRY WALLS AS NECESSARY TO ACCOMMODATE NEW MATERIALS, COMPONENTS, AND SYSTEMS INCLUDING CONDUIT, WIRING, PIPING, DUCTS, AND ALL OTHER ITEMS REQUIRED FOR INSTALLATION AND OPERATION OF MEP SYSTEMS. SEE STRUCTURAL DRAWINGS FOR PENETRATION DETAILS AT MASONRY LOAD BEARING WALLS
   B. FOR BELOW GRADE PENETRATIONS PROVIDE WATERTIGHT SEAL, SUCH AS LINKSEAL OR APPROVED EQUAL
   C. FOR ABOVE GRADE PENETRATIONS PROVIDE WEATHERTIGHT SEAL WITH BACKER-ROD AND SEALANT
8. MEP SHOP DRAWINGS:
   A. MECHANICAL DUCTWORK AND PIPING SHOP DRAWINGS ARE TO INCLUDE SPOT ELEVATIONS TO THE BOTTOM OF THESE SYSTEMS ABOVE FINISH FLOOR TO VERIFY CLEARANCES AT SUSPENDED CEILINGS AND FURR DOWNS.

AUDIOVISUAL DATA DROP REQUIREMENTS (BY DATA/TELECOM)

DEVICE / LOCATION	QTY AT EACH LOC.	ADDITIONAL NOTES
DV	1	(1) DATA OUTLET ADJACENT TO EACH "DV" PLATE.
VP	1	(1) DATA OUTLET ADJACENT TO EACH "VP" PLATE.
WR	1	(1) DATA OUTLET INSIDE "WR" EQUIPMENT RACK WITH 15' SERVICE LOOP UNTERMINATED

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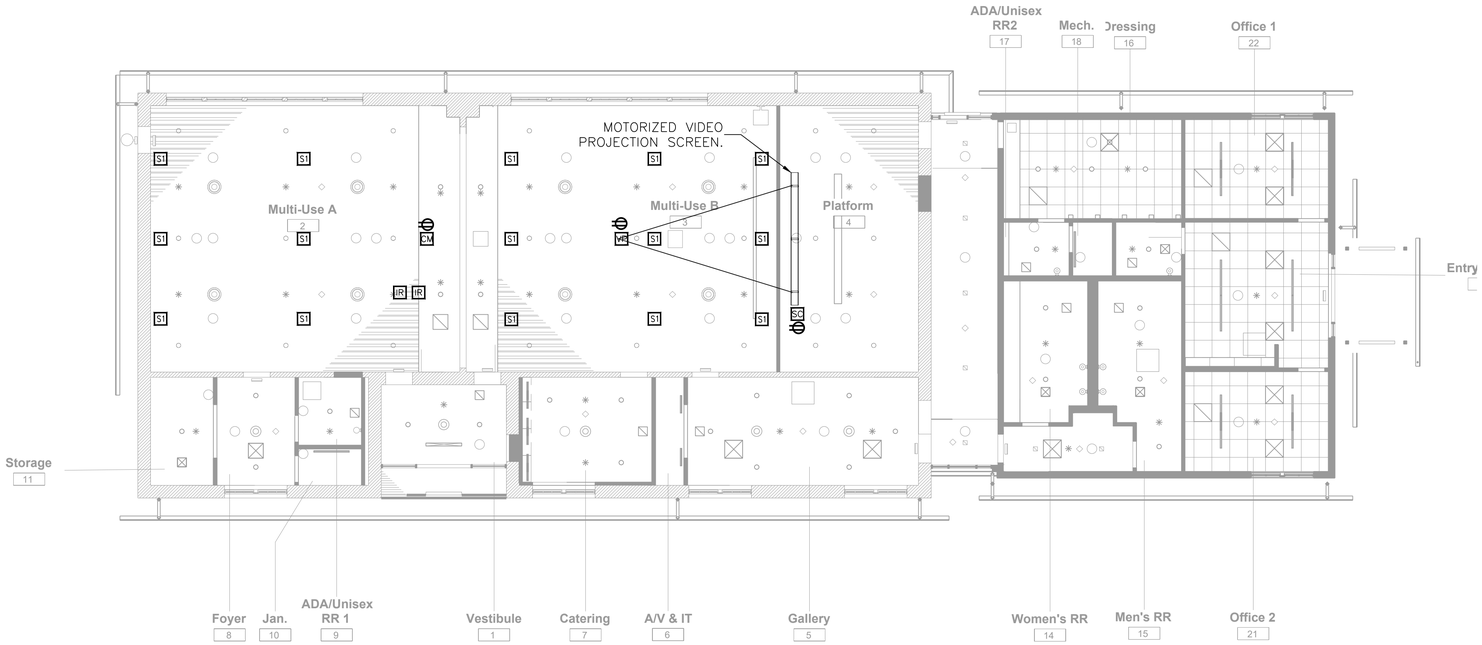
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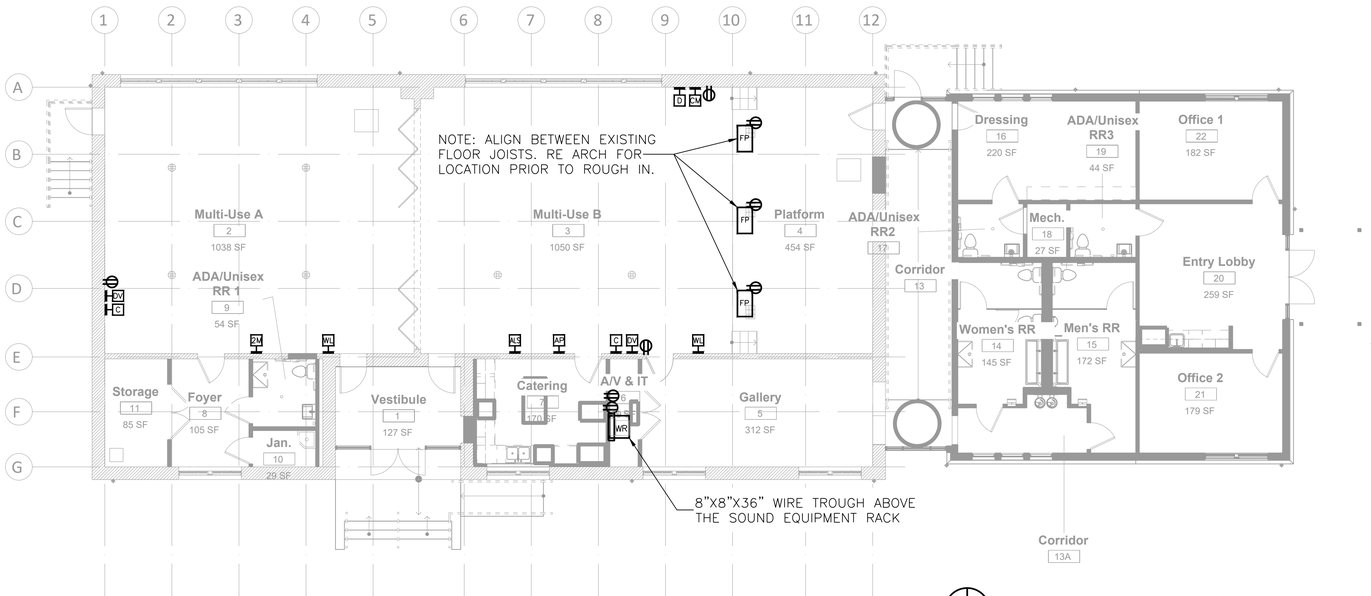
Sheet Name
AV SYSTEMS - POWER AND LEGEND

Sheet Number
AV0-00



PLAN NORTH

2 Level 1 Reflected Ceiling Plan
1/8" = 1'-0"



PLAN NORTH

1 Level 1 Floor Plan
1/8" = 1'-0"

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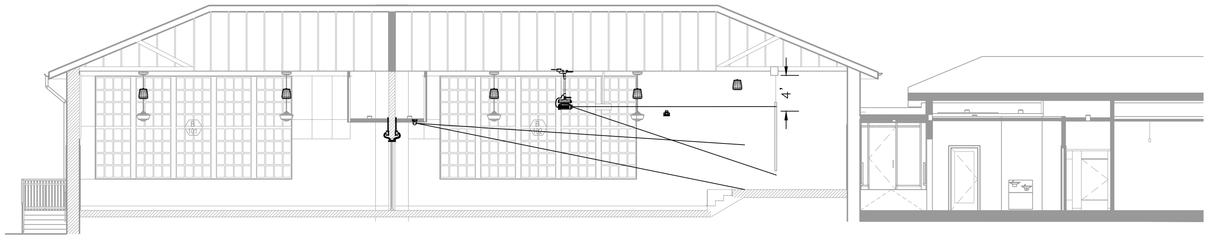
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Sheet Name
AV SYSTEMS - FIRST FLOOR

Sheet Number
AV2-01



PLAN NORTH

1 BUILDING SECTION
1/8" = 1'-0"

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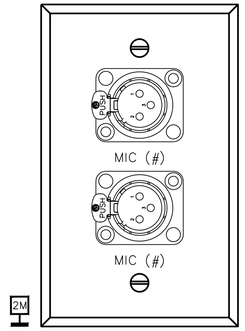
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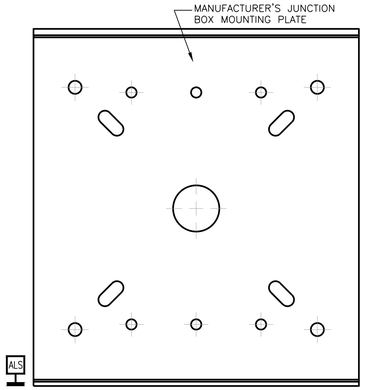
Date
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Sheet Name
AV SYSTEMS - SECTIONS AND DETAILS

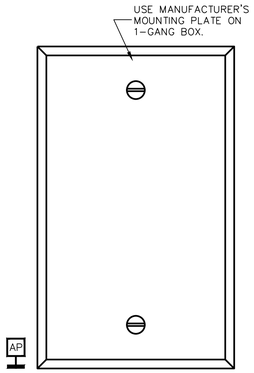
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AV4-01



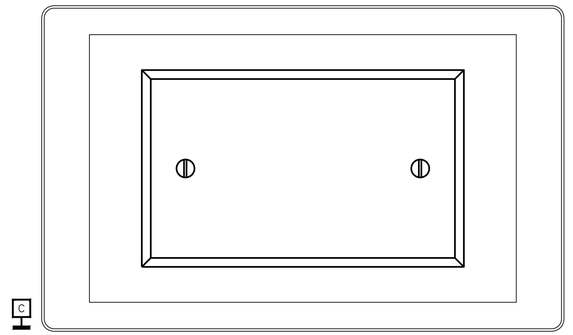
1 PLATE DETAIL - 2M
12" = 1'-0"



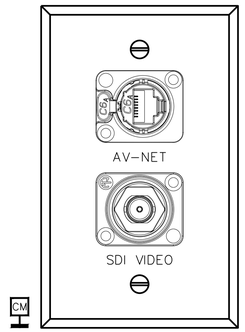
2 PLATE DETAIL - ALS
12" = 1'-0"



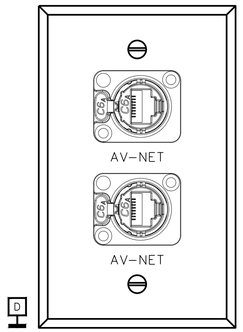
3 PLATE DETAIL - AP
12" = 1'-0"



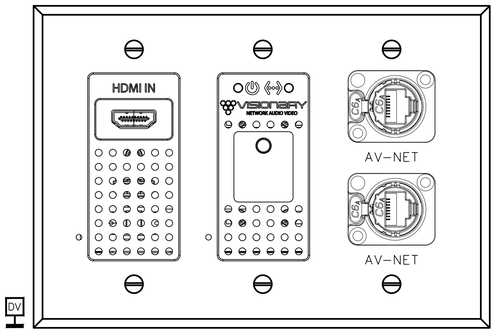
4 PLATE DETAIL - C
12" = 1'-0"



5 PLATE DETAIL - CM
12" = 1'-0"



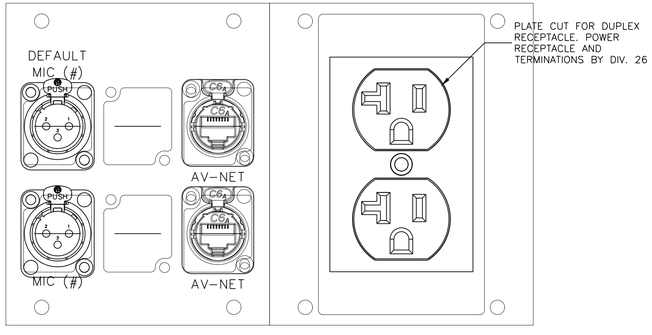
6 PLATE DETAIL - D
12" = 1'-0"



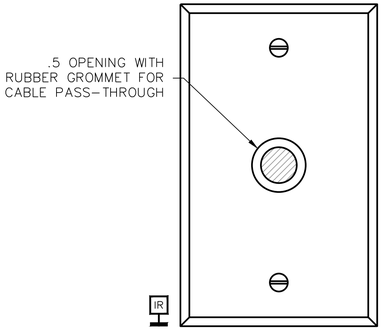
7 PLATE DETAIL - DV
12" = 1'-0"

NOTES FOR PLATES/PANELS:

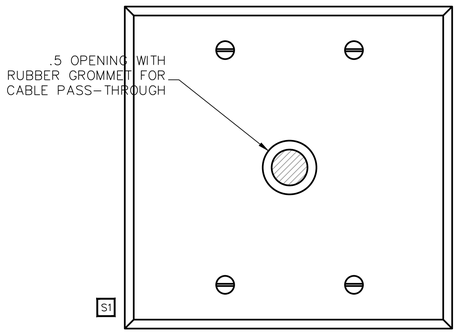
DETAILS OF CUSTOM PLATES AND PANELS ARE SHOWN FOR THE SAKE OF CLARITY AND CONTENT. THE INSTALLING CONTRACTOR SHALL VERIFY ALL BACK BOX DIMENSIONS AND MOUNTING HOLES IN THE FIELD PRIOR TO PANEL/PLATE FABRICATION AND INSTALLATION.



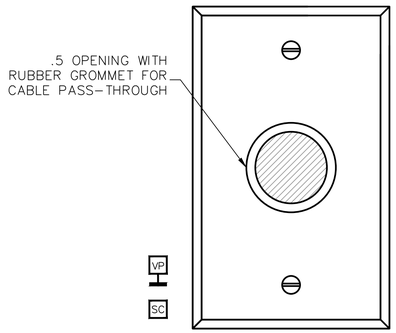
8 PLATE DETAIL - FP
12" = 1'-0"



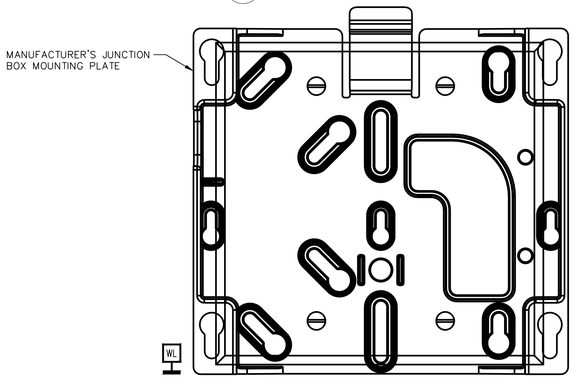
9 PLATE DETAIL - IR
12" = 1'-0"



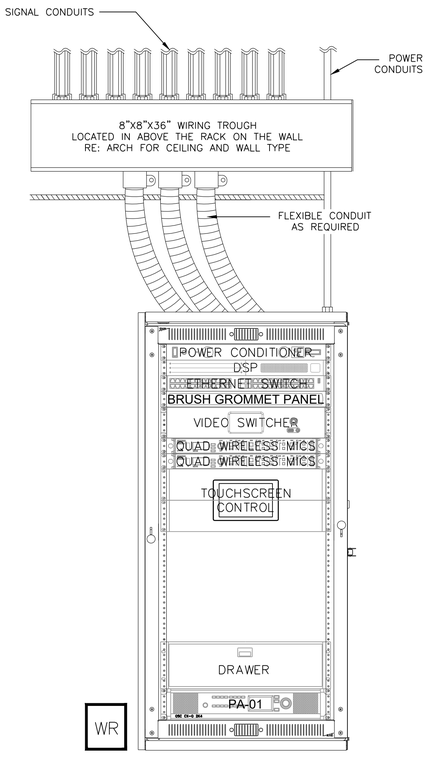
10 PLATE DETAIL - S1
12" = 1'-0"



11 PLATE DETAIL - VP SC
12" = 1'-0"



12 PLATE DETAIL - WL
12" = 1'-0"



13 RACK ELEVATION - WR
1 1/2" = 1'-0"

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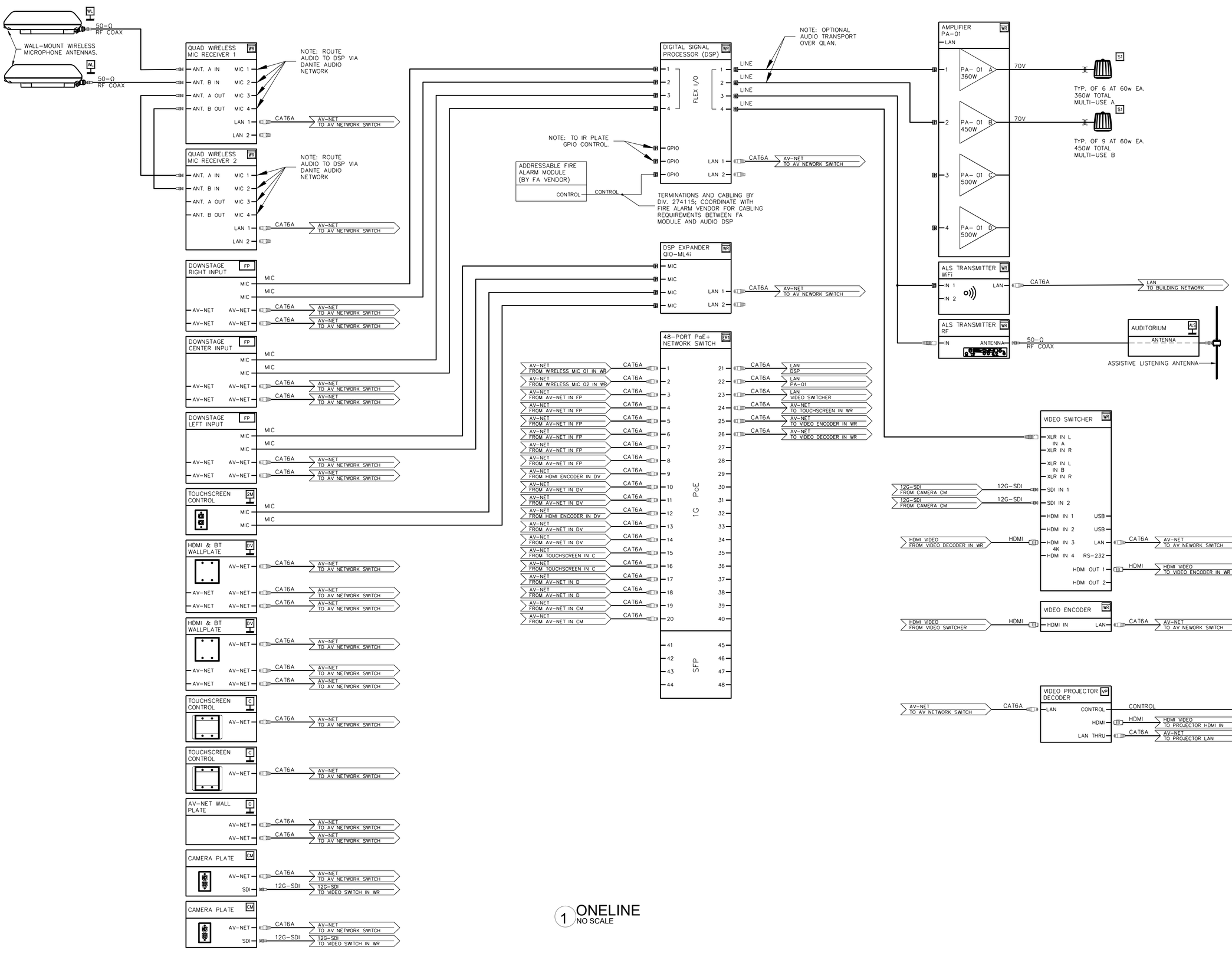
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Sheet Name
AV SYSTEMS - PLATE DETAILS & RACK ELEVATIONS

Sheet Number
AV6-01



1 ONELINE
NO SCALE

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Sheet Name
AV SYSTEMS - ONELINE

Sheet Number
AV6-02

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD
HAYS COUNTY,DRIPPING SPRINGS, TX
AUGUST 2024

OWNER:	CITY OF DRIPPING SPRINGS 511 MERCER STREET DRIPPING SPRINGS, TEXAS 78620	CONTACT:	MICHELLE FISCHER (512) 858-4725
ENGINEER:	DOUCET & ASSOCIATES 7401B HWY 71 WEST, SUITE 160 AUSTIN, TX 78735	CONTACT:	JOE GRASSO, P.E. (512)583-2600
LAND SURVEY:	DOUCET & ASSOCIATES 7401B HWY 71 WEST, SUITE 160 AUSTIN, TX 78735	CONTACT:	CHRIS TERRY, R.P.L.S. (512)583-2600
PROJECT ADDRESS:	311 OLD FITZHUGH ROAD, DRIPPING SPRINGS TEXAS		

LEGAL DESCRIPTION: 1.43 ACRES LOT 1, BLOCK 1 MINOR REPLAT OF STEPHENSON CIVIC DISTRICT RECORDED IN DOCUMENT NO. _____ OF THE PLAT RECORDS OF HAYS COUNTY, TEXAS

WATERSHED: THIS SITE IS LOCATED IN THE ONION CREEK WATERSHED WHICH IS CLASSIFIED AS A SUBURBAN WATERSHED. THIS PROJECT IS WITHIN THE EDWARDS AQUIFER CONTRIBUTING ZONE AS REGULATED BY TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ).

FLOODPLAIN: ACCORDING TO THE CURRENT FEMA FLOOD INSURANCE RATE MAP NUMBER 48209C0105F, DATED SEPTEMBER 2, 2005, HAYS COUNTY, TEXAS, NO PORTIONS OF THIS PROPERTY LIE WITHIN THE DESIGNATED HUNDRED YEAR FLOOD PLAIN FLOOD HAZARD AREA. THIS FLOOD STATEMENT SHALL NOT CREATE LIABILITY ON THE PART OF THE SURVEYOR OR ENGINEER.

ZONING: GUI -GOVERNMENT/UTILITY/INSTITUTIONAL / HISTORIC OVERLAY

WATER SERVICE: DRIPPING SPRINGS WATER SUPPLY CORP.

WASTEWATER SERVICE: CITY OF DRIPPING SPRINGS

SUBMITTAL DATE: AUGUST 2024

I CERTIFY TO THE BEST OF MY KNOWLEDGE THAT THESE ENGINEERING DOCUMENTS ARE COMPLETE, ACCURATE AND ADEQUATE FOR THE INTENDED PURPOSES, INCLUDING CONSTRUCTION, BUT ARE NOT AUTHORIZED FOR CONSTRUCTION PRIOR TO FORMAL CITY APPROVAL.

SUBMITTED BY:

JOE GRASSO, P.E.
DOUCET & ASSOCIATES
7401 B HWY. 71 WEST, SUITE 160
AUSTIN, TEXAS 78735
(512) 583-2600

APPROVED BY:

_____
CHAD GILPIN, CITY ENGINEER, CITY OF DRIPPING SPRINGS

_____
TORY CARPENTER, PLANNING DIRECTOR, CITY OF DRIPPING SPRINGS

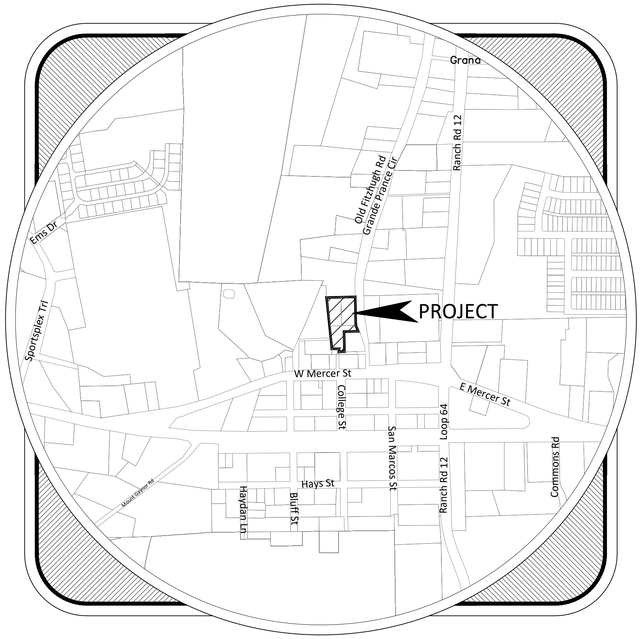
_____
ROBBY CALLEGARI, P.E., CITY OF DRIPPINGS SPRINGS, WASTEWATER ENGINEER

_____
DILLON POLK - ESD #6 FIRE INSPECTOR

_____
DRIPPING SPRINGS WATER SUPPLY CORPORATION

_____
DANE SORRENSON, UTILITY DIRECTOR

CITY OF DRIPPING SPRINGS SITE DEVELOPMENT PERMIT #SP2024-022



MAPSCO: PG. 588L & 588Q GRID R23

VICINITY MAP

ELECTRONIC FILE NOTE:

AT THE BIDDER'S/CONTRACTOR'S REQUEST, DOUCET WILL FURNISH ELECTRONIC FILES AS SUPPORT DOCUMENTS FOR THE APPROVED CONSTRUCTION DOCUMENTS. THE ELECTRONIC FILES ARE PROVIDED AS A SERVICE AND ARE SUBORDINATE TO THE APPROVED CONTRACT DOCUMENTS. IN THE EVENT THE APPROVED CONTRACT DOCUMENTS ARE MODIFIED, IT IS THE CONTRACTOR'S RESPONSIBILITY TO COMPARE THE ELECTRONIC DOCUMENTS TO THE MODIFIED CONTRACT DOCUMENTS PRIOR TO RELEASE OF THE ELECTRONIC FILES, AN ELECTRONIC FILE RELEASE AGREEMENT WITH DOUCET AND ASSOCIATES MUST BE SIGNED BY THE CONTRACTOR.

NOTES:

1. CITY OF DRIPPING SPRINGS WILL BE RESPONSIBLE FOR OPERATION AND MAINTENANCE OF STORMWATER UTILITIES, INCLUDING BMPS, PONDS, AND PERMEABLE PAVER SYSTEMS.
2. ALL RESPONSIBILITY FOR THE ADEQUACY OF THESE PLANS REMAINS WITH THE ENGINEER WHO PREPARED THEM. IN APPROVING THESE PLANS, THE CITY MUST RELY UPON THE ADEQUACY OF WORK OF THE DESIGN ENGINEER.
3. A WATER QUALITY BMP MAINTENANCE PLAN HAS BEEN PREPARED FOR THIS DEVELOPMENT AND IS ON FILE AT CITY HALL IN SITE DEVELOPMENT CASE # SD2024-022.

REVISIONS: REVISION NOTE: ALL REVISIONS AND CORRECTIONS SHALL BE REVIEWED AND APPROVED BY THE CITY OF AUSTIN AND TRAVIS COUNTY.

NO.	DESCRIPTION	REVISE (R)/ADD (A)/ SHEET NO'S	TOTAL # SHEET IN PLAN SET	NET CHANGE IMP. COVER	SITE IMP. COVER	% SITE IMP. COVER	APPROVED DATE	TNR	COA

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33	E107 ELECTRICAL SCHEDULES

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TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

COVER

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
LICENSED
PROFESSIONAL ENGINEER
6-17-25

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

SHEET
1
OF 33

Project No.:
1577-009C
SD2024-022

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GENERAL NOTES:

1. SAW CUT AND MATCH ALL EXISTING PAVEMENT.
2. NO BLASTING IS ALLOWED.
3. ALL AREAS DISTURBED OR EXPOSED DURING CONSTRUCTION SHALL BE REVEGETATED IN ACCORDANCE WITH THE CITY OF DRIPPING SPRINGS STANDARD SPECIFICATION 602S FOR SODDING OR 604S FOR SEEDING, AT THE CONTRACTOR'S DISCRETION. HOWEVER, THE TYPE OF REVEGETATION MUST EQUAL OR EXCEED THE TYPE OF VEGETATION PRESENT BEFORE CONSTRUCTION UNLESS OTHERWISE REQUESTED BY THE PROPERTY OWNER.
4. PRIOR TO ANY CONSTRUCTION, THE CONTRACTOR SHALL CONVENE A PRE-CONSTRUCTION CONFERENCE WITH THE CITY OF DRIPPING SPRINGS, THE ENGINEER, OTHER UTILITY COMPANIES, ANY AFFECTED PARTIES AND ANY OTHER ENTITY THE CITY OR THE ENGINEER MAY REQUIRE.
5. PRIOR TO ANY CONSTRUCTION THE CONTRACTOR SHALL APPLY FOR AND SECURE ALL PROPER PERMITS FROM THE APPROPRIATE AUTHORITIES.
6. DENSITY TESTING FOR TRENCH BACKFILL IS TO BE DONE IN 12" LIFTS AT ONE TEST PER 500' OR EACH LINE SEGMENT.
7. A STABILIZED CONSTRUCTION ENTRANCE IS REQUIRED AT ALL POINTS WHERE CONSTRUCTION TRAFFIC IS EXITING THE PROJECT ONTO EXISTING PAVEMENT.
8. THE ATTENTION OF THE CONTRACTOR IS DIRECTED TO THE STATE LAW (VERNON'S ANNOTATED TEXAS STATUTES, ARTICLE 1436-C) AND THE NEED FOR EFFECTIVE PRECAUTIONARY MEASURES WHEN OPERATING EQUIPMENT IN THE VICINITY OF ELECTRICAL LINES. IF THE CONTRACTOR CHOOSES TO USE EQUIPMENT WITH THE POTENTIAL OF COMING WITHIN THE DISTANCE PRESCRIBED BY THE STATUTE, THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION OF THE WORK WITH THE APPROPRIATE ELECTRIC UTILITY COMPANY.
9. CONTRACTOR SHALL NOTIFY THE CITY OF DRIPPING SPRINGS ENGINEERING INSPECTION DEPARTMENT AT 512-858-4699 PRIOR TO CONSTRUCTING DRAINAGE IMPROVEMENTS IN EASEMENTS OR RIGHTS-OF-WAY. THE METHOD OF PLACEMENT AND COMPACTION OF BACKFILL IN THE CITY'S ROW MUST BE APPROVED PRIOR TO THE START OF BACKFILL OPERATIONS.
10. ALL STRIPING, WITH THE EXCEPTION OF STOP BARS, IS TO BE TYPE II (WATER BASED). STOP BARS REQUIRE TYPE I THERMOPLASTIC.
11. THIS DEVELOPMENT SHALL COMPLY WITH ALL APPLICABLE ITEMS REGARDING THE 2012 INTERNATIONAL FIRE CODE (IFC) AND AS AMENDED BY THE CITY OF DRIPPING SPRING'S DEVELOPMENTAL ORDINANCE.

SPOIL SITE NOTES:

1. THE TEMPORARY SPOILS DISPOSAL SITE IS TO BE SHOWN ON THE EROSION CONTROL PLAN. THE DEPTH OF SPOIL WILL NOT EXCEED 10 FEET IN ANY AREA.
2. NO SPOILS DISPOSAL ON-SITE EXCEPT AS SHOWN ON THE PLANS.

CONSTRUCTION SEQUENCE:

- CALL CITY OF DRIPPING SPRINGS AT 48 HOURS PRIOR TO BEGINNING ANY WORK. CALL THE ONE CALL CENTER AT 811 FOR UTILITY LOCATIONS AND OBTAIN PERMIT FOR ANY WORK WITHIN TXDOT OR CITY OF DRIPPING SPRINGS RIGHT-OF-WAY.
- THE CONTRACTOR SHALL INSTALL TEMPORARY EROSION/SEDIMENTATION CONTROL AND TREE PROTECTION MEASURES AS SHOWN WITHIN THESE PLANS.
- THE OWNER OR HIS AUTHORIZED REPRESENTATIVE SHALL CONVENE A PRE-CONSTRUCTION CONFERENCE.
- WITH THE APPROVAL OF ALL AFFECTED PARTIES, THE CONTRACTOR MAY BEGIN CLEARING AND GRUBBING.
- ROUGH-CUT ALL REQUIRED OR NECESSARY PONDS. EITHER THE PERMANENT OUTLET STRUCTURE OR A TEMPORARY OUTLET MUST BE CONSTRUCTED PRIOR TO DEVELOPMENT OF ANY EMBANKMENT OR EXCAVATION THAT LEADS TO PONDING CONDITIONS. THE OUTLET SYSTEM MUST CONSIST OF A LOW-LEVEL OUTLET AND AN EMERGENCY OVERFLOW MEETING THE REQUIREMENTS OF THE DRAINAGE CRITERIA MANUAL (SECTION 8.3) AND/OR THE ENVIRONMENTAL CRITERIA MANUAL (SECTION 1.4.2.K). THE OUTLET SYSTEM SHALL BE PROTECTED FROM EROSION AND SHALL BE MAINTAINED THROUGHOUT THE COURSE OF CONSTRUCTION UNTIL FINAL RESTORATION IS ACHIEVED.
- COMPLETE ALL GRADING AND UNDERGROUND INSTALLATIONS WITHIN THE PROJECT.
- COMPLETE DRIVEWAYS AND PARKING PAVEMENT.
- COMPLETE BUILDING CONSTRUCTION.
- COMPLETE PERMANENT EROSION CONTROL AND RESTORATION OF SITE VEGETATION.
- REMOVE AND DISPOSE OF TEMPORARY EROSION CONTROL, INCLUDING CONSTRUCTION SPOILS AREA.
- COMPLETE ANY NECESSARY FINAL DRESS UP OF AREAS DISTURBED.
- IF DISTURBED AREA IS NOT TO BE WORKED ON FOR MORE THAN 14 DAYS, DISTURBED AREA NEEDS TO BE STABILIZED BY RE-VEGETAION, MULCH, TARP OR REVEGETATION MATTING.

EROSION CONTROL NOTES:

1. THE CONTRACTOR SHALL INSTALL EROSION/SEDIMENTATION CONTROLS AND TREE PROTECTIVE FENCING PRIOR TO ANY WORK (CLEARING, GRUBBING OR EXCAVATION).
2. THE PLACEMENT OF EROSION/SEDIMENTATION CONTROLS SHALL BE IN ACCORDANCE WITH THE CITY OF DRIPPING SPRINGS AND THE APPROVED EROSION AND SEDIMENTATION CONTROL PLAN.
3. THE PLACEMENT OF TREE PROTECTIVE FENCING SHALL BE IN ACCORDANCE WITH THE DETAILS AND NOTES FOR TREE AND NATURAL AREA PROTECTION.
4. THE CONTRACTOR IS REQUIRED TO INSPECT THE CONTROLS AND FENCES AT WEEKLY INTERVALS AND AFTER SIGNIFICANT RAINFALL EVENTS TO INSURE THAT THEY ARE FUNCTIONING PROPERLY. THE PERSON(S) RESPONSIBLE FOR MAINTENANCE OF CONTROLS AND FENCES SHALL IMMEDIATELY MAKE ANY NECESSARY REPAIRS TO DAMAGED AREAS. SILT ACCUMULATION AT CONTROLS MUST BE REMOVED WHEN THE DEPTH REACHES SIX INCHES.

WATER NOTES:

1. THE CONTRACTOR SHALL CONTACT THE TEXAS EXCAVATION SYSTEM AT 811 FOR EXISTING UTILITY LOCATIONS 48 HOURS PRIOR TO ANY EXCAVATION. THE CONTRACTOR SHALL ALSO CONTACT DRIPPING SPRINGS WATER SUPPLY CORPORATION AT 512-858-7897 FOR ASSISTANCE IN OBTAINING EXISTING WATER AND WASTEWATER LOCATIONS. KNOWN EXISTING UTILITIES ARE SHOWN ON THE DRAWINGS. PRIOR TO THE START OF CONSTRUCTION THE CONTRACTOR SHALL VERIFY THE LOCATIONS OF ALL UTILITIES THAT ARE TO BE EXTENDED, TIED TO, CROSSED, OR ALTERED, OR SUBJECT TO DAMAGE/INCONVIENIENCE BY THE CONSTRUCTION OPERATIONS.
2. PRESSURE TAPS SHALL BE IN ACCORDANCE WITH THE DSWSC OR CITY OF AUSTIN STANDARD SPECIFICATIONS. THE CONTRACTOR SHALL PERFORM ALL EXCAVATION, ETC. AND SHALL FURNISH, INSTALL AND AIR TEST THE SLEEVE AND VALVE. A DSWSC INSPECTOR MUST BE PRESENT WHEN THE CONTRACTOR MAKES A TAP, AND/OR ASSOCIATED TESTS. A MINIMUM OF TWO (2) WORKING DAYS NOTICE IS REQUIRED. "SIZE ON SIZE" TAPS WILL NOT BE PERMITTED UNLESS MADE BY THE USE OF AN APPROVED FULL-CIRCLE GASKETED TAPPING SLEEVE. CONCRETE BLOCKING SHALL BE PLACED BEHIND AND UNDER ALL TAP SLEEVES A MINIMUM OF 24 HOURS PRIOR TO THE BRANCH BEING PLACED IN SERVICE.
3. FIRE HYDRANTS ON MAINS UNDER CONSTRUCTION SHALL BE SECURELY WRAPPED WITH A POLY WRAP BAG AND TAPED INTO PLACE. THE POLY WRAP SHALL BE REMOVED WHEN THE MAINS ARE ACCEPTED AND PLACED INTO SERVICE. HYDRANTS MUST BE EQUIPPED WITH A 5" STORZ CONNECTOR WITH A BLIND CAP AFFIXED TO THE STEAMER CONNECTION. THE 2.5" CONNECTIONS MUST BE NH THREAD. A BLUE REFLECTIVE MARKER SHALL BE AFFIXED TO THE ROADWAY DIRECTLY IN LINE WITH THE HYDRANT IN ORDER TO IDENTIFY THE LOCATION OF EACH HYDRANT.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COORDINATION BETWEEN HIMSELF/HERSELF AND OTHER CONTRACTORS AND UTILITIES IN THE VICINITY OF THE PROJECT. THIS INCLUDES GAS, WASTEWATER, WATER, ELECTRICAL, TELEPHONE, CABLE TV, AND STREET DRAINAGE WORK. ONCE THE CONTRACTOR BECOMES AWARE OF A POSSIBLE CONFLICT, IT IS THE CONTRACTORS RESPONSIBILITY TO NOTIFY THE ENGINEER WITHIN TWENTY-FOUR (24) HOURS.
5. WATER LINE TESTING AND DISINFECTION SHALL BE IN ACCORDANCE WITH AWWA STANDARD AND TCEQ.
6. ALL MECHANICAL JOINT RESTRAINTS SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS INSTRUCTIONS.
7. WHERE WATER LINES AND NEW SEWER LINE ARE INSTALLED WITH A SEPARATION DISTANCE CLOSER THAN NINE FEET (I.E., WATER LINES CROSSING WASTEWATER LINES, WATER LINES PARALLELING WASTEWATER LINES, OR WATER LINES NEXT TO MANHOLES) THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30 TAC §217.53(d (PIPE DESIGN) AND 30 TAC §290.44(e) (WATER DISTRIBUTION).
8. PIPE MATERIAL FOR WATER MAINS SHALL BE PVC (AWWA C-900 MIN. CLASS 200), OR DUCTILE IRON (AWWA C-100 MIN. CLASS 250). WATER SERVICES (2" OR LESS) SHALL BE POLYETHYLENE TUBING (BLACK, 200 psi, SDR-9).
9. ALL FIRE HYDRANTS SHALL BE OF THE SAME MANUFACTURER AND IN ACCORDANCE WITH ITEM 17 OF GENERAL CONSTRUCTION NOTES OF DSWSC DATED OCTOBER 2018.
10. ALL IRON PIPE AND FITTINGS SHALL BE WRAPPED WITH MINIMUM 8-MIL POLYETHYLENE.
11. THE CONTRACTOR SHALL CONTACT THE DRIPPING SPRINGS WATER SUPPLY CORPORATION AT 512-858-7897 AT LEAST 48 HOURS PRIOR TO CONNECTING TO EXISTING WATER LINES.
12. THE CONTRACTOR MUST OBTAIN A BULK WATER PERMIT OR PURCHASE AND INSTALL A WATER METER FOR ALL WATER USED DURING CONSTRUCTION. A COPY OF THIS PERMIT MUST BE CARRIED AT ALL TIMES BY ALL WHO USE WATER.
13. LINE FLUSHING OR ANY ACTIVITY USING A LARGE QUANTITY OF WATER MUST BE SCHEDULED WITH THE DSWSC REPRESENTATIVE AT 512-858-7897.
14. THE CONTRACTOR, AT HIS EXPENSE, SHALL PERFORM DISINFECTION OF ALL POTABLE WATER LINES CONSTRUCTED AND SHALL PROVIDE ALL EQUIPMENT (INCLUDING TEST GAUGES), SUPPLIES (INCLUDING CONCENTRATED CHLORINE DISINFECTING MATERIAL), AND NECESSARY LABOR REQUIRED FOR THE DISINFECTION PROCEDURE. THE DISINFECTION PROCEDURE SHALL BE MONITORED BY THE DSWSC PERSONNEL. WATER SAMPLES WILL BE COLLECTED BY THE DSWSC TO VERIFY EACH TREATED LINE HAS ATTAINED AN INITIAL CHLORINE CONCENTRATION OF 50 ppm. WHERE MEANS OF FLUSHING IS NECESSARY, THE CONTRACTOR, AT HIS EXPENSE, SHALL PROVIDE FLUSHING DEVICES AND REMOVE SAID DEVICES PRIOR TO FINAL ACCEPTANCE BY THE DSWSC. ALL FLUSHING MUST BE COORDINATED WITH THE DSWSC.
15. SAMPLING TAPS SHALL BE BROUGHT UP TO 3 FEET ABOVE GRADE AND SHALL BE EASILY ACCESSIBLE FOR DSWSC PERSONNEL. AT THE CONTRACTOR'S REQUEST, AND IN HIS PRESENCE, SAMPLES FOR BACTERIOLOGICAL TESTING WILL BE COLLECTED BY THE DSWSC NOT LESS THAN 24 HOURS AFTER THE TREATED LINE HAS BEEN FLUSHED OF THE CONCENTRATED CHLORINE SOLUTION AND CHARGED WITH WATER APPROVED BY THE DSWSC. THE CONTRACTOR SHALL SUPPLY A CHECK OR MONEY ORDER, PAYABLE TO THE TEXAS DEPARTMENT OF HEALTH, TO COVER THE FEE CHARGED FOR TESTING EACH WATER SAMPLE.
16. A QUALIFIED LAB SHALL PERFORM TESTING FOR ALL WASTEWATER PIPE INSTALLED AND PRESSURE PIPE HYDROSTATIC TESTING OF ALL WATER LINES CONSTRUCTED AT THE OWNER'S EXPENSE. THE OWNERS CONTRACTOR SHALL PROVIDE ALL EQUIPMENT (INCLUDING PUMPS AND GAUGES), SUPPLIES AND LABOR NECESSARY TO PERFORM THE TESTS. THE CONTRACTOR SHALL NOTIFY DSWSC NO LESS THAN 48 HOURS PRIOR TO PERFORMING STERILIZATION, QUALITY TESTING OR PRESSURE TESTING. A DSWSC INSPECTOR MUST BE PRESENT FOR ALL TESTS.
17. THE CONTRACTOR SHALL NOT OPEN OR CLOSE ANY VALVES UNLESS AUTHORIZED BY THE DSWSC.
18. ALL VALVE BOXES AND COVERS SHALL BE CAST IRON.
19. ALL WATER SERVICE, WASTEWATER SERVICE AND VALVE LOCATIONS SHALL BY APPROPRIATELY MARKED AS FOLLOWS:

WATER SERVICE	"W" ON TOP OF CURB
WASTEWATER SERVICE	"S" ON TOP OF CURB
VALVE	"V" ON TOP OF CURB

    TOOLS FOR MARKING THE CURB SHALL BE PROVIDED BY THE CONTRACTOR, OTHER APPROPRIATE MEANS OF MARKING SERVICE AND VALVE LOCATIONS SHALL BE PROVIDED IN AREAS WITHOUT CURBS. SUCH MEANS OF MARKING SHALL BE SPECIFIED BY THE ENGINEER AND ACCEPTED BY THE CITY OF DRIPPING SPRINGS.
20. SAND, AS DESCRIBED IN SPECIFICATION ITEM 510 PIPE, SHALL NOT BE USED AS BEDDING FOR WATER AND WASTEWATER LINES. ACCEPTABLE PIPE EMBEDMENT MATERIAL SHALL BE AS STIPULATED IN ITEM 16 OF DSWSC CONSTRUCTION NOTES DATED OCTOBER 2018.
21. THE CONTRACTOR IS HEREBY NOTIFIED THAT CONNECTING TO, SHUTTING DOWN, OR TERMINATING EXISTING UTILITY LINES MAY HAVE TO OCCUR AT OFF-PEAK HOURS. SUCH HOURS ARE USUALLY OUTSIDE NORMAL WORKING HOURS AND POSSIBLY BETWEEN 12 MIDNIGHT AND 6 AM.

