Greeley City Council Agenda

Regular Meeting

Tuesday, January 17, 2023, at 6:00 p.m.

City Council Chambers at City Center South, 1001 11th Ave, Greeley, CO 80631
Zoom Webinar link: https://greeleygov.zoom.us/j/88429125363

NOTICE:

City Council Meetings are held on the 1st and 3rd Tuesdays of each month in the City Council Chambers. Meetings are conducted in a hybrid format, with a Zoom webinar in addition to the in person meeting in Council Chambers.

City Council members may participate in this meeting via electronic means pursuant to their adopted policies and protocol.

Members of the public are also invited to choose how to participate in Council meetings in the manner that works best for them.

Watch Meetings::

Meetings are open to the public and can be attended in person by anyone.

Meetings are televised live on GTV8 on cable television.

Meetings are livestreamed on the City's website, greeleygov.com as well as YouTube at youtube.com/CityofGreeley

Comment in real time::

During the public input portion of the meeting and public hearings:

In person attendees can address the Council in the Chambers .

The public can join the Zoom webinar and comment from the remote meeting.

Submit written comments::

Email comments about any item on the agenda before Noon on the day of the meeting to cityclerk@greeleygov.com

Written comments can be mailed or dropped off at the City Clerk's Office at City Hall, at 1000 10th St, Greeley, CO 80631

For more information about this meeting or to request reasonable accommodations, contact the City Clerk's Office at 970-350-9740 or by email at cityclerk@greeleygov.com.

Meeting agendas, minutes, and archived videos are available on the City's meeting portal at greeley-co.municodemeetings.com

City Council Meeting Agenda

January 17, 2023 at 6:00 PM

City Council Chambers, City Center South, 1001 11th Ave & via Zoom at https://greeleygov.zoom.us/j/88429125363

Mayor
John Gates

Councilmembers

Tommy Butler
Ward I

Deb DeBoutez
Ward II

Johnny Olson
Ward III

Dale Hall
Ward IV

Brett Payton
At-Large

Ed Clark
At-Large

A City Achieving Community Excellence
Greeley promotes a healthy, diverse economy and high quality of life responsive to all its residents and neighborhoods, thoughtfully managing its human and natural resources in a manner that creates and sustains a safe, unique, vibrant and rewarding community in which to live, work, and play.

1. Call to Order
2. Pledge of Allegiance
3. Roll Call
4. Approval of the Agenda
5. Recognitions and Proclamations
6. Citizen Input
7. Reports from Mayor and Councilmembers
8. Initiatives from Mayor and Councilmembers

Consent Agenda

The Consent Agenda is a meeting management tool to allow the City Council to handle several routine items with one action.

Council Members may request an item be pulled off the Consent Agenda and considered separately under the next agenda item in the order they were listed.

9. Approval of the City Council Proceedings of January 3, 2023
10. Introduction and first reading of an Ordinance Amending Section 20-62 and Adopting Section 20-64 for the Water & Sewer Department Updated Utility Design Criteria & Construction Specifications

End of Consent Agenda

11. Pulled Consent Agenda Items
12. Public hearing and consideration of a Resolution to approve the Downtown 2032 - Plan Update

13. Public hearing and second reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from Holding-Agriculture (H-A) to Residential-High Density (R-H), changing the underlying land use designations for approximately 31.19 acres of property located north of and adjacent to 13th Street and the Fox Run Neighborhood, approximately 500' west of 59th Avenue, and approximately 580' south of 10th Street (ZON2021-0016)

14. Public hearing and second reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from R-H (Residential High Density) to MU-H (Mixed Use High Intensity), changing the underlying land use designations for approximately 1.722 acres of property located at 1603, 1611, 1613, and 1619 7th Avenue, located at the southwest corner of 16th Street and 7th Avenue (ZON2022-0008)

15. Public hearing and second reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from I-L (Industrial Low Intensity) to MU-H (Mixed Use High Intensity) for 7.8 acres located at 123 9th Avenue (ZON2022-0012)