TRENCH SAFETY NOTES:

1. IN ACCORDANCE WITH THE LAWS OF THE STATE OF TEXAS AND THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS, ALL TRENCHES OVER 5 FEET IN DEPTH SHALL ALSO BE EFFECTIVELY PROTECTED WHEN HAZARDOUS GROUND MOVEMENT MAY BE EXPECTED. TRENCH SAFETY SYSTEMS TO BE UTILIZED FOR THIS PROJECT ARE DESCRIBED IN ITEM 509S "TRENCH SAFETY SYSTEMS" OF THE CITY OF AUSTIN STANDARD SPECIFICATIONS..
2. IN ACCORDANCE WITH THE U.S. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION REGULATIONS, WHEN EMPLOYEES ARE REQUIRED TO BE IN TRENCHES 4 FEET DEEP OR MORE, ADEQUATE MEANS OF EXIT, SUCH AS A LADDER OR STEPS MUST BE PROVIDED AND LOCATED SO AS TO REQUIRE NO MORE THAN 25' OF LATERAL TRAVEL.

GRADING NOTES:

1. CHANNEL DRAINAGE SLOPES SHALL BE NO STEEPER THAN 3:1 UNLESS OTHERWISE NOTED.
2. POSITIVE DRAINAGE SHALL BE MAINTAINED ON ALL SURFACE AREAS WITHIN THE SCOPE OF THIS PROJECT. CONTRACTOR SHOULD TAKE PRECAUTIONS NOT TO ALLOW ANY PONDING OF WATER.
3. CONTRACTOR SHALL IMMEDIATELY NOTIFY THE ENGINEER OF ANY QUESTIONS THAT MAY ARISE CONCERNING THE INTENT, PLACEMENT, OR LIMITS OF DIMENSIONS OR GRADES NECESSARY FOR THE CONSTRUCTION OF THIS PROJECT.
4. THE CONTRACTOR SHALL CONSTRUCT EARTHEN EMBANKMENTS WITH SLOPES NO STEEPER THAN 3:1 AND NOT FLATTER THAN 2% AND COMPACT SOIL TO 95% OF MAXIMUM DENSITY IN ACCORDANCE WITH THE CITY OF AUSTIN STANDARD SPECIFICATIONS, ITEM 132.

SPECIFICATIONS:

THE FOLLOWING REFERENCED SPECIFICATION REQUIREMENTS SHALL APPLY TO THIS PROJECT CONSTRUCTED WITHIN THE CITY OF DRIPPING SPRINGS PER THE DRIPPING SPRINGS TECHNICAL CRITERIA MANUAL (DSTC) AS SHOWN IN CODE OF ORDINANCES CHAPTER 28, EXHIBIT C SECTION 1. THE CITY REQUIRES THE USE OF THE CITY OF AUSTIN (COA) STANDARD SPECIFICATIONS WHEN REQUIREMENTS ARE NOT SHOWN IN THE HAYS COUNTY TECHNICAL CRITERIA. WATER AND WASTEWATER SHALL BE PER PROVIDER REQUIREMENTS. WORK WITHIN STREET R.O.W. OR CITY EASEMENTS SHALL FOLLOW, HAYS COUNTY SPECIFICATION FOR ROADWAY DESIGN, PAVING AND DRAINAGE IMPROVEMENTS. IF WORK IS WITHIN THE TEXAS DEPARTMENT FOR TRANSPORTATION (TXDOT) R.O.W. THOSE IMPROVEMENTS SHALL FOLLOW TXDOT STANDARD SPECIFICATIONS FOR CONSTRUCTION.

ALL WATER LINE INSTALLATIONS SHALL BE PER REQUIREMENTS OF THE DRIPPING SPRINGS WATER SUPPLY CORP. AND DETAILS.

ALL WASTEWATER LINE INSTALLATIONS SHALL BE PER CITY OF DRIPPING SPRINGS REQUIREMENTS AND DETAILS.
ALL REFERENCES TO THE CITY OF AUSTIN (AS REFERENCED IN THE COA STANDARD SPECIFICATIONS) SHALL BE DISREGARDED, AS THE CITY OF AUSTIN IS NOT A PARTY TO THIS CONTRACT. WHERE APPROPRIATE, "OWNER", CAN BE USED IN PLACE OF "CITY OF AUSTIN" FOR ONSITE INSTALLATIONS.
ALL REFERENCES TO "MEASUREMENT AND PAYMENT" IN THE STANDARD SPECIFICATIONS SHALL BE DISREGARDED AND WORK SHALL BE INCLUDED IN THE PROPOSED LUM SUM AMOUNT BID.
THIS PROJECT IS BEING BID LUMP SUM. ALL WORK DEPICTED IN THE PLANS AND CONTRACT DOCUMENTS SHALL BE INCLUDED IN THE SPECIFICATION ITEMS LISTED BELOW WITH THE EXCEPTION OF ITEMS THAT ARE EXPLICITLY EXCLUDED. ANY WORK THAT IS INCIDENTAL TO AN ITEM OR THE GENERAL WORK OF THE CONTRACT WHICH IS NOT SPECIFICALLY DESCRIBED OR INCLUDED IN THE LUMP SUM ITEM, BUT WHICH IS REQUIRED FOR PERFORMANCE AND COMPLETION OF THE WORK REQUIRED UNDER THE CONTRACT, SHALL ALSO BE INCLUDED IN HIS PROJECT WITHIN THE LUMP SUM BID.
ALL REFERENCES TO THE DEPARTMENT IN THE TXDOT STANDARD SPECIFICATIONS SHALL BE DISREGARDED, AS THE TXDOT IS NOT A PARTY TO THIS CONTRACT. WHERE APPROPRIATE, "CITY OF DRIPPING SPRINGS OR OWNER", CAN BE USED IN PLACE OF "DEPARTMENT" DEPENDING ON LOCATION.
WHERE PHRASES IN THE SPECIFICATIONS SUCH AS "AS DIRECTED BY" OR "TO THE SATISFACTION OF THE DIRECTOR OR ENGINEER" OCCUR, IT IS TO BE UNDERSTOOD THAT REQUIREMENTS, ORDERS OR INSTRUCTIONS TO WHICH THEY RELATE ARE WITHIN LIMITATIONS OF AND AUTHORIZED BY THE OWNER/DEVELOPER AND THE CITY OF DRIPPING SPRINGS IF APPLICABLE. WHERE REFERENCE IS MADE TO SPECIFICATIONS OF ASTM, AASHTO, TXDOT, WATER AND WASTEWATER STANDARD PRODUCTS LIST, ETC., IT SHALL MEAN THE LATEST STANDARD (UNLESS OTHERWISE SHOWN IN DETAIL) OR TENTATIVE STANDARD IN EFFECT ON THE DATE OF THE PERMIT AUTHORIZING CONSTRUCTION, UNLESS ANOTHER DATE APPLIES PURSUANT TO STATE STATUTES.

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GENERAL NOTES

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E.. TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
LICENSED PROFESSIONAL ENGINEER
6-17-25

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

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OF 33

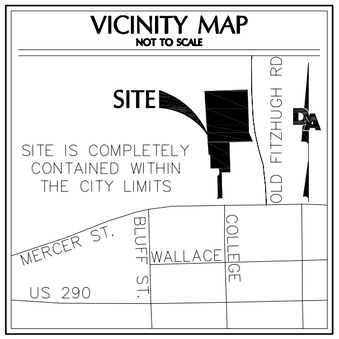
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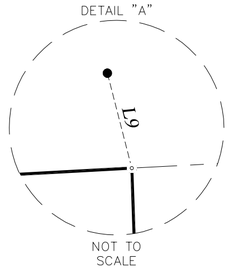
MINOR PLAT OF STEPHENSON CIVIC DISTRICT
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

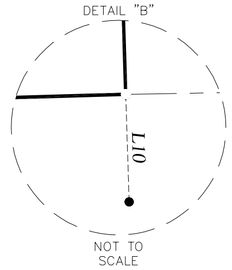
VICINITY MAP
NOT TO SCALE



LINE TABLE		
LINE	BEARING	DISTANCE
L1	N36°38'01"E	15.96'
L2	N02°08'28"W	27.48'
L3	S88°26'48"W	39.41'
L4	S88°12'01"W	7.26'
L5	S88°35'41"W	40.04'
L6	S02°08'28"E	20.01'
L7	S87°33'23"W	0.48'
L8	S88°22'50"W	19.99'
L9	S75°35'30"W	1.94'
L10	N88°09'23"E	1.23'

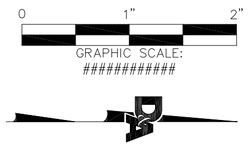
RECORD LINE TABLE		
LINE	BEARING	DISTANCE
(L1)	N38°35'E	16.12'
(L2)	N00°14'E	27.49'
(L3)	S88°53'07"W	N/A
(L4)	S88°36'50"W	7.26'
(L5)	S89°00'15"W	39.96'
(L6)	S00°14'W	N/A
(L7)	S89°30'W	0.48'
(L8)	S89°30'W	20.00'





LEGEND

	PROPERTY LINE
	EXISTING PROPERTY LINE
	ADJOINER PROPERTY LINE
	PROPOSED EASEMENT [AS NOTED]
●	1/2" IRON ROD FOUND [UNLESS NOTED]
○	1/2" IRON PIPE FOUND
▲	"MAG" NAIL IN DRIVEWAY FOUND
	1/2" IRON ROD WITH "DOUCET" CAP SET
⊗	COTTON SPINDLE FOUND
	HAYS COUNTY BENCHMARK
P.O.B.	POINT OF BEGINNING
DOC. NO.	DOCUMENT NUMBER
VOL.	VOLUME
PG.	PAGE
R.O.W.	RIGHT-OF-WAY
R.P.R.H.C.T.	REAL PROPERTY RECORDS, HAYS COUNTY, TEXAS
O.P.R.H.C.T.	OFFICIAL PUBLIC RECORDS, HAYS COUNTY, TEXAS
D.R.H.C.T.	DEED RECORDS, HAYS COUNTY, TEXAS
P.R.H.C.T.	PLAT RECORDS, HAYS COUNTY, TEXAS
(.....)	RECORD INFORMATION



HAYS COUNTY MONUMENT #56 (GRID)
N=13,981171.35'
E=2,251,337.88'
ELEV.=1,146.25'

S75°11'20"W 4,864.08'

PARCEL ID: 26703
ASPEN LEAF PROPERTIES LLC
LOTS 5, 6, 7, AND 8, BLOCK 7, ORIGINAL TOWN OF DRIPPING SPRINGS
DOC. NO. 21043085
O.P.R.H.C.T.

DESCRIBED IN:
VOL. 0, PG. 513
D.R.H.C.T.

POINT OF BEGINNING
GRID COORDINATES:
N=13,982,414.66
E=2,256,039.97

PARCEL ID: 26678
SUSAN H. MCFARLAND, ET AL
(NO ACREAGE GIVEN)
VOL. 296, PG. 800
D.R.H.C.T.

PARCEL ID: 168897
VINTAGE HAVEN LLC
UNIT 4
SPRINGS PROVISIONS
PLAZA CONDOMINIUMS
DOC. NO. 22018771
O.P.R.H.C.T.

PARCEL ID: 23565
CARTER CORE FUND I, LP
CALLED 0.76 ACRE
DOC. NO. 18008098
O.P.R.H.C.T.

DESCRIBED IN:
DOC. NO. 16008039
O.P.R.H.C.T.

PARCEL ID: 23572
RICHARD R. GARZA, ET AL
CALLED 1.02 ACRE
DOC. NO. 24009200
O.P.R.H.C.T.

EAST LINE DESCRIBED IN:
VOL. 775, PG. 822
R.P.R.H.C.T.

(N00°14'E 100.00')
N01°42'37"W 100.00'
L8 (L8)
20' P.U.E. (BY PLAT)
5/8" "STAUDT"
(L1) L1
(L2) L2
L3 (L3)
(L4) L4
(N01°21'58"W 63.78')
N01°41'34"W 63.85'
(N03°19'50"W 56.56')
N04°03'12"W 56.41'
(N03°18'30"W 79.90')
N03°45'02"W 79.79'
39.98'
39.81'
(N3°42'23"W 80.12')
N03°42'23"W 80.12'
(N02°46'40"W 80.26')
N03°09'16"W 79.93'
WITH 1/4" IRON ROD IN CENTER
SEE DETAIL "A"

5/8" UNDER CURB
S01°42'37"E 100.00'
(S00°14'W 100.00')
L7 (L7)
L6 (L6)
3/4"
4.02'
L5 (L5)
36.03'
(LEANING)
S01°29'28"E 140.09'
(S01°02'39"E 140.08')
N76°01'22"E 58.38'
CP1 (OPUS)
S88°33'13"W 108.62'
(S88°57'21"W 108.60')

PARCEL ID: 144738
CITY OF DRIPPING SPRINGS
CALLED 0.0569 ACRES
DOC. NO. 24008706
O.P.R.H.C.T.

DESCRIBED IN:
VOL. 278, PG. 277
D.R.H.C.T.

PARCEL ID: 23573
TRACT ONE (1)
CALLED 0.4659 ACRES
VOL. 3772, PG. 776
DOC. NO. 90029788
O.P.R.H.C.T.

1.4289 ACRES
LOT 1, BLOCK 1

PARCEL ID: 23574
TRACT TWO (2)
CALLED 0.4456 ACRES
VOL. 3772, PG. 776
DOC. NO. 90029788
O.P.R.H.C.T.

55' R.O.W. RESERVATION (BY PLAT)

CITY OF DRIPPING SPRINGS
CALLED 1.3712 ACRES
DOC. NO. 90029788
O.P.R.H.C.T.

"CUNNINGHAM ALLEN INC"

PARCEL ID: 60325
TRACT THREE (3)
CALLED 0.4597 ACRES
VOL. 3772, PG. 776
DOC. NO. 90029788
O.P.R.H.C.T.

20' DRAINAGE EASEMENT (BY PLAT)

(N88°32'36"E 100.05')
N88°01'42"E 99.97'
(N88°40'58"E 100.23')
N88°18'33"E 100.42'

PARCEL ID: 17921
215 OLD FITZHUGH LIMITED PARTNERSHIP
TRACT 2
CALLED 1.285 ACRES
DOC. NO. 16014703
O.P.R.H.C.T.

SEE DETAIL "B"

(IN CHINABERRY)
S01°37'27"E 199.75'
(S01°10'06"E 199.94')
S23°17'14"E 44.44'
(S23°02'05"E 44.29')

MERCER STREET
(75' WIDE R.O.W.)
BOOK T, PG. 426
P.R.H.C.T.

PARCEL ID: 26694
CHARLES W. HAYDON AND SHERRY E. HAYDON
SECOND TRACT
CALLED 0.6844 ACRE
DOC. NO. 18024191
O.P.R.H.C.T.

PARCEL ID: 168894
BEAST PROPERTIES, LLC
UNIT 1
SPRINGS PROVISIONS
PLAZA CONDOMINIUMS
DOC. NO. 20025732
O.P.R.H.C.T.

PHILIP A. SMITH SURVEY NO. 26
ABSTRACT NO. 415

PARCEL ID: 62387
RAMBO LODGE
NUMBER 426, AF&AM
(NO CALLED ACREAGE)
VOL. 154, PG. 1
D.R.H.C.T.

OLD FITZHUGH ROAD
(VARIABLE WIDTH R.O.W.)
(NO RECORDING INFO FOUND)

PARCEL ID: 23566
MERCER STREET HOLDINGS, LLC
LOTS 1 AND 2 AND A PORTION OF LOT 3, BLOCK 2
W.T. CHAPMAN'S FIRST ADDITION
DOC. NO. 16035261
O.P.R.H.C.T.

DESCRIBED IN:
VOL. P, PG. 372
D.R.H.C.T.

PARCEL ID: 23575
WEETON PROPERTIES, LLC
CALLED 0.443 ACRE
DOC. NO. 15038080
O.P.R.H.C.T.

PARCEL ID: 23576
JOHN SCOTT, JR., JANIE SCOTT, AND JESSIE SCOTT
TRACT 2
DOC. NO. 20033912
O.P.R.H.C.T.

DESCRIBED IN:
VOL. R, PG. 337
VOL. T, PG. 426
D.R.H.C.T.

PARCEL ID: 91736
KATHY ANN HUEY GREEN AND ROBERT GREEN
LOT 2, CLARENCE T. SHELTON SUBDIVISION
DOC. NO. 18035683
O.P.R.H.C.T.

DESCRIBED IN:
BOOK 8, PG. 195
P.R.H.C.T.

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W, Ste. 160
Austin, TX 78735, Tel: (512)-583-2600
www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10194551

Date:	03/12/2025
Scale:	1" = 30'
Drawn by:	JWF
Reviewer:	BSS
Project:	25002582.001A
Sheet:	1 OF 2
Field Book:	558
Party Chief:	BSS
Survey Date:	04/18/2024

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MINOR PLAT OF STEPHENSON CIVIC DISTRICT
CITY OF DRIPPING SPRINGS, HAYS COUNTY, TEXAS

OWNER'S ACKNOWLEDGMENT:
STATE OF TEXAS }
CITY OF DRIPPING SPRINGS }
HAYS COUNTY, TEXAS }

KNOW ALL ME BY THESE PRESENTS:

THAT THE CITY OF DRIPPING SPRINGS, TEXAS, BEING THE OWNER OF 1.4289 ACRES IN THE PHILIP A. SMITH SURVEY NUMBER 26, ABSTRACT NUMBER 415, HAYS COUNTY, TEXAS, BEING COMPRISED OF FOUR (4) SEPARATE TRACTS: TRACT ONE: DESCRIBED AS TRACT ONE (1), A 0.4659 ACRE TRACT; TRACT TWO: DESCRIBED AS TRACT TWO (2), A 0.4456 ACRE TRACT; TRACT THREE: DESCRIBED AS TRACT THREE (3), A 0.4597 ACRE TRACT, ALL CONVEYED IN VOLUME 3772, PAGE 775 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS; AND TRACT FOUR: DESCRIBED AS A 0.0569 ACRE TRACT, CONVEYED IN DOCUMENT NUMBER 24008706 OF THE OFFICIAL PUBLIC RECORDS OF HAYS COUNTY, TEXAS;

DO HEREBY SUBDIVIDE 1.4289 ACRES IN ACCORDANCE WITH THE MAP OR PLAT ATTACHED HERETO, TO BE KNOWN AS

MINOR PLAT OF STEPHENSON CIVIC DISTRICT

SUBJECT TO ANY EASEMENTS AND/OR RESTRICTIONS HERETOFORE GRANTED AND NOT RELEASED, AND DO HEREBY DEDICATE TO THE PUBLIC USE OF THE STREETS AND EASEMENTS SHOWN HEREON.

WITNESS MY HAND THIS THE _____ DAY OF _____ A.D. 2024.

_____
CITY OF DRIPPING SPRINGS, TEXAS

THE STATE OF TEXAS }
THE COUNTY OF HAYS }

BEFORE ME, THE UNDERSIGNED AUTHORITY, A NOTARY PUBLIC IN AND FOR SAID COUNTY AND THE STATE, ON THIS DAY PERSONALLY APPEARED _____ KNOWN TO ME TO BE THE PERSON WHOSE NAME IS SUBSCRIBED TO THE FOREGOING INSTRUMENT AND HE ACKNOWLEDGED TO ME THAT HE EXECUTED THE SAME FOR THE PURPOSES AND CONSIDERATIONS THEREIN EXPRESSED.
GIVEN UNDER MY HAND AND SEAL OF OFFICE, THIS THE _____ DAY OF _____ A.D. 2024.

_____
NOTARY PUBLIC IN AND FOR HAYS COUNTY, TEXAS

STATE OF TEXAS }
CITY OF DRIPPING SPRINGS }
HAYS COUNTY, TEXAS }

I, ELAINE HANSON CARDENAS, COUNTY CLERK OF HAYS COUNTY, TEXAS, DO HEREBY CERTIFY THAT THE FOREGOING INSTRUMENT OF WRITING WITH ITS CERTIFICATE OF AUTHENTICATION WAS FILED FOR RECORD IN MY OFFICE ON THE _____ DAY OF _____, 20__, A.D. AT _____ O'CLOCK _____M., AND DULY RECORDED ON THE _____ DAY OF _____, 20__, A.D. AT _____ O'CLOCK _____M., IN THE PLAT RECORDS OF HAYS COUNTY, TEXAS IN INSTRUMENT NUMBER _____.

WITNESS MY HAND AND SEAL OF OFFICE, THIS THE _____ DAY OF _____, 20__, A.D.

_____
ELAINE HANSON CARDENAS, MBA, PHD, COUNTY CLERK
HAYS COUNTY, TEXAS

STATE OF TEXAS }
CITY OF DRIPPING SPRINGS }
HAYS COUNTY, TEXAS }

THIS SUBDIVISION HAS BEEN APPROVED BY THE CITY OF DRIPPING SPRINGS ON THE _____ DAY OF _____, 2024.

_____
TORY CARPENTER, PLANNING DIRECTOR

_____
CHAD GILPIN, P.E. – CITY ENGINEER

_____
WATER SERVICE PROVIDER

_____
WASTEWATER SERVICE PROVIDER

ENGINEER:
DOUCET AND ASSOCIATES
7401 B HIGHWAY 71 WEST, SUITE 160
AUSTIN, TX 78735

SURVEYOR:
DOUCET AND ASSOCIATES
7401 B HIGHWAY 71 WEST, SUITE 160
AUSTIN, TX 78735

UTILITY PROVIDERS:
WATER: DRIPPING SPRINGS WATER SUPPLY CORPORATION (DSWSC)

WASTEWATER: CITY OF DRIPPING SPRINGS

ELECTRIC: PEDERNALES ELECTRIC COOPERATIVE (P.E.C.)

GAS: TEXAS GAS SERVICE

EMERGENCY SERVICES: HAYS COUNTY ESD #1 & #6

SCHOOL DISTRICT: DRIPPING SPRINGS ISD

FINAL PLAT NOTES:

1. THIS FINAL PLAT IS LOCATED WITHIN THE CITY OF DRIPPING SPRINGS CITY LIMITS.
2. THIS PLAT LIES WITHIN THE BOUNDARIES OF THE EDWARDS AQUIFER CONTRIBUTING ZONE.
3. NO PORTION OF THIS PLAT LIES WITHIN THE BOUNDARIES OF THE EDWARDS AQUIFER RECHARGE ZONE.
4. THIS PLAT IS LOCATED WITHIN THE DRIPPING SPRINGS INDEPENDENT SCHOOL DISTRICT.
5. NO PORTION OF THIS PROPERTY IS LOCATED WITHIN A DESIGNATED 100 YEAR FLOOD PLAIN AS DELINEATED ON MAP NUMBER 48209C0105F, DATED SEPTEMBER 02, 2005, AS PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY.
6. WATER SERVICE WILL BE PROVIDED TO EACH LOT BY THE DRIPPING SPRINGS WATER SUPPLY CORPORATION.
7. ORGANIZED WASTEWATER SERVICE WILL BE PROVIDED TO EACH LOT BY THE CITY OF DRIPPING SPRINGS.
8. ELECTRIC SERVICE WILL BE PROVIDED BY THE PEDERNALES ELECTRIC COOPERATIVE.
9. GAS SERVICE WILL BE PROVIDED BY TEXAS GAS SERVICE.
10. NO STRUCTURE IN THIS SUBDIVISION SHALL BE OCCUPIED UNTIL CONNECTED TO A STATE–APPROVED COMMUNITY WATER SYSTEM.
11. NO STRUCTURE IN THIS SUBDIVISION SHALL BE OCCUPIED UNTIL CONNECTED TO A STATE–APPROVED ORGANIZED WASTEWATER SYSTEM.
12. NO CONSTRUCTION OR OTHER DEVELOPMENT WITHIN THIS SUBDIVISION MAY BEGIN UNTIL ALL DEVELOPMENT AUTHORIZATION REQUIREMENTS HAVE BEEN SATISFIED ACCORDING TO THE CITY OF DRIPPING SPRINGS.
13. NO STRUCTURE SHALL BE OCCUPIED UNTIL A CERTIFICATE OF OCCUPANCY IS ISSUED BY THE CITY OF DRIPPING SPRINGS.
14. IN ORDER TO PROMOTE SAFE USE OF ROADWAYS AND TO PRESERVE THE CONDITIONS OF PUBLIC ROADWAYS, NO DRIVEWAY CONSTRUCTED ON ANY LOT WITHIN THIS SUBDIVISION SHALL BE PERMITTED ACCESS ONTO A PUBLIC ROADWAY UNLESS (A) A PERMIT FOR USE OF THE CITY RIGHT–OF–WAY HAS BEEN ISSUED.
15. NO OBJECTS, INCLUDING BUT NOT LIMITED TO BUILDINGS, FENCES, OR LANDSCAPING, THAT OBSTRUCT OR LIMIT FLOW SHALL BE ALLOWED IN A DRAINAGE EASEMENT.
16. THE PROPERTY OWNER SHALL PROVIDE ACCESS TO DRAINAGE AND UTILITY EASEMENTS AS MAY BE NECESSARY AND SHALL NOT PROHIBIT ACCESS FOR INSPECTION, OPERATION AND MAINTENANCE.

ENGINEER'S CERTIFICATION:
STATE OF TEXAS }
HAYS COUNTY, TEXAS }

I, JOE GRASSO, THE UNDERSIGNED, A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF TEXAS, HEREBY CERTIFY THAT THE PLAT AND ALL PLANS AND SPECIFICATIONS WHICH ARE INCLUDED WITH THE PLAT ARE, TO THE BEST OF MY PROFESSIONAL CAPACITY, COMPLETE AND ACCURATE AND IN COMPLIANCE WITH ALL RELEVANT CITY ORDINANCES, CODES, PLANS, AND RELEVANT STATE STANDARDS.

_____
JOE GRASSO, P.E. DATE
TEXAS REGISTRATION NO. 73285
DOUCET, A KLEINFELDER COMPANY
7401B HIGHWAY 71 WEST, SUITE 160
AUSTIN, TEXAS 78735

SURVEYOR'S CERTIFICATION:
STATE OF TEXAS }
CITY OF DRIPPING SPRINGS }
HAYS COUNTY, TEXAS }

KNOW BY ALL MEN THESE PRESENTS:
THAT I, THE UNDERSIGNED, A REGISTERED PROFESSIONAL LAND SURVEYOR (R.P.L.S.) IN THE STATE OF TEXAS, HEREBY CERTIFY THAT THIS PLAT COMPLIES WITH THE SURVEY RELATED REQUIREMENTS OF THE CITY OF DRIPPING SPRINGS, TEXAS AND FURTHER CERTIFY THAT THIS PLAT IS TRUE AND CORRECTLY MADE AND IS PREPARED FROM AN ACTUAL SURVEY OF THE PROPERTY MADE UNDER MY SUPERVISION ON THE GROUND THAT THE CORNER MONUMENTS WERE PROPERLY PLACED UNDER MY SUPERVISION.

_____
JOSHUA P. ARMENDARIZ, R.P.L.S. DATE
TEXAS REGISTRATION NO. 6822
DOUCET, A KLEINFELDER COMPANY
7401B HIGHWAY 71 WEST, SUITE 160
AUSTIN, TEXAS 78735
JARMENDARIZ@KLEINFELDER.COM

SURVEYORS NOTES:
COORDINATES AND BEARINGS SHOWN HEREON ARE BASED ON THE TEXAS COORDINATE SYSTEM, SOUTH CENTRAL ZONE [4204], NAD83 (2011), EPOCH 2010. ALL COORDINATE VALUES AND DISTANCES SHOWN ARE SURFACE VALUES AND MAY BE CONVERTED TO GRID BY DIVIDING BY THE SURFACE ADJUSTMENT FACTOR OF 1.00008 AND USING CP1 (OPUS) (SHOWN HEREON) AS THE ORIGIN POINT.
US SURVEY FEET.

CP1 (OPUS)
N=13,982,550.27'
E=2,256,153.37'

THE AREA CALCULATIONS SHOWN ARE CONVERTED FROM SQUARE FOOTAGE AND ARE NOTED FOR INFORMATIONAL PURPOSES ONLY. THIS SURVEY DOES NOT IDENTIFY OR DELINEATE ANY SURFACE OR SUBSURFACE MINERAL RIGHTS, NOR DOES IT IDENTIFY ANY RIGHTS TO THE SURFACE RESULTING FROM SAID MINERAL RIGHTS.

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W, Ste. 160
Austin, TX 78735, Tel: (512)-583-2600
www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10194551

Date:	03/12/2025
Scale:	N/A
Drawn by:	JWF
Reviewer:	BSS
Project:	25002582.001A
Sheet:	2 OF 2
Field Book:	558
Party Chief:	BSS
Survey Date:	04/18/202

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PHILIP A. SMITH
SURVEY NO. 26
ABSTRACT NO. 415

CALLED 1.285 ACRES
VOL. 1328, PG. 48
O.P.R.H.C.T.

N88°01'42"E 99.97'

N88°18'33"E 100.42'

3004

5' B.S.L.

3005

CONCRETE PLANTER

10' B.S.L.

N03°09'16"W 79.93'

BOUNDARY LINE AGREEMENT BY RICHARD A. GARZA & D.S.I.S.D. VOL. 775, PG. 822 O.P.R.H.C.T.

N03°42'23"W 80.12'

3003

3002

3001

S01°37'27"E 199.75'

OLD FITZHUGH ROAD
(VARIABLE WIDTH R.O.W.)
(NO RECORDING INFO FOUND)
(ASPHALT)

LOT 1, BLOCK 1
1.4289 ACRES
CITY OF DRIPPING SPRINGS
VOL. 3772, PG. 775
O.P.R.H.C.T.

N03°45'02"W 79.79'

3000

L37

S23°17'14"E 44.44'

STONE BLDG

ABOVE GROUND PROPANE TANK

CONCRETE PAD

ASPHALT DRIVEWAY

5' B.S.L.

S88°33'13"W 108.62'

CALLED 1.02 ACRES
VOL. 1403, PG. 780
O.P.R.H.C.T.

ABOVE GROUND WATER TANK

CONCRETE SIDEWALK

VISITORS PARKING

1-STORY STONE BUILDING FFE=1162.25

N04°03'12"W 56.41'

3006

FLAG POLE

CONCRETE HANDICAPPED RAMP

VISITORS PARKING

CONCRETE STEPS

CALLED 0.76 ACRE
DOC. NO. 16008039
O.P.R.H.C.T.

L52

S88°03'34"W 63.83'

1-STORY METAL BUILDING

CONCRETE STEPS

N01°41'34"E 63.83'

GRAVEL DRIVEWAY
10' B.S.L.

1160

ELECTRICAL CONDUITS

L51

DECK

RAMP

1-STORY STUCCO BUILDING

L50

STEPS

L49

L36

4.02'

5' B.S.L.

36.03'

L53

5/8"

L54

CG

L55

REMAINDER OF A 20' ALLEY

4-PARKING BOLLARDS

N76°01'22"E 58.38'

L34

3000
160.20
BM=SQ CUT SET VRS

CALLED 0.0350 ACRE
PARCEL 1
DOC. NO. 18025301

CALLED 0.4823 ACRE
DOC. NO. 18025301

P

ABOVE GROUND PROPANE TANK

ELEVATED STAIRS

ELEVATED DECK

2-STORY STONE BUILDING

RAMBO LODGE NO. 426
VOL. 154, PG. 1
D.R.H.C.T.

S01°29'28"E 140.09'

ELEVATED STAIRS

SIGN

BENCH

FLAG POLE

TREE TABLE				
NUMBER	SIZE(IN)	SPECIES	CRZ(FT)	MT(IN)
3000	17"	CHINABERRY (M)	34'	9 7 7
3001	37"	TALLOW (M)	74'	21 20 11
3002	48"	CATALPA (M)	96'	17 17 14 13 11 10
3003	28"	LIVE OAK	56'	
3004	12"	HACKBERRY (M)	24'	8 8
3005	14"	HACKBERRY (M)	28'	10 7
3006	16"	HACKBERRY	32'	
3010	7"	PECAN	14'	

10 0 5 10 20
(IN FEET)
GRAPHIC SCALE 1"=20'

LEGEND

- PROPERTY LINE
- WATER QUALITY
- UTILITY EASEMENT
- BUILDING SETBACK LINE
- WASTEWATER LINE
- WATER LINE
- GAS LINE
- FIBER OPTIC CABLE
- WIRE FENCE
- OVERHEAD ELECTRIC
- EDGE OF PAVEMENT
- WATER VALVE
- WATER METER
- WASTEWATER MANHOLE
- WATER MANHOLE
- TRAFFIC SIGN
- POWER POLE
- DOWN GUY
- CLEAN OUT
- ELECTRIC PULL BOX
- COMMUNICATION PULL BOX
- ELECTRIC VAULT
- ELECTRIC TRANSFORMER
- ELECTRIC MANHOLE
- EXIST./PROP. FIRE HYDRANT
- GAS METER

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Austin, TX 78735. Tel: (512)-583-2600
www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

EXISTING CONDITIONS

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
LICENSED
PROFESSIONAL ENGINEER
6-17-25

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

SHEET
5
OF 33

Project No.:
1577-009C
SD2024-022

1124

Drawing: c:\pwworking\klf-dct-prod\richard.elizondo\d0206635\1577009C-CD-EXISTING-SURVEY.dwg
User: RELIZONDO
Last Modified: Mar. 26, 25 - 13:35
Plot Date/Time: Jun. 10, 25 - 10:35:58

PHILIP A. SMITH
SURVEY NO. 26
ABSTRACT NO. 415

CALLED 1.285 ACRES
VOL. 1328, PG. 48
O.P.R.H.C.T.

BOUNDARY LINE AGREEMENT BY RICHARD A. GARZA & D.S.I.S.D. VOL. 775, PG. 822 O.P.R.H.C.T.

CALLED 1.02 ACRES
VOL. 1403, PG. 780
O.P.R.H.C.T.

CALLED 0.76 ACRE
DOC. NO. 16008039
O.P.R.H.C.T.

CALLED 0.0350 ACRE
PARCEL 1
DOC. NO. 18025301

CALLED 0.4823 ACRE
DOC. NO. 18025301

RAMBO LODGE NO. 426
VOL. 154, PG. 1
D.R.H.C.T.

OLD FITZHUGH ROAD
(VARIABLE WIDTH R.O.W.)
(NO RECORDING INFO FOUND)
(ASPHALT)

2001
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
2016
2017
2018
2019
2020
2021
200
160.20
BM=SQ CUT SET VRS

CONCRETE PLANTER TO BE REMOVED
CONCRETE PLANTER
TO BE REMOVED
TO REMAIN
5' B.S.L.
10' B.S.L.
REMOVE EXISTING CONCRETE
CONTRACTOR TO VERIFY DEPTH OF EXISTING WATER AND WASTEWATER SERVICE. COORDINATE WITH ARCHITECT/ENGINEER PRIOR TO REMOVAL
POWER POLE TO BE RELOCATED COORDINATE WITH PEC.
REMOVE 1,125 SY OF EXISTING PAVEMENT
REMOVE EXISTING PROPANE TANK AND SERVICE LINE TO THE BUILDING
ABOVE GROUND PROPANE TANK
CONCRETE PAD
EXISTING UTILITY POLE, SERVICE LINE AND GUY WIRES TO BE REMOVED AND REPLACED
ASPHALT DRIVEWAY
REMOVE EXISTING CONCRETE AND FLATWORK IN FRONT OF BUILDING
ABOVE GROUND WATER TANK
EXISTING WATER TANK TO BE REMOVED
CONCRETE SIDEWALK
REMOVE ALL SIGNS AND FLAG POLES
ABOVE GROUND PROPANE TANK
AC UNITS AND PADS TO BE REMOVED AND REPLACED
VISITORS PARKING
1-STORY STONE BUILDING FFE=1162.25
ELEVATED STAIRS
ELEVATED DECK
2-STORY STONE BUILDING
FLAG POLE
CONCRETE HANDICAPPED RAMP
VISITORS PARKING
SIGN
BENCH
1-STORY METAL BUILDING
CONCRETE STEPS
GRAVEL DRIVEWAY
10' B.S.L.
1160
ELECTRICAL CONDUITS
REMOVE EXISTING CONCRETE AND FLATWORK IN FRONT OF BUILDING
CONCRETE STEPS AND STOOP TO BE REMOVED
DECK
RAMP
1-STORY STUCCO BUILDING
STEPS
4-PARKING BOLLARDS
5/8"
REMAINDER OF A 20' ALLEY
STONE BLDG
L34
L36

TREE TABLE				
NUMBER	SIZE(IN)	SPECIES	CRZ(FT)	MT(IN)
3000	17"	CHINABERRY (M)	34'	9 7 7
3001	37"	TALLOW (M)	74'	21 20 11
3002	48"	CATALPA (M)	96'	17 17 14 13 11 10
3003	28"	LIVE OAK	56'	
3004	12"	HACKBERRY (M)	24'	8 8
3005	14"	HACKBERRY (M)	28'	10 7
3006	16"	HACKBERRY	32'	
3010	7"	PECAN	14'	

10 0 5 10 20
(IN FEET)
GRAPHIC SCALE 1"=20'

LEGEND

- PROPERTY LINE
- WATER QUALITY
- UTILITY EASEMENT
- BUILDING SETBACK LINE
- WASTEWATER LINE
- WATER LINE
- GAS LINE
- FIBER OPTIC CABLE
- WIRE FENCE
- OVERHEAD ELECTRIC
- EDGE OF PAVEMENT
- WATER VALVE
- WATER METER
- WASTEWATER MANHOLE
- WATER MANHOLE
- TRAFFIC SIGN
- POWER POLE
- DOWN GUY
- CLEAN OUT
- ELECTRIC PULL BOX
- COMMUNICATION PULL BOX
- ELECTRIC VAULT
- ELECTRIC TRANSFORMER
- ELECTRIC MANHOLE
- EXIST./PROP. FIRE HYDRANT
- GAS METER
- ASPHALT PAVEMENT AND/OR GRAVEL DRIVE TO BE REMOVED
- CONCRETE PAVEMENT, SLAB AND/OR SIDEWALK TO BE REMOVED
- BUILDING AND/OR GARAGE TO BE REMOVED
- EXISTING TREE TO BE REMOVED

DEMOLITION NOTES

1. THE CONTRACTOR IS RESPONSIBLE FOR THE DEMOLITION, REMOVAL, AND DISPOSAL OF (IN A LOCATION APPROVED BY ALL GOVERNING AUTHORITIES) ALL STRUCTURES, PADS, WALLS, PAVEMENT FOUNDATIONS, DRAINAGE, UTILITIES, ETC., SUCH THAT THE IMPROVEMENTS SHOWN ON THE PLANS CAN BE CONSTRUCTED. ALL FACILITIES TO BE REMOVED SHALL BE UNDERCUT TO SUITABLE MATERIAL AND BROUGHT TO GRADE WITH SUITABLE COMPACTED FILL MATERIAL PER THE SPECIFICATIONS.
2. THE CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL DEBRIS FROM THE SITE AND DISPOSING THE DEBRIS IN A LAWFUL MANNER. THE CONTRACTOR IS RESPONSIBLE FOR OBTAINING ALL PERMITS REQUIRED FOR DEMOLITION AND DISPOSAL.
3. THE CONTRACTOR SHALL COORDINATE WITH RESPECTIVE UTILITY COMPANIES PRIOR TO THE REMOVAL AND/OR RELOCATION OF UTILITIES. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANY CONCERNING PORTIONS OF WORK WHICH MAY BE PERFORMED BY THE UTILITY COMPANY'S FORCES AND ANY FEES WHICH ARE TO BE PAID TO THE UTILITY COMPANY FOR THEIR SERVICES. THE CONTRACTOR IS RESPONSIBLE FOR PAYING ALL FEES AND CHARGES.
4. THE LOCATIONS OF ALL EXISTING UTILITIES SHOWN ON THIS PLAN HAVE BEEN DETERMINED FROM THE BEST INFORMATION AVAILABLE AND ARE GIVEN FOR THE CONVENIENCE OF THE CONTRACTOR. THE ENGINEER ASSUMES NO RESPONSIBILITY FOR THEIR ACCURACY. PRIOR TO THE START OF ANY DEMOLITION ACTIVITY, THE CONTRACTOR SHALL NOTIFY THE UTILITY COMPANIES FOR ON-SITE LOCATIONS OF EXISTING UTILITIES AND DISCONNECT/DECOMMISSION AS PER UTILITY AND CITY REQUIREMENTS.
5. ALL EXISTING SEWERS, PIPING AND UTILITIES SHOWN ARE NOT TO BE INTERPRETED AS THE EXACT LOCATION, OR AS THE ONLY OBSTACLES THAT MAY OCCUR ON THE SITE. VERIFY EXISTING CONDITIONS AND PROCEED WITH CAUTION AROUND ANY ANTICIPATED FEATURES. GIVE NOTICE TO ALL UTILITY COMPANIES REGARDING DESTRUCTION AND REMOVAL OF ALL SERVICE LINES AND CAP ALL LINES BEFORE PROCEEDING WITH THE WORK. UTILITIES DETERMINED TO BE ABANDONED AND LEFT IN PLACE SHALL BE GROUTED. ANY EXISTING UTILITY LINES THAT CROSS THE PROPOSED BUILDING PAD SHALL BE REMOVED IN IT'S ENTIRETY. ALSO, BEDDING MATERIALS SHALL BE REMOVED WITHIN THE PROPOSED BUILDING FOOTPRINTS.
6. ELECTRICAL, TELEPHONE, CABLE, WATER, FIBER OPTIC CABLE AND/OR GAS LINES NEEDING TO BE REMOVED OR RELOCATED SHALL BE COORDINATED WITH THE AFFECTED UTILITY COMPANY. ADEQUATE TIME SHALL BE PROVIDED FOR RELOCATION AND CLOSE COORDINATION WITH THE UTILITY COMPANY IS NECESSARY TO PROVIDE A SMOOTH TRANSITION IN UTILITY SERVICE.
7. CONTRACTOR MUST PROTECT THE PUBLIC AT ALL TIMES WITH FENCING, BARRICADES, ENCLOSURES, ETC., (AND OTHER APPROPRIATE BEST MANAGEMENT PRACTICES) AS APPROVED BY THE CITY OF DRIPPING SPRINGS.
8. CONTINUOUS ACCESS SHALL BE MAINTAINED FOR THE SURROUNDING PROPERTIES AT ALL TIMES DURING CONSTRUCTION.
9. PRIOR TO DEMOLITION OCCURRING, ALL EROSION CONTROL DEVICES SHALL BE INSTALLED.
10. SHOULD REMOVAL AND/OR RELOCATION ACTIVITIES DAMAGE FENCING, LIGHTING AND/OR STORM INLET STRUCTURES, THE CONTRACTOR SHALL PROVIDE NEW MATERIALS/ STRUCTURES IN ACCORDANCE WITH THE CITY OF DRIPPING SPRINGS.
11. CONTRACTOR MAY LIMIT SAW-CUT & PAVEMENT REMOVAL TO ONLY THOSE AREAS WHERE IT IS REQUIRED AS SHOWN ON THESE CONSTRUCTION PLANS, BUT IF ANY DAMAGE IS INCURRED ON ANY OF THE SURROUNDING PAVEMENT, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IT'S REMOVAL AND REPAIR/REPLACEMENT PER CITY OF DRIPPING SPRINGS REQUIREMENTS.
12. THE CONTRACTOR SHALL COORDINATE WATER MAIN WORK WITH DRIPPINGS SPRINGS WATER SUPPLY CORPORATION TO PLAN PROPOSED IMPROVEMENTS AND TO ENSURE ADEQUATE FIRE PROTECTION IS CONSTANTLY AVAILABLE TO THE ADJACENT BUILDINGS AND SITE THROUGHOUT CONSTRUCTION. CONTRACTOR WILL BE RESPONSIBLE FOR ARRANGING/PROVIDING ANY REQUIRED WATER MAIN SHUT OFFS WITH DRIPPING SPRINGS WATER SUPPLY CORPORATION. ANY COSTS ASSOCIATED WITH WATER MAIN SHUT OFFS WILL BE THE RESPONSIBILITY OF THE CONTRACTOR AND NO EXTRA COMPENSATION WILL BE PROVIDED.
13. ANY DEMOLITION WITHIN THE CRITICAL ROOT ZONE (CRZ) OF TREES TO BE DONE WITH HAND TOOLS OR SMALL EQUIPMENT