16. Public hearing and second reading of an Ordinance Amending Sections 6-998, 6-1000, 6- 1002 through 6-1009, 6-1013 and 6-1015 the City of Greeley Municipal Code of Ordinances Relating to Development Impact Fees

17. Appointment of applicants to the Commission on Disabilities, Civil Service Commission, Greeley Art Commission, Greeley Urban Renewal Authority, and Museum Advisory Board

18. Scheduling of Meetings, Other Events

19. Consideration of a motion authorizing the City Attorney to prepare any required resolutions, agreements, and ordinances to reflect action taken by the City Council at this meeting and any previous meetings, and authorizing the Mayor and City Clerk to sign all such resolutions, agreements, and ordinances

20. Consideration of a motion to go into Executive Session to receive legal advice from the City Attorney and to determine positions, develop strategy, and give instructions to negotiators regarding 2023 collective bargaining with Greeley Firefighters

21. Adjournment

Council Agenda Summary

Title
Recognitions and Proclamations

Summary
Mayor Gates will present a proclamation for Black History Month

Councilmember Clark will present the *What's Great about Greeley* Report.

Attachments
Black History Month Proclamation
What's Great about Greeley Report

Black History Month 2023

WHEREAS, Black History Month offers an opportunity to recognize the heritage and achievements of African Americans across the nation, including in Greeley and Weld County; and,

WHEREAS, the contributions African Americans have made and continue to make are an integral and essential part of our society and community, and reflect the resilience and innovative spirit that defines our nation; and,

WHEREAS, attention to this month offers us a reminder of the importance of reaching and reflection upon the many roles and achievements African Americans have made in advancing the strength of the nation, our state, and local community; and,

WHEREAS, the Greeley community is especially fortunate to have the Marcus Garvey Cultural Center on the campus of the University of Northern Colorado, which offers a local resource to learn and appreciate the history and achievements of African Americans; and,

WHEREAS, in recognition of Black History Month, the City Greeley urges the community to reflect upon and honor the accomplishments of African Americans in every area of endeavor throughout our country's history this month and throughout the year.

NOW, THEREFORE, I, John D. Gates, by virtue of the authority vested in me as Mayor of the City of Greeley, do hereby proclaim February 2023, as Black History Month in the City of Greeley, and urge the people of Greeley, Colorado to observe Black History Month with community programs and activities that celebrate the contributions of African Americans to life in the United States.

IN WITNESS WHEREOF, I have hereunto set my hand and caused to be affixed the official seal of the City of Greeley, Colorado, this 17th day of January 2023.

_____

John D. Gates
Mayor

City of Greeley Colorado

greeleygov.com

City Council Meeting

January 17, 2023

A Story Best Lived In.

In all ways, we will transmit this City not only, not less, but greater and more beautiful than it was transmitted to us.
- Athenian Oath

Eric Wilkinson Inducted into the Colorado Agriculture Hall of Fame

- Retired general manager of Northern Water
- Oversaw key aspects of Colorado's largest water projects
- Developed measures to prevent "buy-and-dry" in Colorado

Aims Community College Recognized for Marketing and Communication Excellence

- MarCom Awards recognizing excellence in branding, website design, social media, and more.
- Received one Platinum and four Gold awards
- Aims.edu website received National Council for Marketing & Public Relations Medallion Award and w3 Award.

UNC Named Best of the Best LGBTQ-Friendly Colleges & Universities

- Campus Pride Index measures how well universities and colleges demonstrate commitment to LGBTQ-inclusivity.
- University of Northern Colorado received a 5-Star Rating

City of Greeley Colorado

City of Greeley Colorado

greeleygov.com

A Story Best Lived In.

Council Agenda Summary

Title
Citizen Input

Summary
During this 15-minute portion of the meeting, anyone may address the Council on any item of City Business appropriate for Council consideration that is not already listed as a public hearing on this evening's agenda.

As this meeting is being conducted in a hybrid format, citizen input will be accepted first from those in the City Council Chambers, and then from the virtual meeting audience via the meeting's webinar.

Written comments submitted for any item on the agenda will be placed in the public record and provided to the Council for their review and should include the name and city of residence of the person submitting the comments for the record.

Council Agenda Summary

Title

Reports from Mayor and Councilmembers

Summary

During this portion of the meeting any Councilmember may offer announcements or reports on recent events and happenings. These reports should be a summary of the Councilmember's attendance at assigned board/commission meetings and should include key highlights and points that may require additional decision and discussion by the full Council at a future time.

Council Agenda Summary

Title
Initiatives from Mayor and Councilmembers

Summary
During this portion of the meeting any Councilmember may bring before the Council any business that the member feels should be deliberated upon by the Council. These matters need not be specifically listed on the Agenda, but formal action on such matters shall be deferred until a subsequent Council meeting.

Initiatives will generally fall into three categories:

1) A policy item for Council deliberation and direction for a future Worksession, Committee meeting, or regular/special Council meeting;

2) A request to the City Manager for information or research;

3) A request involving administrative processes or procedures.

At the close of this portion of the meeting, the Mayor will confirm Council's consensus that the individual requests be pursued.

Attachments
Status Report of Council Initiatives and Related Information

Greeley City Council

Status Report of Council Initiatives

Initiative No.	Council Member Initiating	Council Request	Council Meeting or Work Session Date Requested	Status or Disposition (After completion, item is shown one time as completed and then removed.)	Next Steps & Schedule	Anticipated Deliverable & Date (Report, Council Presentation, etc.)	Assigned to:
15-2021	Olson	Formation of a committee for implementation of a funding strategy for the 35th and 47th interchanges.	December 7, 2021 Council Meeting	Councilmember Olson will be following up with Manager Lee and Director Trombino on next steps	Pending outcome of federal grant application submitted	Report to Council early 2023	Paul Trombino
09-2022	Butler	Review traffic and safety surrounding 15 acre open area between 71st Avenue and 8th Street	June 7, 2022 Council Meeting	Requested that Public Works review the traffic and to improve safety in this congested area.	Additional signage installed for traffic and parking. Staff worked with School District, builder and GPD to ensure road is passable for school buses. GPD will focus enforcement times to ensure compliance with posted speed limit. Staff developing neighborhood safety improvement options and working with School District on transportation issues to improve coordination and support related to safety and infrastructure around school sites.	Anticipate providing report to Council on Improvements in early 2023	Paul Trombino
10-2022	Butler	Review costs and strategies to live stream Planning Commission and Water Board meetings for public and Councilmembers	June 7, 2022 Council Meeting	Asked staff to investigate the cost of live streaming Planning Commission and Water and Sewer Board meetings and return to Council with findings	Additional technology costs ~ $15,000. Parts are backordered, eta approx. mid-January. Anticipate additional operation costs to include 1 addt'l staff at each B&C meeting to accommodate hybrid meeting. Assessing costs related to staffing, overtime expenses or other flexible staff options. Some testing has occurred for broadcasting of meetings. Additional equipment testing will be done once equipment is received. Staff will identify long-term operational impacts at that time.	Anticipated report to Council 1st Qtr 2023	Kelli Johnson
12-2022	Butler	Varying Boards & Commissions meeting times	September 6, 2022 Council Meeting	Asked staff to research the ability for alternative meeting times for Boards & Commissions to increase community engagement and recruitment	CCO survey to Boards due back 12/16. Gathering feedback and will work with CMO on how to deliver to Council.	Report to Council/January 2023	City Clerk's Office
15-2022	Hall	Concerns regarding aftermath of natural disasters	October 4, 2022 Council Meeting	Requested update from Greeley's emergency management team to lessen the aftermath effects from a natural disaster, i.e. water and sewer, electricity, phone services, etc.	OEM update to Council	Work Session report 1/10/2023	Brian Kuznik
16-2022	Clark	Concerns over the increase in incidents and safety in the tunnel under Hwy 34 in the Hillside/Farr Park neighborhood	November 1, 2022 Council Meeting	Requested staff study implementing a closure of the tunnel entrance between the hours of 10:00 PM and 7:00 AM over safety concerns	Neighborhood meeting scheduled for 1/25/23 5:30 - 7:00 pm at Jackson Elementary.	Report to Council early 2023.	Paul Trombino/Becky Safarik
17-2022	DeBoutez	Expressed concern about neighborhood issues, i.e. speeding and noise violations.	November 15, 2022 Council Meeting	Requested GPD and PW research technologies available for traffic calming, speed/red light cameras and decibel measuring devices to improve safety, wellbeing and quality of life in Greeley.	CMO recommendation - Do we invest in additional technology tools and structure to combat neighborhood issues? PW/GPD provide report on technologies available, cost of such technology, and how different technologies are used in other communities and the results of implementing such technology.	Work Session report/CMO recommendation on neighborhood issues and technological options	Adam Turk/Paul Trombino