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TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

DEMOLITION PLAN

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
REGISTERED
PROFESSIONAL ENGINEER
6-17-25

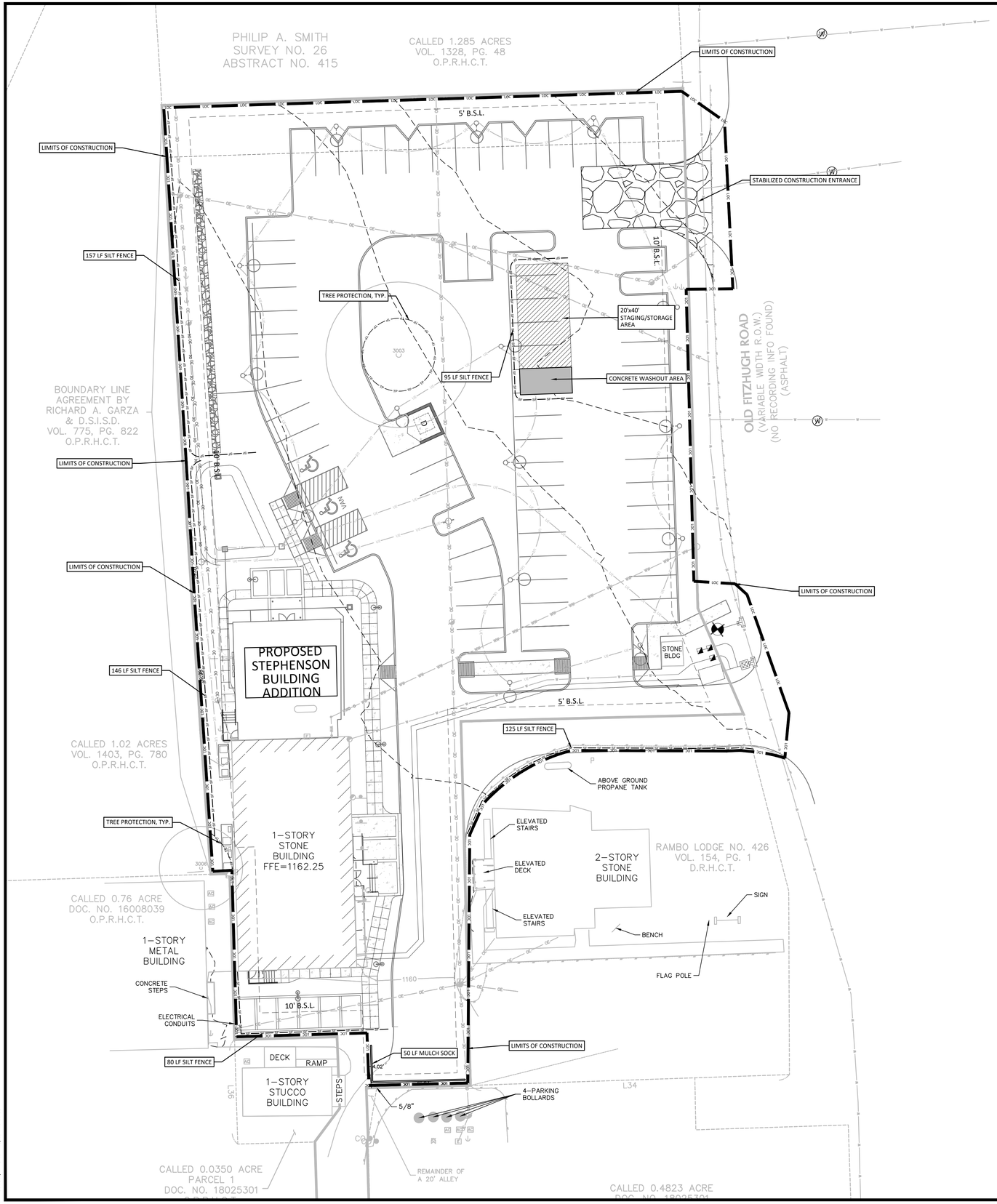
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Reviewed:	TM/JG
Date:	6/10/25

SHEET
6
OF 33

Project No.:
1577-009C
SD2024-022

1125

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EROSION CONTROL NOTES

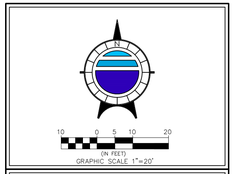
1. IF DISTURBED AREA IS NOT TO BE WORKED ON FOR MORE THAN 14 DAYS, DISTURBED AREA NEEDS TO BE STABILISED BY VEGETATION, MULCH, TAPR, OR REVEGETATIVE MATTING. [ECM, 1.4.4.B.3, SECTION 5, 1].
2. ENVIRONMENTAL INSPECTOR HAS THE AUTHORITY TO ADD AND/OR MODIFY EROSION/SEDIMENTATION CONTROLS ON SITE TO KEEP PROJECT IN COMPLIANCE WITH CITY OF DRIPPING SPRINGS RULES AND REGULATIONS. [LDC 25-8-183]
3. CONTRACTOR SHALL UTILIZE DUST CONTROL MEASURES DURING SITE CONSTRUCTION SUCH AS IRRIGATION TRUCKS AND MULCHING AS PER ECM 1.4.5 (A), OR AS DIRECTED BY THE ENVIRONMENTAL INSPECTOR.
4. THE CONTRACTOR WILL CLEAN UP SPOILS THAT MIGRATE ONTO THE ROADS A MINIMUM OF ONCE DAILY. [ECM 1.4.4.D.4].

NOTE TO GENERAL CONTRACTOR

PRIOR TO CONSTRUCTION, GC MUST CLEARLY DELINEATE AND MARK OFF AREAS IDENTIFIED IN THE SWPPP OR IN THE FIELD, TO BE PROTECTED (SUCH AS, NATURAL BUFFERS, TREES, HABITATS OF ENDANGERED/ THREATENED SPECIES, HISTORIC PROPERTIES, ETC.).

ENVIRONMENTAL NOTE

- A PRE-CONSTRUCTION MEETING WITH THE CITY ENVIRONMENTAL INSPECTOR IS REQUIRED PRIOR TO ANY SITE DISTURBANCE.



LEGEND

- EXISTING EASEMENT
- EXISTING CONTOUR
- PROJECT BOUNDARY
- ADJACENT PROPERTY
- LOC — LIMITS OF CONCTRUCTION
- SILT FENCE WITH J-HOOK
- STABILIZED CONSTRUCTION ENTRANCE
- INLET PROTECTION
- ROCK BERM
- MULCH SOCK
- PROPOSED FLOW DIRECTION
- EXISTING TREE TO BE REMOVED

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STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

EROSION CONTROL PLAN

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STATE OF TEXAS
JOE GRASSO
73285
REGISTERED
PROFESSIONAL ENGINEER
6-17-25

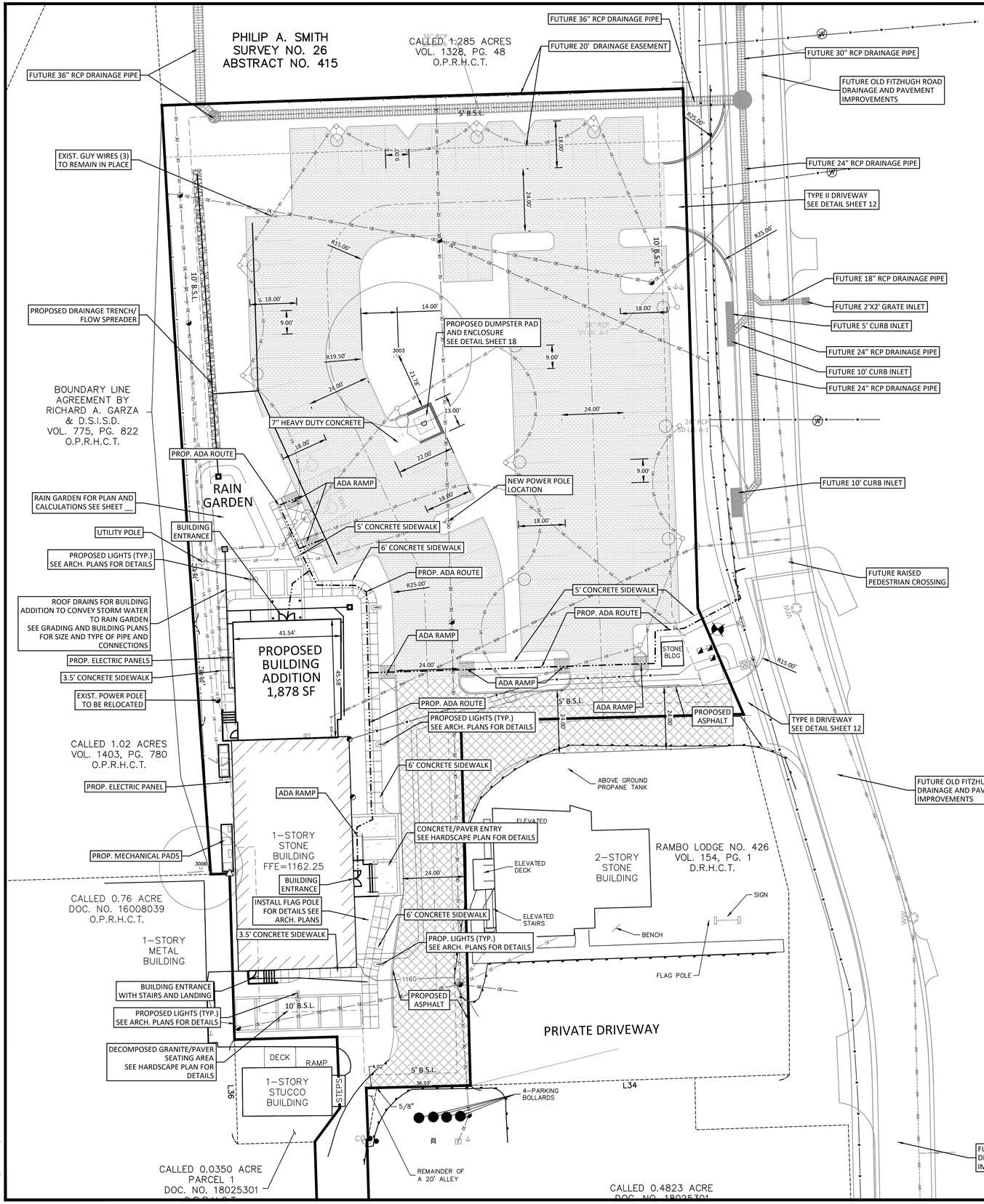
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Reviewed:	TM/JG
Date:	6/10/25

SHEET
7
OF 33

Project No.:
1577-009C
SD2024-022

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SITE NOTES

1. ALL WORK AND MATERIALS SHALL COMPLY WITH ALL CITY/COUNTY REGULATIONS AND CODES AND O.S.H.A. STANDARDS.
2. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND DIMENSIONS OF VESTIBULES, SLOPE PAVING, SIDEWALKS, EXIT PORCHES, TRUCK DOCKS, PRECISE BUILDING DIMENSIONS AND EXACT BUILDING UTILITY ENTRANCE LOCATIONS.
3. EXISTING STRUCTURES WITHIN CONSTRUCTION LIMITS ARE TO BE ABANDONED, REMOVED OR RELOCATED AS NECESSARY.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL RELOCATIONS, (UNLESS OTHERWISE NOTED ON PLANS) INCLUDING BUT NOT LIMITED TO, ALL UTILITIES, STORM DRAINAGE, SIGNS, TRAFFIC SIGNALS & POLES, ETC. AS REQUIRED. ALL WORK SHALL BE IN ACCORDANCE WITH GOVERNING AUTHORITIES REQUIREMENTS.
5. ALL PAVEMENT REMOVED SHALL BE DONE SUCH THAT THE REMAINING PAVEMENT IS LEFT WITH A CLEAN SMOOTH SAWCUT STRAIGHT EDGE.
6. CONTRACTOR IS RESPONSIBLE FOR REPAIRS AND DAMAGE TO ANY EXISTING ITEM DURING CONSTRUCTION SUCH AS, BUT NOT LIMITED TO DRAINAGE, UTILITIES, PAVEMENT, STRIPING, CURB, ETC. REPAIRS SHALL BE EQUAL TO OR BETTER THAN EXISTING CONDITIONS.
7. STRIPING - FIRE APPARATUS ACCESS ROADS SHALL BE CONTINUOUSLY MARKED BY PAINTED LINES OF RED TRAFFIC PAINT SIX INCHES (6") IN WIDTH TO SHOW THE BOUNDARIES OF THE LANE. THE WORDS "FIRE LANE - NO PARKING" SHALL APPEAR IN THE FOUR INCH (4") WHITE LETTERS AT 25 FEET INTERVALS ON THE RED BOARDER MARKINGS ALONG BOTH SIDES OF THE FIRE LANES. WHERE CURB IS AVAILABLE, THE STRIPING SHALL BE ON THE VERTICAL FACE OF THE CURB.
8. SIGNS - SIGNS SHALL READ "FIRE LANE - NO PARKING" AND SHALL BE 12" WIDE AND 18" HIGH. SIGNS SHALL BE PAINTED ON A WHITE BACKGROUND WITH LETTERS AND BORDERS IN RED, USING NOT LESS THAN 2" LETTERING. SIGNS SHALL BE PERMANENTLY AFFIXED TO A STATIONARY POST AND THE BOTTOM OF THE SIGN SHALL BE SIX FEET, SIX INCHES (6'-6") ABOVE FINISHED GRADE. SIGNS SHALL BE SPACED NOT MORE THAN FIFTY FEET (50') APART ALONG BOTH SIDES OF THE FIRE LANE. SIGNS MAY BE INSTALLED ON PERMANENT BUILDINGS OR WALLS OR AS APPROVED.

Parking Table	
Existing Building 4,023 Mercer St. Historic Disrict, Ord. #2020-27	No additonal parking required
Community Center Building Addition 1,849 SF (10 spaces plus 1 for every 2,000 SF)	10 Spaces Required
Standard Spaces Provided	67
Per IBC Table 1106.1 51 to 75, 3 spaces including 1 Van) Accessible Spaces Provided	3
Total Parking Spaces Provided	70
Bicycle Parking Provided	0

Site Table - Existing Conditions		
Gross Site Area	62291 sf	1.43 ac
No. of Buildings	1	
Building Coverage	4,023 sf	6.5%
Impervious Cover	12,447 sf	20.0%

Site Table - Proposed Conditions		
Gross Site Area	62,291 sf	1.43 ac
No. of Buildings	1	
Building Coverage	4,023 sf	9.7%
Gross Floor Area of Proposed Building	1,878 sf	
Height (stories & feet) of Proposed Building	1 story	19 ft
Impervious Cover	36,986 sf	59.4%
Limits of Construction	50,865 sf	1.16 ac

10 0 5 10 20
(IN FEET)
GRAPHIC SCALE 1"=20'

LEGEND

- PROPERTY LINE
- WATER QUALITY
- UTILITY EASEMENT
- BUILDING SETBACK LINE
- WASTEWATER LINE
- WATER LINE
- GAS LINE
- FIBER OPTIC CABLE
- WIRE FENCE
- OVERHEAD ELECTRIC
- EDGE OF PAVEMENT
- BUILDING OVERHANG
- PROPOSED 6" VERTICAL CURB
- ACCESSIBLE ROUTE- PEDESTRIAN ACCESS
- PROPOSED BUILDING
- PROPOSED CONCRETE SIDEWALK
- PROPOSED HEAVY DUTY CONCRETE PAVEMENT.
- PROPOSED MEDIUM DUTY HMAC PAVEMENT
- PROPOSED PERMEABLE PAVERS HERRINGBONE PATTERN
- WATER VALVE
- WATER METER
- WASTEWATER MANHOLE
- WATER MANHOLE
- TRAFFIC SIGN
- POWER POLE
- DOWN GUY
- CLEAN OUT
- ELECTRIC PULL BOX
- COMMUNICATION PULL BOX
- ELECTRIC VAULT
- ELECTRIC TRANSFORMER
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STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

SITE PLAN

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STATE OF TEXAS
JOE GRASSO
73285
LICENSED
PROFESSIONAL ENGINEER
6-17-25

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

SHEET
8
OF 33

Project No.:
1577-009C
SD2024-022

1127

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Last Modified: Mar. 26, 25 - 13:34
Plot Date/Time: Jun. 10, 25 - 10:20:22

PHILIP A. SMITH
SURVEY NO. 26
ABSTRACT NO. 415

CALLED 1.285 ACRES
VOL. 1328, PG. 48
O.P.R.H.C.T.

FUTURE 36" RCP DRAINAGE PIPE
FUTURE 20' DRAINAGE EASEMENT
FUTURE 36" RCP DRAINAGE PIPE
FUTURE 30" RCP DRAINAGE PIPE
FUTURE OLD FITZHUGH ROAD DRAINAGE AND PAVEMENT IMPROVEMENTS
FUTURE 24" RCP DRAINAGE PIPE
FUTURE 18" RCP DRAINAGE PIPE
FUTURE 2'X2' GRATE INLET
FUTURE 5' CURB INLET
FUTURE 24" RCP DRAINAGE PIPE
FUTURE 10' CURB INLET
FUTURE 24" RCP DRAINAGE PIPE
FUTURE 10' CURB INLET
FUTURE RAISED PEDESTRIAN CROSSING
FUTURE OLD FITZHUGH ROAD DRAINAGE AND PAVEMENT IMPROVEMENTS
FUTURE OLD FITZHUGH ROAD DRAINAGE AND PAVEMENT IMPROVEMENTS

5' B.S.L.
10' B.S.L.
10' B.S.L.
5' B.S.L.
10' B.S.L.
5' B.S.L.

BOUNDARY LINE AGREEMENT BY RICHARD A. GARZA & D.S.I.S.D. VOL. 775, PG. 822 O.P.R.H.C.T.

EXISTING 6" WATER LINE (DSWSC)
EXISTING WW SERVICE
EXISTING 6" WATER LINE (DSWSC)

NEW UNDERGROUND ELECTRIC SERVICE
EXISTING WW CLEANOUT
INSTALL STANDARD FIRE HYDRANT ASSEMBLY
RAIN GARDEN FOR PLAN AND CALCULATIONS SEE SHEET15
NEW UTILITY POLE LOCATION
NEW UNDERGROUND ELECTRIC SERVICE
ROOF DRAINS FOR BUILDING ADDITION TO CONVEY STORM WATER TO RAIN GARDEN SEE GRADING AND BUILDING PLANS FOR SIZE AND TYPE OF PIPE AND CONNECTIONS
INSTALL TWO-WAY WW CLEANOUT MIN. 3' FROM BUILDING
PROPOSED 2" DOMESTIC WATER LINE
INSTALL IRRIGATION METER
EXISTING WATER METER TO BE REPLACED WITH 2" WATER METER. COORDINATE WITH DSWSC.
INSTALL BACKFLOW PREVENTER
INSTALL 6"X6" CUT IN TEE WITH 6" GATE VALVE
UNDERGROUND ELECTRIC SERVICE TO PROPOSED ELECTRIC PANEL
BUILDING ADDITION
INSTALL 2" SERVICE CLAMP TO PROPOSED 6" FIRE LINE
INSTALL 6" BACKFLOW PREVENTOR
REMOTE FDC
6" PVC FIRE LINE TO BUILDING
6" PVC FIRE LINE TO REMOTE FDC
ABOVE GROUND PROPANE TANK
UNDERGROUND ELECTRIC SERVICE TO PROPOSED ELECTRIC PANEL

CALLED 1.02 ACRES
VOL. 1403, PG. 780
O.P.R.H.C.T.

1-STORY STONE BUILDING FFE=1162.25

CALLED 0.76 ACRE
DOC. NO. 16008039
O.P.R.H.C.T.

1-STORY METAL BUILDING

CONCRETE STEPS
ELECTRICAL CONDUITS

ELEVATED STAIRS
ELEVATED DECK
ELEVATED STAIRS
2-STORY STONE BUILDING
RAMBO LODGE NO. 426
VOL. 154, PG. 1
D.R.H.C.T.
SIGN
BENCH
FLAG POLE

PRIVATE DRIVEWAY

DECK
RAMP
1-STORY STUCCO BUILDING
STEPS
5/8"
4-PARKING BOLLARDS
REMAINDER OF A 20' ALLEY

CALLED 0.0350 ACRE
PARCEL 1
DOC. NO. 18025301

CALLED 0.4823 ACRE
DOC. NO. 18025301

UTILITY NOTES

1. CONTRACTOR IS RESPONSIBLE FOR REPAIRS OF DAMAGE TO ANY EXISTING UTILITY DURING CONSTRUCTION AT NO COST TO THE OWNER.
2. SEE SPECIFICATIONS FOR BACKFILLING AND COMPACTION REQUIREMENTS ON UTILITY TRENCHES.
3. ALL FILL MATERIAL IS TO BE IN PLACE AND COMPACTED TO 98% PROCTOR DENSITY BEFORE INSTALLATION OF PROPOSED UTILITIES.
4. CONTRACTOR SHALL NOTIFY THE UTILITY AUTHORITIES INSPECTORS 72 HOURS BEFORE CONNECTING TO ANY EXISTING LINE.
5. LINES UNDERGROUND SHALL BE INSTALLED, INSPECTED AND APPROVED BEFORE BACKFILLING.
6. EXISTING UTILITIES SHALL BE VERIFIED IN FIELD PRIOR TO INSTALLATION OF ANY NEW LINES.
7. CONTRACTOR IS RESPONSIBLE FOR COMPLYING TO THE SPECIFICATIONS OF THE LOCAL AUTHORITIES WITH REGARDS TO MATERIALS AND INSTALLATION OF THE WATER AND SEWER LINES.
8. ALL CONCRETE FOR ENCASEMENTS SHALL HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH AT 3000 P.S.I.
9. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO RELOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
10. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICE.
11. THE CONTRACTOR SHALL CONDUCT ALL REQUIRED TESTS TO THE SATISFACTION OF THE RESPECTIVE UTILITY COMPANIES AND THE OWNER'S INSPECTING AUTHORITIES.
12. RAISE OR LOWER EXISTING CLEANOUT TO PROPOSED FINISHED GRADE
13. RAISE OR LOWER EXISTING CLEANOUT TO PROPOSED FINISHED GRADE

10 0 5 10 20
(IN FEET)
GRAPHIC SCALE 1"=20'

LEGEND

- PROPERTY LINE
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Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

SHEET
9
OF 33

Project No.:
1577-009C
SD2024-022

1128

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Last Modified: Mar. 26, 25 - 13:33
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PHILIP A. SMITH
SURVEY NO. 26
ABSTRACT NO. 415

CALLED 1.285 ACRES
VOL. 1328, PG. 48
O.P.R.H.C.T.

BOUNDARY LINE
AGREEMENT BY
RICHARD A. GARZA
& D.S.I.S.D.
VOL. 775, PG. 822
O.P.R.H.C.T.

CALLED 1.02 ACRES
VOL. 1403, PG. 780
O.P.R.H.C.T.

CALLED 0.76 ACRE
DOC. NO. 16008039
O.P.R.H.C.T.

CALLED 0.0350 ACRE
PARCEL 1
DOC. NO. 18025301
O.P.R.H.C.T.

CALLED 0.4823 ACRE
DOC. NO. 18025301
O.P.R.H.C.T.

RAMBO LODGE NO. 426
VOL. 154, PG. 1
D.R.H.C.T.

OLD FITZHUGH ROAD
(VARIABLE WIDTH R.O.W.)
(NO RECORDING INFO FOUND)
(ASPHALT)

FUTURE 30" RCP DRAINAGE PIPE

FUTURE OLD FITZHUGH ROAD DRAINAGE AND PAVEMENT IMPROVEMENTS

FUTURE 24" RCP DRAINAGE PIPE

FUTURE 18" RCP DRAINAGE PIPE

FUTURE 2'X2' GRATE INLET

FUTURE 5' CURB INLET

FUTURE 24" RCP DRAINAGE PIPE

FUTURE 10' CURB INLET

FUTURE 24" RCP DRAINAGE PIPE

FUTURE 10' CURB INLET

FUTURE RAISED PEDESTRIAN CROSSING

FUTURE OLD FITZHUGH ROAD DRAINAGE AND PAVEMENT IMPROVEMENTS

FUTURE OLD FITZHUGH ROAD DRAINAGE AND PAVEMENT IMPROVEMENTS

BUILDING ADDITION
FFE: 1162.25

1-STORY
STONE
BUILDING
FFE=1162.25

1-STORY
METAL
BUILDING

1-STORY
STUCCO
BUILDING

2-STORY
STONE
BUILDING

ABOVE GROUND PROPANE TANK

ELEVATED STAIRS

ELEVATED DECK

ELEVATED STAIRS

SIGN

BENCH

FLAG POLE

DECK

RAMP

STEPS

CONCRETE STEPS

ELECTRICAL CONDUITS

RAIN GARDEN

4-PARKING BOLLARDS

REMAINDER OF A 20' ALLEY

STONE BLD.

EL:1163.32

EL:1163.92

EL:1163.76

EL:1164.41

EL:1163.95

EL:1163.59

EL:1163.25

EL:1163.26

EL:1162.67

EL:1162.06

EL: 1162.65

5' B.S.L.

10' B.S.L.

GRADING NOTES

1. IF ANY EXISTING STRUCTURES TO REMAIN ARE DAMAGED DURING CONSTRUCTION, INCLUDING IMPROVEMENTS IN PUBLIC RIGHT-OF-WAY AND/OR EASEMENTS, IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
2. CONTRACTOR SHALL ASSURE POSITIVE DRAINAGE AWAY FROM THE BUILDING FOR ALL NATURAL AND PAVED AREAS.
3. TOPOGRAPHIC INFORMATION IS TAKEN FROM A TOPOGRAPHIC SURVEY BY DOUCET AND ASSOCIATES, INC. IF THE CONTRACTOR DOES NOT ACCEPT EXISTING TOPOGRAPHY AS SHOWN ON THE PLANS, WITHOUT EXCEPTION, THEN THE CONTRACTOR SHALL SUPPLY, AT THEIR EXPENSE, A TOPOGRAPHIC SURVEY BY A REGISTERED LAND SURVEYOR TO THE OWNER FOR REVIEW.
4. ALL UNSURFACED AREAS DISTURBED BY GRADING OPERATION SHALL RECEIVE 4 INCHES OF TOPSOIL. CONTRACTOR SHALL APPLY STABILIZATION FABRIC TO ALL SLOPES 3H:1V OR STEEPER. CONTRACTOR SHALL STABILIZE DISTURBED AREAS IN ACCORDANCE WITH GOVERNING SPECIFICATIONS UNTIL A HEALTHY STAND OF VEGETATION IS OBTAINED.

10 0 5 10 20
(IN FEET)
GRAPHIC SCALE 1"=20'

LEGEND

XXX	EXISTING CONTOUR
XXX	PROPOSED CONTOUR
	PROPERTY BOUNDARY
TC	TOP OF CURB ELEVATION
TP	TOP OF PAVEMENT ELEVATION
TG	TOP OF GRATE ELEVATION
+ 604.00	SPOT ELEVATION

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www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

GRADING PLAN

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
REGISTERED
PROFESSIONAL ENGINEER
6-17-25

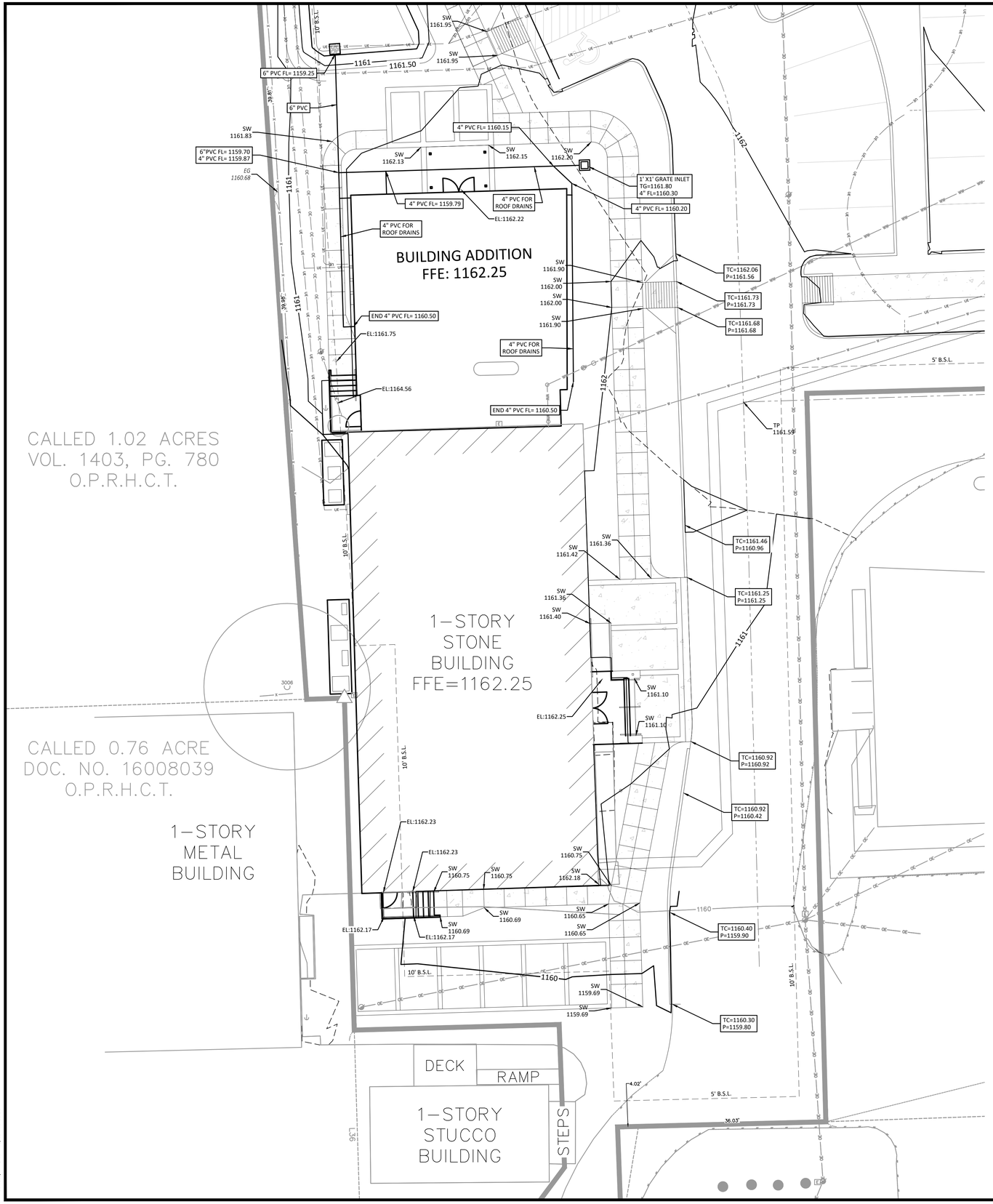
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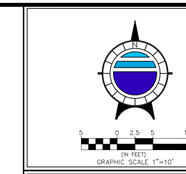
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10
OF 33

Project No.:
1577-009C
SD2024-022

1129

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LEGEND

XXX	EXISTING CONTOUR
XXX	PROPOSED CONTOUR
	PROPERTY BOUNDARY
TC	TOP OF CURB ELEVATION
TP	TOP OF PAVEMENT ELEVATION
TG	TOP OF GRATE ELEVATION
+ 604.00	SPOT ELEVATION

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BUILDING GRADING PLAN

STEPHENSON BUILDING
SITE DEVELOPMENT PLANS
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

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STATE OF TEXAS
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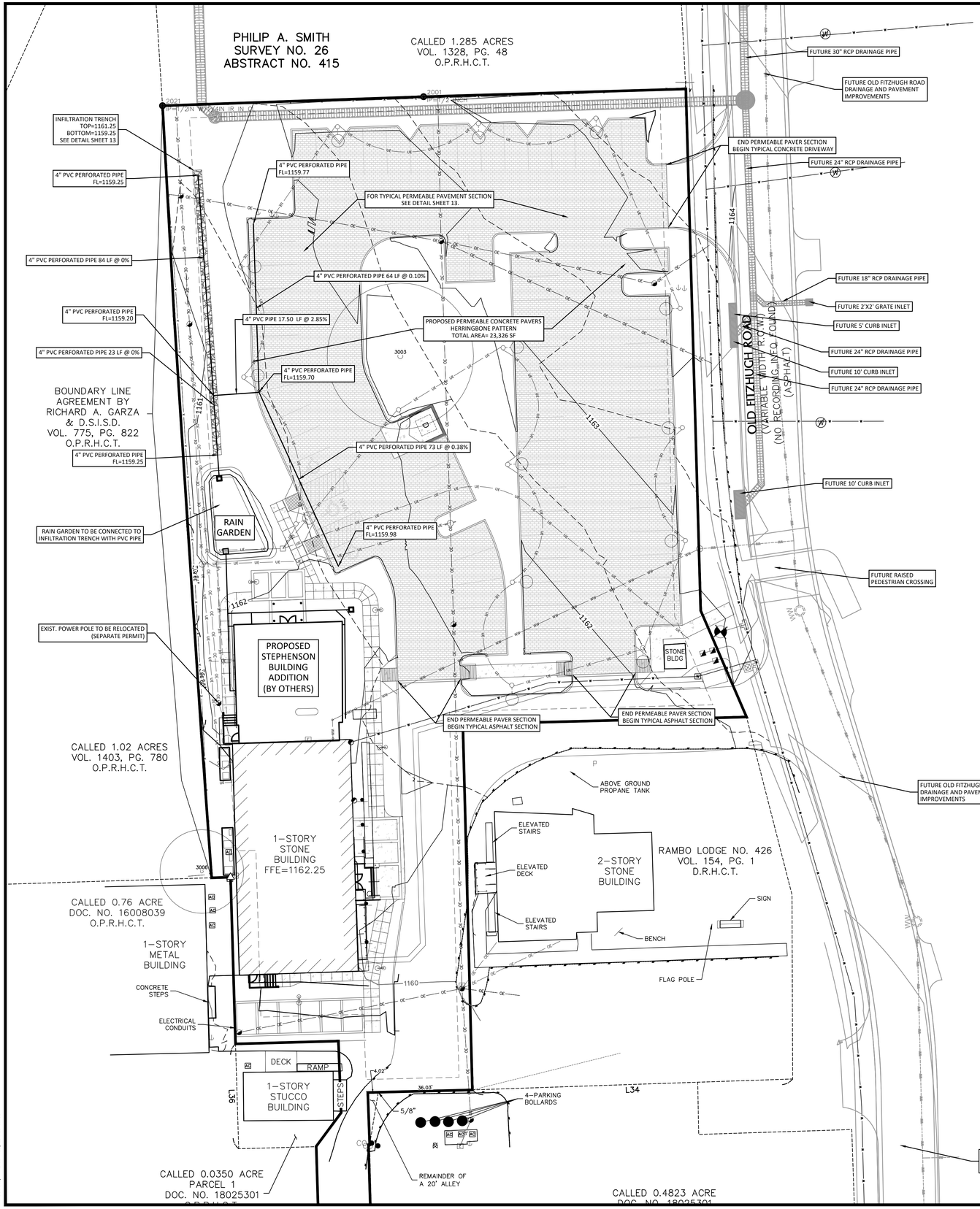
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Reviewed:	TM/JG
Date:	6/10/25

SHEET
11
OF 33

Project No.:
1577-009C
SD2024-022

1130

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Plot Date/Time: Jun. 10, 25 - 10:20:52



Permeable Interlocking Concrete Pavements Structural and Hydrological Design Inputs

Project: Perm Pavers [AASHTO Method]

Site Information

	Pavement Length	ft
	Pavement Width	ft
	Pavement Area	23,326 ft²
	Catchment Area	23,326 ft² (Avg CN=0)

Layer Information

Paving Layer	**Concrete Pavers + ASTM No 89 Stone**	
	Structural Coefficient	0.3
	Structural Number	1.5 in
	Thickness	5.125 in
Base Material	**ASTM No 57 Stone**	
	Structural Coefficient	0.09
	Structural Number	0.36 in
	Thickness	4.0 in
	Porosity	0.318
	Void Ratio	0.47
	Permeability	1,502 in/hr
Subbase Material	**ASTM No 4 Stone**	
	Structural Coefficient	0.06
	Structural Number	0.72 in
	Thickness	12.0 in
	Porosity	0.347
	Void Ratio	0.53
	Permeability	20,305 in/hr
Subgrade Material	**SW-Well Graded Sand**	
	Subgrade Strength	23,000 psi
	Porosity	0.275
	Void Ratio	0.38
	Permeability	0.795 in/hr

Structural Design Information

	Average Annual Daily Traffic	
	Design ESALs	75,000
	Design Structural Number	1.31
	Pavement Structural Number	2.58
	Structurally Adequate	Yes

Hydrological Design Information

	Rainfall Location	Dripping Springs, TX, TX
	Storm Type	III

Permeable Interlocking Concrete Pavements Structural and Hydrological Design Inputs

Project: Perm Pavers [AASHTO Method]

Hydrological Design Results

Equivalent Design Storm		
	Storage Goal	100 year storm
	Storage Capacity	100 year storm
	Pavement Water Storage Capacity	10,574 ft³

Permeable Interlocking Concrete Pavements Structural and Hydrological Design Inputs

Project: Perm Pavers [AASHTO Method]

Hydrological Evaluation Results

Storm Return Period (Years)	24-hour Rainfall Intensity in	Satisfies Paver Infiltration Capacity	Satisfies Granular Infiltration Capacity	Satisfies Storage Goal	Satisfies Storage Capacity
2	4.1	Yes	Yes	Yes	Yes
5	5.5	Yes	Yes	Yes	Yes
10	6.8	Yes	Yes	Yes	Yes
25	8.9	Yes	Yes	Yes	Yes
50	10.7	Yes	Yes	Yes	Yes
100	12.8	Yes	Yes	No	No

Storage goal represents 100 percent of maximum water storage capacity

Water Balance

Return Period (Years)	Inflow (ft³)		Outflow (ft³)				
	Initial Water in the Pavement	Surface Inflow	Pavement Storage	Subgrade infiltration	Pipe Drainage	Surface Runoff	Surface Ponding
2	0.0	8,047.5	0.0	8,047.5	0.0	0.0	0.0
5	0.0	10,710.5	0.0	10,710.5	0.0	0.0	0.0
10	0.0	13,295.8	0.0	13,295.8	0.0	0.0	0.0
25	0.0	17,300.1	0.0	17,300.1	0.0	0.0	0.0
50	0.0	20,779.6	1,151.2	19,628.4	0.0	0.0	0.0
100	0.0	24,881.1	2,815.1	22,066.0	0.0	0.0	0.0

10 0 5 10 20
(IN FEET)
GRAPHIC SCALE 1"=20'

LEGEND

- PROPERTY LINE
- 100 YEAR FLOOD PLAIN
- CEF
- WATER QUALITY
- UTILITY EASEMENT
- BUILDING SETBACK LINE
- STORM SEWER PIPING
- GRATED DROP INLET
- TC — TOP OF CURB ELEVATION
- TP — TOP OF PAVEMENT ELEVATION
- TG — TOP OF GRATE ELEVATION
- + 604.00 — SPOT ELEVATION
- PROPOSED FLOW ARROW
- EXISTING FLOW ARROW

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TBPELS Firm Number: 10105800

PERMEABLE PAVER PLAN AND CALCULATIONS

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

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STATE OF TEXAS
JOE GRASSO
73285
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PROFESSIONAL ENGINEER
6-17-25

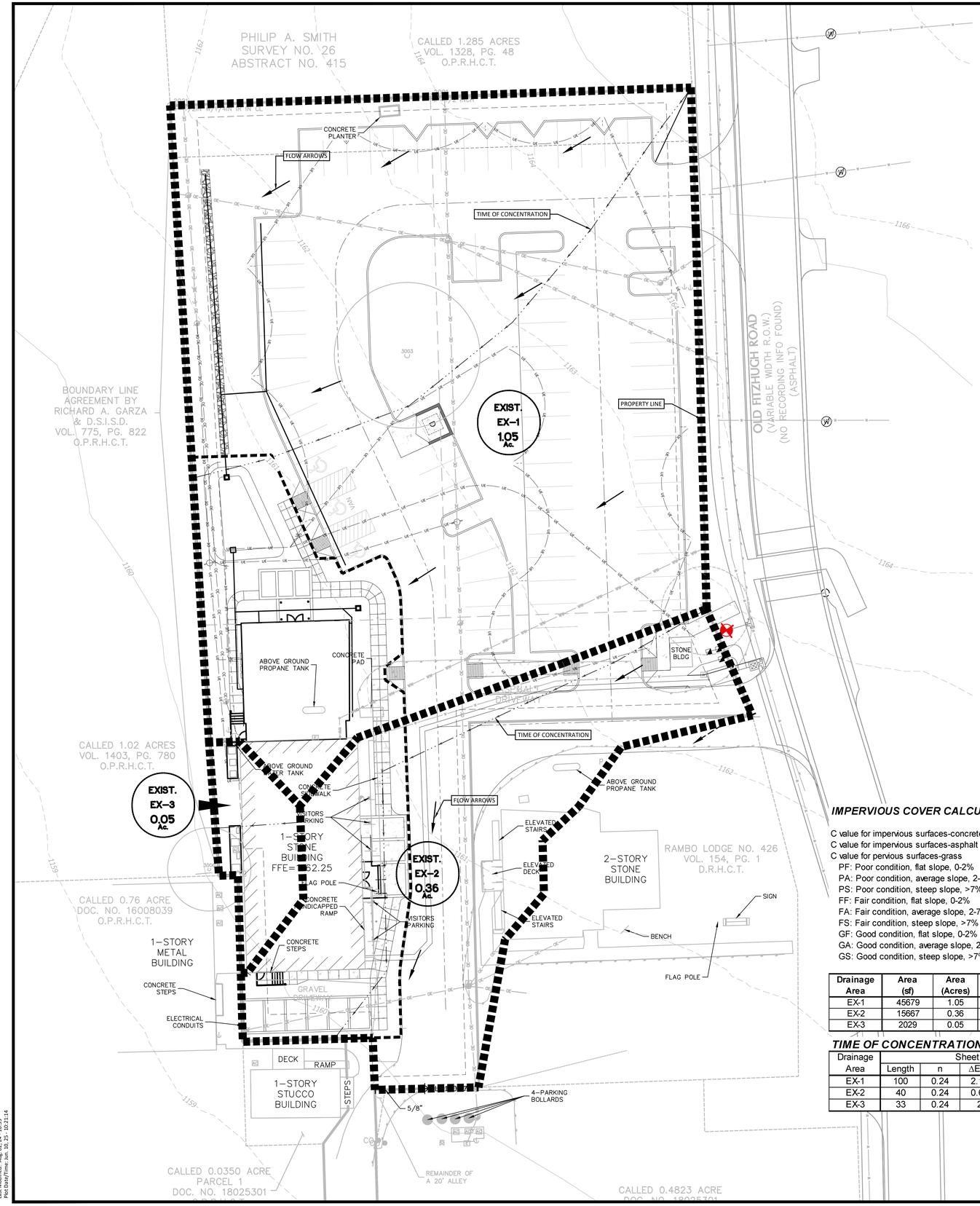
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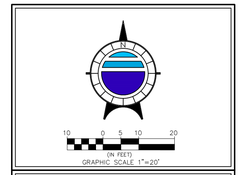
SHEET
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Project No.:
1577-009C
SD2024-022