01-2023	Butler	Costs and feasibility study of translation services for agendas and meetings	January 3, 2023 Council Meeting	Request staff research the costs and feasibility of translating the agenda, agenda packet and live streamed meetings in other languages? Is Spanish the predominant language for translation or are other languages also appropriate?	CCO to work with C&E to gather statistical information for report.	Work Session Report	City Clerk's Office/Communication & Engagement

Council Agenda Summary

Title:

Approval of the City Council Proceedings of January 3, 2023

Summary:

A meeting of the City Council was held in the City Council's Chambers on January 3, 2023. The draft proceedings of the meeting have been prepared and is being presented for the Council's review and approval.

Decision Options:

1) To approve the proceedings of the Council meeting as presented; and/or
2) Amend the Council meeting proceedings, if amendments or corrections are needed, and approve as amended.

Council's Recommended Action:

A motion to approve the City Council proceedings as presented (or amended).

Attachments:

Draft Council meeting proceedings of January 3, 2023

City of Greeley, Colorado
CITY COUNCIL PROCEEDINGS
January 03, 2023

1. Call to Order
Mayor Gates called the meeting to order at 6:00 p.m. in the City Council Chambers at 1001 11th Ave, Greeley, Colorado, with hybrid participation available via the City's Zoom platform.

2. Pledge of Allegiance
Mayor Gates led the Pledge of Allegiance.

3. Roll Call
Heidi Leatherwood, City Clerk, called the roll.
Present:
Mayor John Gates
Councilmember Tommy Butler
Councilmember Deb DeBoutez
Councilmember Dale Hall
Mayor Pro Tem Brett Payton
Councilmember Ed Clark
Councilmember Johnny Olson

4. Approval of the Agenda

5. Recognitions and Proclamations
Councilmember Butler presented *What's Great about Greeley***?**

6. Citizen Input
1. Edwin Grant spoke about new housing development, taxes and increased costs in Weld County.

7. Reports from Mayor and Councilmembers
Councilmember Butler, extended condolences, thoughts and prayers to Andy Feinstein and his family for their loss.

Mayor Gates attended the Housing Navigation Center Open House and thanked United Way and City of Greely for allowing homeless persons to shelter during the cold weather. He thanked the City Clerk's Office and other staff for the efforts to make the Employee Holiday Luncheon a success. Mayor Gates was able to issue a proclamation at Wreaths Across America, which allows organizers to place wreaths on the graves of veterans. He and Councilmember Butler, Councilmember DeBoutez and various city staff attended the Menorah Lighting with Rabbi Gorelik.

Mayor Gates shared a tribute on the City Council's behalf to UNC President Andy Feinstein and family on the tragic loss of their son Nick and offered support and condolences, thoughts and prayers to Andy, Kerry, and Rachel.

8. Initiatives from Mayor and Councilmembers

Councilmember Butler brought forth an initiative for city staff to investigate the cost and feasibility to provide live Spanish translation by subtitles or other means, including translating Council agendas and city signage. Included in this request is to find out the percentage of Greeley's population that is Spanish speaking only/or is the main language used at home and if there are other languages that need these services as well. Councilmember Butler would like this information presented at a Work Session, with information including what percentage of the population are Spanish speaking in the community.

Consent Agenda

9. Approval of the City Council Proceedings of December 6, 2022 Approval of the City Council Work Session Proceedings of December 13, 2022

10. Motion to designate the City of Greeley website as the official posting site for meeting notices of the City Council, including agendas of City Council Meetings and Work Sessions, and the public lobby of City Hall at 1000 10th Street as the backup location for such postings

11. Introduction and first reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from R-H (Residential High Density) to MU-H (Mixed Use High Intensity), changing the underlying land use designations for approximately 1.722 acres of property located at 1603, 1611, 1613, and 1619 7th Avenue, (ZON2022-0008)

12. Introduction and first reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from I-L (Industrial Low Intensity) to MU-H (Mixed Use High Intensity) for 7.8 acres located at 123 9th Avenue (ZON2022-0012)

This item was pulled from the consent agenda by Mayor Pro Tem Payton.

13. Introduction and first reading of an Ordinance Amending Sections 6-998, 6-1000, 6-1002 through 6-1009, 6-1013 and 6-1015 the City of Greeley Municipal Code of Ordinances Relating to Development Impact Fees

14. Consideration of a Resolution of the City Council of the City of Greeley authorizing City staff to enter into a Settlement and Mutual Release Agreement with Ms. Manuela Sanchez

15. Motion to adopt the City of Greeley 2023 Legislative Agenda

16. Consideration of change order #3 to the contract with Icon Engineering, Inc. (Icon) for design services for 12th Street Storm Drain Outfall Phase 1B (Project), increasing the contract from $865,060 to $971,790.00.

Councilmember Butler moved to approve the Consent Agenda Items 9-11 and 13-16. Councilmember DeBoutez seconded the motion. The motion passed 7-0 at 6:17 p.m.

End of Consent Agenda

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17. Pulled Consent Agenda Items

12. Introduction and first reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from I-L (Industrial Low Intensity) to MU-H (Mixed Use High Intensity) for 7.8 acres located at 123 9th Avenue (ZON2022-0012)

Mayor Pro Tem Payton pulled the item due to a conflict of interest. He recused himself and left the Council Chambers at 6:18 p.m.

Councilmember Olson moved to introduce the ordinance and schedule the public hearing and second reading for January 17, 2023. Councilmember Hall seconded the motion. The motion passed 6-0 with Mayor Pro Tem absent at 6:19 p.m.

Mayor Pro Tem Payton returned to Council Chambers following the vote on this item.

18. Public hearing and second reading of an Ordinance Reauthorizing Various Boards and Commissions for Three Years

City Clerk Heidi Leatherwood introduced the item at 6:19 p.m. and was present for questions. Council did not have questions.

The Public Hearing opened at 6:19 p.m.
With no speakers, the Public Hearing closed at 6:20 p.m.

Councilmember Hall moved to adopt the ordinance and publish with reference to title only. Mayor Pro Tem Payton seconded the motion. The motion passed 7-0 at 6:21 p.m.

19. Public hearing and final reading of an ordinance for the sixth amendment to the development agreement for Leprino Foods Company.

Water and Sewer Department Deputy Director Erik Dial introduced the item with a presentation at 6:21 p.m.

Mr. Dial states that the Leprino Foods Company (Leprino) has had and continues to have a positive impact on the Greeley community. The plant employs over 500 people, advertises well paying positions and attracts educated applicants. Key components of the Leprino development agreement include raw water credits and costs.

The Fourth Amendment defined the option for Greeley to purchase any excess water above 600-acre feet of Produced Water. A water court application determined that the Produced Water volume was 840-acre feet of water, or 240-acre feet above the volume of raw water credit given to Leprino. Greeley and Leprino staff agreed that Leprino could satisfy their raw water surcharge liability with a portion of the excess Produced Water rather than pay the surcharge with cash. The enclosed Sixth Amendment to the Development Agreement reflects Greeley purchasing 38.70-acre feet of excess Produced Water, which is the volume of water the raw water surcharge of $565,001.68 can purchase using the price of this water as defined in the Fourth Amendment.