1131

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IMPERVIOUS COVER CALCULATIONS

	25-year	100-year
C value for impervious surfaces-concrete	0.88	0.97
C value for impervious surfaces-asphalt	0.86	0.95
C value for pervious surfaces-grass	(Reference COA Drainage Criteria Manual)	
PF: Poor condition, flat slope, 0-2%	0.40	0.47
PA: Poor condition, average slope, 2-7%	0.46	0.53
PS: Poor condition, steep slope, >7%	0.49	0.55
FF: Fair condition, flat slope, 0-2%	0.34	0.41
FA: Fair condition, average slope, 2-7%	0.42	0.49
FS: Fair condition, steep slope, >7%	0.46	0.53
GF: Good condition, flat slope, 0-2%	0.29	0.36
GA: Good condition, average slope, 2-7%	0.39	0.46
GS: Good condition, steep slope, >7%	0.44	0.51

Drainage Area	Area (sf)	Area (Acres)	Area (Sq. Mi.)	Impervious Cover		Impervious Cover Composite C Value		Percent Impervious	Pervious Classification	Pervious C Value		Composite C Value	
				Concrete (%)	Asphalt (%)	25-year	100-year			25-year	100-year	25-year	100-year
EX-1	45679	1.05	0.001641	1.25	2.56	0.03	0.04	4%	Good condition, Slopes 2-7%	0.39	0.46	0.38	0.44
EX-2	15667	0.36	0.000562	20.55	62.08	0.71	0.79	83%	Good condition, Slopes 2-7%	0.39	0.46	0.66	0.73
EX-3	2029	0.05	0.000073	69.00	0.00	0.61	0.67	69%	Good condition, Slopes 2-7%	0.39	0.46	0.54	0.60

TIME OF CONCENTRATION CALCULATIONS

Drainage Area	Sheet Flow 1					Shallow Concentrated Flow 1						Channel/Storm Drain Flow					Time of Concentration
	Length	n	ΔElev	Slope	Sub Tc	Length	n	ΔElev	Slope	Velocity	Sub Tc	Length	n	ΔElev	Velocity	Sub Tc	
EX-1	100	0.24	2.14	0.021	12.33	152		2.84	0.019	2.21	1.15	*No Channelized Flow*					13.5
EX-2	40	0.24	0.68	0.017	6.50	209		2.18	0.010	1.65	2.11	*No Channelized Flow*					8.6
EX-3	33	0.24	2	0.061	3.35	*No Shallow Concentrated Flow*						*No Channelized Flow*					5.0

EXISTING - HYDROLOGY CALCULATIONS 3A

Drainage Area	Area Acres	T_c min	I_{25}	I_{100}	C_{25}	C_{100}	Q_{25} cfs	Q_{100} cfs
EX-1	1.05	13.5	8.32	10.86	0.38	0.44	3.3	5.1
EX-2	0.36	5.0	8.32	10.86	0.66	0.73	2.0	2.9
EX-3	0.05	0.0	8.32	10.86	0.54	0.60	0.2	0.3

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TBPELS Firm Number: 10105800

STEPHENSON BUILDING ADDITION

311 OLD FITZHUGH ROAD,
DRIPPING SPRINGS, TEXAS

EXISTING DRAINAGE CONDITIONS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E. TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
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6-17-25

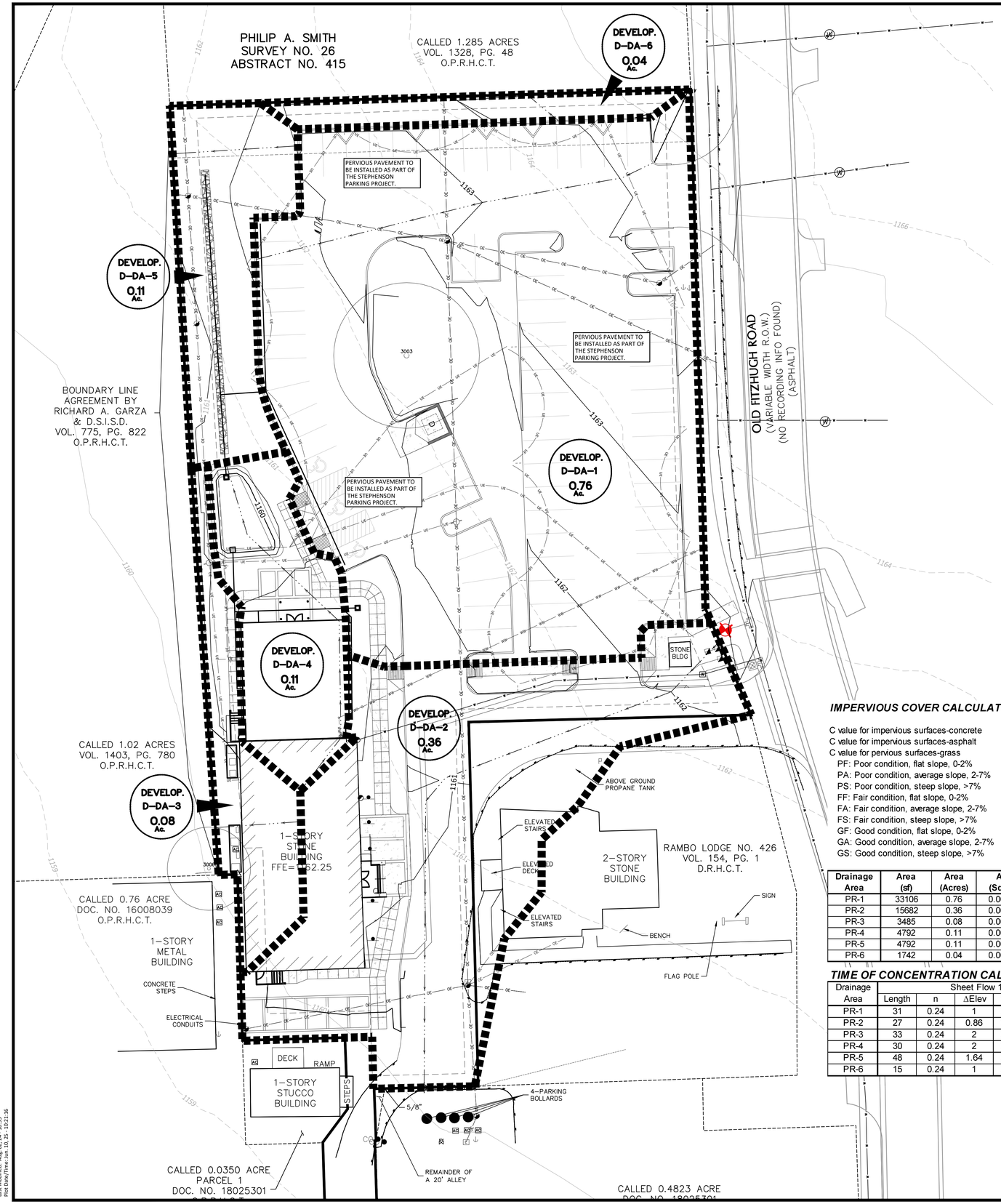
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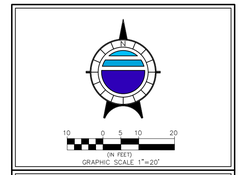
SHEET
13
OF 33

Project No.:
1577-009C

1132

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NOTE:

PROPOSED RAIN GARDEN WILL BE USED FOR DRAINAGE AREA D-DA-4. SEE SHEET 11.

PERVIOUS PAVEMENT WILL BE USED FOR WATER QUALITY AND DETENTION FOR D-DA-1 AND WILL BE IN THE STEPHENSON PARKING IMPROVEMENT PLANS.

IMPERVIOUS COVER CALCULATIONS

	25-year	100-year
C value for impervious surfaces-concrete	0.88	0.97
C value for impervious surfaces-asphalt	0.86	0.95
C value for pervious surfaces-grass	(Reference COA Drainage Criteria Manual)	
PF: Poor condition, flat slope, 0-2%	0.40	0.47
PA: Poor condition, average slope, 2-7%	0.46	0.53
PS: Poor condition, steep slope, >7%	0.49	0.55
FF: Fair condition, flat slope, 0-2%	0.34	0.41
FA: Fair condition, average slope, 2-7%	0.42	0.49
FS: Fair condition, steep slope, >7%	0.46	0.53
GF: Good condition, flat slope, 0-2%	0.29	0.36
GA: Good condition, average slope, 2-7%	0.39	0.46
GS: Good condition, steep slope, >7%	0.44	0.51

Drainage Area	Area (sf)	Area (Acres)	Area (Sq. Mi.)	Impervious Cover		Impervious Cover Composite C Value		Percent Impervious	Pervious Classification	Pervious C Value		Composite C Value	
				Concrete (%)	Asphalt (%)	25-year	100-year			25-year	100-year	25-year	100-year
PR-1	33106	0.76	0.001188	75.00	0.00	0.66	0.73	75%	Good condition, Slopes 2-7%	0.39	0.46	0.59	0.66
PR-2	15682	0.36	0.000563	29.25	46.14	0.65	0.72	75.39%	Good condition, Slopes 2-7%	0.39	0.46	0.59	0.66
PR-3	3485	0.08	0.000125	51.60	0.00	0.45	0.50	51.60%	Good condition, Slopes 2-7%	0.39	0.46	0.42	0.48
PR-4	4792	0.11	0.000172	61.23	0.00	0.54	0.59	61.23%	Good condition, Slopes 2-7%	0.39	0.46	0.48	0.54
PR-5	4792	0.11	0.000172	0.00	0.00	0.00	0.00	0%	Good condition, Slopes 2-7%	0.39	0.46	0.39	0.46
PR-6	1742	0.04	0.000063	0.00	0.00	0.00	0.00	0%	Good condition, Slopes 2-7%	0.39	0.46	0.39	0.46

TIME OF CONCENTRATION CALCULATIONS

Drainage Area	Sheet Flow 1					Shallow Concentrated Flow 1						Channel/Storm Drain Flow					Time of Concentration
	Length	n	ΔElev	Slope	Sub Tc	Length	n	ΔElev	Slope	Velocity	Sub Tc	Length	n	ΔElev	Velocity	Sub Tc	
PR-1	31	0.24	1	0.032	4.10	158	0.015	2.74	0.017	2.12	1.24	*No Channelized Flow*					5.3
PR-2	27	0.24	0.86	0.032	3.69	215	0.015	1.93	0.009	1.53	2.34	*No Channelized Flow*					6.0
PR-3	33	0.24	2	0.061	3.35	*No Shallow Concentrated Flow*						*No Channelized Flow*					5.0
PR-4	30	0.24	2	0.067	2.99	72	0.015	2.42	0.034	2.96	0.41	*No Channelized Flow*					5.0
PR-5	48	0.24	1.64	0.034	5.68	*No Shallow Concentrated Flow*						*No Channelized Flow*					5.7
PR-6	15	0.24	1	0.067	1.72	*No Shallow Concentrated Flow*						*No Channelized Flow*					5.0

NOTE:

- DA-1 WILL HAVE ZERO FLOW LEAVING THE DRAINAGE AREA AS ALL WATER CAPTURED BY THE AREA WILL INFILTRATE INTO THE PERVIOUS PAVERS AND DOWN INTO THE SOIL. LEAVE NO FLOW LEAVING THE AREA.

PROPOSED - HYDROLOGY CALCULATIONS 3A

Drainage Area	Area Acres	T_c min	I_{25}	I_{100}	C_{25}	C_{100}	Q_{25} cfs	Q_{100} cfs
PR-1	0.76	5.3	8.32	10.86	0.59	0.66	0.0	0.0
PR-2	0.36	6.0	8.32	10.86	0.59	0.66	1.8	2.6
PR-3	0.08	5.0	8.32	10.86	0.42	0.48	0.3	0.4
PR-4	0.11	5.0	8.32	10.86	0.48	0.54	0.4	0.6
PR-5	0.11	5.7	8.32	10.86	0.39	0.46	0.4	0.5
PR-6	0.04	5.0	8.32	10.86	0.39	0.46	0.1	0.2

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PROPOSED DRAINAGE PLAN

STEPHENSON BUILDING ADDITION

311 OLD FITZHUGH ROAD,
DRIPPING SPRINGS, TEXAS

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PROFESSIONAL ENGINEER
6-17-25

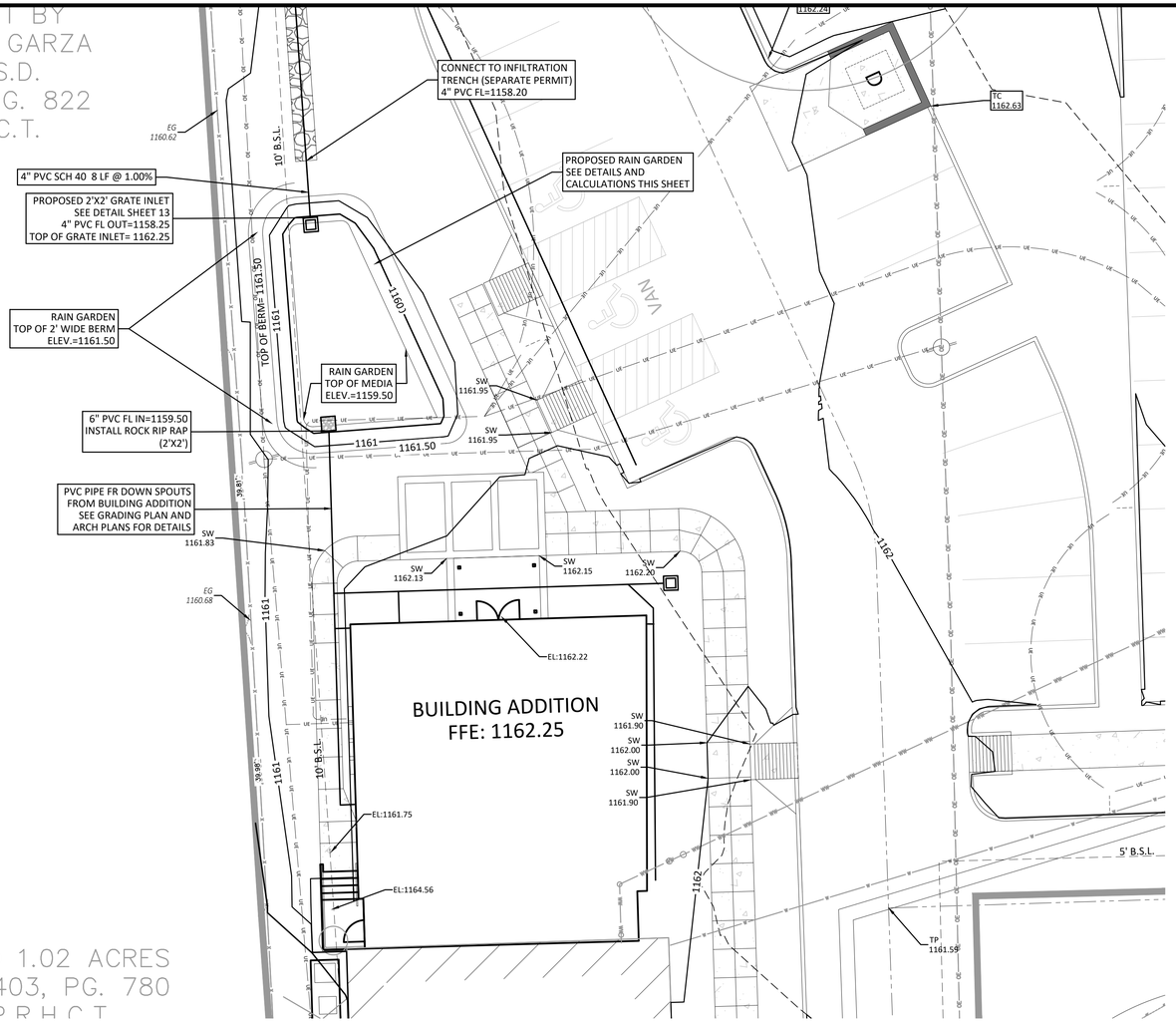
Designed:	RLE/MH/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	10/25/24

SHEET
14
OF 33

Project No.:
1577-009C

Drawing: c:\pwworking\klf-dct-prod\richard.elsondc\d0224811577009C-CD-BUILDING-PRE AND POST DRAINAGE.dwg
User: RELIZONDO
Last Modified: Aug. 02, 24 - 10:33
Plot Date/Time: Jan. 15 - 10:21:16

AGREEMENT BY
RICHARD A. GARZA
& D.S.I.S.D.
VOL. 775, PG. 822
O.P.R.H.C.T.



CALLED 1.02 ACRES
VOL. 1403, PG. 780
O.P.R.H.C.T.

STEPHENSON
COA - RAIN GARDEN POND CALCULATIONS
APPENDIX R-11

Drainage Data:

Drainage Area to Control (DA)	0.13	ac.		
Drainage Area Impervious Cover	55.00	%	0.07	ac.
Capture Depth (CD)	0.85	in.		
25 year Peak Flow Rate to Control (Q25)	0.40	cfs		
100 year Peak Flow Rate to Control (Q100)	0.60	cfs		

Water Quality Control Calculations:	**Required**		**Provided**	
Water Quality Volume (WQV=CD*DA*3630)	401	cf.	411	cf.
100 Year Peak Flow Rate to Control (Q100)	1	cf.		
Filtration Pond Area (Af)	257	sf.	744	sf.
Depth of Ponding (D)	Max. 1	ft.	0.75	ft.
Depth of Filtration Media (L)	Min. 1.5	ft.	1.5	ft.
Effective Perosity Water Quality Volume			268	cf.
Ponded Water Quality Volume			143	cf.
		Total WQV	411	cf.
Water Quality Elevation (WQE)			1161.25	ft. MSL
Elevation of Splitter/Overflow Weir (Minimum WQE)			1.0	ft. MSL

For Infiltration Rain Garden

Infiltration Rate	0.795	in/hr.
Rain Garden Pond Drawdown Time	48	hr.

Stage-Area-Storage Table

Rain Garden

Stage (ft.)	Area (sf.)	Storage (cf.) (Cumulative)
1160.50	447	0
1161.25	588	441
1161.50	744	627

Texas Commission on Environmental Quality

TSS Removal Calculations 04-20-2009

Project Name: Stephenson
Date Prepared: 3/3/2025

Additional information is provided for cells with a red triangle in the upper right corner. Place the cursor over the cell.
Text shown in blue indicate location of instructions in the Technical Guidance Manual - RG-348
Characters shown in red are data entry fields.
Characters shown in black (Bold) are calculated fields. Changes to these fields will remove the equations used in the spreadsheet.

1. The Required Load Reduction for the total project: Calculations from RG-348 Pages 3-27 to 3-30

Page 3-29 Equation 3.3: $L_M = 27.2(A_N \times P)$

where:
$L_{M\ TOTAL\ PROJECT}$ = Required TSS removal resulting from the proposed development = 80% of increased load
A_N = Net increase in impervious area for the project
P = Average annual precipitation, inches

Site Data: Determine Required Load Removal Based on the Entire Project

County =	Hays	
Total project area included in plan * =	1.37	acres
Predevelopment impervious area within the limits of the plan * =	0.23	acres
Total post-development impervious area within the limits of the plan* =	0.56	acres
Total post-development impervious cover fraction * =	0.41	
P =	33	inches
$L_{M\ TOTAL\ PROJECT}$ =	296	lbs.

* The values entered in these fields should be for the total project area.

Number of drainage basins / outfalls areas leaving the plan area = 1

2. Drainage Basin Parameters (This information should be provided for each basin):

Drainage Basin/Outfall Area No. = 1

Total drainage basin/outfall area =	0.13	acres
Predevelopment impervious area within drainage basin/outfall area =	0.01	acres
Post-development impervious area within drainage basin/outfall area =	0.06	acres
Post-development impervious fraction within drainage basin/outfall area =	0.46	
$L_{M\ THIS\ BASIN}$ =	45	lbs.

3. Indicate the proposed BMP Code for this basin.

Proposed BMP = Retention / Irrigation
Removal efficiency = 100 percent

Aqualogic Cartridge Filter
Bioretention
Contech StormFilter
Constructed Wetland
Extended Detention
Grassy Swale
Retention / Irrigation
Sand Filter
Stormceptor
Vegetated Filter Strips
Vortechs
Wet Basin
Wet Vault

4. Calculate Maximum TSS Load Removed (L_R) for this Drainage Basin by the selected BMP Type.

RG-348 Page 3-33 Equation 3.7: L_R = (BMP efficiency) x P x (A_I x 34.6 + A_P x 0.54)

where:
A_C = Total On-Site drainage area in the BMP catchment area
A_I = Impervious area proposed in the BMP catchment area
A_P = Pervious area remaining in the BMP catchment area
L_R = TSS Load removed from this catchment area by the proposed BMP

A_C =	0.13	acres
A_I =	0.06	acres
A_P =	0.07	acres
L_R =	70	lbs

5. Calculate Fraction of Annual Runoff to Treat the drainage basin / outfall area

Desired $L_{M\ THIS\ BASIN}$ = 50 lbs.

F = 0.72

6. Calculate Capture Volume required by the BMP Type for this drainage basin / outfall area. Calculations from RG-348 Pages 3-34 to 3-36

Rainfall Depth =	0.83	inches
Post Development Runoff Coefficient =	0.34	
On-site Water Quality Volume =	132	cubic feet

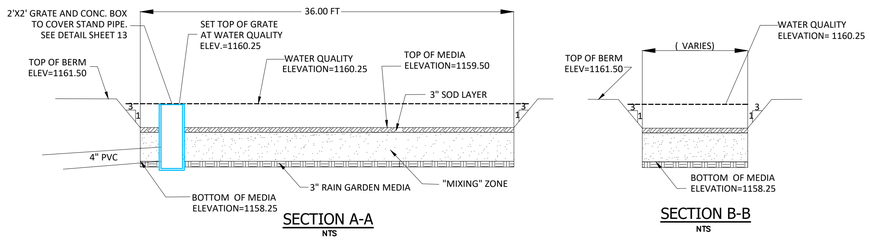
Calculations from RG-348 Pages 3-36 to 3-37

Off-site area draining to BMP =	0.00	acres
Off-site Impervious cover draining to BMP =	0.00	acres
Impervious fraction of off-site area =	0	
Off-site Runoff Coefficient =	0.00	
Off-site Water Quality Volume =	0	cubic feet
Storage for Sediment =	26	
Total Capture Volume (required water quality volume(s) x 1.20) =	159	cubic feet

The following sections are used to calculate the required water quality volume(s) for the selected BMP.
The values for BMP Types not selected in cell C45 will show NA.

7. Retention/Irrigation System Designed as Required in RG-348 Pages 3-42 to 3-46

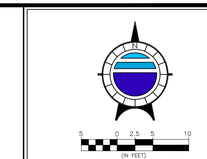
Required Water Quality Volume for retention basin =	159	cubic feet	
Irrigation Area Calculations:			
Soil infiltration/permeability rate =	0.1	in/hr	Enter determined permeability rate or assumed value of 0.1
Irrigation area =	635	square feet	
	0.01	acres	



SECTION A-A
NTS

SECTION B-B
NTS

RAIN GARDEN- FULL INFILTRATION (EARTHEN)
NTS



LEGEND

XXX	EXISTING CONTOUR
XXX	PROPOSED CONTOUR
	PROPERTY BOUNDARY
TC	TOP OF CURB ELEVATION
TP	TOP OF PAVEMENT ELEVATION
TG	TOP OF GRATE ELEVATION
+ 604.00	SPOT ELEVATION

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W. Ste. 160
Austin, TX 78735, Tel: (512)-583-2600
www.doucetengineers.com
TBPE Firm Number: 2337
TBPELS Firm Number: 10105800

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

RAIN GARDEN

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
REGISTERED PROFESSIONAL ENGINEER
6-17-25

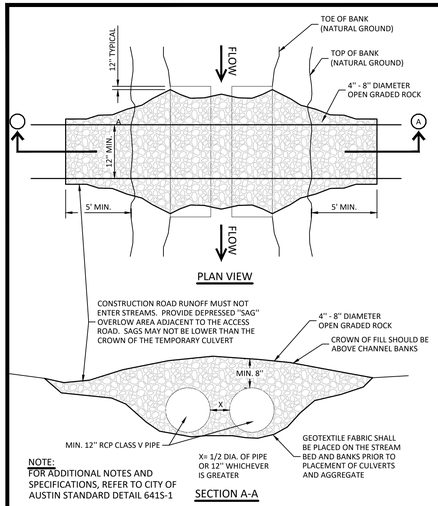
Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

SHEET
15
OF 33

Project No.:
1577-009C
SD2024-022

1134

Drawing: c:\pwworking\klf-dcs-prod\richard.elizondo\d0224841\1577009C-CD-BUILDING-GRADING.dwg
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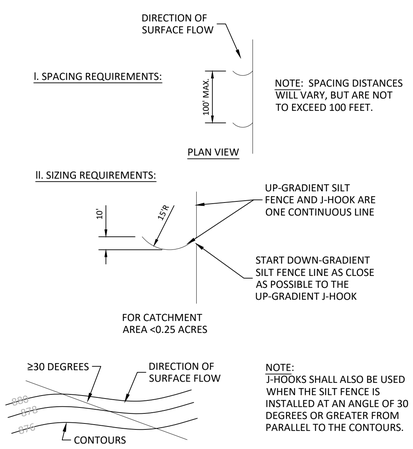


NOTE:
FOR ADDITIONAL NOTES AND SPECIFICATIONS, REFER TO CITY OF AUSTIN STANDARD DETAIL 641S-1

XX
XX

STABILIZED CONSTRUCTION ENTRANCE WITH CULVERT CROSSING

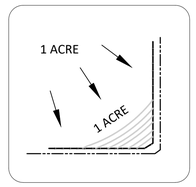
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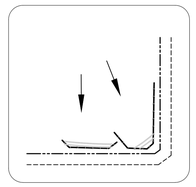
SILT FENCE "J" - HOOK DETAIL

SCALE: NONE (COA DETAIL: ECM FIGURE 1.4.5.G.4)

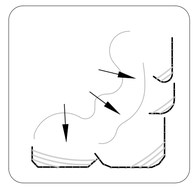
CUST 388

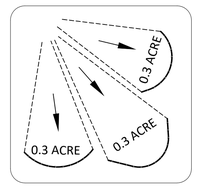


INCORRECT - DO NOT LAYOUT "PERIMETER CONTROL" SILT FENCES ALONG PROPERTY LINES. ALL SEDIMENT LADEN RUNOFF WILL CONCENTRATE AND OVERWHELM THE SYSTEM



CORRECT - INSTALL "J"-HOOKS



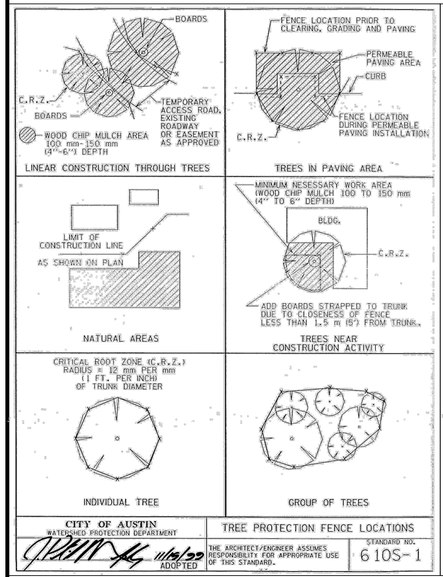


DISCREET SEGMENTS OF SILT FENCES, INSTALLED WITH "J"-HOOKS OR "SMILES" WILL BE MUCH MORE EFFECTIVE

SILT FENCE PLACEMENT FOR PERIMETER CONTROL

SCALE: NONE COA DETAIL: ECM FIGURE 1.4.5.G.3

CUST 456



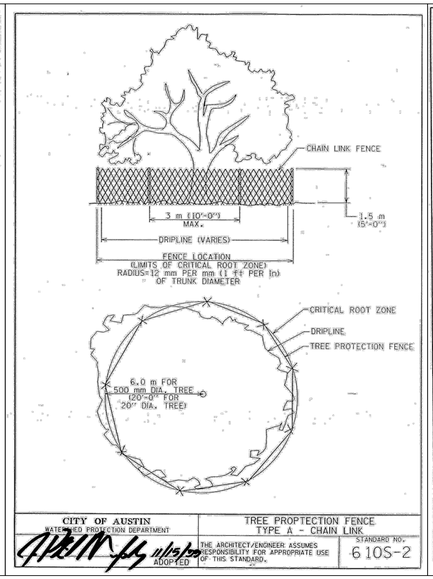
CITY OF AUSTIN
WATERSHED PROTECTION DEPARTMENT

TREE PROTECTION FENCE LOCATIONS

11/19/99 ADOPTED

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

STANDARD NO. 610S-1



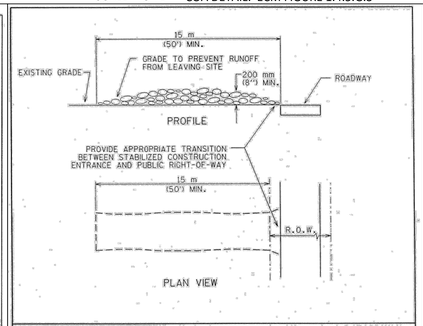
CITY OF AUSTIN
WATERSHED PROTECTION DEPARTMENT

TREE PROPTECTION FENCE
TYPE A - CHAIN LINK

11/19/99 ADOPTED

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

STANDARD NO. 610S-2



NOTES:
1. STONE SIZE: 75-125 mm (3-5") OPEN GRADED ROCK.
2. LENGTH: AS EFFECTIVE BUT NOT LESS THAN 15 m (50').
3. THICKNESS: NOT LESS THAN 200 mm (8").
4. WIDTH: NOT LESS THAN FULL WIDTH OF ALL POINTS OF INGRESS/EGRESS.
5. WASHING: WHEN NECESSARY, VEHICLE WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC ROADWAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH CRUSHED STONE AND DRAINS INTO AN APPROVED TRAP OR SEDIMENT BASIN. ALL SEDIMENT SHALL BE PREVENTED FROM ENTERING ANY STORM DRAIN, DITCH OR WATERCOURSE USING APPROVED METHODS.
6. MAINTENANCE: THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC ROADWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND, AS WELL AS REPAIR AND CLEAN OUT OF ANY MEASURE DEVICES USED TO TRAP SEDIMENT. ALL SEDIMENTS THAT IS SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC ROADWAY MUST BE REMOVED IMMEDIATELY.
7. DRAINAGE: ENTRANCE MUST BE PROPERLY GRADED OR INCORPORATE A DRAINAGE SWALE TO PREVENT RUNOFF FROM LEAVING THE CONSTRUCTION SITE.

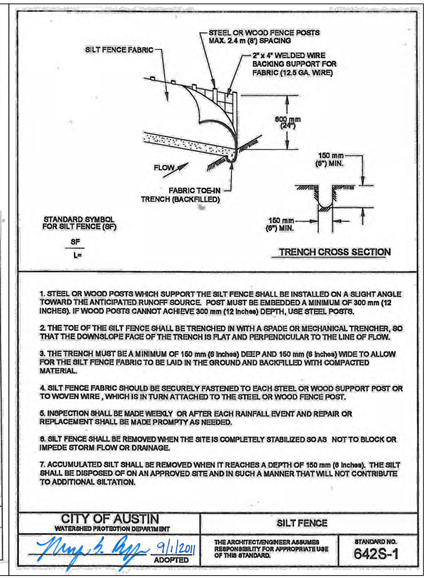
CITY OF AUSTIN
WATERSHED PROTECTION DEPARTMENT

STABILIZED CONSTRUCTION ENTRANCE

5/23/00 ADOPTED

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

STANDARD NO. 641S-1



1. STEEL OR WOOD POSTS WHICH SUPPORT THE SILT FENCE SHALL BE INSTALLED ON A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POST MUST BE EMBEDDED A MINIMUM OF 300 mm (12 INCHES). IF WOOD POSTS CANNOT ACHIEVE 300 mm (12 Inches) DEPTH, USE STEEL POSTS.

2. THE TOE OF THE SILT FENCE SHALL BE TRENCHED IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW.

3. THE TRENCH MUST BE A MINIMUM OF 150 mm (6 Inches) DEEP AND 150 mm (6 Inches) WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.

4. SILT FENCE FABRIC SHOULD BE SECURELY FASTENED TO EACH STEEL OR WOOD SUPPORT POST OR TO WOVEN WIRE, WHICH IS IN TURN ATTACHED TO THE STEEL OR WOOD FENCE POST.

5. INSPECTION SHALL BE MADE WEEKLY OR AFTER EACH RAINFALL EVENT AND REPAIR OR REPLACEMENT SHALL BE MADE PROMPTLY AS NEEDED.

6. SILT FENCE SHALL BE REMOVED WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.

7. ACCUMULATED SILT SHALL BE REMOVED WHEN IT REACHES A DEPTH OF 150 mm (6 Inches). THE SILT SHALL BE DISPOSED OF ON AN APPROVED SITE AND IN SUCH A MANNER THAT WILL NOT CONTRIBUTE TO ADDITIONAL SILTATION.

CITY OF AUSTIN
WATERSHED PROTECTION DEPARTMENT

SILT FENCE

9/1/2011 ADOPTED

THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

STANDARD NO. 642S-1

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W. Ste. 160
Austin, TX 78735. Tel: (512)-583-2600
www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN

311 OLD FITZHUGH ROAD,

HAYS COUNTY, DRIPPING SPRINGS, TEXAS

EROSION CONTROL DETAILS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
REGISTERED
PROFESSIONAL ENGINEER

6-17-25

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

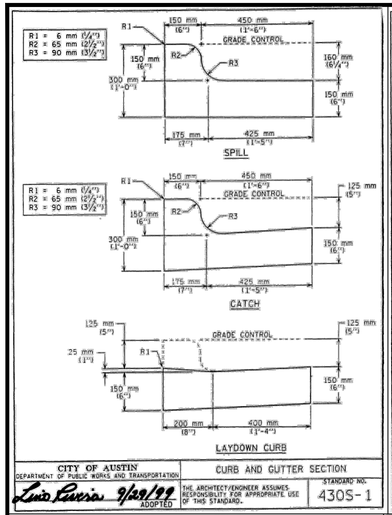
SHEET
16
OF 33

Project No.:
1577-009C
SD2024-022

1135

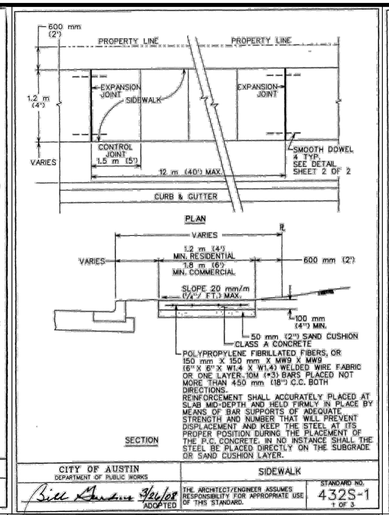
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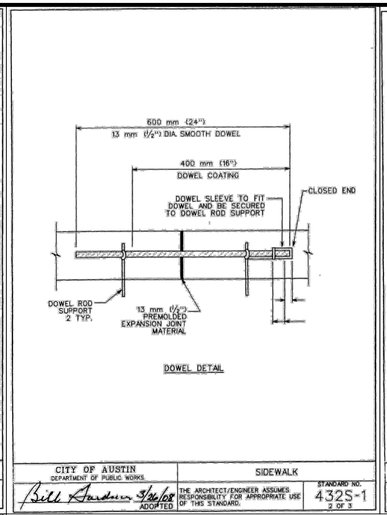
CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS — CURB AND GUTTER SECTION

Luis Parras 9/29/99 ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 430S-1



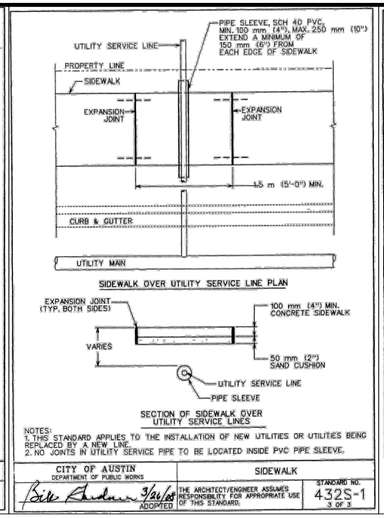
CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS — SIDEWALK

Bill Gordon 9/26/08 ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-1 1 OF 3



CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS — SIDEWALK

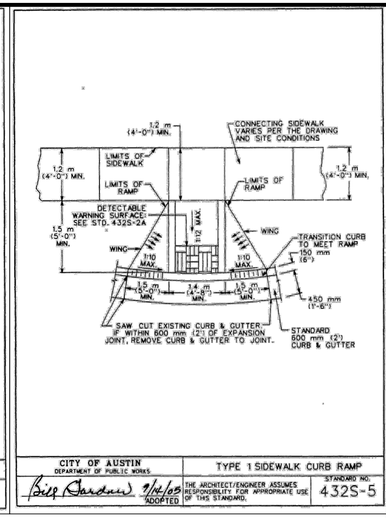
Bill Gordon 9/26/08 ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-1 2 OF 3



NOTES:
1. THIS STANDARD APPLIES TO THE INSTALLATION OF NEW UTILITIES OR UTILITIES BEING REPLACED BY A NEW LINE.
2. NO JOINTS IN UTILITY SERVICE PIPE TO BE LOCATED INSIDE PVC PIPE SLEEVE.

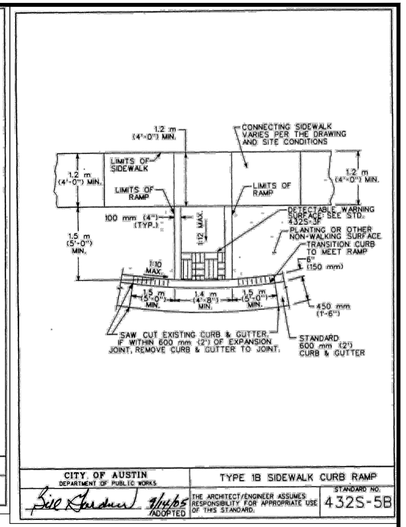
CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS — SIDEWALK

Bill Gordon 9/26/08 ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-1 3 OF 3



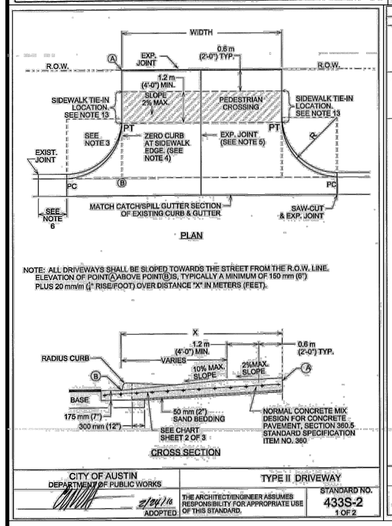
CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS — TYPE 1 SIDEWALK CURB RAMP

Bill Gordon 9/16/05 ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-5



CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS — TYPE 1B SIDEWALK CURB RAMP

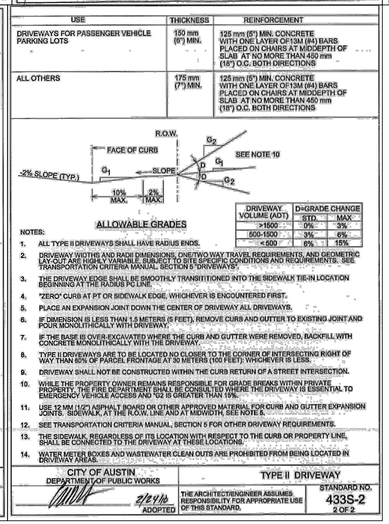
Bill Gordon 9/16/05 ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 432S-5B



CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS — TYPE II DRIVEWAY

ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 433S-2 1 OF 2

USE	THICKNESS	REINFORCEMENT
DRIVEWAYS FOR PASSENGER VEHICLE PARKING LOTS	150 mm (6") MIN.	125 mm (5") MIN. CONCRETE WITH ONE LAYER OF 13M (#4) BARS PLACED ON CHAIRS AT MIDDEPTH OF SLAB AT NO MORE THAN 450 mm (18") O.C. BOTH DIRECTIONS
ALL OTHERS	175 mm (7") MIN.	125 mm (5") MIN. CONCRETE WITH ONE LAYER OF 13M (#4) BARS PLACED ON CHAIRS AT MIDDEPTH OF SLAB AT NO MORE THAN 450 mm (18") O.C. BOTH DIRECTIONS

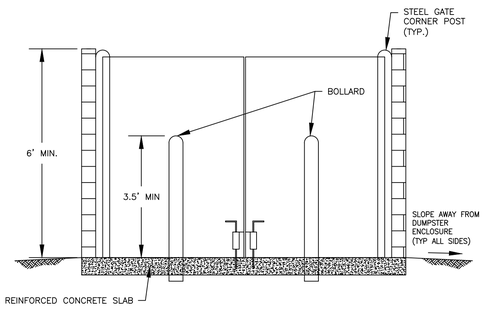


DRIVEWAY VOLUME (ADT)	D=GRADE CHANGE STD.	MAX
>1500	0%	3%
500-1500	3%	6%
<500	8%	15%

NOTES:
1. ALL TYPE II DRIVEWAYS SHALL HAVE RADIUS ENDS.
2. DRIVEWAY WIDTHS AND RADII DIMENSIONS, ONE/TWO WAY TRAVEL REQUIREMENTS, AND GEOMETRIC LAY-OUT ARE HIGHLY VARIABLE, SUBJECT TO SITE SPECIFIC CONDITIONS AND REQUIREMENTS. SEE TRANSPORTATION CRITERIA MANUAL, SECTION 9 "DRIVEWAYS".
3. THE DRIVEWAY EDGE SHALL BE SMOOTHLY TRANSITIONED INTO THE SIDEWALK TIE-IN LOCATION BEGINNING AT THE RADIUS PC LINE.
4. "ZERO" CURB AT PT OR SIDEWALK EDGE, WHICHEVER IS ENCOUNTERED FIRST.
5. PLACE AN EXPANSION JOINT DOWN THE CENTER OF DRIVEWAY ALL DRIVEWAYS.
6. IF DIMENSION IS LESS THAN 1.5 METERS (5 FEET), REMOVE CURB AND GUTTER TO EXISTING JOINT AND POUR MONOLITHICALLY WITH DRIVEWAY.
7. IF THE BASE IS OVER-EXCAVATED WHERE THE CURB AND GUTTER WERE REMOVED, BACKFILL WITH CONCRETE MONOLITHICALLY WITH THE DRIVEWAY.
8. TYPE II DRIVEWAYS ARE TO BE LOCATED NO CLOSER TO THE CORNER OF INTERSECTING RIGHT OF WAY THAN 80% OF PARCEL FRONTAGE AT 30 METERS (100 FEET); WHICHEVER IS LESS.
9. DRIVEWAY SHALL NOT BE CONSTRUCTED WITHIN THE CURB RETURN OF A STREET INTERSECTION.
10. WHILE THE PROPERTY OWNER REMAINS RESPONSIBLE FOR GRADE BREAKS WITHIN PRIVATE PROPERTY, THE FIRE DEPARTMENT MAY REQUIRE REVISIONS WHERE THE DRIVEWAY IS ESSENTIAL TO EMERGENCY VEHICLE ACCESS AND 10% IS GREATER THAN 19%.
11. USE 12 MM (1/2") ASPHALT BOARD OR OTHER APPROVED MATERIAL FOR CURB AND GUTTER EXPANSION JOINTS. SIDEWALK, AT THE R.O.W. LINE AND AT MIDWIDTH, SEE NOTE 5.
12. SEE TRANSPORTATION CRITERIA MANUAL, SECTION 6 FOR OTHER DRIVEWAY REQUIREMENTS.
13. THE SIDEWALK, REGARDLESS OF ITS LOCATION WITH RESPECT TO THE CURB OR PROPERTY LINE, SHALL BE CONNECTED TO THE DRIVEWAY AT THESE LOCATIONS.
14. WATER METER BOXES AND WASTEWATER CLEAN OUTS ARE PROHIBITED FROM BEING LOCATED IN DRIVEWAY AREAS.

CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS — TYPE II DRIVEWAY

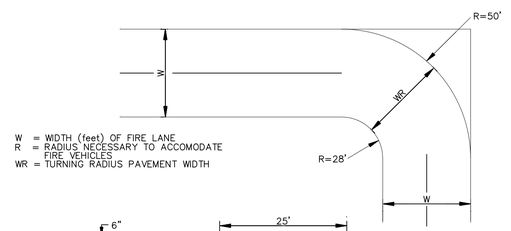
ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. — STANDARD NO. 433S-2 2 OF 2



NOTES:

1. DUMPSTER ENCLOSURE SHALL BE LOCATED ON THE SIDE OR REAR OF THE BUILDING AND SCREENED FROM GROUND LEVEL PUBLIC VIEW.
2. DUMPSTER ENCLOSURE MUST BE LOCATED AT LEAST 50' AWAY FROM RESIDENTIAL ZONING DISTRICTS OR LAND USES, WITH THE EXCEPTION OF MULTI-FAMILY-ZONED PROPERTY.
3. DUMPSTER ENCLOSURE MAY ENCROACH NO MORE THAN 10' INTO THE SIDE OR REAR SETBACK, BUT AT NO TIME MAY THEY ENCROACH INTO THE FRONT SETBACK OR WITHIN A SETBACK ADJACENT TO SINGLE FAMILY.
4. DUMPSTER BINS SHALL BE LOCATED ON A MINIMUM 6" REINFORCED CONCRETE SLAB.
5. DUMPSTER BINS SHALL BE SCREENED ON FOUR SIDES, USING AN ENCLOSURE THAT SCREENS THE BINS FROM VIEW AT THE PROPERTY LINES. SCREENING SHALL BE A MINIMUM OF 6' IN HEIGHT AND AS TALL AS THE CONTAINER, AND SHALL BE COMPOSED OF:
   a. NATIVE STONE MASONRY AND COLOR SCHEMES CONSISTENT WITH THE PRIMARY BUILDING.
   b. A MINIMUM OF TWO (2) CONCRETE FILLED 6" STEEL BOLLARDS ADJACENT TO THE REAR WALL TO EXTEND A MINIMUM OF 18" BELOW GRADE.
6. DUMPSTER ENCLOSURES SHALL HAVE SPRING LOADED OPAQUE STEEL GATES WITH HINGES AND FASTENERS TO KEEP THEM CLOSED. GATES ON THE ENCLOSURE SHALL BE HINGED ON THE OUTSIDE OF EACH CORNER POST TO ALLOW THE GATES TO OPEN A MINIMUM OF 110 DEGREES. WHEN IN USE, TIEBACKS SHALL BE USED TO SECURE THE STEEL GATES IN THE OPEN POSITION.
7. THE INGRESS, EGRESS, AND APPROACH SHALL CONFORM TO FIRE LANE REQUIREMENTS.
8. SCREENING SHALL BE MAINTAINED BY THE OWNER AT ALL TIMES.
9. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSION STRENGTH OF 3000 PSI.

DUMPSTER ENCLOSURE



W = WIDTH (feet) OF FIRE LANE
R = RADIUS NECESSARY TO ACCOMODATE FIRE VEHICLES
WR = TURNING RADIUS PAVEMENT WIDTH

FIRE LANE STRIPING

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W. Ste. 160
Austin, TX 78735. Tel: (512)-583-2600
www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

Item 2.

SITE DETAILS 1

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E.. TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS — JOE GRASSO — 73285 — REGISTERED PROFESSIONAL ENGINEER
6-17-25

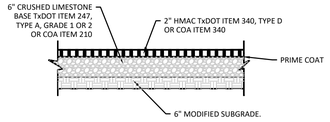
Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

SHEET
17
OF 33

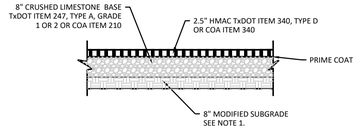
Project No.: 1577-009C
SD2024-022

1136

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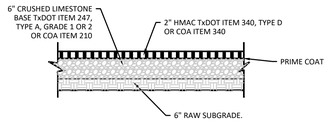
LIGHT DUTY ASPHALT PAVEMENT SECTION



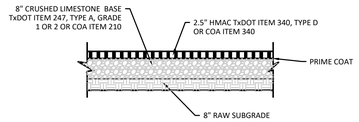
MEDIUM DUTY ASPHALT PAVEMENT SECTION

NOTE1 : GEOGRID MAY BE USED IN LIEU OF MODIFIED SUBGRADE

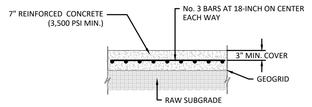
PAVEMENT SECTION WITH MODIFIED SUBGRADE



LIGHT DUTY ASPHALT PAVEMENT SECTION



MEDIUM DUTY ASPHALT PAVEMENT SECTION



HEAVY DUTY CONCRETE PAVEMENT

PAVEMENT SECTION WITH RAW SUBGRADE

Hot Mix Asphaltic Concrete (HMAC) Courses - The HMAC surface course should be plant mixed, hot laid Type D. Each mix should meet the master specifications requirements of 2014 TxDOT Standard Specifications Item 341, Item SS 3224 (2011) and specific criteria for the job mix formula.

Flexible Base Material - Flexible Base Material should meet the requirements of TxDOT 2014 Standard Specifications Item 247, Grade 1-2, Type A. The crushed limestone base material should be compacted to at least 95 percent in accordance with ASTM D 1557 and within the range of 2 percentage points below to 2 percentage points above the material's optimum moisture content.

Modified Subgrade - Due to the presence of clay (with a PI over 20) and low plasticity soils, both lime stabilization and cement modification of the pavement subgrade can be considered at this site. Recommendations for both lime stabilized subgrade and cement modified subgrade are provided below:

Lime Stabilized Subgrade – Due to the presence of clayey soils (with a PI over 20) at this site, the pavement subgrade may be treated with hydrated lime. The subgrade should be scarified to a depth of 8 inches and mixed with a minimum 6 percent hydrated lime (by dry soil weight) in conformance with TxDOT Standard Specification Item 260. The actual amount of lime required should be confirmed by additional laboratory tests (ASTM C 977 Appendix XI) prior to construction. The soil-lime mixture should be compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 0 to 4 percentage points above the mixture's optimum moisture content. In

all areas where hydrated lime is used to stabilize subgrade soil, routine Atterberg-limit tests should be performed to verify the resulting Plasticity Index of the soil-lime mixture is at/or below 20 percent. **In addition, the clay soils at the final pavement subgrade should be tested for the presence of soluble sulfates prior to the use of lime.** Subgrade preparation utilizing lime stabilization as described herein will not prevent normal seasonal movement of the underlying untreated materials.

Cement Stabilized Subgrade – The pavement subgrade should be scarified to a depth of 8 inches and mixed with 4 percent of Portland Cement (by dry unit weight) in conformance with TxDOT Item 275. The soil-cement mixture should be compacted to at least 95 percent of the standard Proctor maximum dry density (ASTM D 698) and within the range of -1 to +3 percentage points of the mixture's optimum moisture content. **Cement stabilized soil should be micro-cracked where asphalt concrete pavement is utilized to reduce future pavement cracking. The micro-cracking should be performed with a minimum of one pass of a vibratory roller.**

Geogrid – Geogrid may be used in lieu of the 8 inches of modified subgrade for asphalt pavements. The geogrid should consist of Tensar TX130S, Tensar Biaxial Type 1 or geogrid that meets TXDOT Type 2 geogrid specifications. The geogrid should be placed at the bottom of the flexible base material layer. However, the pavement subgrade should consist of Recompacted Subgrade (see below).

Recompacted Subgrade - The subgrade should be scarified to a depth of 8 inches and compacted to a dry density of at least 95 percent in accordance with ASTM D 698 and within the range of 0 to +4 percentage points of optimum moisture content.

6.3 Pavement Subgrade Preparation

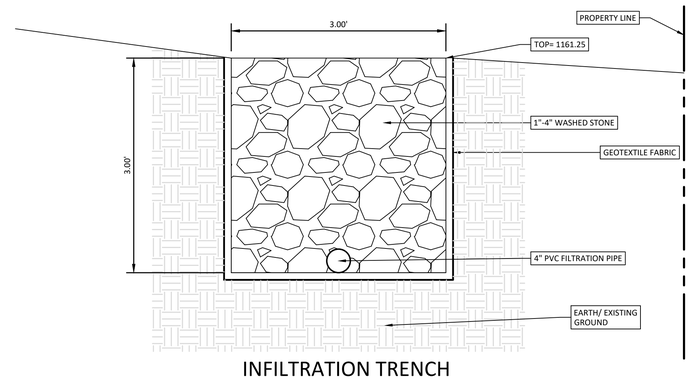
The pavement subgrade is expected to consist of natural undisturbed cohesive soils or fill material in cut areas, and cohesive fill utilizing soils taken from the cut to raise grades where required. The native clay soils are moderately plastic and will be susceptible to shrink/swell movements associated with moisture changes. Areas of the site within the proposed pavement sections should be excavated to sufficient depths to expose clay soils. The clay soils should be scarified to a depth of 6 inches and compacted at 95 percent of the maximum dry density as determined by ASTM D698. The moisture content should be within the range of 0 to +4 percentage points of optimum. At least 6 inches of granular structural fill should be placed as soon as possible after compaction of clay soils in order to limit moisture loss within the upper clays.

We understand a drainage layer may be used directly under the pavement section. If used, the pavement recommendations for raw subgrade (without subgrade modification) provided in **Table 3** should be used. The drainage layer should be separated from the above flexible base material using a non-woven filter fabric (Mirafi 140N, or equivalent) to prevent intrusion of flexible base material into the drainage layer.

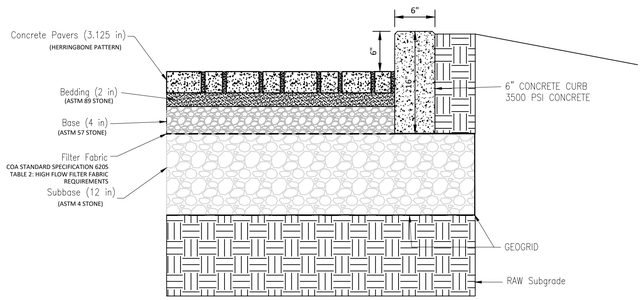
Table 3 – AASHTO Flexible Pavement Specifications

	FLEXIBLE PAVEMENT SYSTEM (inches)			
	Raw Subgrade		Modified Subgrade	
Materials	Light Duty	Medium Duty	Light Duty	Medium Duty
HMAC Surface Course – Type D	2.0	2.0	2.0	2.5
Flexible Base Material	8.0	12.0	6.0	8.0
Modified Subgrade [1]	----	----	8.0	8.0
Recompacted Subgrade	8.0	8.0	----	----

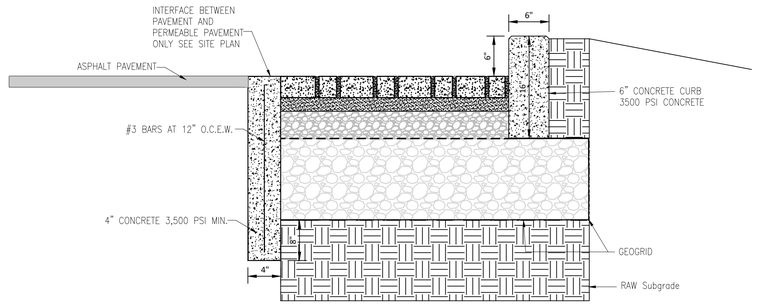
[1] *Geogrid may be used in lieu of the 8-inch Modified Subgrade. Criteria for geogrid can be found in Section 6.2.*



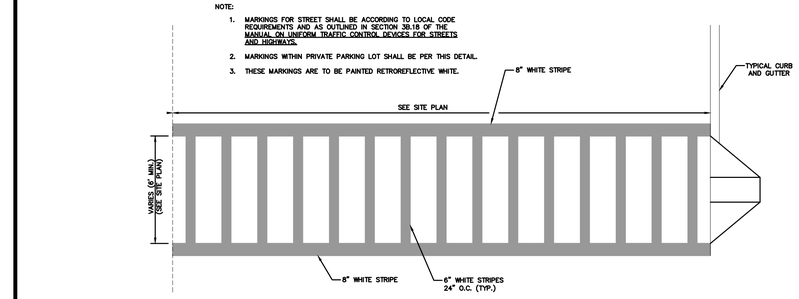
INFILTRATION TRENCH



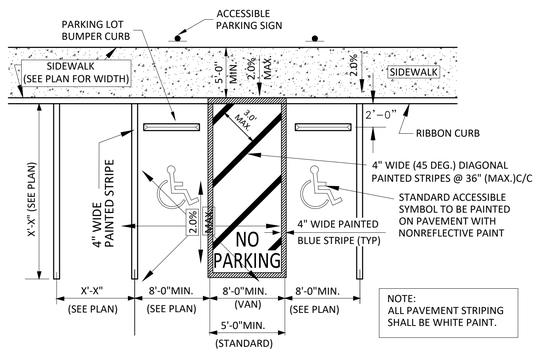
TYPICAL PERMEABLE PAVER SECTION



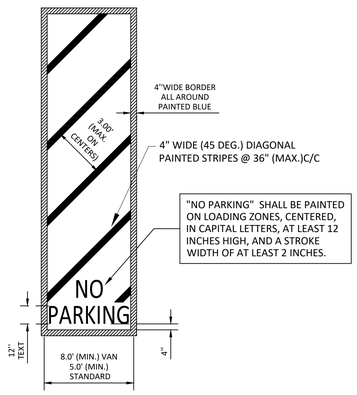
PERMEABLE PAVER ASPHALT PAVEMENT INTERFACE SECTION



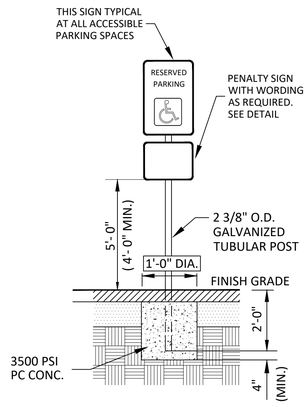
PEDESTRIAN CROSSWALK



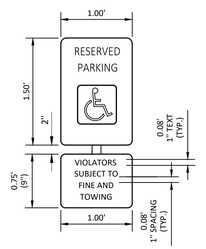
PAINTED STRIPE SHALL CONFORM TO CITY OF AUSTIN STANDARD SPECIFICATIONS.



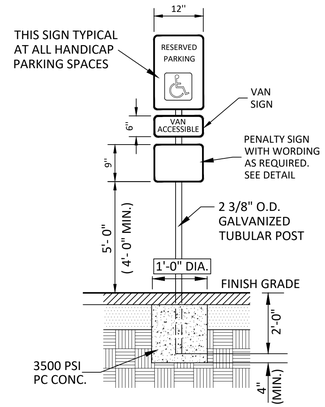
ACCESSIBLE PARKING SPACE LAYOUT



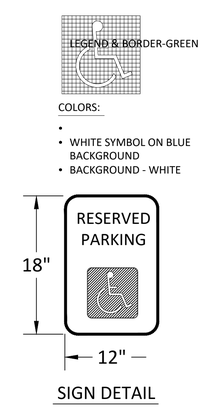
- STANDARD ACCESSIBLE SIGN



PENALTY SIGN



- VAN ACCESSIBLE SIGN



SIGN DETAIL

NOT TO SCALE

VAN AND STANDARD ACCESSIBLE PARKING SIGNS

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W. Ste. 160
Austin, TX 78735, Tel: (512)-583-2600
www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

SITE DETAILS 2

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
LICENSED
PROFESSIONAL ENGINEER
6-17-25

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

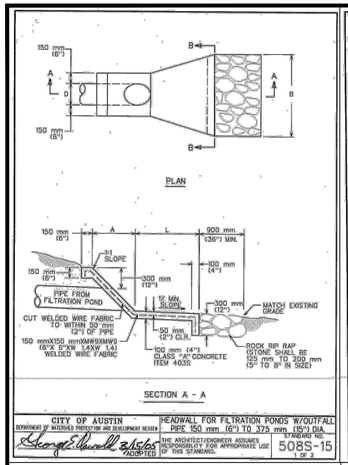
SHEET
18
OF 33

Project No.:
1577-009C
SD2024-022

1137

Item 2.

Drawing: C:\pwworking\atl-dct-prod\richard.elizondo\d0206639\1577009C-CD-DETAILS.dwg
User: RELIZONDO
Last Modified: Jun. 10, 25 - 10:07
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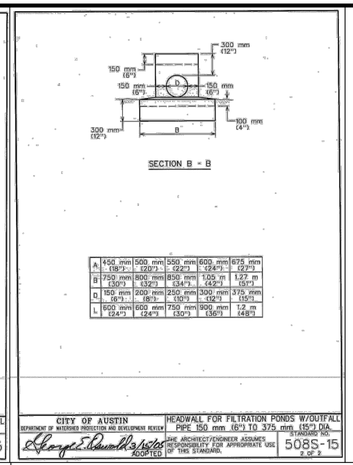
CITY OF AUSTIN — DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW

HEADWALL FOR FILTRATION PONDS W/OUTFALL PIPE 150 mm (6") TO 375 mm (15") DIA.

ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

STANDARD NO. 508S-15

1 OF 2



A	450 mm (18")	500 mm (20")	550 mm (22")	600 mm (24")	675 mm (27")
B	750 mm (30")	800 mm (32")	850 mm (34")	1.05 m (42")	1.27 m (51")
D	150 mm (6")	200 mm (8")	250 mm (10")	300 mm (12")	375 mm (15")
L	600 mm (24")	600 mm (24")	750 mm (30")	900 mm (36")	1.2 m (48")

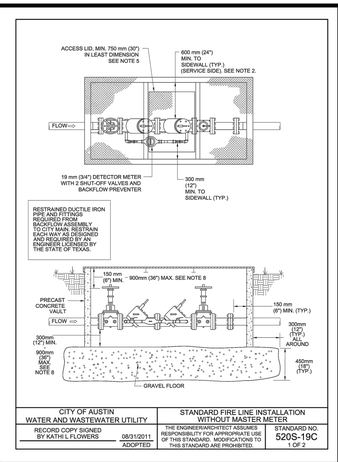
CITY OF AUSTIN — DEPARTMENT OF WATERSHED PROTECTION AND DEVELOPMENT REVIEW

HEADWALL FOR FILTRATION PONDS W/OUTFALL PIPE 150 mm (6") TO 375 mm (15") DIA.

ADOPTED — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

STANDARD NO. 508S-15

2 OF 2



CITY OF AUSTIN — WATER AND WASTEWATER UTILITY

STANDARD FIRE LINE INSTALLATION WITHOUT MASTER METER

RECORD COPY SIGNED BY KATHI L FLOWERS — 08/31/2011 ADOPTED

THE ENGINEER/ARCHITECT ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. MODIFICATIONS TO THIS STANDARD ARE PROHIBITED.

STANDARD NO. 520S-19C

1 OF 2

NOTES:

1. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL HAVE LAB AND FIELD APPROVAL FROM THE UNIVERSITY OF SOUTHERN CALIFORNIA FOUNDATION FOR CROSS CONNECTION CONTROL AND HYDRAULIC RESEARCH.
2. TEST PORTS SHALL BE DIRECTED UPWARD AND PLUGGED. TEST PORTS ARE LOCATED ON SERVICE SIDE. PLUGS SHALL BE NON-FERROUS.
3. BACKFLOW PREVENTION ASSEMBLIES SHALL BE INSTALLED IN THE UPRIGHT HORIZONTAL POSITION, UNLESS OTHERWISE APPROVED. BACKFLOW PREVENTION ASSEMBLIES SHALL NOT BE ROTATED ON THEIR AXIS.
4. CLEARANCE SHALL BE AS INDICATED AND IN THE STANDARD CROSS CONNECTION ORDINANCES AND UCM.
5. ACCESS OPENING MUST BE LARGE ENOUGH TO REMOVE LARGEST PORTION OF BACKFLOW PREVENTER, BUT NOT LESS THAN 750 mm (30") IN LEAST DIMENSION.
6. TEST AND MAINTENANCE REPORT SHALL BE RECEIVED BY AUSTIN WATER UTILITY'S SPECIAL SERVICE GROUP WITHIN 5 BUSINESS DAYS OF TESTING.
7. VAULT SHALL BE DESIGNED FOR TRAFFIC LOADS.
8. VAULT DEPTH MAY NOT EXCEED 1.8m (72"), BOTTOM OF LID TO TOP OF FLOOR.
9. HAND WHEELS SHALL BE HORIZONTALLY LOCATED WITHIN 300mm (12") OF ACCESS OPENING.
10. FOR ACCESS DOORS SEE SPL WW-614 OR APPROVED EQUAL (H20 LOADING REQUIRED).
11. FOR VAULT SEE SPL WW-298 OR APPROVED EQUAL (H20 LOADING REQUIRED).
12. VAULT PIPE WALL VOIDS SHALL BE SEALED WITH NON-SHRINK GROUT OR SEALANT PER SPL WW-146A OR APPROVED EQUAL.
13. THE TOP OF THE METER VAULT SHALL BE AT AN ELEVATION SUCH THAT THE SURROUNDING GROUND SLOPES AWAY FROM THE VAULT. ADDITIONAL DRAINAGE CONSIDERATION SUCH AS CONNECTION OF VAULT TO STORM SEWER, LATERAL DRAIN LINES FROM GRAVEL BED OR OTHER MEANS SHALL BE REQUIRED IF CONDITIONS CAUSE WATER TO COLLECT IN VAULT.

CITY OF AUSTIN — WATER AND WASTEWATER UTILITY

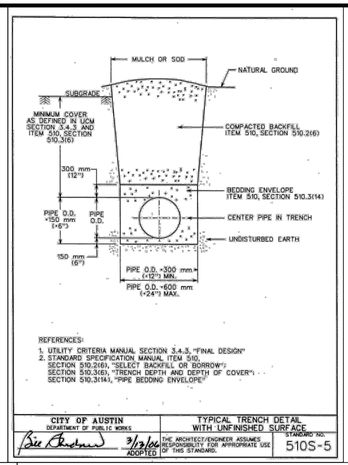
STANDARD FIRE LINE INSTALLATION WITHOUT MASTER METER

RECORD COPY SIGNED BY KATHI L FLOWERS — 08/31/2011 ADOPTED

THE ENGINEER/ARCHITECT ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. MODIFICATIONS TO THIS STANDARD ARE PROHIBITED.

STANDARD NO. 520S-19C

2 OF 2



REFERENCES:

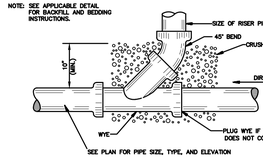
1. UTILITY CRITERIA MANUAL SECTION 3.4.3, "FINAL DESIGN"
2. STANDARD SPECIFICATION MANUAL ITEM 510,
   SECTION 510.2(6), "SELECT BACKFILL OR BORROW"
   SECTION 510.3(6), "TRENCH DEPTH AND DEPTH OF COVER"
   SECTION 510.3(14.), "PIPE BEDDING ENVELOPE"

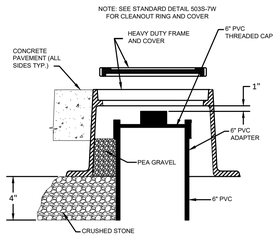
CITY OF AUSTIN — DEPARTMENT OF PUBLIC WORKS

TYPICAL TRENCH DETAIL WITH UNFINISHED SURFACE

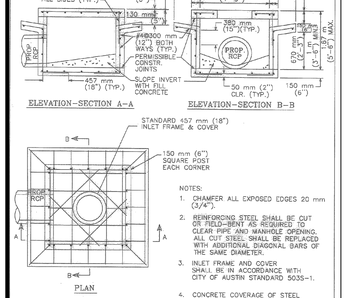
ADOPTED 3/13/96 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

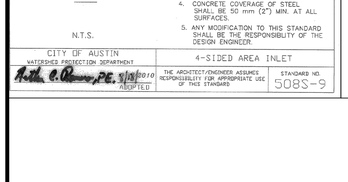
STANDARD NO. 510S-5





SINGLE WASTEWATER CLEAN-OUT (PRIVATE)





NOTES:

1. CHAMFER ALL EXPOSED EDGES 20 mm (3/4").
2. REINFORCING STEEL SHALL BE CUT OR FIELD-BENT AS REQUIRED TO CLEAR PIPE AND MANHOLE OPENING. ALL CUT STEEL SHALL BE REPLACED WITH ADDITIONAL DIAGONAL BARS OF THE SAME DIAMETER.
3. INLET FRAME AND COVER SHALL BE IN ACCORDANCE WITH CITY OF AUSTIN STANDARD 503S-1.
4. CONCRETE COVERAGE OF STEEL SHALL BE 50 mm (2") MIN. AT ALL SURFACES.
5. ANY MODIFICATION TO THIS STANDARD SHALL BE THE RESPONSIBILITY OF THE DESIGN ENGINEER.

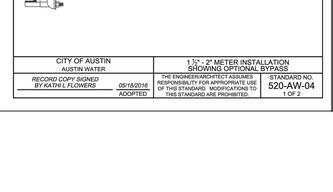
N.T.S.

CITY OF AUSTIN — WATERSHED PROTECTION DEPARTMENT

4-SIDED AREA INLET

ADOPTED 5/1/2010 — THE ARCHITECT/ENGINEER ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD.

STANDARD NO. 508S-9



CITY OF AUSTIN — AUSTIN WATER

1 ½" - 2" METER INSTALLATION SHOWING OPTIONAL BYPASS

RECORD COPY SIGNED BY KATHI L FLOWERS — 05/18/2016 ADOPTED

THE ENGINEER/ARCHITECT ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. MODIFICATIONS TO THIS STANDARD ARE PROHIBITED.

STANDARD NO. 520-AW-04

1 OF 2

MATERIALS LIST:

A. 2" SERVICE CLAMP
B. 2" CORPORATION STOP MALE THREAD INLET BY COMPRESSION OUTLET
C. 2" COPPER METER STOP SERVICE TUBING EXTENDED BEYOND PAVEMENT
D1. 2" BALL VALVE, SPL WW-275
D2. 2" BALL VALVE, SPL WW-275
E. 2" COPPER SERVICE TUBING
F. 2" BRASS COUPLING - COMPRESSION TO MALE IPT
G. 2" BRASS TEE
H. 2" BRASS CLOSE-NIPPLE
I. 2" ANGLE METER STOP; SERVICE TUBING INLET x FLANGED OUTLET
J. 2" BRASS NIPPLE
K. 2" BRASS ELBOW
L. 2" LOCKABLE CURB STOP - FEMALE IPT INLET BY COMPRESSION OUTLET
M. 2" BRASS COUPLING - SERVICE TUBING TO MALE IPT
N. RECTANGULAR METER BOX AND COVER, SPL WW-145A
O. BRASS ADAPTER (2" x 1 ½") FOR 1 ½" METER ONLY
P. WATER METER, LENGTH 13", (PURCHASED FROM AUSTIN WATER)
Q. 2" COPPER SERVICE TUBING (PRIVATE PLUMBING PER CODE)
R. CUSTOMER CUT-OFF VALVE
S. CUSTOMER VALVE BOX AND LID

NOTES:

1. SERVICE CLAMP SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM.
2. BRANCH CONNECTIONS AND ALL ANGLE METER STOPS MUST BE INSTALLED PRIOR TO ANY METER INSTALLATION.
3. TOP OF BOXES SHOULD BE 1" ABOVE GROUND.
4. PIPING AND TUBING IN STREET RIGHT-OF-WAY SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED BY SECTION 510.3 (14) OF THE CITY OF AUSTIN STANDARD SPECIFICATIONS; BACKFILL ABOVE GRANULAR BEDDING AS REQUIRED BY SECTION 510.3 (25).
5. BOX MUST BE BEHIND CURB NEXT TO PROPERTY LINE OR EASEMENT AND OUT OF VEHICULAR TRAFFIC AREA AND SIDEWALK.
6. BALL VALVE "D1" SHALL NOT BE LOCATED UNDER SIDEWALK, CURB, OR PAVEMENT, AND NOT BE LOCATED MORE THAN 24" HORIZONTALLY FROM METER BOX OR 36" BELOW FINAL GRADE.
7. COPPER SHALL BE COPPER TUBING SIZE ANNEALED SEAMLESS TYPE "K" MEETING ASTM B88 WITH NO SWEAT OR SOLDERED JOINTS.

RECLAIMED WATER:

FOR RECLAIMED WATER SERVICES AND METERS, ALL RECLAIMED TUBING SHALL BE MANUFACTURED PURPLE TUBING. ALL OTHER TUBING AND APPURTENANCES SHALL BE MANUFACTURED PURPLE IF AVAILABLE. ALL TUBING AND FITTINGS THAT ARE NOT AVAILABLE FROM THE MANUFACTURER IN PURPLE SHALL BE PAINTED PURPLE PER SPL WW-3C. ALL BURIED D AND CI PIPE AND FITTINGS SHALL ALSO BE WRAPPED IN PURPLE POLYETHYLENE PER SPL WW-27D. ALL COVERS SHALL HAVE **"RECLAIMED WATER"** CAST INTO THEM.

CITY OF AUSTIN — AUSTIN WATER

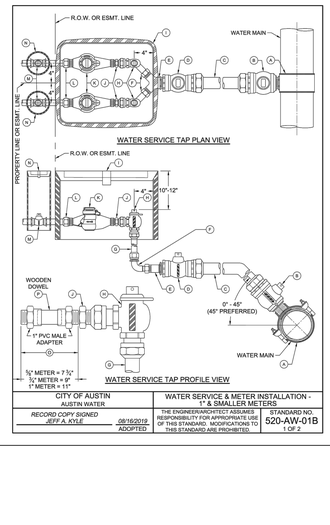
1 ½" - 2" METER INSTALLATION SHOWING OPTIONAL BYPASS

RECORD COPY SIGNED BY KATHI L FLOWERS — 05/18/2016 ADOPTED

THE ENGINEER/ARCHITECT ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. MODIFICATIONS TO THIS STANDARD ARE PROHIBITED.

STANDARD NO. 520-AW-04

2 OF 2



CITY OF AUSTIN — AUSTIN WATER

WATER SERVICE & METER INSTALLATION - 1" & SMALLER METERS

RECORD COPY SIGNED JEFF A. KYLE — 08/16/2019 ADOPTED

THE ENGINEER/ARCHITECT ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. MODIFICATIONS TO THIS STANDARD ARE PROHIBITED.

STANDARD NO. 520-AW-01B

1 OF 2

MATERIALS LIST:

A. 2" SERVICE CLAMP, SPL WW-264
B. 2" CORPORATION STOP, SPL WW-69
C. 2" HDPE WATER SERVICE TUBING, SPL WW-65
D. 2" BALL VALVE, SPL WW-68
E. SINGLE SERVICE: 2" MIP X 1" COPPER FLARE FITTING, SPL WW-68 OR DOUBLE SERVICE: 2" MIP X 1" COPPER FLARE WYE, SPL WW-68
F. 1" SWIVEL NUT X 1" COMPRESSION 90° BEND, SPL WW-68
G. 1" HDPE WATER SERVICE TUBING, SPL WW-65
H. 1" ANGLE METER STOP, SPL WW-68
I. METER BOX AND LID, SPL WW-145A
   FOR DUAL 1" METERS: USE TWO SINGLE METER BOXES

MATERIALS TO BE INSTALLED BY PLUMBER:

J. BRASS METER BUSHING - SIZE AS NEEDED TO CONNECT ANGLE METER STOP TO METER
K. WATER METER PURCHASED FROM AUSTIN WATER
L. BRASS WATER METER COUPLING NUT:
   ¾" AND ⅞" METERS: 8 ½" LONG x ¾" DIA.
   1" METERS: 8 ½" LONG x 1" DIA.
M. PROPERTY OWNER'S CUT OFF VALVE, SPL WW-27B
N. PROPERTY OWNER'S CUT OFF VALVE BOX AND LID
O. TEMPORARY METER SPACER (REQUIRED TO ASSURE METER WILL FIT APPROPRIATELY)
P. 1" WOODEN DOWEL (SHOW ADDRESS ON DOWEL USING WATERPROOF MARKER)

NOTES:

1. SERVICE CLAMP SHALL BE WRAPPED COMPLETELY WITH 8 MIL. POLYETHYLENE FILM, SPL WW-27D.
2. BRANCH CONNECTIONS AND ALL ANGLE METER STOPS MUST BE INSTALLED PRIOR TO ANY METER INSTALLATION.
3. TOP OF METER BOXES SHOULD BE 4" ABOVE GROUND.
4. PIPING AND TUBING IN STREET RIGHT-OF-WAY SHALL BE BEDDED IN GRANULAR MATERIALS AS REQUIRED BY SECTION 510.3 (14) OF THE CITY OF AUSTIN STANDARD SPECIFICATIONS; BACKFILL ABOVE GRANULAR BEDDING AS REQUIRED BY SECTION 510.3 (25).
5. METER BOX MUST BE BEHIND CURB NEXT TO PROPERTY LINE OR EASEMENT AND OUT OF VEHICULAR TRAFFIC AREA AND SIDEWALK.
6. BALL VALVE "D" SHALL NOT BE LOCATED UNDER SIDEWALK, CURB, OR PAVEMENT, AND NOT BE LOCATED MORE THAN 36" BELOW FINAL GRADE.
7. METER SIZES TO BE SHOWN ON PLANS.
8. METER BOX CUT OUTS SHALL NOT EXCEED TWO TIMES THE PIPE DIAMETER.
9. INSTALL METALLIC TRACER TAPE, SPL WW-387, MINIMUM 1' ABOVE TUBING FROM SERVICE CLAMP "A" TO BALL VALVE "D".
10. TUBING SHALL BE PLACED IN A STRAIGHT ALIGNMENT AND ALLOWED TO RELAX AND "SNAKE" LOOSELY IN THE TRENCH. TUBING BEHIND CURB AND GUTTER SHALL BE INSTALLED WITH A MINIMUM 2' DEPTH OF COVER.
11. 1" TUBING, WHEN BENT, SHALL HAVE A RADIUS NO SMALLER THAN 3'. 2" TUBING, WHEN BENT, SHALL HAVE A RADIUS NO SMALLER THAN 5'. BRASS FITTINGS SHALL NOT BE CONNECTED TO A BENT SECTION OF TUBING.
12. SOLID, TUBULAR STAINLESS STEEL INSERT STIFFENERS FOR HDPE TUBING SHALL BE USED AT ALL COMPRESSION FITTINGS. INSERT STIFFENERS SHALL BE FROM THE SAME MANUFACTURER AS THE COMPRESSION FITTING USED.
13. FOR RECLAIMED WATER SERVICES AND METERS, ALL RECLAIMED TUBING SHALL BE MANUFACTURED SOLID PURPLE, SPL WW-69A. ALL APPURTENANCES SHALL BE MANUFACTURED PURPLE IF AVAILABLE. ALL FITTINGS THAT ARE NOT AVAILABLE FROM THE MANUFACTURER IN PURPLE SHALL BE PAINTED PURPLE PER SPL WW-3C. ALL METER BOX LIDS SHALL BE PURPLE AND HAVE **"RECLAIMED WATER"** CAST INTO THEM, SPL WW-145A.

CITY OF AUSTIN — AUSTIN WATER

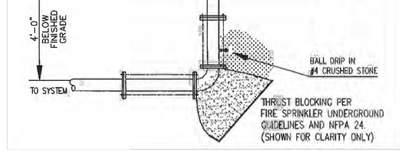
WATER SERVICE & METER INSTALLATION - 1" & SMALLER METERS

RECORD COPY SIGNED JEFF A. KYLE — 08/16/2019 ADOPTED

THE ENGINEER/ARCHITECT ASSUMES RESPONSIBILITY FOR APPROPRIATE USE OF THIS STANDARD. MODIFICATIONS TO THIS STANDARD ARE PROHIBITED.

STANDARD NO. 520-AW-01B

2 OF 2



General Requirements

1) All underground lines shall begin at the point of connection to the underground circulating public/private water main. A valve shall be provided at the point of connection such that the fire sprinkler underground service line can be isolated from the public/private water distribution system.
2) Underground piping shall have a 10-foot minimum separation from all other utilities and placed in a separate trench. Underground piping within 5-feet of the building may be combined with other utilities for entrance into the building.
3) All underground lines shall terminate at the top of the spigot no more than 5-feet inside the building and 1-foot above finished floor.
4) All ductile iron, retaining rods, and other non-corrosive resistant components shall be externally coated for corrosion or poly wrapped.
5) All underground piping shall be a minimum of Class 200 DR14 or greater.
6) Water supply shall be provided in conformance with the requirements of the respective standards; however, every fire protection system shall be designed with a minimum 5 psi safety factor at 20 psi residual on City mains.

Fire Department Connection (FDC)

- FDC shall be a separate and independent service main from the underground water line
- FDC's for automatic sprinkler systems and/or standpipe systems for new buildings shall be equipped with a 2 ½" Siamese connection. (See Details)
- All FDC's shall be equipped with locking Knox FDC Caps. Knox products may be ordered online at www.knoxbox.com.
- Check valves shall be accessible for 5-year inspection. If located underground, shall be installed within a meter can/valve box.
- FDC shall be facing and visible from the fire lane.
- FDC must be within 100-feet of a fire hydrant.
- FDC installed in a "yard" should have 12" x 12" x 4" concrete pad placed at the base to provide additional stability.
- The FDC shall be clear and unobstructed with a minimum of a 5-feet clear all-weather path from fire lane access.
- The FDC shall be installed 18-48 inches above grade.
- Fire hose threads shall be national standard hose thread.
- Underground piping shall be designed and constructed as required for an underground fire main using NFPA 24, Standard for the Installation of Private Fire Service Mains and Their Appurtenances, as the installation standard.
- The FDC shall discharge into the system on the discharge side of the pump if a pump is present.
- Where the FDC is subject to vehicular damage, the connection shall be protected. Protection components shall not be closer than 36-inches to the connection and shall not interfere with the operation of the connection.
- The pipe size and arrangement of the FDC should conform to the latest edition of NFPA 13, Standard for the Installation of Sprinkler Systems.

REMOTE FIRE DEPARTMENT CONNECTION DETAIL AND NOTES

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W. Ste. 160
Austin, TX 78735. Tel: (512) 583-2600
www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

Item 2.

STEPHENSON BUILDING
SITE DEVELOPMENT PLAN
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

SITE DETAILS 3

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS — JOE GRASSO — 73285 — REGISTERED PROFESSIONAL ENGINEER

6-17-25

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

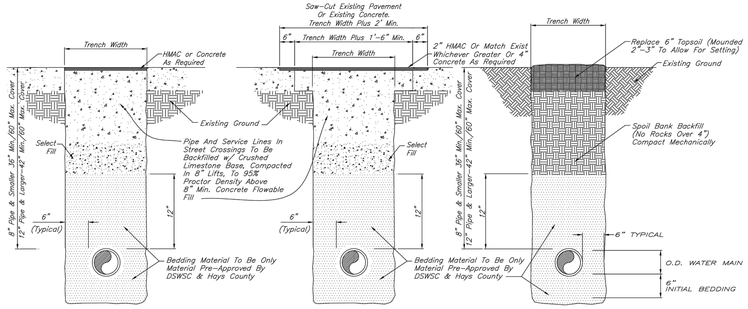
SHEET 19 OF 33

Project No.: 1577-009C

SD2024-022

1138

Drawing: c:\pwworking\klf-dst-prod\richard.elizondo\d0224841\5770090-CD-BUILDING-DETAILS.dwg
User: RELIZONDO
Last Modified: Mar. 26, 25 - 13:31
Plot Date/Time: Jun. 10, 25 - 10:11:51

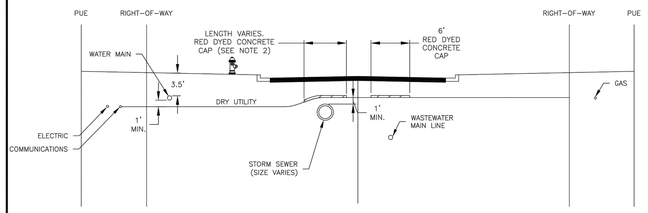


TRENCH BACKFILL CROSSING A PROPOSED PAVED DRIVE, STREET OR WITHIN 4 FEET OF EDGE OF STREET PAVEMENT

TRENCH BACKFILL CROSSING A PAVED DRIVE, STREET OR WITHIN 4 FEET OF EDGE OF STREET PAVEMENT

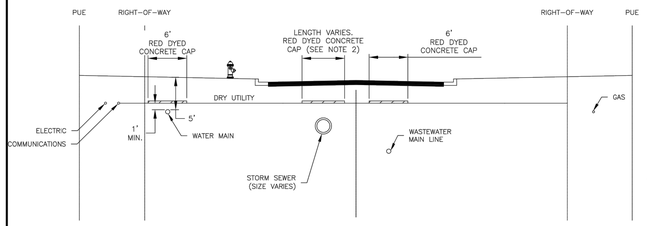
TRENCH BACKFILL IN AREAS GREATER THAN 4 FEET FROM EDGE OF STREET PAVEMENT.

PIPELINE EMBEDMENT



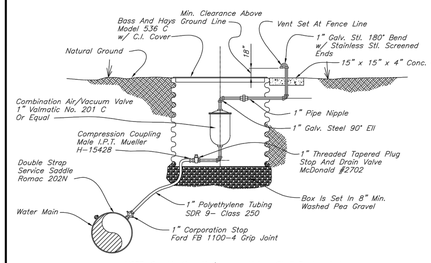
DRY UTILITY LOCATION - WATER LINE DEPTH LESS THAN 5'

NOTES:
1. DETECTABLE WARNING TAPE SHOULD BE PLACED ON ALL DRY UTILITY MAIN LINES AND SERVICES.
2. CONCRETE CAP SHOULD BE EXTENDED 2' OUTSIDE THE STORM SEWER.



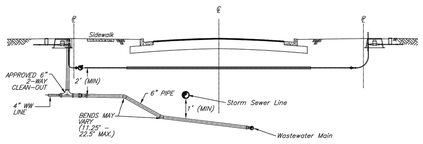
DRY UTILITY LOCATION - WATER LINE DEPTH OF 5' OR LARGER

NOTES:
1. DETECTABLE WARNING TAPE SHOULD BE PLACED ON ALL DRY UTILITY MAIN LINES AND SERVICES.
2. CONCRETE CAP SHOULD BE EXTENDED 2' OUTSIDE THE STORM SEWER.



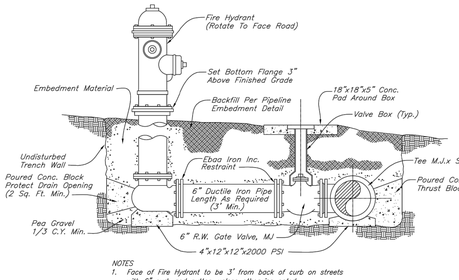
NOTE: Combination Air/Vacuum Valves Shall Be Located As Per Plans At The Highest Point Of The Line.

COMBINATION AIR/VACUUM VALVE



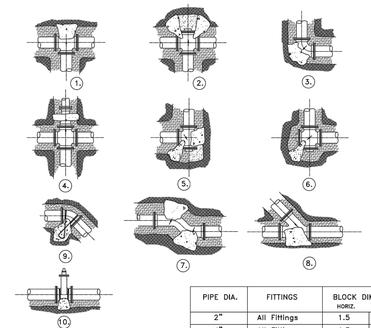
NOTES:
1. This detail to be used when the depth of the wastewater service cleanout is greater than 6'.
2. See utility assignment cross-sections for actual utility assignments.