The Sixth Amendment requires legislative body (City Council) approval in accordance with Sec. 20-268 and Sec. 20-273 of the Greeley Municipal Code.

Councilmember Clark asked if Greeley was purchasing CBT water. In response to the question, Mr. Dial clarified that it was actually Produced Water, which is useful and can be used as non-potable water in ponds.

In response to Councilmember Olson's request for additional clarification, Mr. Dial indicated that the Leprino plant was initially credited for 600-acre feet of Produced Water, but the actual amount produced was 840-acre feet. The City has the right to purchase this additional 240-acre feet. And therefore, Greeley is using revenue owed from Leprino to pay for an additional portion of the Produced Water supply.

In response to Councilmember DeBoutez's inquiry regarding how long this requirement for the Produced Water supply from Leprino would be in effect, Mr. Dial confirmed that Leprino would be required to supply the Produced Water as noted throughout the company's existence.

Mayor Pro Tem Payton thanked the previous mayor and staff who negotiated the previous agreements. He asked about the additional acre feet of Produced Water. In response, Mr. Dial confirmed that Leprino could sell any additional water that the City did not purchase.

Water and Sewer Director Sean Chambers added that the Water and Sewer Board unanimously approved this amendment at its meeting.

20. Scheduling of Meetings, Other Events

None.

21. Consideration of a motion authorizing the City Attorney to prepare any required resolutions, agreements, and ordinances to reflect action taken by the City Council at this meeting and any previous meetings, and authorizing the Mayor and City Clerk to sign all such resolutions, agreements, and ordinances

Mayor Pro Tem Payton moved to approve the motion. Councilmember Butler seconded the motion. The motion passed 7-0 with a voice vote at 6:34 p.m.

22. Adjournment

Mayor Gates adjourned the meeting at 6:34 p.m.

_____
John D. Gates, Mayor

_____
Heidi Leatherwood, City Clerk

Council Agenda Summary

January 17, 2023

Key Staff Contact: Sean Chambers, Water & Sewer Director

Title:

Introduction and first reading of an Ordinance Amending Section 20-62 and Adopting Section 20-64 for the Water & Sewer Department Updated Utility Design Criteria & Construction Specifications

Summary:

Current Water & Sewer utility design criteria, standards and construction specification date back to 2008. The updates incorporate new techniques, materials, updated best practices, and revisions required by Colorado subsurface utility law. Updating the design standards helps to ensure quality utility infrastructure is installed appropriately to serve the community for generation.

The update incorporates the findings and analysis from recent Water & Sewer Department infrastructure master plans covering Non-Potable Water, Sanitary Sewer, and Potable Water Transmission & Distribution. These updates align with the City's development code updates in 2021 and the 2022 Water Efficiency Plan. These updates support maintaining a high level of service reliability for water and sewer customers.

The updated design criteria for the potable water distribution, sanitary sewer collection, non-potable irrigation system, and landscape & irrigation will guide developers and engineers in connecting to the City's utilities. The changes include added guidance and criteria for sewer lift station design, non-potable system design criteria, and updated criteria incorporating recent development code changes. Also included are provisions for compliance with changes to Subsurface Utility Engineering (SUE) law. Lastly, to ensure long lasting community vitality, the criteria have a sixth section that provides guidance on commercial landscape & irrigation design.

The Water and Sewer Department coordinated internal review with other city departments and incorporated feedback through stakeholder and peer review processes. City Planning and Engineering Development Review staff played a vital role in review and refinement of the updated documents, providing feedback for consistency with other planning documents and city code. Stakeholder workshops with the builders, realtors, developers, landscape and irrigation stakeholders were held from July 2021 through December 2022 to collect feedback and apply the insights and wisdom of the stakeholder community. The Water & Sewer Department tracked comments and questions from private sector engineers, developers, landscape professionals and irrigation stakeholders.

The process has produced a set of design criteria, standards, and specifications that meet all regulatory and legal requirements. The updated document provides the building and development community with authorization to utilize updated techniques and best available materials, many of which are a cost savings. The Document provides clear guidance that conforms with Greeley master plans, current code, and updates to subsurface utility laws.

The Water and Sewer Board, and the Planning Commission have each had extensive reviews and their feedback have been incorporated into the update. The Water & Sewer Board and the Planning Commission have both formally approved the updated Design Criteria, Standards and Specifications.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	
What is the annual impact?	
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	
Is there grant funding for this item?	N/A
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	
Additional Comments:	

Legal Issues:

Consideration of this matter is a legislative process. The City Attorney's Office drafted the proposed ordinance to adopt, by reference, the enclosed Water & Sewer Department Updated Design Criteria and Construction Specifications.

Other Issues and Considerations:

The matter has been heard by the Greeley Water & Sewer Board and the Planning Commission. The Board and Commission heard the item for informational purposes first, provided staff with feedback and the subsequently both bodies formally approved and recommended the update to Council for adoption.

Strategic Focus Area:

Community Vitality

Infrastructure and Mobility

Decision Options:

1) Introduce the ordinance as presented; or
2) Amend the ordinance and introduce as amended; or
3) Deny the ordinance; or
4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:

A motion to introduce the ordinance and schedule the public hearing and second reading for February 7, 2023.

Attachments:

Ordinance Adopting Water & Sewer Design Criteria & Specifications
Water & Sewer Design Criteria & Construction Specifications
Informational Presentation

CITY OF GREELEY, COLORADO

ORDINANCE NO. 6, 2023

AN ORDINANCE AMENDING SECTION 20-62 (STANDARDS FOR DESIGN AND CONSTRUCTION) AND ADOPTING SECTION 20-64 (ADOPTION OF DESIGN CRITERIA AND CONSTRUCTION SPECIFICATIONS), TITLE 20 OF THE GREELEY MUNICIPAL CODE FOR THE CITY OF GREELEY

WHEREAS, the City of Greeley, Colorado ("City") is a home rule municipality empowered pursuant to Sections 1 and 6 of Article XX of the Colorado Constitution to, inter alia, construct, purchase, acquire, lease, add to, maintain, conduct, and operate water works and everything required therefor, within or without its territorial limits, for the use of the City; and

WHEREAS, Section 17-4(c) of the Greeley City Charter and Section 20-30 of the Greeley Municipal Code authorize the Board to acquire, develop, convey, lease and protect the water and sewer assets, supplies and facilities needed to fully use the water supplies decreed, adjudicated or contracted for the City; and

WHEREAS, the City of Greeley Water and Sewer Department has recently developed design criteria and construction specifications for and placed them into a manual entitled “Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, Non-Potable Irrigation Systems, and Landscape & Irrigation,” dated February, 2023; and

WHEREAS, the manual requires all design and construction of water, sanitary sewer, non-potable, and landscape and irrigation facilities within the City to comply with the design criteria and construction specifications set forth therein; and

WHEREAS, Section 20-88 provides a penalty for violating the manual.

NOW THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. That Section 20-62 be amended to read as shown on Appendix A, attached hereto and incorporated herein.

Section 2. That Section 20-64 be adopted to read as shown on Appendix A.

Section 3. That the Director of Water & Sewer has the authority to make corrections to any typographical errors and other non-substantive corrections, additions, or deletions to the “Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, Non-Potable Irrigation Systems, and Landscape & Irrigation,” dated February, 2023.

Section 4. Except as explicitly modified on Exhibit A, all other provisions of Title 20 of the Greeley Municipal Code shall remain in full force and effect.

Section 5. This Ordinance shall take effect on the fifth day following its final publication, as provided by Section 3-16 of the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED ON THIS _____ DAY OF _____ 2023.

ATTEST

_____

City Clerk

CITY OF GREELEY, COLORADO

_____

Mayor

APPENDIX A
ORDINANCE AMENDING TITLE 20
GREELEY MUNICIPAL CODE

Section 1. Section 20-62 shall be amended to read as follows:

Sec. 20-62. Standards for design and construction.