ALTERNATE DEEP SERVICE CONNECTION



NOTES
1. Face of Fire Hydrant to be 3' from back of curb on streets with 6" curb and gutter, unless otherwise noted.
2. Face of Fire Hydrant to be 10' from back of ribbon/rolled curb on streets with ribbon/rolled curb, unless noted otherwise.
3. Fire hydrant should not be in conflict with sidewalks, curb ramps, or any other improvements.
4. Hydrants require 5 1/4 Storz connection.

FIRE HYDRANT ASSEMBLY

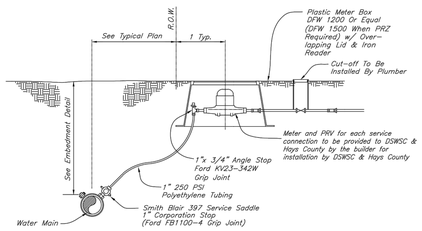


NOTES:
1. Thru Line Connection,Tee
2. Thru Line connection, Cross Used As Tee
3. Directional Change, Elbow
4. Change Line Size, Reducer
5. Direction Change, Tee Used As Elbow
6. Direction Change, Cross Used AS Elbow
7. Direction Change
8. Thru Line Connection
9. Valve Anchor
10. Direction Change Vertical, Bend Anchor

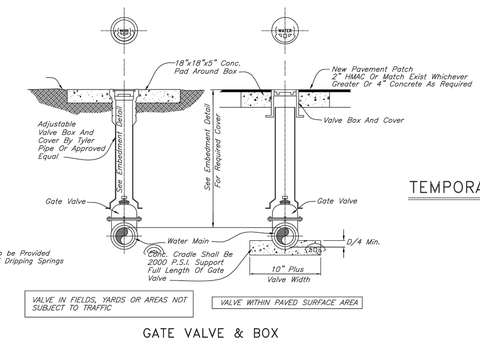
PIPE DIA.	FITTINGS	BLOCK DIMENSION HORIZ.	VERT.
2"	All Fittings	1.5	2.0
4"	All Fittings	1.5	2.0
6"	Tee,Cross,Valve	1.5	1.5
6"	90° Bend	1.5	2.0
8"	Tee,Cross,Valve	2.0	2.0
8"	90° Bend	2.0	2.5
12"	Tee,Valve	3.0	3.0
12"	90° Bend	4.5	2.5
12"	45° Bend	2.5	2.5

NOTE: Each Mechanical Joint Fitting And Gate Valves Shall Have Ebaa Iron Inc. Restraint.

TYPICAL THRUST BLOCKING



RESIDENTIAL WATER SERVICE CONNECTION

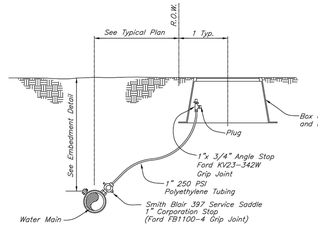


VALVE IN FIELDS, YARDS OR AREAS NOT SUBJECT TO TRAFFIC

VALVE WITHIN PAVED SURFACE AREA

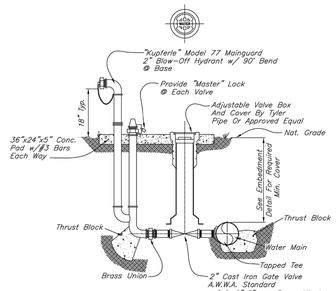
GATE VALVE & BOX

N.T.S



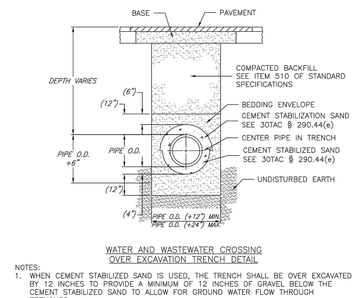
Note:
Install one sampling site per subdivision phase. Sampling site should be located in a common area or corner lot.

SAMPLING PORT



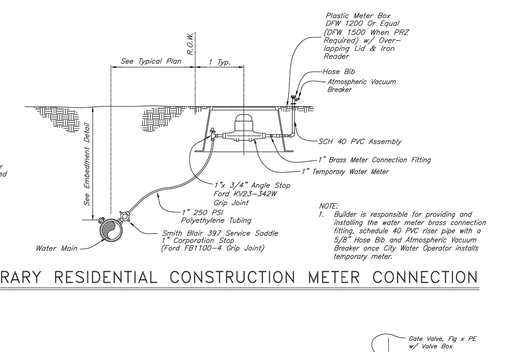
NOTE: Thrust Blocking Shall Be Placed In A Manner Not To Plug Integral Weep Hole

FLUSH VALVE



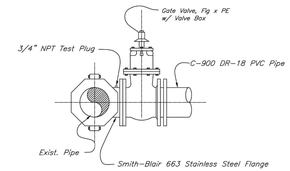
WATER AND WASTEWATER CROSSING OVER EXCAVATION TRENCH DETAIL

NOTES:
1. WHEN CEMENT STABILIZED SAND IS USED, THE TRENCH SHALL BE OVER EXCAVATED BY 12 INCHES TO PROVIDE A MINIMUM OF 12 INCHES OF GRAVEL BELOW THE CEMENT STABILIZED SAND TO ALLOW FOR GROUND WATER FLOW THROUGH TRENCHES.
2. OVER EXCAVATION SHALL EXTEND 5 FEET BEYOND THE CEMENT STABILIZED SAND ON BOTH SIDES OF THE PIPE.
3. THE INSTALLATION MUST MEET THE REQUIREMENTS OF 30TAC § 290.44(e).



NOTE:
1. Builder is responsible for providing and installing the water meter brass connection fitting, schedule 40 PVC riser pipe with a 5/8" Hose Bib and Atmospheric Vacuum Breaker once City Water Operator installs temporary meter.

TEMPORARY RESIDENTIAL CONSTRUCTION METER CONNECTION



TAPPING SLEEVE AND VALVE

DRIPPING SPRINGS WATER SUPPLY CORPORATION DETAILS 1 OF 2 JUNE 2022

DOUCET
A Kleinfelder Company
Civil Engineering // Entitlements // Geospatial
7401 B. Highway 71 W. Ste. 160
Austin, TX 78735. Tel: (512)-583-2600
www.doucetengineers.com
TBPE Firm Number: 3937
TBPELS Firm Number: 10105800

Item 2.

STEPHENSON BUILDING SITE DEVELOPMENT PLAN

311 OLD FITZHUGH ROAD,

HAYS COUNTY, DRIPPING SPRINGS, TEXAS

UTILITY DETAILS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF JOE GRASSO, P.E., TBPE#73285, ON 6-17-25 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
JOE GRASSO
73285
REGISTERED
PROFESSIONAL ENGINEER

6-17-25

Designed:	RLE/PM
Drawn:	RLE
Reviewed:	TM/JG
Date:	6/10/25

SHEET 20 OF 33

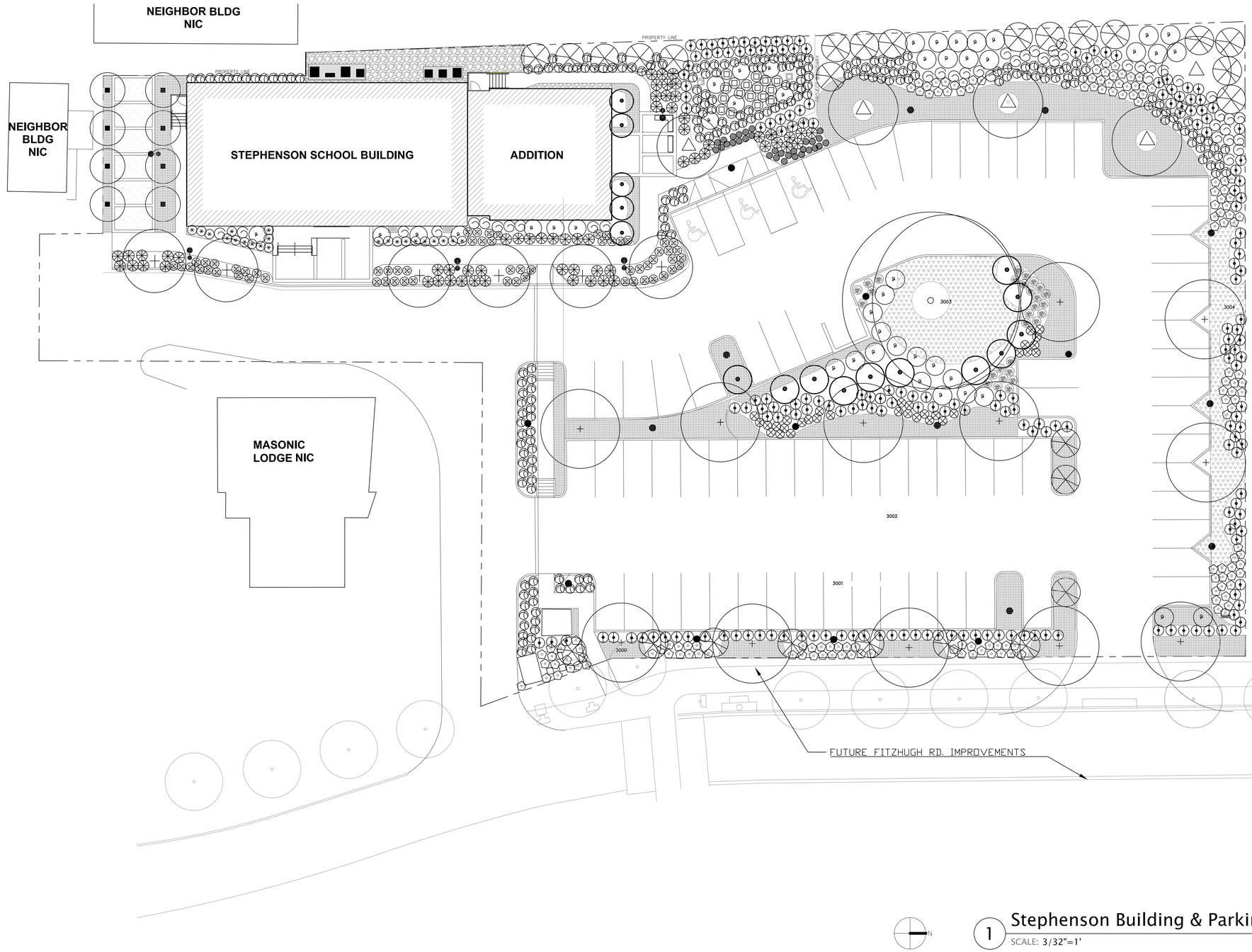
Project No.: 1577-009C

SD2024-022

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User: RELIZONDO
Last Modified: Mar. 26, 25 - 13:31
PW/Date/Time: Jun. 10, 25 - 10:21:58

borrego - Nov 09, 2022 - 11:47am - File: O:\Operations\800-Build\835-AUSSouthDistrict\UTILITY DISTRICTS\Dripping Springs Water Supply Corporation\Details and Specifications\DSWSC WATER STANDARDS 2022.dwg



PLANTING LEGEND

- CHINQUAPIN OAK, QUERCUS MUHLENBERGII
- CEDAR ELM, ULMUS CRASSIFOLIA
- DESERT WILLOW CHILAPSIS LINEARIS
- MEXICAN BUCKEYE UNGNADIA SPECIOSA
- YAUPON HOLLY ILEX VOMITORIA
- FLAMELEAF SUMAC RHUS LANCEOLATA
- BAMBOO MUHLY, MUHLENBURGIA DUMOSA
- GOLDEN THRYALLIS GALPHIMIA GLAUCA
- FIRECRACKER FERN RUSSELIA EQUISETIFORMIS
- MEXICAN HONEYSUCKLE JUSTICIA SPICIGERA
- SWITCHGRASS PANICUM VIRGATUM
- BIG MUHLY GRASS, MUHLENBERGIA LINDHEIMERI
- DWARF BARBADOS CHERRY MALPIGHIA PUNICIFOLIA
- TEXAS LANTANA LANTANA URTICOIDES
- CHEROKEE SEDGE, CAREX CHEROKEENSIS
- INLAND SEA OATS, CHASMANTHIUM LATIFOLIUM
- AMERICAN BEAUTYBERRY CALLICARPA AMERICANA
- INDIANGRASS SORGHSTRUM NUTANS
- PLATEAU GOLDENEYE VIGUIERA DENTATA

PLAN NORTH

1 Stephenson Building & Parking Lot Planting Plan

SCALE: 3/32"=1'

0 16 32 48

CO'DESIGN

CO'DESIGN, LLC
1200 Yaupon Valley Rd.
Austin, TX 78746
512-423-1298
www.codesignaustin.co

City of Dripping Springs
STEPHENSON SCHOOL BUILDING & PARKING LOT

311 Old Fitzhugh
Dripping Springs, TX
78620

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REVISION HISTORY

PERMIT SET

REGISTERED LANDSCAPE ARCHITECT
CATHERINE M. O'CONNOR
2218
STATE OF TEXAS
8/2/24

Project No.

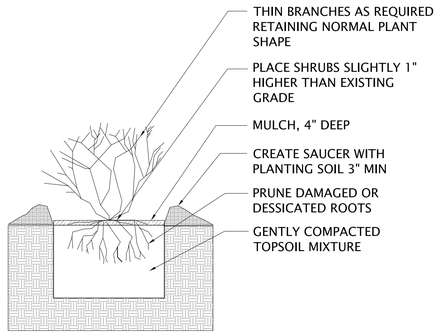
Date
August 2, 2024

Sheet Name
Planting Plan

Sheet Number
21 OF 33

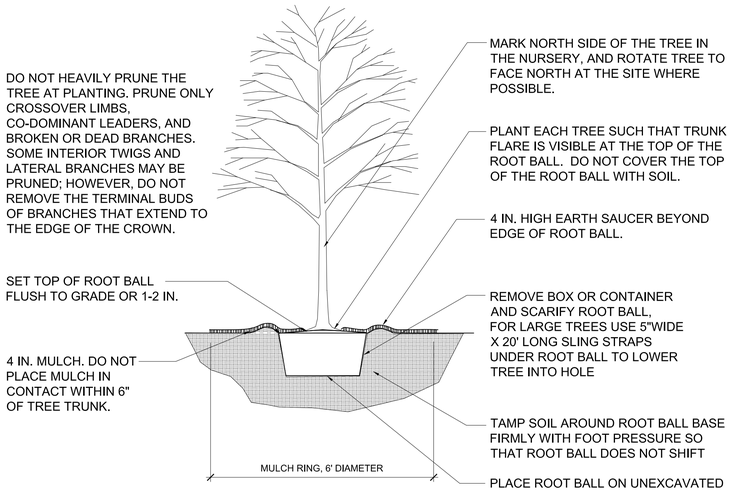
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1140



1 Shrub Planting Detail

SCALE: NTS



2 Tree Planting

SCALE: NTS

TREE PLANTING NOTES:

1. PLANTED TREES SHALL BE STAKED AND WRAPPED
2. PRE- AND POST-CONSTRUCTION FERTILIZATION IS REQUIRED FOR EXISTING TREES THAT WILL BE OR HAVE BEENDISTURBED BY CONSTRUCTION ACTIVITIES, INCLUDING DISTURBANCE OF THE CRITICAL ROOT ZONE. FERTILIZERS MUST BE PHOSPHATE-FREE.
3. TREE PROTECTION SHALL REMAIN IN PLACE UNTIL FINAL LANDSCAPING INSTALLATION AS APPROVED BY THE CITY ADMINISTRATOR OR DESIGNEE. REFER TO CIVL DRAWINGS FOR TREE PROTECTION PLANS & DETAILS
4. PARKING OR STORING OF VEHICLES, EQUIPMENT OR MATERIALS ALLOWED WITHIN THE CRITICAL ROOT ZONE IS PROHIBITED.

MAINTENANCE NOTES:
THE OWNER SHALL BE RESPONSIBLE FOR (UNLESS OTHERWISE SPECIFIED HEREIN):
(1) REGULAR MAINTENANCE OF ALL REQUIRED LANDSCAPED AREAS AND PLANT MATERIALS IN A VIGOROUS AND HEALTHY CONDITION, FREE FROM DISEASES, PESTS, WEEDS, AND LITTER. THIS MAINTENANCE SHALL INCLUDE WEEDING, WATERING, FERTILIZATION, PRUNING, MOWING, EDGING, MULCHING, OR OTHER NECESSARY MAINTENANCE IN ACCORDANCE WITH GENERALLY ACCEPTED HORTICULTURAL PRACTICE;
(2) THE REPAIR OR REPLACEMENT OF REQUIRED LANDSCAPE STRUCTURES (WALLS, FENCES, ETC.) TO A STRUCTURALLY SOUND CONDITION;
(3) THE REGULAR MAINTENANCE, REPAIR, OR REPLACEMENT, WHERE NECESSARY, OF ANY SCREENING OR BUFFERING;
(4) REPLACING PLANTED TREES IF THEY DIE OR BECOME DISEASED BEYOND REPAIR WITHIN FIVE (5) YEARS AFTER PLANTING; AND
(5) REPAIRING DAMAGE TO LANDSCAPED AREAS, STRUCTURES, SCREENING, BUFFERING, OR TREES AS A RESULT OF INGRESS OR EGRESS FROM SITE EASEMENTS BY AUTHORIZED OR UNAUTHORIZED PARTIES.
SEC. 28.06.058 INTEGRATED PEST MANAGEMENT AIR INTEGRATED PEST MANAGEMENT PLAN (IPM) SHALL BE SUBMITTED WITH THE SITE PLAN. THE IPM SHALL INCLUDE THE FERTILIZER RATIOS, BRANDS, AND TYPES OF FERTILIZATION APPLICATION METHODS TO BE USED. FERTILIZERS MUST BE PHOSPHATE-FREE.

TREE CALCULATIONS (SEE CIVIL DRAWINGS FOR TREE SURVEY AND DEMOLITION PLAN FOR TREE REMOVALS):

TREE REMOVALS & CALCULATIONS BASED ON CITY OF AUSTIN ENVIRONMENTAL CRITERIA MANUAL TREE ORDINANCE:

#3000 17" CHINABERRY--25% REPLACEMENT OR 8.5" (NOT A TREE IN APPENDIX F)
#3001 37" TALLOW--50% REPLACEMENT OR 18.5" (NOT A TREE IN APPENDIX F)
#3002 48" CATALPA-- 100% REPLACEMENT OR 48" (IN APPENDIX F)

#3004 12" HACKBERRY--50% REPLACEMENT OR 6" (IN APPENDIX F)

#3005 14" HACKBERRY----50% REPLACEMENT OR 7" (IN APPENDIX F)

#3010 7" PECAN--UNDERSIZED LESS THAN 8" NO REPLACEMENT REQUIRED.

TREES TO REMAIN
3003 28" LIVE OAK-- COUNTS AS TWO 4' REPLACEMENT TREE CREDIT PER SEC. 28.06.055C PARKING AREA LANDSCAPING. A TOTAL OF 8" CREDIT.

TOTAL REPLACEMENT INCHES REQUIRED:
88" REPLACEMENT DUE TO REMOVAL
8" CREDIT
REPLACEMENT INCHES REQUIRED: 80"
REPLACEMENT INCHES PROVIDED: 284"

Plant Schedule

COMMON NAME	BOTANICAL NAME	SIZE	NOTES	HT	SPD	QTY	TREE CAL. INCHES
Large Trees							
Chinquapin Oak	Quercus muhlenbergii	4" cal.	36" box	15-17'	8-10'	4	16
Cedar Elm	Ulmus crassifolia	4" cal.	36" box	15-17'	8-10'	18	72
Retama 'Desert Museum'	Parkinsonia Aculeata	3"	24" box	10-12'	6-8'	8	24
Small Trees							
Yaupon Holly	Ilex vomitoria	2" min.	20 gal. multi trunk, container	6'-7'	5-6'	43	86
Mexican Buckeye	Ungnadia speciosa	2" min.	20 gal. multi trunk, container	6'-7'	5-6'	16	32
Flameleaf Sumac	Rhus Lanceolata	2" min.	20 gal. multi trunk, container	6-7'	5-6'	27	54
						TOTAL TREE CAL. INCHES	284

Shrubs and Groundcover			
Big Muhly Grass	Muhlenbergia lindheimerii	5 Gal.	full dense
Switchgrass	Panicum virgatum	5 Gal.	full dense
Bamboo Muhly	Muhlenbergia dumosa	5 Gal.	full dense
Firecracker Fern	Russelia equisetformis	5 Gal.	full dense
Texas Lantana	Lantana urticoides	5 Gal.	full dense
Dwarf Barbados Cherry	Malpighia glabra dwarf	5 Gal.	full dense
Golden Thryallis	Galphimia glauca	5 Gal.	full dense
Mexican Honeysuckle	Justica spicigera	5 Gal.	full dense
Cherokee Sedge	Carex cherokeensis	1 gal. pots @ 24" oc	full dense
Inland Sea Oats	Chasmanthium latifolium	1 gal. pots @ 24" oc	full dense
American Beautyberry	Callicarpa americana	5 Gal.	full dense
Indiangrass	Sorghstrum nutans	1 gal.	full dense
Plateau Goldeneye	Viguiera dentata	1 gal.	full dense

Note: Landscape Contractor is responsible for verifying plant quantities.

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PERMIT SET

REGISTERED LANDSCAPE ARCHITECT
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2218
STATE OF TEXAS
8/2/24

Project No.

Date
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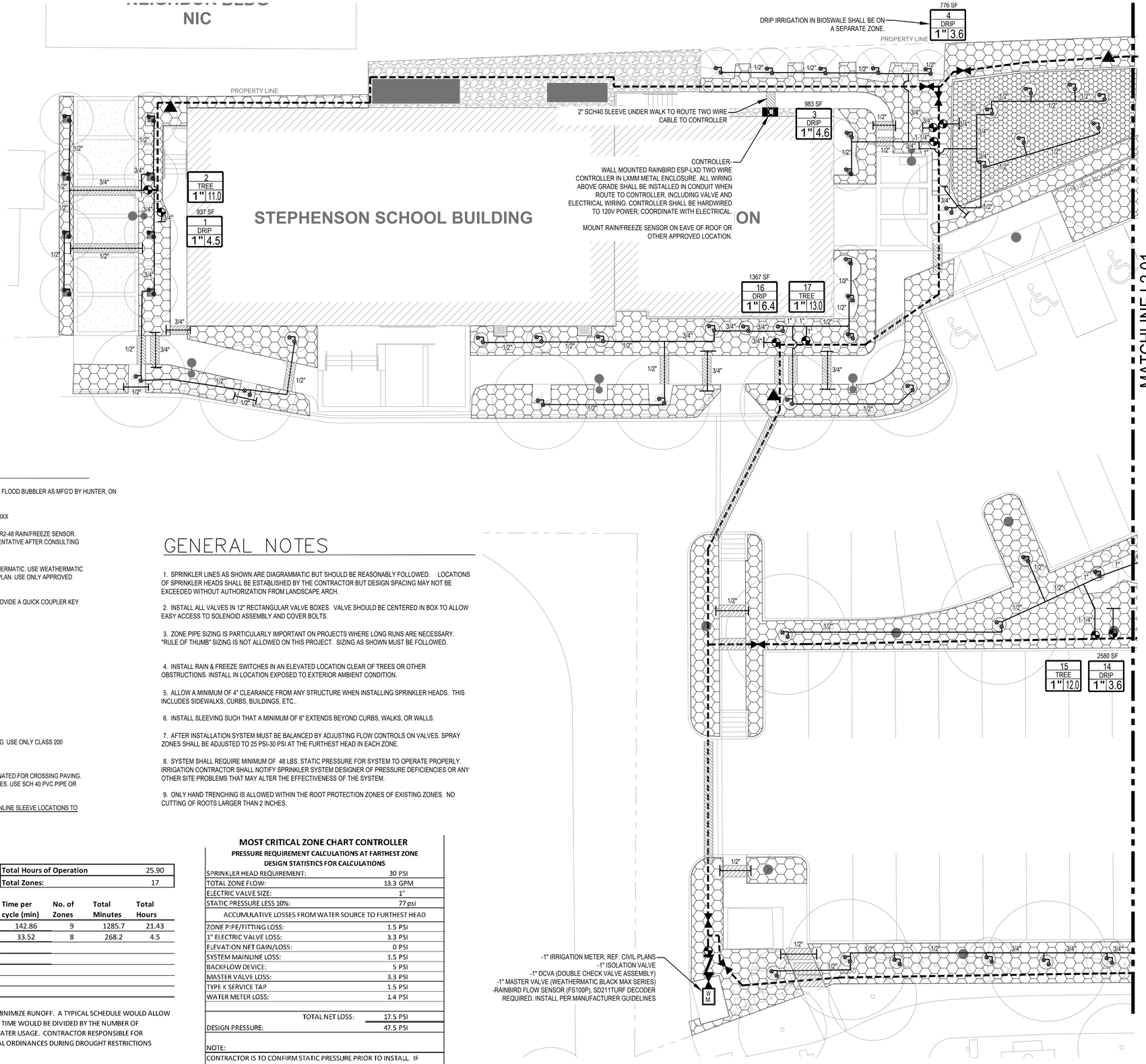
Sheet Name
Planting Details, Schedule, Tree Mitigation & Notes

Sheet Number
22 OF 33

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Item 2.



LEGEND

- BUBBLER - PRESSURE COMPENSATING BUBBLER (0.5 G.P.M.). PCN-50 FLOOD BUBBLER AS MFG'D BY HUNTER, ON HUNTER PROS-06 6" POP UP SPRAY.
- INDICATES DRIP TUBING BY NETAFIM, NETAFIM TECHLINE CV TLCV-18XX
- CONTROLLER - RAINBIRD ESP-LXD TWO WIRE CONTROLLER WITH WR2-48 RAIN/FREEZE SENSOR. FINAL LOCATION IS TO BE DETERMINED BY OWNER OR HIS REPRESENTATIVE AFTER CONSULTING WITH PROJECT ARCHITECT.
- REMOTE CONTROL VALVE - BLACK MAX SERIES AS MFG'D BY WEATHERMATIC. USE WEATHERMATIC SCZ-MAX-DW-10 DRIP KIT FOR DRIP ZONES. SIZE AS NOTED ON PLAN. USE ONLY APPROVED SPLICE KITS SUCH AS 3M DBY CONNECTORS.
- QUICK COUPLING VALVE - SERIES 44LRC AS MFG'D BY RAINBIRD. PROVIDE A QUICK COUPLER KEY W/ SWIVEL HOSE ELL FOR EVERY THREE (3) VALVES.
- ISOLATION GATE VALVE - LINE SIZE
- BACKFLOW PREVENTER-D.C.V. ASSEMBLY
- W M — 1" WATER METER
- 1250 SF — DRIP ZONE SF, IF APPLICABLE
  A-5 — ZONE IDENTIFICATION
  DRIP — IRRIGATION TYPE (SHRUB, TURF,DRIP, ROTOR, OR BUBBLER)
  1" 5.8 — ZONE SIZE IN GALLONS PER MINUTE
  VALVE SIZE THIS ZONE
- 1/2" — LATERAL LINE - SIZE AS NOTED ON PLAN. DO NOT DEVIATE ON SIZING. USE ONLY CLASS 200 OR 315 PVC PIPE.
- MAIN LINE - USE 2" SCH 40 PVC PIPE AS DESIGNATED ON PLANS.
- SLEEVE - USE TWO (2) SIZES LARGER THAN SPRINKLER PIPE DESIGNATED FOR CROSSING PAVING. WHERE REQUIRED, VALVE WIRING MAY BE RUN IN THE SAME SLEEVES. USE SCH 40 PVC PIPE OR AS DESIGNATED ON PLANS.

NOTE: PROVIDE AN EXTRA 2" SCH 40 PVC SLEEVE NEXT TO ALL MAINLINE SLEEVE LOCATIONS TO ALLOW FOR ELEC. VALVE WIRING FROM CONTROLLER.

GENERAL NOTES

1. SPRINKLER LINES AS SHOWN ARE DIAGRAMMATIC BUT SHOULD BE REASONABLY FOLLOWED. LOCATIONS OF SPRINKLER HEADS SHALL BE ESTABLISHED BY THE CONTRACTOR BUT DESIGN SPACING MAY NOT BE EXCEEDED WITHOUT AUTHORIZATION FROM LANDSCAPE ARCH.
2. INSTALL ALL VALVES IN 12" RECTANGULAR VALVE BOXES. VALVE SHOULD BE CENTERED IN BOX TO ALLOW EASY ACCESS TO SOLENOID ASSEMBLY AND COVER BOLTS.
3. ZONE PIPE SIZING IS PARTICULARLY IMPORTANT ON PROJECTS WHERE LONG RUNS ARE NECESSARY. "RULE OF THUMB" SIZING IS NOT ALLOWED ON THIS PROJECT. SIZING AS SHOWN MUST BE FOLLOWED.
4. INSTALL RAIN & FREEZE SWITCHES IN AN ELEVATED LOCATION CLEAR OF TREES OR OTHER OBSTRUCTIONS. INSTALL IN LOCATION EXPOSED TO EXTERIOR AMBIENT CONDITION.
5. ALLOW A MINIMUM OF 4" CLEARANCE FROM ANY STRUCTURE WHEN INSTALLING SPRINKLER HEADS. THIS INCLUDES SIDEWALKS, CURBS, BUILDINGS, ETC..
6. INSTALL SLEEVING SUCH THAT A MINIMUM OF 6" EXTENDS BEYOND CURBS, WALKS, OR WALLS.
7. AFTER INSTALLATION SYSTEM MUST BE BALANCED BY ADJUSTING FLOW CONTROLS ON VALVES. SPRAY ZONES SHALL BE ADJUSTED TO 25 PSI-30 PSI AT THE FURTHEST HEAD IN EACH ZONE.
8. SYSTEM SHALL REQUIRE MINIMUM OF 48 LBS. STATIC PRESSURE FOR SYSTEM TO OPERATE PROPERLY. IRRIGATION CONTRACTOR SHALL NOTIFY SPRINKLER SYSTEM DESIGNER OF PRESSURE DEFICIENCIES OR ANY OTHER SITE PROBLEMS THAT MAY ALTER THE EFFECTIVENESS OF THE SYSTEM.
9. ONLY HAND TRENCHING IS ALLOWED WITHIN THE ROOT PROTECTION ZONES OF EXISTING ZONES. NO CUTTING OF ROOTS LARGER THAN 2 INCHES.

Scheduling Controller

Typical Weekly, Based on Precipitation Rate

Total Hours of Operation	25.90
Total Zones:	17

ZONE TYPE	Precipitation Rate (in/hr)	Water Desired Inch/Week	Time per cycle (min)	No. of Zones	Total Minutes	Total Hours
DRIP	0.42	1.00	142.86	9	1285.7	21.43
.5 GAL TREE BUBBLER	1.79	1.00	33.52	8	268.2	4.5

NOTE:
IT WILL BE NECESSARY TO DIVIDE TIME INTO 2 TO 3 CYCLES TO MINIMIZE RUNOFF. A TYPICAL SCHEDULE WOULD ALLOW WATERING TO OCCUR TWO DAYS PER WEEK. TOTAL WATERING TIME WOULD BE DIVIDED BY THE NUMBER OF WATERING DAYS. THIS SCHEDULE IS DESIGNED FOR SUMMER WATER USAGE. CONTRACTOR RESPONSIBLE FOR WATERING SCHEDULE DURING ESTABLISHMENT. FOLLOW LOCAL ORDINANCES DURING DROUGHT RESTRICTIONS

MOST CRITICAL ZONE CHART CONTROLLER

PRESSURE REQUIREMENT CALCULATIONS AT FARTHEST ZONE
DESIGN STATISTICS FOR CALCULATIONS

SPRINKLER HEAD REQUIREMENT:	30 PSI
TOTAL ZONE FLOW:	13.3 GPM
ELECTRIC VALVE SIZE:	1"
STATIC PRESSURE LESS 10%:	77 psi
ACCUMULATIVE LOSSES FROM WATER SOURCE TO FURTHEST HEAD	
ZONE PIPE/FITTING LOSS:	1.5 PSI
1" ELECTRIC VALVE LOSS:	3.3 PSI
ELEVATION NET GAIN/LOSS:	0 PSI
SYSTEM MAINLINE LOSS:	1.5 PSI
BACKFLOW DEVICE:	5 PSI
MASTER VALVE LOSS:	3.3 PSI
TYPE K SERVICE TAP	1.5 PSI
WATER METER LOSS:	1.4 PSI
TOTAL NET LOSS:	17.5 PSI
DESIGN PRESSURE:	47.5 PSI

NOTE:
CONTRACTOR IS TO CONFIRM STATIC PRESSURE PRIOR TO INSTALL. IF DESIGN PRESSURE IS LESS THAN STATIC PRESSURE, CONTACT IRRIGATION CONSULTANT BEFORE BEGINNING INSTALLATION.

NORTH

1 IRRIGATION PLAN
SCALE: 1" = 10'-0"

CO'DESIGN
CO'DESIGN, LLC
1200 Yaupon Valley Rd.
Austin, TX 78746
512-423-1298
www.codesignaustin.co

City of Dripping Springs
STEPHENSON SCHOOL BUILDING &
PARKING LOT

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Dripping Springs, TX
78620

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REVISION HISTORY

PERMIT SET

STATE OF TEXAS
STEVEN GARZA
15791
LICENSED IRRIGATOR
08-02-2024

GARZA CONSULTING
IRRIGATION DESIGN
PLANNING & COST ANALYSIS
P.O. BOX 685874
SAN ANTONIO, TX 78268
210.460.1101
WWW.GARZA-CONSULTING.COM

Project No.

Date
August 2, 2024

Sheet Name
Irrigation Plan

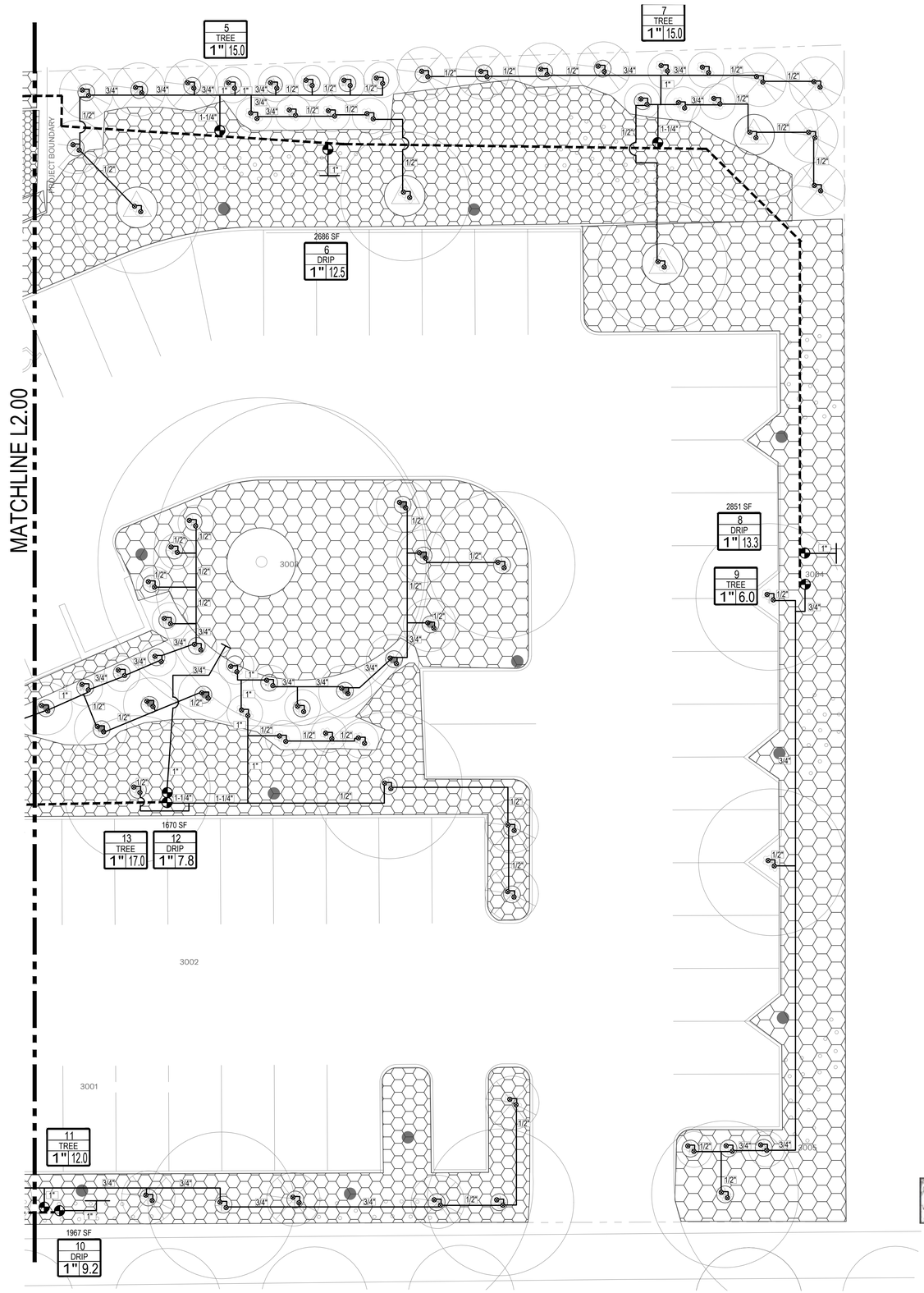
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LEGEND

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SCALE: 1" = 10'-0"

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STATE OF TEXAS
STEVEN GARZA
15791
LICENSED IRRIGATION CONSULTANT
08-02-2024

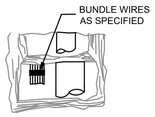
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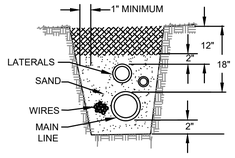
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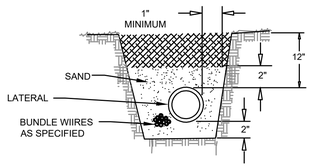
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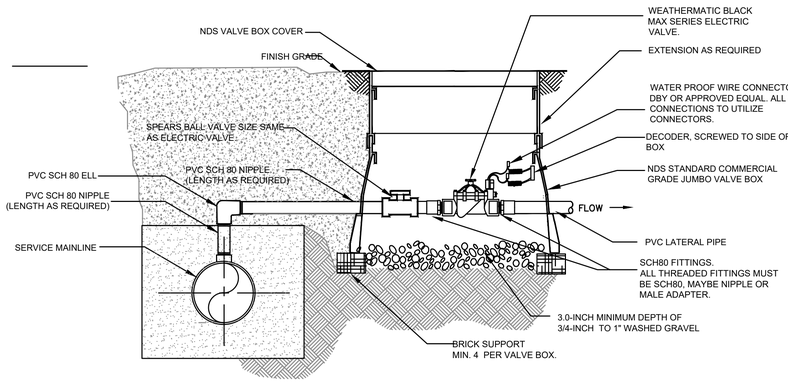
MAIN & LATERAL SECTION



LATERAL SECTION

1 TYPICAL TRENCH DETAILS

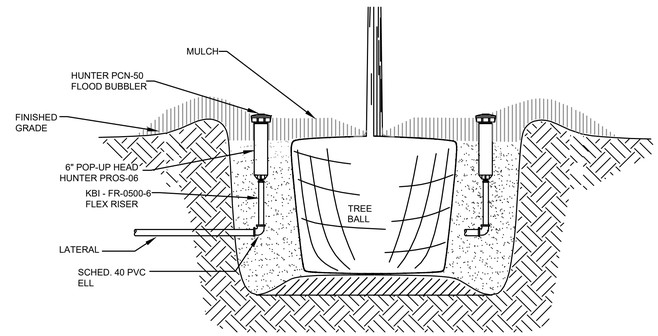
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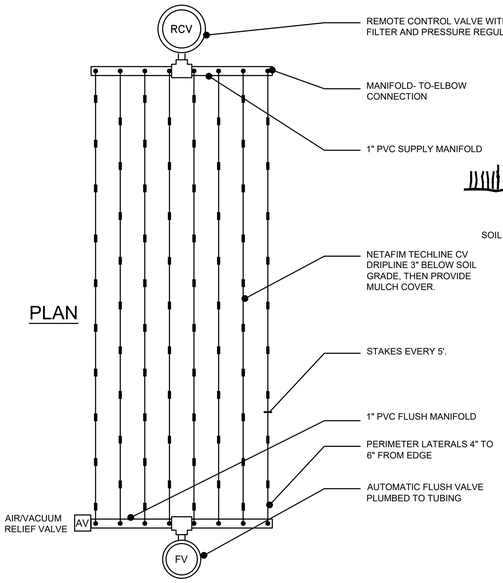
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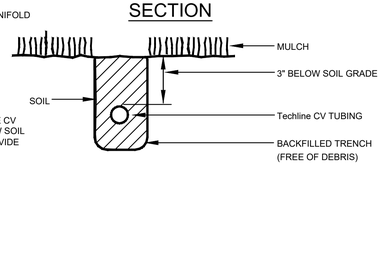


3 BUBBLERS AT TREE - SECTION

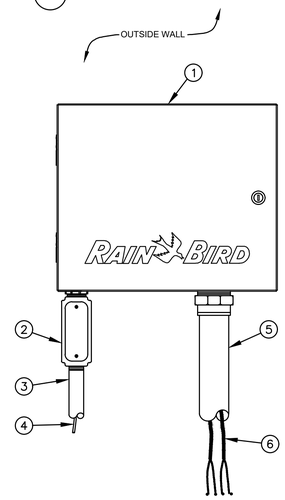
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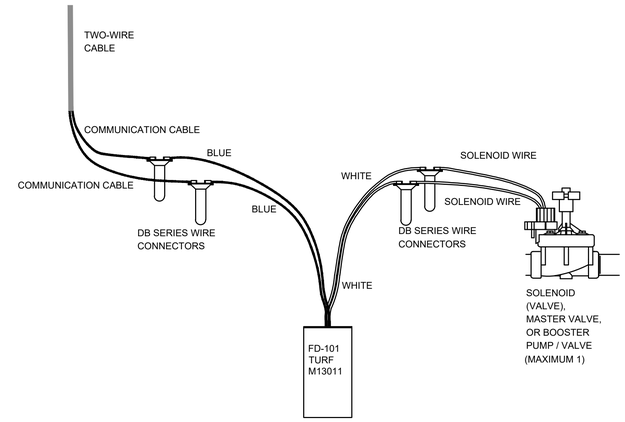
SECTION



1. TWO-WIRE DECODER CONTROLLER:
   RAIN BIRD ESP-LXD TWO-WIRE DECODER CONTROLLER IN LXMM METAL CABINET WITH OUTSIDE WALL MOUNT. INSTALL CONTROLLER AND CABINET ON WALL PER MANUFACTURER'S RECOMMENDATIONS.
2. JUNCTION BOX
3. 1-INCH CONDUIT AND FITTINGS TO POWER SUPPLY
4. POWER SUPPLY WIRE
5. 2-INCH CONDUIT AND FITTINGS FOR TWO-WIRE CABLE
6. MAXICABLE TWO-WIRE PATH TO DECODERS
   USE A DIFFERENT CABLE JACKET COLOR FOR EACH PATH.

NOTES:
1. ESP-LXD CONTROLLER COMES WITH 50 STATIONS AVAILABLE. TWO ADDITIONAL 75 STATION ESPLXD-SUM75 MODULES MAY BE ADDED TO EXPAND THE CONTROLLER UP TO 200 TOTAL STATIONS.
2. USE STEEL CONDUIT FOR ABOVE GRADE AND SCH 4O PVC CONDUIT FOR BELOW GRADE CONDITIONS.
3. PROVIDE PROPER GROUNDING COMPONENTS TO ACHIEVE GROUND RESISTANCE OF 10 OHMS OR LESS.

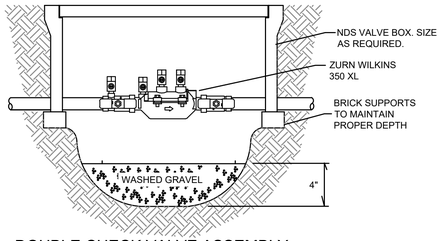
5 ESP-LXD TWO WIRE DECODER CONTROLLER IN METAL CABINET



6 FD-101TURF DECODER WIRING DIAGRAM

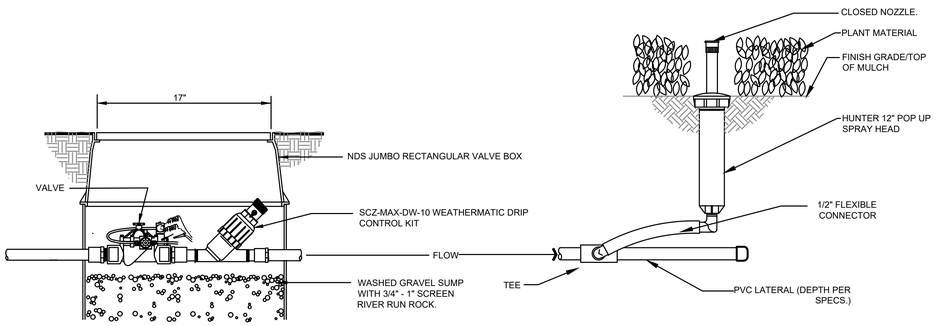
4 DRIP ZONE INSTALLATION DETAIL (TYP.)

NOT TO SCALE



7 DOUBLE CHECK VALVE ASSEMBLY

NOT TO SCALE

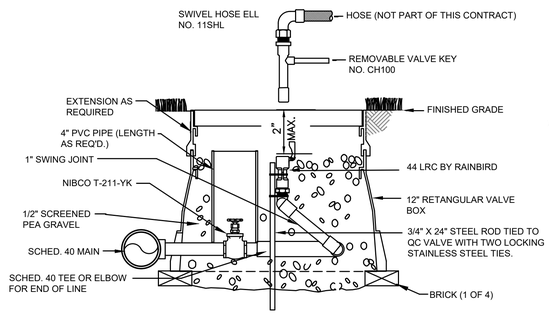


8 WEATHERMATIC DRIP CONTROL KIT (SCZ-MAX-DW-10)

NOT TO SCALE

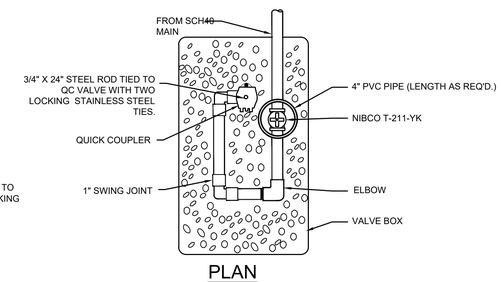
ZONE FUNCTION INDICATOR HEAD
PLACED AT FURTHEST POINT OF ZONE

NOT TO SCALE



9 QUICK-COUPLING VALVE DETAIL

NOT TO SCALE



PLAN

GARZA CONSULTING
IRRIGATION DESIGN
PLUMBING & COST ANALYSIS
P.O. BOX 691974
SAN ANTONIO, TX. 78269
210.460.7101
WWW.GARZA-CONSULTING.COM

CO'DESIGN

CO'DESIGN, LLC
1200 Yaupon Valley Rd.
Austin, TX 78746
512-423-1298
www.codesignaustin.co

City of Dripping Springs
STEPHENSON SCHOOL
BUILDING &
PARKING LOT

311 Old Fitzhugh Rd.
Dripping Springs, TX
78620

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REVISION HISTORY

PERMIT SET

STATE OF TEXAS
STEVEN GARZA
15791
LICENSED IRRIGATOR
08-02-2024

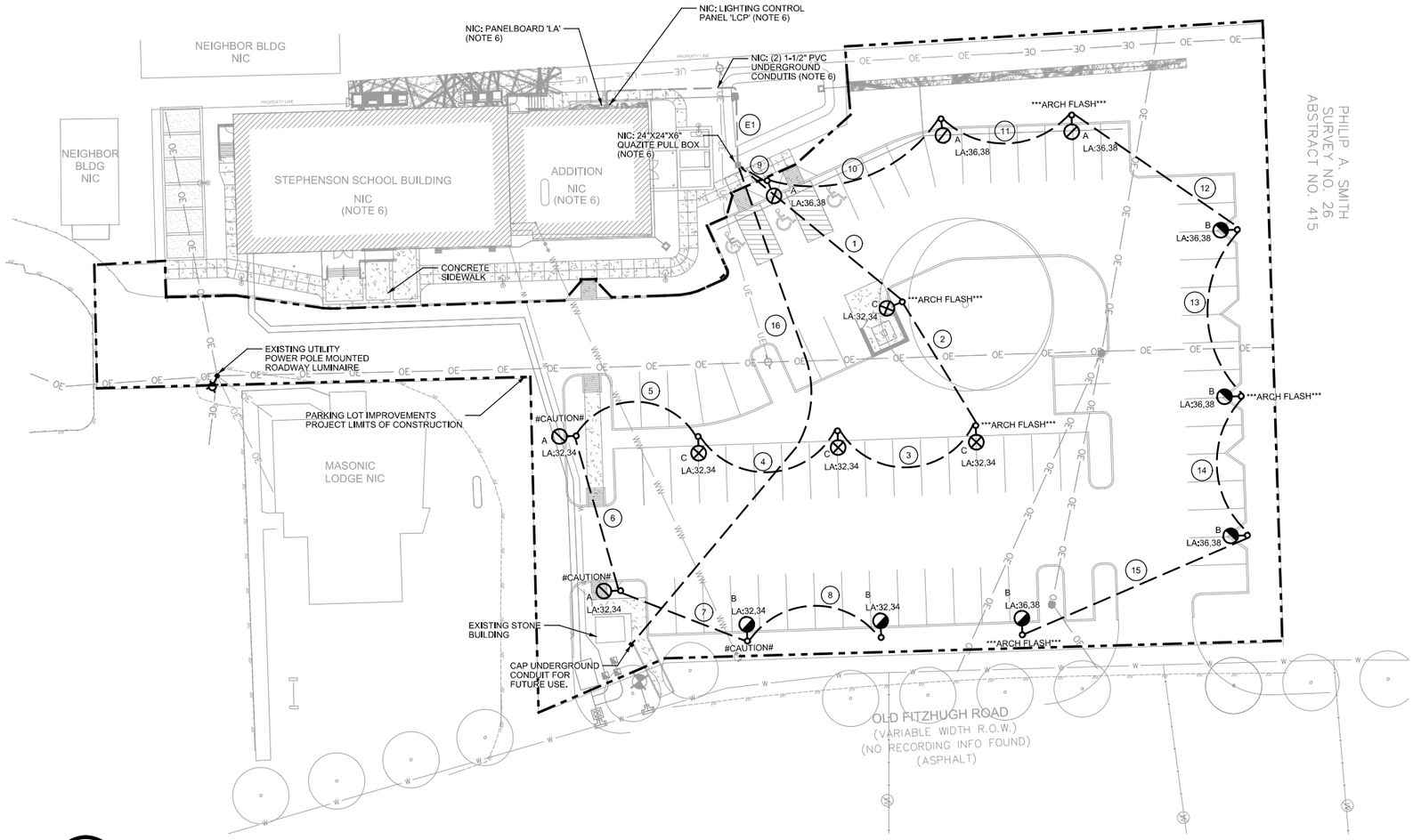
Project No.

Date
August 2, 2024

Sheet Name
Irrigation Details

Sheet Number
25 OF 33

L2.0



1 PARKING LOT ILLUMINATION PLAN

SCALE: 1" = 20'-0"

0 20 40 60 80

SCALE IN FEET

LEGEND

- TYPE 'A' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE III MEDIUM DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.
- TYPE 'B' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE III BACKLIGHT CONTROL DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.
- TYPE 'C' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE V MEDIUM DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.

SUBSCRIPTS:

X - INDICATES LUMINAIRE TYPE PER ILLUMINATION ASSEMBLY SCHEDULE

Y - INDICATES CIRCUIT DESIGNATION FROM PANELBOARD

UNDERGROUND BRANCH CIRCUIT CONDUIT AND CONDUCTORS DUCT BANK. RE: DETAIL #3 ON E501.

NIC NOT IN CONTRACT

(XX) CONDUCTORS/CONDUIT SEGMENT NO.

GENERAL NOTES:

1. ALL WORK SHALL BE COMPLETED ACCORDING TO APPLICABLE CITY OF DRIPPING SPRINGS STANDARDS, UTILITY COMPANY STANDARDS, AND THE NATIONAL ELECTRICAL CODE.

2. THE CONTRACTOR SHALL VERIFY WITH ALL UTILITY COMPANIES THE EXACT LOCATION OF EXISTING/ PROPOSED UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT OR DAMAGE TO THE EXISTING/ PROPOSED UTILITIES.

3. REFER TO ILLUMINATION SCHEMATIC, SCHEDULES, AND DETAILS FOR ADDITIONAL INFORMATION.

4. CONTRACTOR TO INSTALL ALL SITE/AREA PARKING LOT ILLUMINATION ASSEMBLIES PER DETAIL #1 ON E501.

5. ALL SITE AREA LUMINAIRES TO BE CONTROLLED BY CENTRAL LIGHTING CONTROL PANEL 'LCP' (NOTE 6).

6. STEPHENSON BUILDING ELECTRICAL SERVICE EQUIPMENT, PANELBOARD 'LA', LIGHTING CONTROL PANEL 'LCP', AND PANELBOARD 'LA' CIRCUIT BREAKERS ARE PART OF THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION PROJECT AND NOT PART OF THIS PROJECT. CONTRACTOR TO REFER TO THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION DOCUMENTS FOR EXACT STEPHENSON BUILDING ELECTRICAL SERVICE EQUIPMENT, PANELBOARD 'LA', LIGHTING CONTROL PANEL 'LCP', AND PANELBOARD 'LA' CIRCUIT BREAKERS DESIGN INFORMATION.

7. CONTRACTOR TO HAND DIG ILLUMINATION ASSEMBLY DRILL SHAFT POLE FOUNDATIONS FOR ALL LOCATIONS LABELED #CAUTION# ON THIS PLAN. THE POLE LOCATIONS INDICATED HAVE POTENTIAL IMPACTS TO EXISTING/ PROPOSED UNDERGROUND UTILITIES. ONE WEEK NOTICE REQUIRED FOR ALL POT HOLING CLOSER THAN 18" OFFSET OF ALL EXISTING/PROPOSED UNDERGROUND UTILITIES.

8. ***ARCH FLASH HAZARD*** - CONTRACTOR TO COORDINATE THE INSTALLATION OF THE ILLUMINATION ASSEMBLIES WITH ALL OVERHEAD UTILITY COMPANIES. ALL OVERHEAD UTILITY COMPANIES TO PROVIDE PROTECTION FROM THE OVERHEAD UTILITY LINES DURING ILLUMINATION ASSEMBLY INSTALLATION.

CONDUCTORS AND CONDUIT SUMMARY

PANEL	CIRCUIT	SEGMENT NO.	SEGMENT LENGTH (FT)	CONDUIT 1-1/2" PVC SCH 40	CONDUCTORS #6 BARE (GROUND)	CONDUCTORS #6 XHHW (POWER)	NOTES
LA	32,34	E1	72	(NOTE 1)	1 X 77 = 77	2 X 77 = 154	1
	36,38			(NOTE 1)	1 X 77 = 77	2 X 77 = 154	
LA	32,34	1	70		1 X 70 = 70	2 X 75 = 150	
LA	32,34	2	48		1 X 48 = 48	2 X 53 = 106	
LA	32,34	3	55		1 X 55 = 55	2 X 60 = 120	
LA	32,34	4	55		1 X 55 = 55	2 X 60 = 120	
LA	32,34	5	49		1 X 49 = 49	2 X 54 = 108	
LA	32,34	6	53		1 X 53 = 53	2 X 58 = 116	
LA	32,34	7	45		1 X 45 = 45	2 X 50 = 100	
LA	32,34	8	51		1 X 51 = 51	2 X 56 = 112	
LA	36,38	9	11		1 X 11 = 11	2 X 16 = 32	
LA	36,38	10	65		1 X 65 = 65	2 X 70 = 140	
LA	36,38	11	48		1 X 48 = 48	2 X 53 = 106	
LA	36,38	12	67		1 X 67 = 67	2 X 72 = 144	
LA	36,38	13	60		1 X 60 = 60	2 X 65 = 130	
LA	36,38	14	51		1 X 51 = 51	2 X 56 = 112	
LA	36,38	15	82		1 X 82 = 82	2 X 87 = 174	
LA	FUTURE	16	180		1 X 180 = 180	(FUTURE)	(FUTURE)	2
SHEET TOTAL				990	1039	2078	

NOTES:

1) THE (2) 1-1/2" SCH 40 PVC CONDUITS FOR THIS SEGMENT ARE PART OF THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION PROJECT. SEE GENERAL NOTE 6 ON THIS SHEET. CONTRACTOR TO INSTALL PARKING LOT ILLUMINATION BRANCH CIRCUIT CONDUCTORS WITHIN PROVIDED CONDUITS FROM THE PARKING LOT ILLUMINATION ASSEMBLIES TO STEPHENSON BUILDING PANELBOARD 'LA' AND LIGHTING CONTROL PANEL 'LCP'.

2) PROVIDE EMPTY SPARE CONDUIT WITH HIGH STRENGTH PULLSTRING FOR FUTURE USE.

SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM#	DESCRIPTION	UNIT	QTY
001	24" DIA. DRILL SHAFT POLE FOUNDATION	LF	135
002	TYPE A AREA LED ILLUMINATION ASSEMBLY	EA	5
003	TYPE B AREA LED ILLUMINATION ASSEMBLY	EA	6
004	TYPE C AREA LED ILLUMINATION ASSEMBLY	EA	4
005	1-1/2" SCH 40 PVC CONDUIT - TRENCH	LF	990
006	NO. 6 BARE ELEC CONDUCTOR	LF	1039
007	NO. 6 INSULATED ELEC CONDUCTOR	LF	2078

FDR

ILLUMINATION PLAN

STEPHENSON BUILDING
PARKING IMPROVEMENTS
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF PAUL K. DAVILA, P.E., TBPE#73285, ON 5/30/2025 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
30 MAY 2025

Designed:	GM
Drawn:	EW
Reviewed:	PKD
Date:	5/30/2025

SHEET

E100

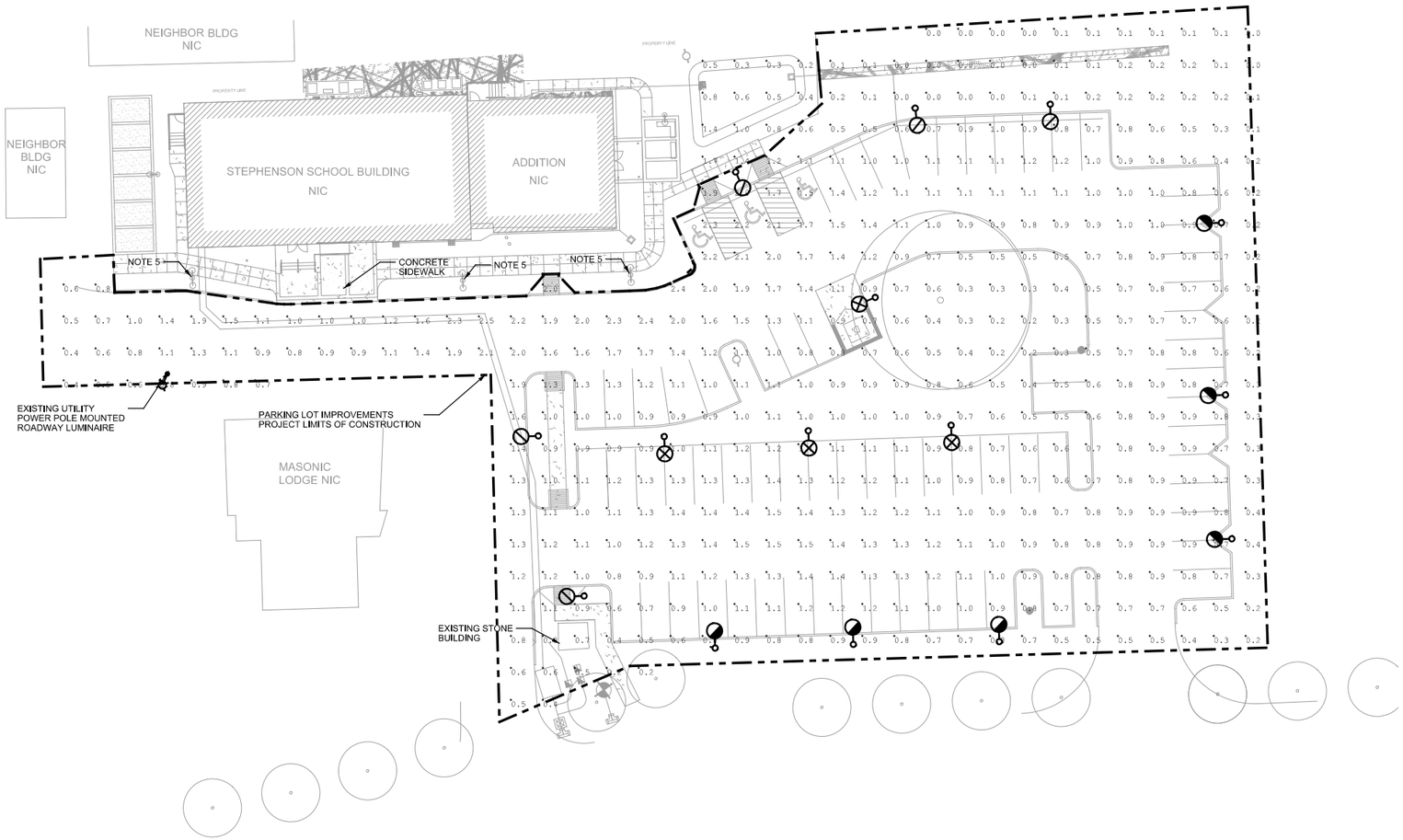
26 OF 3

Project No.: 10248905

1145

SP-YEAR-2024

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User: ewhite
Last Modified: 5/30/2025
Plot Date/Time: 5/30/2025 2:42:53 PM



N

0 20 40 60 80

SCALE IN FEET

LEGEND

TYPE 'A' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE III MEDIUM DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.

TYPE 'B' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE III BACKLIGHT CONTROL DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.

TYPE 'C' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE V MEDIUM DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.

GENERAL NOTES:

1. REFER TO ILLUMINATION SCHEMATIC, SCHEDULES, AND DETAILS FOR ADDITIONAL INFORMATION.

2. CONTRACTOR TO SUBMIT PROJECT LIMITS (EXTERIOR BASE, PARKING, AND WALKWAYS) PHOTOMETRIC AND POWER DENSITY ANALYSIS FOR ALL SUBMITTED APPROVED EQUAL/ ALTERNATE LUMINAIRE MANUFACTURERS AND MODEL NUMBERS NOT LISTED ON THE LUMINAIRE SCHEDULE. SUBMITTED APPROVED EQUAL/ ALTERNATE LUMINAIRE MANUFACTURERS AND MODEL NUMBERS MUST MEET THE REQUIRED PHOTOMETRIC AND POWER DENSITY STATISTICS FOR ALL AREAS/ SPACES INDICATED ON THIS SHEET. INCREASING LUMINAIRE QUANTITIES SHOWN ON THIS SHEET, INCREASING THE LUMEN OUTPUT ON THE LUMINAIRE SCHEDULE, OR INCREASING THE VA (VOLTAGE AMPS) ON THE LUMINAIRE SCHEDULE FOR THE PHOTOMETRIC AND POWER DENSITY STATISTICS COMPLIANCE IS PROHIBITED.

3. AGI32-20.10 SOFTWARE WAS UTILIZED FOR DEVELOPING THE PHOTOMETRIC ANALYSIS.

4. 10' X 10' POINT-BY-POINT GRID LAYOUT WAS UTILIZED FOR THE SPECIFIC ZONE.

5. ILLUMINATION POLES ARE PART OF THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION PROJECT AND ARE NOT PART OF THIS PROJECT. PHOTOMETRIC CALCULATIONS SHOWN INCLUDE THE LUMEN OUTPUT OF THE ILLUMINATION POLES.

1 PARKING LOT ILLUMINATION PHOTOMETRIC ANALYSIS - PROJECT LIMITS

SCALE: 1" = 20'-0"

PHOTOMETRIC ANALYSIS STATISTICS

DESCRIPTION ZONE	SYMBOL	AVERAGE	MAXIMUM	MINIMUM	MAX./MIN.	AVG./MIN.	LLF
LIMITS OF CONSTRUCTION	+	0.88 FC	2.5 FC	0.00 FC	N.A.	N.A.	0.8

FDR

ILLUMINATION PHOTOMETRIC ANALYSIS

STEPHENSON BUILDING PARKING IMPROVEMENTS

311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

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STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
30 MAY 2025

Designed:	GM
Drawn:	EW
Reviewed:	PKD
Date:	5/30/2025

SHEET

E101

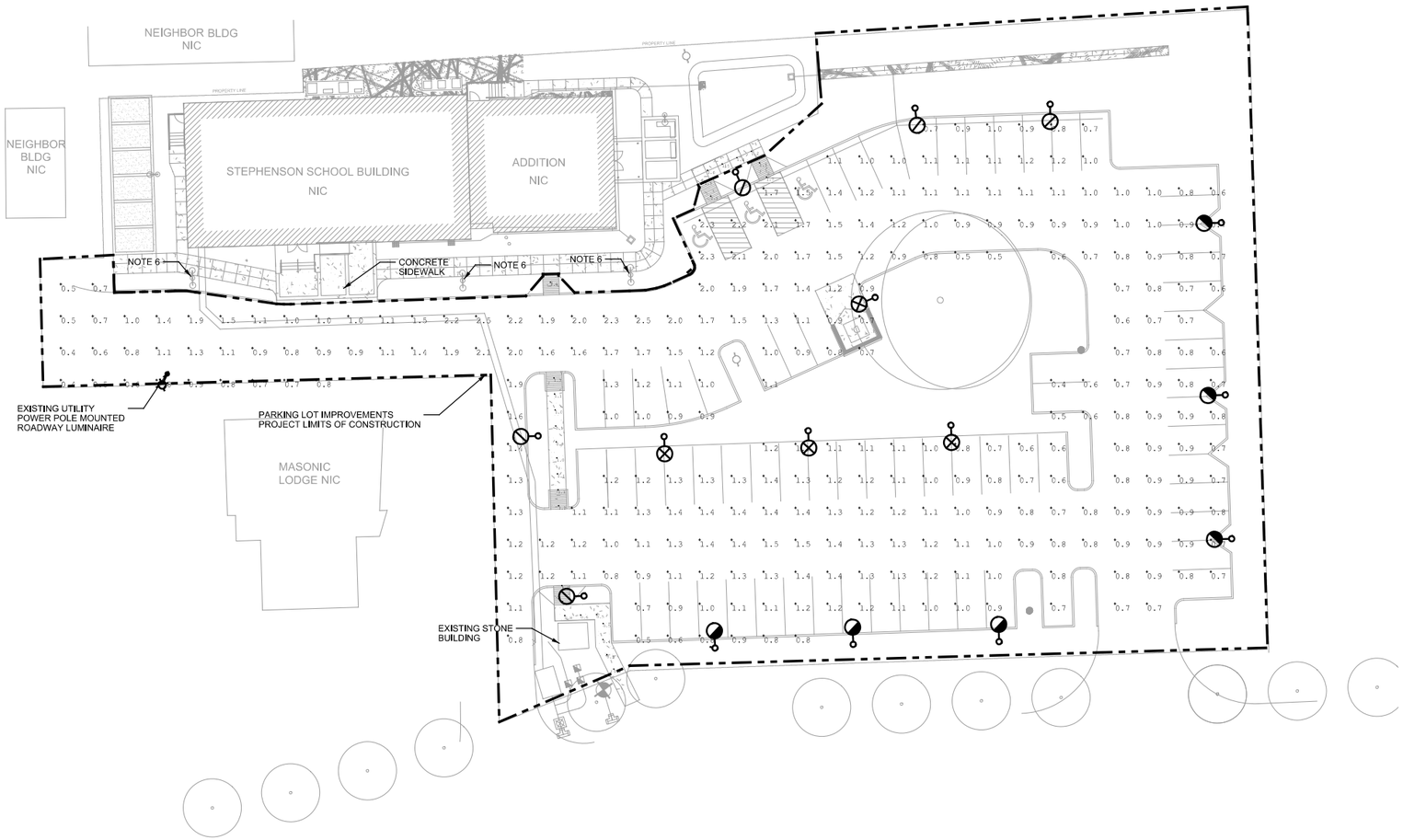
27 OF 3

Project No.: 10248905

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SP-YEAR-2024

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User: ewhite
Last Modified: 5/30/2025
Plot Date/Time: 5/30/2025 2:45:18 PM



N

0 20 40 60 80

SCALE IN FEET

LEGEND

TYPE 'A' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE III MEDIUM DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.

TYPE 'B' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE III BACKLIGHT CONTROL DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.

TYPE 'C' AREA ILLUMINATION ASSEMBLY, 22'-0" MOUNTING HEIGHT, LED LUMINAIRE WITH FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE V MEDIUM DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD.

GENERAL NOTES:

1. REFER TO ILLUMINATION SCHEMATIC, SCHEDULES, AND DETAILS FOR ADDITIONAL INFORMATION.

2. CONTRACTOR TO SUBMIT PROJECT LIMITS (EXTERIOR BASE, PARKING, AND WALKWAYS) PHOTOMETRIC AND POWER DENSITY ANALYSIS FOR ALL SUBMITTED APPROVED EQUAL/ ALTERNATE LUMINAIRE MANUFACTURERS AND MODEL NUMBERS NOT LISTED ON THE LUMINAIRE SCHEDULE. SUBMITTED APPROVED EQUAL/ ALTERNATE LUMINAIRE MANUFACTURERS AND MODEL NUMBERS MUST MEET THE REQUIRED PHOTOMETRIC AND POWER DENSITY STATISTICS FOR ALL AREAS/ SPACES INDICATED ON THIS SHEET. INCREASING LUMINAIRE QUANTITIES SHOWN ON THIS SHEET, INCREASING THE LUMEN OUTPUT ON THE LUMINAIRE SCHEDULE, OR INCREASING THE VA (VOLTAGE AMPS) ON THE LUMINAIRE SCHEDULE FOR THE PHOTOMETRIC AND POWER DENSITY STATISTICS COMPLIANCE IS PROHIBITED.

3. AGI32-20.10 SOFTWARE WAS UTILIZED FOR DEVELOPING THE PHOTOMETRIC ANALYSIS.

4. 10' X 10' POINT-BY-POINT GRID LAYOUT WAS UTILIZED FOR THE PARKING AREA ZONE.

5. 5' POINT-BY-POINT LINE WAS UTILIZED FOR THE WALKWAYS AND RAMPS ZONE.

6. ILLUMINATION POLES ARE PART OF THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION PROJECT AND ARE NOT PART OF THIS PROJECT. PHOTOMETRIC CALCULATIONS SHOWN INCLUDE THE LUMEN OUTPUT OF THE ILLUMINATION POLES.

1 PARKING LOT ILLUMINATION PHOTOMETRIC ANALYSIS - PARKING AREA

SCALE: 1" = 20'-0"

PHOTOMETRIC ANALYSIS STATISTICS

DESCRIPTION ZONE	SYMBOL	AVERAGE	MAXIMUM	MINIMUM	MAX./MIN.	AVG./MIN.	LLF
PARKING AREA	+	1.04 FC	2.50 FC	0.4 FC	6.25	2.73	0.8
WALKWAYS AND RAMPS	+	1.09 FC	2.10 FC	0.2 FC	10.50	5.45	0.8

PHOTOMETRIC AND POWER DENSITY STATISTICS - 2018 IECC REQUIREMENTS (ZONE 4)

DESCRIPTION	MINIMUM (HORIZONTAL)	MAX./MIN.	W/FT2	W/LINEAR FT.
PARKING AREAS/ DRIVES	0.2 FC @ AFG	20.0:1	0.08	N/A
WALKWAYS AND RAMPS LESS THAN 10 FT WIDE (WITHIN PARKING AREA)	0.2 FC @ AFG	20.0:1	N/A	0.7

ILLUMINATION PHOTOMETRIC ANALYSIS

STEPHENSON BUILDING
PARKING IMPROVEMENTS
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF PAUL K. DAVILA, P.E., TBPE#73285, ON 5/30/2025 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
30 MAY 2025

Designed:	GM
Drawn:	EW
Reviewed:	PKD
Date:	5/30/2025

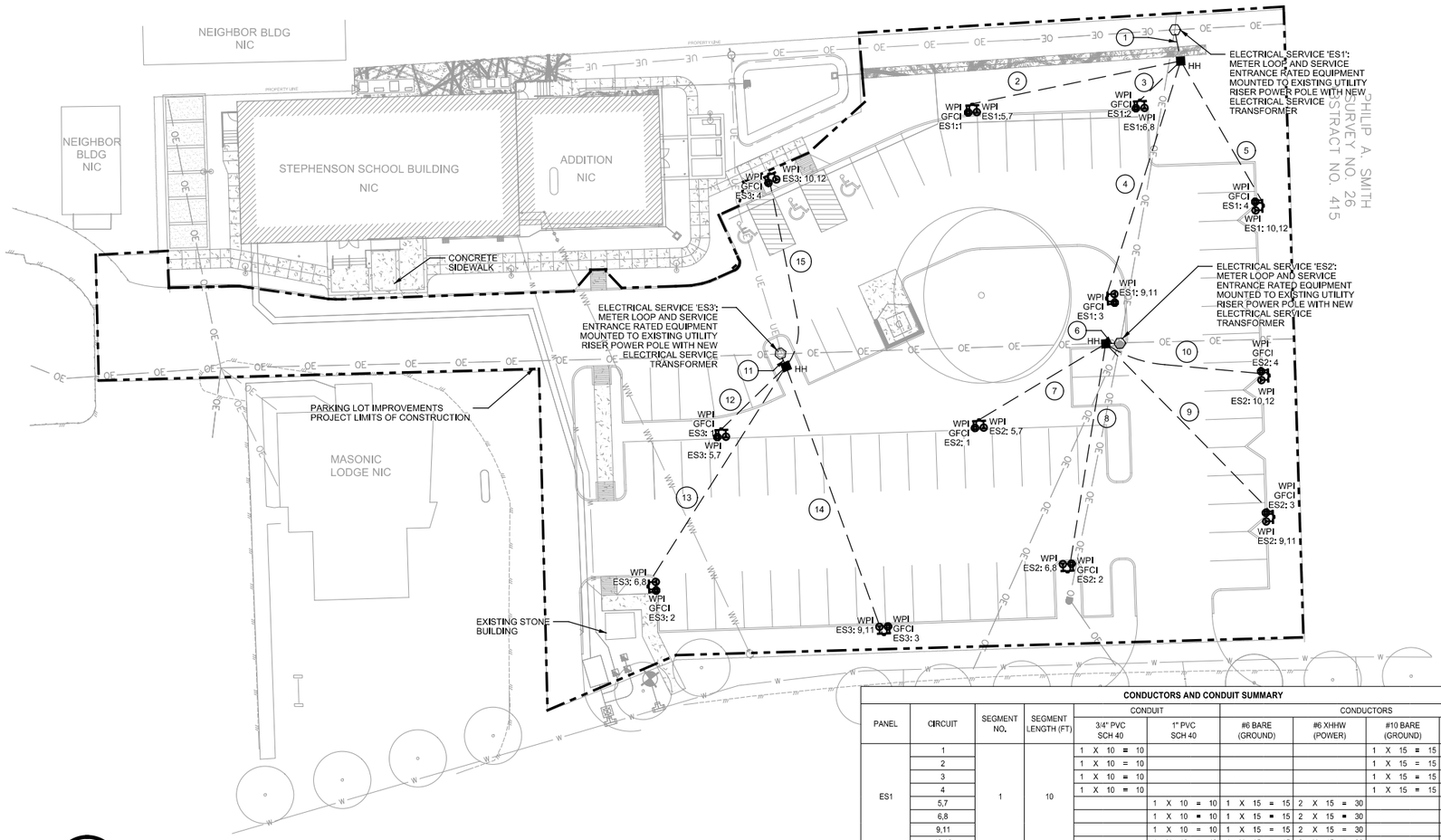
SHEET
E102
28 OF 3

Project No.: 10248905

1147

SP-YEAR-2024

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1 PARKING LOT ELECTRICAL PLAN

SCALE: 1" = 20'-0"

0 20 40 60 80

SCALE IN FEET

LEGEND

X / Y	NEMA MOUNTED QUAD RECEPTACLE AND SPECIAL FOOD TRAILER LOCKING RECEPTACLE. QUANTITY AND TYPE OF RECEPTACLES AS INDICATED. RE: DETAIL #2 ON E502.

SUBSCRIPTS:

X - INDICATES TYPE
GFCI - GROUND FAULT CIRCUIT INTERRUPTER
WPI - WEATHERPROOF IN-USE

Y - INDICATES CIRCUIT DESIGNATION FROM PANELBOARD

	225A, 120/240 VOLT, 1 PHASE, 3 WIRE, METER LOOP & ELECTRICAL SERVICE EQUIPMENT. RE: DETAIL #1 ON E502.
	UNDERGROUND BRANCH CIRCUIT CONDUIT AND CONDUCTORS DUCT BANK. RE: DETAIL #3 ON E501.
NIC	NOT IN CONTRACT
HH	TRAFFIC RATED HANDHOLE. REFER TO DETAIL #2 ON SHEET E501.
XX	CONDUCTORS/CONDUIT SEGMENT NO.

GENERAL NOTES:

1. ALL WORK SHALL BE COMPLETED ACCORDING TO APPLICABLE CITY OF DRIPPING SPRINGS STANDARDS, UTILITY COMPANY STANDARDS, AND THE NATIONAL ELECTRICAL CODE.

2. THE CONTRACTOR SHALL VERIFY WITH ALL UTILITY COMPANIES THE EXACT LOCATION OF EXISTING/ PROPOSED UNDERGROUND AND OVERHEAD UTILITIES PRIOR TO CONSTRUCTION TO AVOID CONFLICT OR DAMAGE TO THE EXISTING/ PROPOSED UTILITIES.

3. REFER TO ELECTRICAL SCHEMATICS, SCHEDULES, AND DETAILS FOR ADDITIONAL INFORMATION.

CONDUCTORS AND CONDUIT SUMMARY

PANEL	CIRCUIT	SEGMENT NO.	SEGMENT LENGTH (FT)	CONDUIT: 3/4" PVC SCH 40	CONDUIT: 1" PVC SCH 40	CONDUCTORS: #6 BARE (GROUND)	CONDUCTORS: #6 XHHW (POWER)	CONDUCTORS: #10 BARE (GROUND)	CONDUCTORS: #10 XHHW (POWER)	NOTES
ES1	1	1	10	1 X 10 = 10				1 X 15 = 15	2 X 15 = 30	
	2			1 X 10 = 10				1 X 15 = 15	2 X 15 = 30	
	3			1 X 10 = 10				1 X 15 = 15	2 X 15 = 30	
	4			1 X 10 = 10				1 X 15 = 15	2 X 15 = 30	
	5,7				1 X 10 = 10	1 X 15 = 15	2 X 15 = 30			
	6,8				1 X 10 = 10	1 X 15 = 15	2 X 15 = 30			
	9,11				1 X 10 = 10	1 X 15 = 15	2 X 15 = 30			
	10,12				1 X 10 = 10	1 X 15 = 15	2 X 15 = 30			
ES1	1	2	68	1 X 68 = 68				1 X 73 = 73	2 X 73 = 146	
	5,7				1 X 68 = 68	1 X 73 = 73	2 X 73 = 146			
ES1	2	3	18	1 X 18 = 18				1 X 23 = 23	2 X 23 = 46	
	6,8				1 X 18 = 18	1 X 23 = 23	2 X 23 = 46			
ES1	3	4	80	1 X 80 = 80				1 X 85 = 85	2 X 85 = 170	
	9,11				1 X 80 = 80	1 X 85 = 85	2 X 85 = 170			
ES1	4	5	54	1 X 54 = 54				1 X 59 = 59	2 X 59 = 118	
	10,12				1 X 54 = 54	1 X 59 = 59	2 X 59 = 118			
ES2	1	6	5	1 X 5 = 5				1 X 10 = 10	2 X 10 = 20	
	2			1 X 5 = 5				1 X 10 = 10	2 X 10 = 20	
	3			1 X 5 = 5				1 X 10 = 10	2 X 10 = 20	
	4			1 X 5 = 5				1 X 10 = 10	2 X 10 = 20	
	5,7				1 X 5 = 5	1 X 10 = 10	2 X 10 = 20			
	6,8				1 X 5 = 5	1 X 10 = 10	2 X 10 = 20			
	9,11				1 X 5 = 5	1 X 10 = 10	2 X 10 = 20			
	10,12				1 X 5 = 5	1 X 10 = 10	2 X 10 = 20			
ES2	1	7	47	1 X 47 = 47				1 X 52 = 52	2 X 52 = 104	
	5,7				1 X 47 = 47	1 X 52 = 52	2 X 52 = 104			
ES2	2	8	75	1 X 75 = 75				1 X 80 = 80	2 X 80 = 160	
	6,8				1 X 75 = 75	1 X 80 = 80	2 X 80 = 160			
ES2	3	9	77	1 X 77 = 77				1 X 82 = 82	2 X 82 = 164	
	9,11				1 X 77 = 77	1 X 82 = 82	2 X 82 = 164			
ES2	4	10	55	1 X 55 = 55				1 X 60 = 60	2 X 60 = 120	
	10,12				1 X 55 = 55	1 X 60 = 60	2 X 60 = 120			
ES3	1	11	5	1 X 5 = 5				1 X 10 = 10	2 X 10 = 20	
	2			1 X 5 = 5				1 X 10 = 10	2 X 10 = 20	
	3			1 X 5 = 5				1 X 10 = 10	2 X 10 = 20	
	4			1 X 5 = 5				1 X 10 = 10	2 X 10 = 20	
	5,7				1 X 5 = 5	1 X 10 = 10	2 X 10 = 20			
	6,8				1 X 5 = 5	1 X 10 = 10	2 X 10 = 20			
	9,11				1 X 5 = 5	1 X 10 = 10	2 X 10 = 20			
	10,12				1 X 5 = 5	1 X 10 = 10	2 X 10 = 20			
ES3	1	12	29	1 X 29 = 29				1 X 34 = 34	2 X 34 = 68	
	5,7				1 X 29 = 29	1 X 34 = 34	2 X 34 = 68			
ES3	2	13	83	1 X 83 = 83				1 X 88 = 88	2 X 88 = 176	
	6,8				1 X 83 = 83	1 X 88 = 88	2 X 88 = 176			
ES3	3	14	92	1 X 92 = 92				1 X 97 = 97	2 X 97 = 194	
	9,11				1 X 92 = 92	1 X 97 = 97	2 X 97 = 194			
ES3	4	15	63	1 X 63 = 63				1 X 68 = 68	2 X 68 = 136	
	10,12				1 X 63 = 63	1 X 68 = 68	2 X 68 = 136			
SHEET TOTAL				821	821	941	1882	941	1882	

SHEET SUMMARY OF ESTIMATED QUANTITIES

ITEM#	DESCRIPTION	UNIT	QTY
001	225A, 120/240 VOLT, 1 PHASE, 3 WIRE, METER LOOP & ELECTRICAL SERVICE EQUIPMENT	EA	3
002	OUTDOOR RECEPTACLES PLUGGING BOX PEDESTAL (1-20A QUAD & 1-50A LOCKING)	EA	12
003	12" SQUARE PLUGGING BOX FOUNDATION	LF	48
004	3/4" SCH 40 PVC CONDUIT - TRENCH	LF	821
005	1" SCH 40 PVC CONDUIT - TRENCH	LF	821
006	NO. 6 BARE ELEC CONDUCTOR	LF	941
007	NO. 6 INSULATED ELEC CONDUCTOR	LF	1882
008	NO. 10 BARE ELEC CONDUCTOR	LF	941
009	NO. 10 INSULATED ELEC CONDUCTOR	LF	1882
010	TRAFFIC RATED HANDHOLE WITH APRON	EA	3

*** ADD ALTERNATE DESIGN ***
(CONTRACTOR TO BID ALL ELECTRICAL WORK INDICATED ON THIS SHEET AS AN ADD ALTERNATE BID. ADD ALTERNATE WORK TO BE APPROVED BY CITY OF DRIPPING SPRINGS PRIOR TO PROCURMENT AND COMMENCING CONSTRUCTION)

ELECTRICAL PLAN

STEPHENSON BUILDING
PARKING IMPROVEMENTS
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF PAUL K. DAVILA, P.E., TBPE#73285, ON 5/30/2025 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
30 MAY 2025

Designed:	GM
Drawn:	EW
Reviewed:	PKD
Date:	5/30/2025

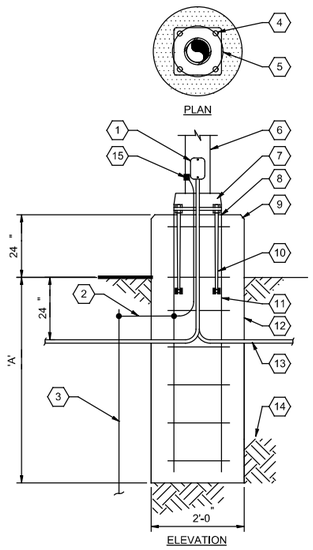
SHEET
E103
29 OF 3

Project No.: 10248905

1148

SP-YEAR-2024

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User Name: PKD
Last Modified: 5/30/2025
Plot Date/Time: 5/30/2025 4:24:04 PM



POLE HEIGHT	MINIMUM EMBEDMENT "A"
10'-0"	5'-0"
15'-0"	6'-0"
20'-0"	7'-0"
25'-0"	8'-0"
30'-0"	9'-0"
40'-0"	10'-0"

KEYNOTE:

1. HAND HOLE AND COVER
2. #6 AWG GROUND TO POLE
3. 3/4" X 10'-0" GROUND ROD
4. 4 HOLES FOR ANCHOR BOLTS AS REQUIRED BY POLE MANUFACTURER
5. BOLT CIRCLE AS PER MANUFACTURERS RECOMMENDATIONS
6. LUMINAIRE POLE
7. BASE/ BOLT COVER PLATE
8. NON-SHRINK GROUT
9. 1" CHAMFER
10. STAINLESS STEEL ANCHOR BOLTS 4 MIN. WITH LEVELING NUTS AS REQUIRED BY POLE MANUFACTURER
11. 6#6 VERTICAL REBAR WITH #4 HOOPS @ 6" O.C. AND 3" MINIMUM COVER ON ALL STEEL REINFORCEMENT
12. 3000 PSI CONCRETE PER CONCRETE SPEC SECTION
13. CONDUIT, SEE ELEC DRAWINGS
14. COMPACTED SUB BASE AS SPECIFIED
15. BOND SYSTEM GROUND TO GROUNDING LUG INSIDE POLE

NOTES:

A. USE STAINLESS STEEL NUTS AND LOCK WASHERS.

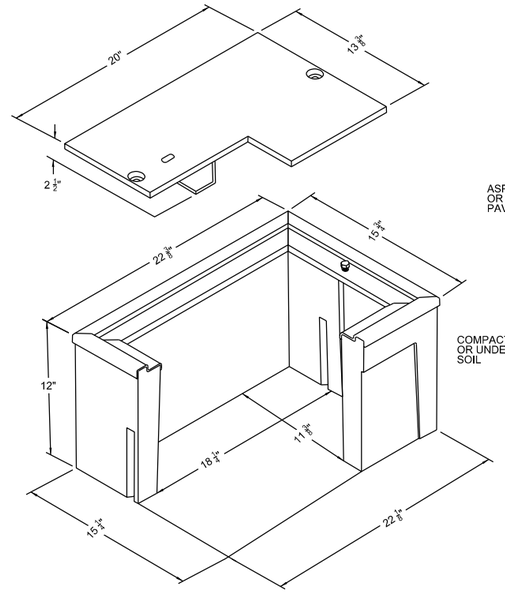
B. INSTALL 2 CONDUITS (MINIMUM PER POLE).

C. CONDUITS SHALL BE STUBBED UP TO WITHIN 6" OF THE POLE HAND HOLE.

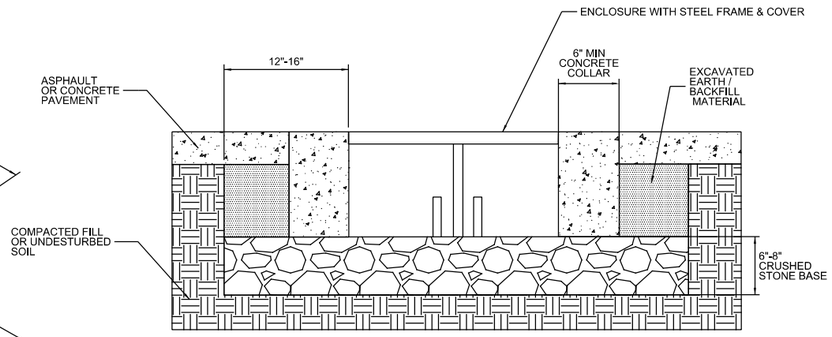
D. COORDINATE WITH SITE PLANS FOR PROPER ORIENTATION OF THE POLE.

E. INSTALL CONCRETE POLE BASE A MINIMUM OF 2'-0" FROM CURB FACE TO FACE OF CONCRETE BASE. SEE PLANS FOR LOCATIONS.

1 TYPE "A", "B", AND "C" LUMINAIRE POLE BASE DETAIL
NOT TO SCALE

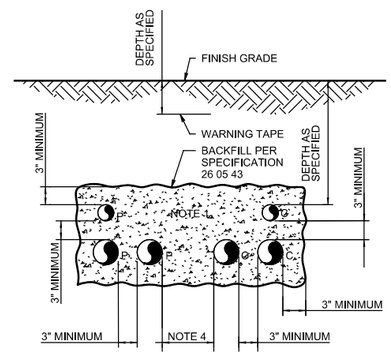


2 HANDHOLE DETAIL
NOT TO SCALE



NOTE:

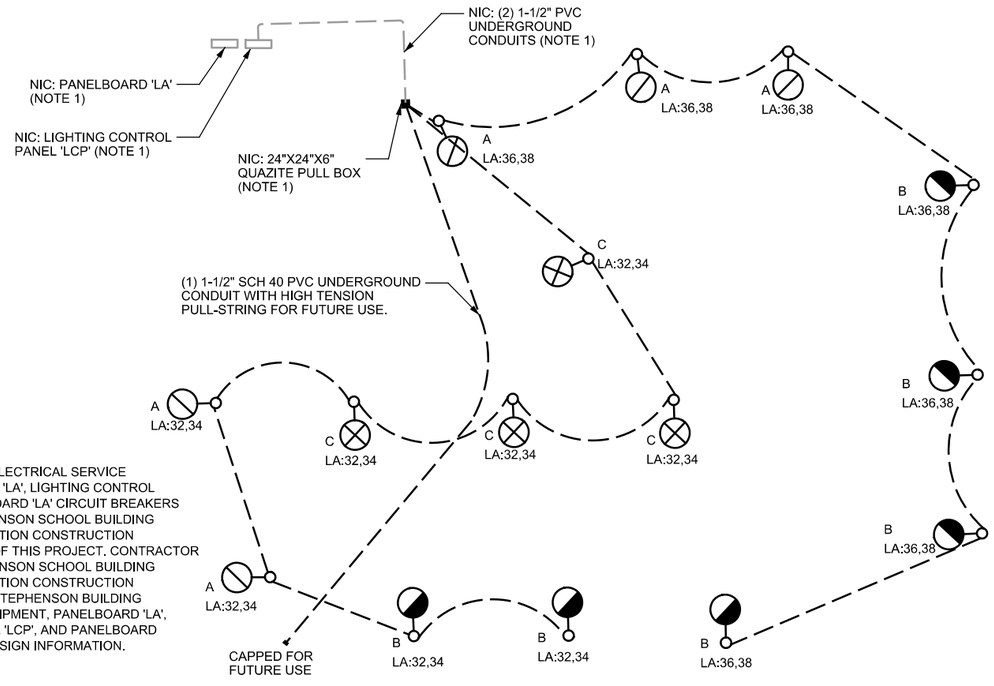
1. HANDHOLE TO BE AASHTO H20 TRAFFIC RATED.



NOTES:

1. NUMBER OF CONDUITS AS REQUIRED FOR THE APPLICATION.
2. P SUBSCRIPT ELECTRICAL POWER OR CONTROL CONDUIT.
3. C SUBSCRIPT COMMUNICATION (TELEPHONE, DATA, INSTRUMENTATION) CONDUIT.
4. 6" MINIMUM WHEN POWER CONDUIT CONTAINS LESS THAN 1000V. 12" MINIMUM WHEN POWER CONDUIT CONTAINS MORE THAN 1000V.

3 DIRECT BURIED CONDUIT(S) SECTION
NOT TO SCALE



NOTE:

1. STEPHENSON BUILDING ELECTRICAL SERVICE EQUIPMENT, PANELBOARD 'LA', LIGHTING CONTROL PANEL 'LCP', AND PANELBOARD 'LA' CIRCUIT BREAKERS ARE PART OF THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION PROJECT AND NOT PART OF THIS PROJECT. CONTRACTOR TO REFER TO THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION DOCUMENTS FOR EXACT STEPHENSON BUILDING ELECTRICAL SERVICE EQUIPMENT, PANELBOARD 'LA', LIGHTING CONTROL PANEL 'LCP', AND PANELBOARD 'LA' CIRCUIT BREAKERS DESIGN INFORMATION.

4 ILLUMINATION SCHEMATIC 'LA' (NOTE 1)
NOT TO SCALE

FDR

ILLUMINATION DETAILS AND SCHEMATIC

STEPHENSON BUILDING PARKING IMPROVEMENTS

311 OLD FITZHUGH ROAD,

HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF PAUL K. DAVILA, P.E., TBPE#73285, ON 5/30/2025 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED PROFESSIONAL ENGINEER
30 MAY 2025

Designed:	GM
Drawn:	EW
Reviewed:	PKD
Date:	5/30/2025

SHEET

E501

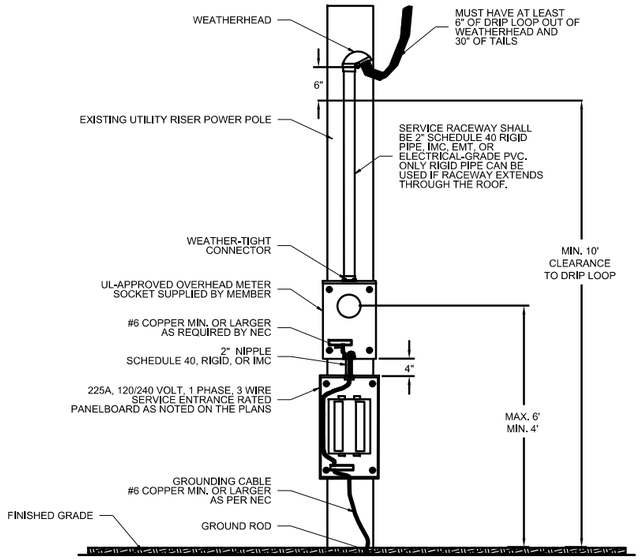
30 OF 3

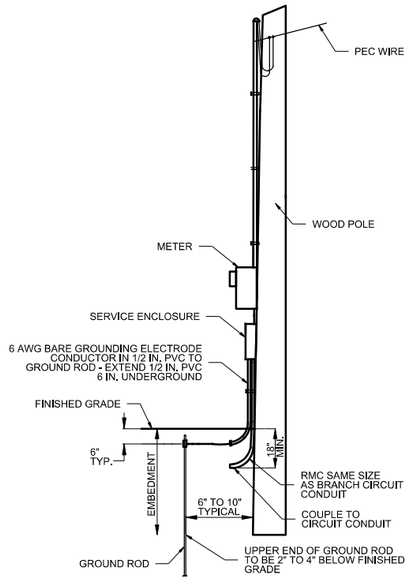
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Project No.: 10248905

SP-YEAR-2024

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Last Modified: 5/30/2025
Plot Date/Time: 5/30/2025 4:06:25 PM

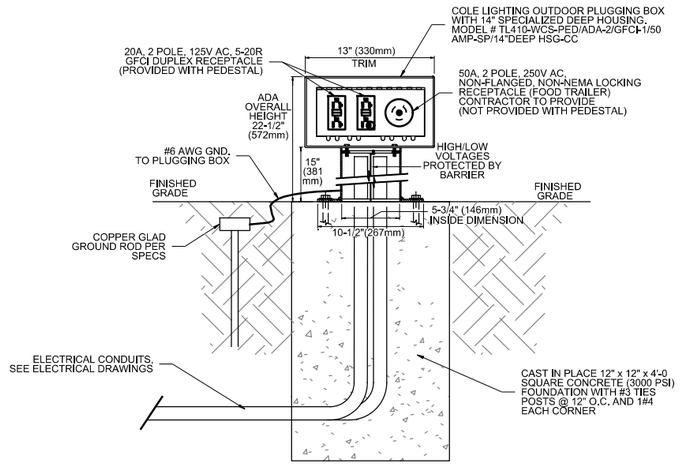




NOTES:

1. PEC SHALL PROVIDE AND INSTALL A SERVICE WIRE DROP TO THE MEMBER'S METER LOOP.
2. NEUTRAL CONDUCTOR MUST BE ELECTRICALLY CONTINUOUS THROUGH THE METER SOCKET TO THE MAIN PANEL AND MUST BE ATTACHED TO THE METER SOCKET. ELECTRIC CONTRACTOR HAS THE OPTION OF TERMINATING THE NEUTRAL AT THE METER SOCKET LUG. MAIN PANELS WILL BE TERMINATED AT THE METER SOCKET LUGS.
3. THE EXTERIOR OF THE SERVICE AREA SHALL HAVE A WEATHERPROOF MAIN DISCONNECT PANEL FUSED OR BREAKER-PROTECTED REGARDLESS OF THE NUMBER OF CIRCUIT BREAKERS.
4. GROUND CABLES SHALL BE #6 COPPER MINIMUM OR LARGER PER NEC TABLE 250.66. GROUND RODS SHALL BE 5/8" x 8' COPPER-CLAD WITH CLAMP AND DRIVEN AT OR BELOW GRADE PER NEC.
5. PERMANENT AND/OR TEMPORARY OBSTRUCTIONS ARE NOT PERMITTED WITHIN 3' IN ANY DIRECTION OF OF AN ELECTRIC METER.
6) OBSTRUCTIONS INCLUDE BUT ARE NOT LIMITED TO TREES, SHRUBS, HVAC UNITS, GENERATORS, WALLS, FENCES, GAS METERS, WINDOWS, AND/OR BUILDINGS.

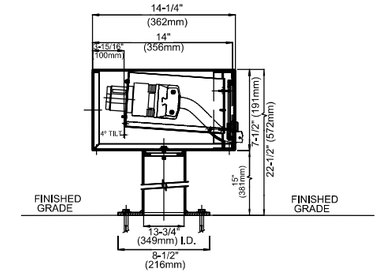
1 METER LOOP & SERVICE EQUIPMENT DETAIL
NOT TO SCALE



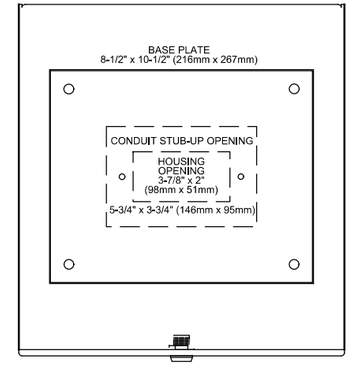
NOTES:

1. MATERIALS AND HARDWARE SHALL CONFORM TO THE REQUIREMENTS OF SPECIFICATION 26 05 00.
2. INSTALL OUTDOOR RECEPTACLES PLUGGING BOX PEDESTAL A MINIMUM OF 2'-0" FROM CURB FACE TO FACE OF OUTDOOR PLUGGING BOX PEDESTAL. SEE PLANS FOR LOCATIONS.

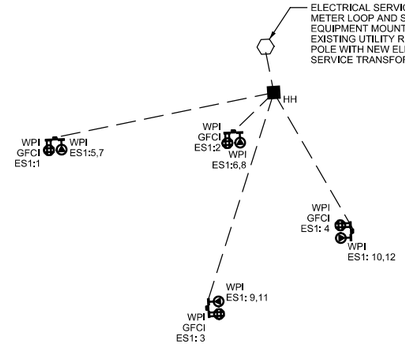
2 OUTDOOR RECEPTACLES PLUGGING BOX PEDESTAL MOUNTING DETAIL
NOT TO SCALE



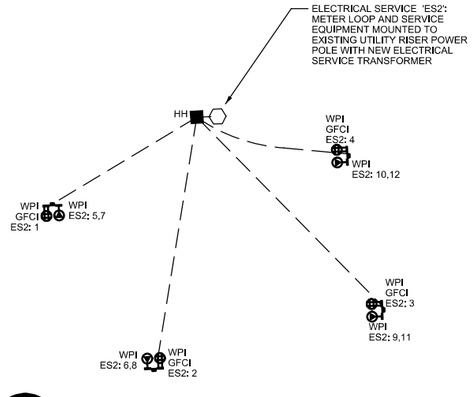
SIDE ELEVATION



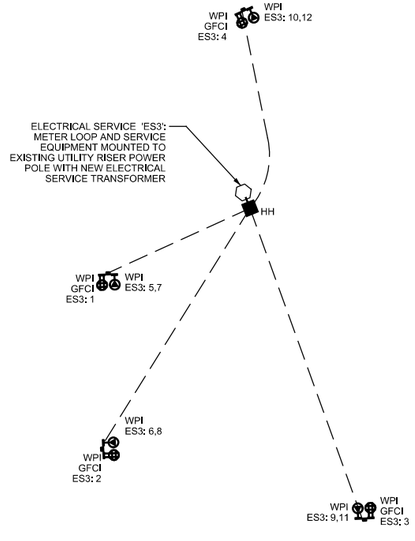
PLAN VIEW



3 ELECTRICAL SCHEMATIC 'ES1'
NOT TO SCALE



4 ELECTRICAL SCHEMATIC 'ES2'
NOT TO SCALE



5 ELECTRICAL SCHEMATIC 'ES3'
NOT TO SCALE

LEGEND

- NEMA MOUNTED QUAD RECEPTACLE AND SPECIAL FOOD TRAILER LOCKING RECEPTACLE
- 225A, 120/240 VOLT, 1 PHASE, 3 WIRE, METER LOOP & ELECTRICAL SERVICE EQUIPMENT
- UNDERGROUND BRANCH CIRCUIT CONDUIT AND CONDUCTORS DUCT BANK.
- HH — TRAFFIC RATED HANDHOLE

*** ADD ALTERNATE DESIGN ***
(CONTRACTOR TO BID ALL ELECTRICAL WORK INDICATED ON THIS SHEET AS AN ADD ALTERNATE BID. ADD ALTERNATE WORK TO BE APPROVED BY CITY OF DRIPPING SPRINGS PRIOR TO PROCURMENT AND COMMENCING CONSTRUCTION)

Item 2.

FDR

ELECTRICAL DETAILS AND SCHEMATIC

STEPHENSON BUILDING PARKING IMPROVEMENTS
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

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STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED PROFESSIONAL ENGINEER
30 MAY 2025

Designed:	GM
Drawn:	EW
Reviewed:	PKD
Date:	5/30/2025

SHEET
E502
31 OF 31

Project No.: 10248905

1150

SP-YEAR-2024

Drawing: ...\STEPH_ELUM_DET-02.dgn
User Name: ...
Last Modified: 5/30/2025
Plot Date/Time: 5/30/2025 2:51:49 PM

ILLUMINATION ASSEMBLY SCHEDULE

TYPE	MANUFACTURER/ MODEL NUMBER	LAMPS							MOUNTING	HEIGHT	DESCRIPTION	IMAGE	NOTES
		TYPE	TEMP	LUMENS	CRI	BUG RATING	VOLTAGE	VA					
A	LUMINAIRE: LITHONIA #DSX0-LED-P1-27K-80CRI-T3M-MVOLT-SPA-NLTAIR2/PIRHN-EGSR-BAA-DDBXD POLE: HAPCO #SSA20F4-4-D19AS-VD-IC-BM	LED	2700K	2734	80	B0-U0-G1	120-277V	34	POLE (TO BOTTOM OF LUMINAIRE)	22'-0" ABOVE FINISHED GRADE	LUMINAIRE: 26.18" X 14.06" X 2.26" SINGLE MOUNTED AT 90 DEGREES AREA LUMINAIRE WITH HEAVY-DUTY SINGLE-PIECE DIE-CAST ALUMINUM HOUSING, INTEGRAL HEAT SINK FINS, TGIC THERMOSET POWDER COAT DARK BRONZE FINISH, PRECISION-MOLDED PROPRIETARY SILICONE LENS, HIGH OUTPUT LONG LIFE LEDS, INTEGRAL NLIGHT AIR ENABLED CONTROL MOTION/AMBIENT SENSOR ENABLED AT 1 FC, 10kV SURGE PROTECTION, INTEGRAL DRIVER DISCONNECT, HIGH-EFFICIENCY DRIVER, 0-10v DIMMING CONTROLS, INTEGRAL MOUNTING ARM, INTEGRAL "NO-DRILL" SQUARE POLE MOUNTING, IP66 WET LOCATION RATED, 0.44 EPA RATING AT 100MPH, VIBRATION 3G RATED, FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE III MEDIUM DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD. POLE: 20' STRAIGHT SQUARE POLE WITH HEAT TREATED EXTRUTED 6XXX SERIES ALUMINUM ALLOY TUBING, 0.250" THICK TUBING, 4" POLE SHAFT, 1 LUMINAIRE DRILLED AT 90°, 9.4 EPA AT 100 MPH, 8.5"-9.5" BOLT CIRCLE 4-BOLT 356 ALLOY ALUMINUM ANCHOR BASE, ALUMINUM SNAP-IN BOLT COVERS, INTEGRAL TOP CAP COVER, INTEGRAL HANDHOLE @ 18" AFF AND COVER, INTEGRAL GROUNDING HARDWARE, INTEGRAL VIBRATION DAMPER, CORROSION RESISTANT INTERIOR COATING, 3/4"X17"X3" STAINLESS STEEL ANCHOR BOLTS, DARK BRONZE POWDER COAT FINISH.		1, 2
B	LUMINAIRE: LITHONIA #DSX0-LED-P1-27K-80CRI-BLC3-MVOLT-SPA-NLTAIR2/PIRHN-EGSR-BAA-DDBXD POLE: HAPCO #SSA20F4-4-D19AS-VD-IC-BM	LED	2700K	2812	80	B0-U0-G1	120-277V	34	POLE (TO BOTTOM OF LUMINAIRE)	22'-0" ABOVE FINISHED GRADE	LUMINAIRE: 26.18" X 14.06" X 2.26" SINGLE MOUNTED AT 90 DEGREES AREA LUMINAIRE WITH HEAVY-DUTY SINGLE-PIECE DIE-CAST ALUMINUM HOUSING, INTEGRAL HEAT SINK FINS, TGIC THERMOSET POWDER COAT DARK BRONZE FINISH, PRECISION-MOLDED PROPRIETARY SILICONE LENS, HIGH OUTPUT LONG LIFE LEDS, INTEGRAL NLIGHT AIR ENABLED CONTROL MOTION/AMBIENT SENSOR ENABLED AT 1 FC, 10kV SURGE PROTECTION, INTEGRAL DRIVER DISCONNECT, HIGH-EFFICIENCY DRIVER, 0-10v DIMMING CONTROLS, INTEGRAL MOUNTING ARM, INTEGRAL "NO-DRILL" SQUARE POLE MOUNTING, IP66 WET LOCATION RATED, 0.44 EPA RATING AT 100MPH, VIBRATION 3G RATED, FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE III BACKLIGHT CONTROL DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD. POLE: 20' STRAIGHT SQUARE POLE WITH HEAT TREATED EXTRUTED 6XXX SERIES ALUMINUM ALLOY TUBING, 0.250" THICK TUBING, 4" POLE SHAFT, 1 LUMINAIRE DRILLED AT 90°, 9.4 EPA AT 100 MPH, 8.5"-9.5" BOLT CIRCLE 4-BOLT 356 ALLOY ALUMINUM ANCHOR BASE, ALUMINUM SNAP-IN BOLT COVERS, INTEGRAL TOP CAP COVER, INTEGRAL HANDHOLE @ 18" AFF AND COVER, INTEGRAL GROUNDING HARDWARE, INTEGRAL VIBRATION DAMPER, CORROSION RESISTANT INTERIOR COATING, 3/4"X17"X3" STAINLESS STEEL ANCHOR BOLTS, DARK BRONZE POWDER COAT FINISH.		1, 2
C	LUMINAIRE: LITHONIA #DSX0-LED-P1-27K-80CRI-T5M-MVOLT-SPA-NLTAIR2/PIRHN-EGSR-BAA-DDBXD POLE: HAPCO #SSA20F4-4-D19AS-VD-IC-BM	LED	2700K	3143	80	B1-U0-G1	120-277V	34	POLE (TO BOTTOM OF LUMINAIRE)	22'-0" ABOVE FINISHED GRADE	LUMINAIRE: 26.18" X 14.06" X 2.26" SINGLE MOUNTED AT 90 DEGREES AREA LUMINAIRE WITH HEAVY-DUTY SINGLE-PIECE DIE-CAST ALUMINUM HOUSING, INTEGRAL HEAT SINK FINS, TGIC THERMOSET POWDER COAT DARK BRONZE FINISH, PRECISION-MOLDED PROPRIETARY SILICONE LENS, HIGH OUTPUT LONG LIFE LEDS, INTEGRAL NLIGHT AIR ENABLED CONTROL MOTION/AMBIENT SENSOR ENABLED AT 1 FC, 10kV SURGE PROTECTION, INTEGRAL DRIVER DISCONNECT, HIGH-EFFICIENCY DRIVER, 0-10v DIMMING CONTROLS, INTEGRAL MOUNTING ARM, INTEGRAL "NO-DRILL" SQUARE POLE MOUNTING, IP66 WET LOCATION RATED, 0.44 EPA RATING AT 100MPH, VIBRATION 3G RATED, FULL "CUT-OFF" (NIGHTTIME FRIENDLY - DARK SKY) TYPE V MEDIUM DISTRIBUTION OPTICS, INTEGRAL EXTERNAL GLARE SHIELD. POLE: 20' STRAIGHT SQUARE POLE WITH HEAT TREATED EXTRUTED 6XXX SERIES ALUMINUM ALLOY TUBING, 0.250" THICK TUBING, 4" POLE SHAFT, 1 LUMINAIRE DRILLED AT 90°, 9.4 EPA AT 100 MPH, 8.5"-9.5" BOLT CIRCLE 4-BOLT 356 ALLOY ALUMINUM ANCHOR BASE, ALUMINUM SNAP-IN BOLT COVERS, INTEGRAL TOP CAP COVER, INTEGRAL HANDHOLE @ 18" AFF AND COVER, INTEGRAL GROUNDING HARDWARE, INTEGRAL VIBRATION DAMPER, CORROSION RESISTANT INTERIOR COATING, 3/4"X17"X3" STAINLESS STEEL ANCHOR BOLTS, DARK BRONZE POWDER COAT FINISH.		1, 2

NOTES:
1) LUMINAIRE(S) TO BE CONTROLLED VIA LOCAL FACILITY PHOTOCELL/TIME CLOCK CONTACTOR LUMINAIRE CONTROLS 'LCP'. REFER TO STEPHENSON SCHOOL BUILDING, REHABILITATION AND ADDITION PLANS.

2) LUMINAIRE(S) ARE COMPLIANT WITH CITY OF DRIPPING SPRINGS LIGHTING ORDINANCE ARTICLE 24.06.

PARKING LOT LOAD ANALYSIS - ILLUMINATION (PANEL 'LA')

PROJECT: CODS STEPHENSON PARKING LOT ILLUMINATION

STEPHENSON BLDG ELECTRICAL SERVICE: 800A, 120/240V, 1PH, 3W (NOTE 1)

LOAD TYPE (LIGHTING)	NEW CONNECTED	NEW DEMAND	
20A, 240V, PANEL 'LA', CIRCUIT 32,34 (NOTE 1)	1.12	1.40	AMPS
20A, 240V, PANEL 'LA', CIRCUIT 36,38 (NOTE 1)	0.98	1.23	AMPS
TOTAL LOAD (PARKING LOT ILLUMINATION)	2.10	2.63	AMPS

NOTE:
1) STEPHENSON BUILDING ELECTRICAL SERVICE EQUIPMENT, PANELBOARD 'LA', LIGHTING CONTROL PANEL 'LCP', AND PANELBOARD 'LA' CIRUIT BREAKERS ARE PART OF THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION PROJECT AND NOT PART OF THIS PROJECT. CONTRACTOR TO REFER TO THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION DOCUMENTS FOR EXACT STEPHENSON BUILDING ELECTRICAL SERVICE EQUIPMENT, PANELBOARD 'LA', LIGHTING CONTROL PANEL 'LCP', AND PANELBOARD 'LA' CIRCUIT BREAKERS DESIGN INFORMATION.

ILLUMINATION (PANEL 'LA') - VOLTAGE DROP

Project Name: STEPHENSON PARKING LOT
Project Number: 10248905
Date: May 27, 2025
Designer: E.WHITE
Note: LUMINAIRES MOUNTED AT 22'-0" A.F.F.

CIRCUIT DESIGNATION	ORIGIN	LENGTH - LINEAR & POLE (FT)	VOLTS	PHASE	LOAD (A)	CONDUCTOR PER PHASE	CONDUCTOR SIZE	RESISTANCE	VOLTAGE DROP (V)	FEEDER PERCENT	PERCENT TOTAL	FINAL VOLTAGE
32,34	PANEL 'LA' (NOTE 1)	678	240	1	1.12	1	6 AWG	0.51	0.77	0.32%	0.32%	239.23
36,38	PANEL 'LA' (NOTE 1)	614	240	1	0.98	1	6 AWG	0.51	0.61	0.26%	0.26%	239.39

LUMINAIRE CONTROLS SEQUENCE

SPACE/ AREA TYPE	SEQUENCE OF OPERATIONS (NO DAYLIGHT HARVESTING)	SEQUENCE OF OPERATIONS (NO DAYLIGHT HARVESTING)	DAYLIGHT HARVESTING - ILLUMINANCE REQUIREMENTS (FC SETPOINTS)
EXTERIOR PARKING AREA AND DRIVES	INTEGRAL - OCCUPANT ENTERS THE SPACE AND THE LUMINAIRES AUTOMATICALLY TURN ON TO 100% OF FULL LUMINAIRE OUTPUT. UPON SENSING VACANCY AFTER 15 MINUTES, THE LUMINAIRES AUTOMATICALLY TURN DOWN TO 30% OF FULL LUMINAIRE OUTPUT.	CONTROL CIRCUITS TO BE ROUTED THROUGH THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION LIGHTING CONTROL PANEL 'LCP' (NOTE 2) FOR ON/OFF PHOTOCELL/TIME CLOCK CONTROL. PROVIDE LOCAL LOW-VOLTAGE MANUAL OVERRIDE SWITCH(S) FOR 2 HOUR MAXIMUM OVERRIDE.	N/A

NOTES:
1) REFER TO LIGHTING PLANS FOR ADDITIONAL INFORMATION.
2) CONTRACTOR TO REFER TO THE STEPHENSON SCHOOL BUILDING REHABILITATION AND ADDITION CONSTRUCTION DOCUMENTS FOR ADDITIONAL LIGHTING CONTROL PANEL 'LCP' DESIGN INFORMATION AND EXACT LOCATION OF THE LIGHTING CONTROL PANEL 'LCP'.

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User: EWHITE
Last Modified: 5/30/2025
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ILLUMINATION SCHEDULES

STEPHENSON BUILDING
PARKING IMPROVEMENTS
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF PAUL K. DAVILA, P.E., TBPE#73285, ON 5/30/2025 FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
30 MAY 2025

Designed:	GM
Drawn:	EW
Reviewed:	PKD
Date:	5/30/2025

SHEET
E601
32 OF 3

Project No.: 10248905

1151

SP-YEAR-2024

PANELBOARD ES1

LOCATION: PARKING LOT | VOLTAGE: 120/240 V | KAIC: 22 | BUSSING SHALL BE FULLY RATED
MOUNTING: UTILITY POWER POLE | PHASE: 1 P / 3W | CODES: 0=EQPT, 1=RCPT, 2=LTG, 3=A/C, 4=HEAT
ENCLOSURE: NEMA 3R | STYLE: POW-R-LINE-1A | BUSSING: 225 A | 5=CONTINUOUS MOTORS, 6=LRGST MOTOR, 7=PANEL
BRKR MTG: BOLT-ON | (SERVICE ENTRANCE RATED) | MCB: 225 A | ACCESSORIES: GROUND BUS, 24 SPACE
BREAKERS: 60/75 DEGREE TERMINALS | MLO: A

CODE	BRKR	CIRCUIT USE	CKT	LOAD	A	B	LOAD	CKT	CIRCUIT USE	BRKR	CODE
1	20/1	QUAD GFCI RECEPTACLE 'A'	1	360	X		360	2	QUAD GFCI RECEPTACLE 'B'	20/1	1
1	20/1	QUAD GFCI RECEPTACLE 'C'	3	360		X	360	4	QUAD GFCI RECEPTACLE 'D'	20/1	1
0	50/2	FOOD TRUCK LOCKING RECEPTACLE 'A'	5	4,800	X		4,800	6	FOOD TRUCK LOCKING RECEPTACLE 'B'	50/2	0
0			7	4,800		X	4,800	8			0
0	50/2	FOOD TRUCK LOCKING RECEPTACLE 'C'	9	4,800	X		4,800	10	FOOD TRUCK LOCKING RECEPTACLE 'D'	50/2	0
0			11	4,800		X	4,800	12			0
	20/1	SPARE	13		X			14	SPARE	20/1	
		SPACE	15			X		16	SPACE		
		SPACE	17		X			18	SPACE		

	EQPT VA	RCPT VA	LTG VA	AC/HEAT VA	MOTORS	CONN VA	FTL VA	PANEL VA	PHASE AMP
PHASE A	19200	720	0	0	0	19920		19920	166
PHASE B	19200	720	0	0	0	19920		19920	166
TOTAL	38400	1440	0	0	0	39840		39840	

PANEL DEMAND KVA: 39.84 | PANEL DEMAND AMPACITY: 166 AMPS
RESERVE KVA: 7.97 | RESERVE AMPACITY: 33 AMPS
DEMAND KVA: 47.81 | DESIGN AMPACITY: 199 AMPS

PANELBOARD ES2

LOCATION: PARKING LOT | VOLTAGE: 120/240 V | KAIC: 22 | BUSSING SHALL BE FULLY RATED
MOUNTING: UTILITY POWER POLE | PHASE: 1 P / 3W | CODES: 0=EQPT, 1=RCPT, 2=LTG, 3=A/C, 4=HEAT
ENCLOSURE: NEMA 3R | STYLE: POW-R-LINE-1A | BUSSING: 225 A | 5=CONTINUOUS MOTORS, 6=LRGST MOTOR, 7=PANEL
BRKR MTG: BOLT-ON | (SERVICE ENTRANCE RATED) | MCB: 225 A | ACCESSORIES: GROUND BUS, 24 SPACE
BREAKERS: 60/75 DEGREE TERMINALS | MLO: A

CODE	BRKR	CIRCUIT USE	CKT	LOAD	A	B	LOAD	CKT	CIRCUIT USE	BRKR	CODE
1	20/1	QUAD GFCI RECEPTACLE 'E'	1	360	X		360	2	QUAD GFCI RECEPTACLE 'F'	20/1	1
1	20/1	QUAD GFCI RECEPTACLE 'G'	3	360		X	360	4	QUAD GFCI RECEPTACLE 'H'	20/1	1
0	50/2	FOOD TRUCK LOCKING RECEPTACLE 'E'	5	4,800	X		4,800	6	FOOD TRUCK LOCKING RECEPTACLE 'F'	50/2	0
0			7	4,800		X	4,800	8			0
0	50/2	FOOD TRUCK LOCKING RECEPTACLE 'G'	9	4,800	X		4,800	10	FOOD TRUCK LOCKING RECEPTACLE 'H'	50/2	0
0			11	4,800		X	4,800	12			0
	20/1	SPARE	13		X			14	SPARE	20/1	
		SPACE	15			X		16	SPACE		
		SPACE	17		X			18	SPACE		

	EQPT VA	RCPT VA	LTG VA	AC/HEAT VA	MOTORS	CONN VA	FTL VA	PANEL VA	PHASE AMP
PHASE A	19200	720	0	0	0	19920		19920	166
PHASE B	19200	720	0	0	0	19920		19920	166
TOTAL	38400	1440	0	0	0	39840		39840	

PANEL DEMAND KVA: 39.84 | PANEL DEMAND AMPACITY: 166 AMPS
RESERVE KVA: 7.97 | RESERVE AMPACITY: 33 AMPS
DEMAND KVA: 47.81 | DESIGN AMPACITY: 199 AMPS

PANELBOARD ES3

LOCATION: PARKING LOT | VOLTAGE: 120/240 V | KAIC: 22 | BUSSING SHALL BE FULLY RATED
MOUNTING: UTILITY POWER POLE | PHASE: 1 P / 3W | CODES: 0=EQPT, 1=RCPT, 2=LTG, 3=A/C, 4=HEAT
ENCLOSURE: NEMA 3R | STYLE: POW-R-LINE-1A | BUSSING: 225 A | 5=CONTINUOUS MOTORS, 6=LRGST MOTOR, 7=PANEL
BRKR MTG: BOLT-ON | (SERVICE ENTRANCE RATED) | MCB: 225 A | ACCESSORIES: GROUND BUS, 24 SPACE
BREAKERS: 60/75 DEGREE TERMINALS | MLO: A

CODE	BRKR	CIRCUIT USE	CKT	LOAD	A	B	LOAD	CKT	CIRCUIT USE	BRKR	CODE
1	20/1	QUAD GFCI RECEPTACLE 'I'	1	360	X		360	2	QUAD GFCI RECEPTACLE 'J'	20/1	1
1	20/1	QUAD GFCI RECEPTACLE 'K'	3	360		X	360	4	QUAD GFCI RECEPTACLE 'L'	20/1	1
0	50/2	FOOD TRUCK LOCKING RECEPTACLE 'I'	5	4,800	X		4,800	6	FOOD TRUCK LOCKING RECEPTACLE 'J'	50/2	0
0			7	4,800		X	4,800	8			0
0	50/2	FOOD TRUCK LOCKING RECEPTACLE 'K'	9	4,800	X		4,800	10	FOOD TRUCK LOCKING RECEPTACLE 'L'	50/2	0
0			11	4,800		X	4,800	12			0
	20/1	SPARE	13		X			14	SPARE	20/1	
		SPACE	15			X		16	SPACE		
		SPACE	17		X			18	SPACE		

	EQPT VA	RCPT VA	LTG VA	AC/HEAT VA	MOTORS	CONN VA	FTL VA	PANEL VA	PHASE AMP
PHASE A	19200	720	0	0	0	19920		19920	166
PHASE B	19200	720	0	0	0	19920		19920	166
TOTAL	38400	1440	0	0	0	39840		39840	

PANEL DEMAND KVA: 39.84 | PANEL DEMAND AMPACITY: 166 AMPS
RESERVE KVA: 7.97 | RESERVE AMPACITY: 33 AMPS
DEMAND KVA: 47.81 | DESIGN AMPACITY: 199 AMPS

PANELBOARD 'ES1' - VOLTAGE DROP

Project Name: STEPHENSON PARKING LOT
Project Number: 10248905
Date: July 24, 2024
Designer: E.WHITE

CIRCUIT DESIGNATION	ORIGIN	LENGTH - LINEAR (FT)	VOLTS	PHASE	LOAD (VA)	CONDUCTOR PER PHASE	CONDUCTOR SIZE	RESISTANCE	VOLTAGE DROP (V)	FEEDER PERCENT	PERCENT TOTAL	FINAL VOLTAGE
1	ES1	68	120	1	3.00	1	10 AWG	1.29	0.53	0.44%	0.44%	119.47
5,7	ES1	68	240	1	40.00	1	6 AWG	0.51	2.77	1.16%	1.16%	237.23
2	ES1	18	120	1	3.00	1	10 AWG	1.29	0.14	0.12%	0.12%	119.86
6,8	ES1	18	240	1	40.00	1	6 AWG	0.51	0.73	0.31%	0.31%	239.27
3	ES1	80	120	1	3.00	1	10 AWG	1.29	0.62	0.52%	0.52%	119.38
9,11	ES1	80	240	1	40.00	1	6 AWG	0.51	3.26	1.36%	1.36%	236.74
4	ES1	54	120	1	3.00	1	10 AWG	1.29	0.42	0.35%	0.35%	119.58
10,12	ES1	54	240	1	40.00	1	6 AWG	0.51	2.20	0.92%	0.92%	237.80

PANELBOARD 'ES2' - VOLTAGE DROP

Project Name: STEPHENSON PARKING LOT
Project Number: 10248905
Date: July 24, 2024
Designer: E.WHITE

CIRCUIT DESIGNATION	ORIGIN	LENGTH - LINEAR (FT)	VOLTS	PHASE	LOAD (A)	CONDUCTOR PER PHASE	CONDUCTOR SIZE	RESISTANCE	VOLTAGE DROP (V)	FEEDER PERCENT	PERCENT TOTAL	FINAL VOLTAGE
1	ES2	47	120	1	3.00	1	10 AWG	1.29	0.36	0.30%	0.30%	119.64
5,7	ES2	47	240	1	40.00	1	6 AWG	0.51	1.92	0.80%	0.80%	238.08
2	ES2	75	120	1	3.00	1	10 AWG	1.29	0.58	0.48%	0.48%	119.42
6,8	ES2	75	240	1	40.00	1	6 AWG	0.51	3.06	1.28%	1.28%	236.94
3	ES2	77	120	1	3.00	1	10 AWG	1.29	0.60	0.50%	0.50%	119.40
9,11	ES2	77	240	1	40.00	1	6 AWG	0.51	3.14	1.31%	1.31%	236.86
4	ES2	55	120	1	3.00	1	10 AWG	1.29	0.43	0.35%	0.35%	119.57
10,12	ES2	55	240	1	40.00	1	6 AWG	0.51	2.24	0.94%	0.94%	237.76

PANELBOARD 'ES3' - VOLTAGE DROP

Project Name: STEPHENSON PARKING LOT
Project Number: 10248905
Date: July 24, 2024
Designer: E.WHITE

CIRCUIT DESIGNATION	ORIGIN	LENGTH - LINEAR (FT)	VOLTS	PHASE	LOAD (A)	CONDUCTOR PER PHASE	CONDUCTOR SIZE	RESISTANCE	VOLTAGE DROP (V)	FEEDER PERCENT	PERCENT TOTAL	FINAL VOLTAGE
1	ES3	29	120	1	3.00	1	10 AWG	1.29	0.22	0.19%	0.19%	119.78
5,7	ES3	29	240	1	40.00	1	6 AWG	0.51	1.18	0.49%	0.49%	238.82
2	ES3	83	120	1	3.00	1	10 AWG	1.29	0.64	0.54%	0.54%	119.36
6,8	ES3	83	240	1	40.00	1	6 AWG	0.51	3.39	1.41%	1.41%	236.61
3	ES3	92	120	1	3.00	1	10 AWG	1.29	0.71	0.59%	0.59%	119.29
9,11	ES3	92	240	1	40.00	1	6 AWG	0.51	3.75	1.56%	1.56%	236.25
4	ES3	63	120	1	3.00	1	10 AWG	1.29	0.49	0.41%	0.41%	119.51
10,12	ES3	63	240	1	40.00	1	6 AWG	0.51	2.57	1.07%	1.07%	237.43

PARKING LOT LOAD ANALYSIS - ELECTRICAL (PANEL 'ES1')

PROJECT: CODS STEPHESON PARKING LOT RECEPTACLES

MAIN DISTRIBUTION: PANELBOARD ES1 | 240 VOLT

LOAD TYPE	NEW CONNECTED AMPACITY	NEW CONNECTED KVA	NEW DEMAND AMPACITY	NEW DEMAND KVA
EQUIPMENT:	160	38	160	38
RECEPTACLES:	6	1	6	1
LIGHTING:	0	0	0	0
A/C	0	0	0	0
HEATING	0	0	0	0
CONTINUOUS MOTORS:	0	0	0	0
20% SPARE CAPACITY	33	8	33	8
TOTAL	199	48	199	48

SERVICE VOLTAGE: 240 VOLTS
REQUIRED SERVICE AMPACITY: 199 AMPS
SCHEDULED SERVICE AMPACITY: 225 AMPS

PARKING LOT LOAD ANALYSIS - ELECTRICAL (PANEL 'ES2')

PROJECT: CODS STEPHESON PARKING LOT RECEPTACLES

MAIN DISTRIBUTION: PANELBOARD ES2 | 240 VOLT

LOAD TYPE	NEW CONNECTED AMPACITY	NEW CONNECTED KVA	NEW DEMAND AMPACITY	NEW DEMAND KVA
EQUIPMENT:	160	38	160	38
RECEPTACLES:	6	1	6	1
LIGHTING:	0	0	0	0
A/C	0	0	0	0
HEATING	0	0	0	0
CONTINUOUS MOTORS:	0	0	0	0
20% SPARE CAPACITY	33	8	33	8
TOTAL	199	48	199	48

SERVICE VOLTAGE: 240 VOLTS
REQUIRED SERVICE AMPACITY: 199 AMPS
SCHEDULED SERVICE AMPACITY: 225 AMPS

PARKING LOT LOAD ANALYSIS - ELECTRICAL (PANEL 'ES3')

PROJECT: CODS STEPHESON PARKING LOT RECEPTACLES

MAIN DISTRIBUTION: PANELBOARD ES3 | 240 VOLT

LOAD TYPE	NEW CONNECTED AMPACITY	NEW CONNECTED KVA	NEW DEMAND AMPACITY	NEW DEMAND KVA
EQUIPMENT:	160	38	160	38
RECEPTACLES:	6	1	6	1
LIGHTING:	0	0	0	0
A/C	0	0	0	0
HEATING	0	0	0	0
CONTINUOUS MOTORS:	0	0	0	0
20% SPARE CAPACITY	33	8	33	8
TOTAL	199	48	199	48

SERVICE VOLTAGE: 240 VOLTS
REQUIRED SERVICE AMPACITY: 199 AMPS
SCHEDULED SERVICE AMPACITY: 225 AMPS

***** ADD ALTERNATE DESIGN *****
(CONTRACTOR TO BID ALL ELECTRICAL WORK INDICATED ON THIS SHEET AS AN ADD ALTERNATE BID. ADD ALTERNATE WORK TO BE APPROVED BY CITY OF DRIPPING SPRINGS PRIOR TO PROCURMENT AND COMMENCING CONSTRUCTION)

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ELECTRICAL SCHEDULES

STEPHENSON BUILDING
PARKING IMPROVEMENTS
311 OLD FITZHUGH ROAD,
HAYS COUNTY, DRIPPING SPRINGS, TEXAS

THESE PLANS ARE RELEASED UNDER THE AUTHORITY OF PAUL K. DAVILA, P.E., TBPE#73285, ON **5/30/2025** FOR THE PURPOSES OF REVIEW AND ARE NOT TO BE USED FOR CONSTRUCTION PRIOR TO APPROVAL BY THE CITY OF DRIPPING SPRINGS.

STATE OF TEXAS
PAUL K. DAVILA
101043
LICENSED
PROFESSIONAL ENGINEER
30 MAY 2025

Designed: GM
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Reviewed: PKD
Date: 5/30/2025

SHEET
E602
33 OF 3

Project No.: 10248905

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SP-YEAR-2024