The director of water and sewer shall adopt and publish design and construction standards for water, ~~and~~ sanitary sewer, non-potable, and landscape and irrigation facilities to be connected to the city system or installed within its jurisdiction. The design and construction of water and sanitary sewer mains and appurtenances shall conform to the published standards, unless deviations from those standards are approved in writing by the director of water and sewer, or their designee. The city may refuse to accept facilities inadequately constructed or constructed in variance with city requirements. the city shall be held harmless for the engineer's or installer's failure to conform to city standards and specifications. The design criteria and construction standards for water, sanitary sewer, non-potable, and landscape and irrigation facilities are adopted by reference in section 20-64.

Section 2. Section 20-64 shall be amended to read as follows:

Sec. 20-64 - Adoption of standards.

All water, sanitary sewer, non-potable, and landscape and irrigation facilities within the city shall be constructed to the minimum standards established by the Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, Non-Potable Irrigation Systems, and Landscape & Irrigation, dated February 2023, in order to safeguard the public health, safety and welfare of the citizens of the city. Copies of the design criteria and construction standards shall be kept and maintained by the city clerk and department of water and sewer and shall be available for inspection at those locations during all business hours and can be located online at https://greeleygov.com/services/pw/design-criteria-and-construction-specifications. Any person or entity convicted of violating these adopted design criteria and construction specification shall be punishable as provided in chapter 9 of title 1 of this Code as provided under Sec. 20-88.

DESIGN CRITERIA
AND
CONSTRUCTION SPECIFICATIONS

VOLUME III

POTABLE WATER DISTRIBUTION,
SANITARY SEWER COLLECTION,
NON-POTABLE IRRIGATION SYSTEMS,
AND LANDSCAPE & IRRIGATION

February 2023

DEPARTMENT OF WATER & SEWER

CITY OF GREELEY, COLORADO

FORWARD

The City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, Non-Potable Irrigation Systems, and Landscape Irrigation* documents are intended to provide guidance for the design, review, and construction of those public utility improvements pertaining to water in or under the public right-of-way or dedicated easements.

This document represents an attempt to assist those in the design, review, and construction industry to provide quality and long-lasting public utility improvements and facilities. The document also provides for consistency in the areas of design, review, and construction.

This document is not intended to replace or restrict the function of the design engineer or the innovativeness and expertise of developers and contractors. Users of this document are encouraged to submit their ideas and methods of improving this document.

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Sean Chambers
Water and Sewer Director

Effective: February 8th, 2023

CITY OF GREELEY, COLORADO

DEPARTMENT OF WATER & SEWER

DESIGN CRITERIA

AND

CONSTRUCTION SPECIFICATIONS

VOLUME III

POTABLE WATER DISTRIBUTION, SANITARY SEWER COLLECTION, NON-POTABLE IRRIGATION SYSTEMS, AND LANDSCAPE & IRRIGATION

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POTABLE WATER DISTRIBUTION, SANITARY SEWER COLLECTION, NON-POTABLE IRRIGATION SYSTEMS, AND LANDSCAPE & IRRIGATION DESIGN CRITERIA

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SECTION 1

GENERAL REQUIREMENTS

1.01 SCOPE

The purpose of the City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems and Landscape and Irrigation*, hereafter referred to as the "Criteria", is to present the minimum design and technical criteria for the analysis and design of potable water distribution, sanitary sewer collection, and non-potable irrigation systems for which City of Greeley acceptance is required. The Criteria may be amended as new technology is developed or a need for revision is demonstrated and proven through experience and use. The Design Engineer shall be responsible for compliance with these Criteria as well as other applicable design and construction standards in the preparation of engineering reports, construction drawings, and specifications for City review and acceptance.

1.02 DEFINITIONS AND ABBREVIATIONS

Wherever the following words, phrases, and abbreviations appear in these specifications they shall have the following meaning:

A. ac – acre

B. ac-ft – acre-feet

C. ANSI – American National Standards Institute

D. APPROVED PLAN – The latest revised Construction Drawing(s) accepted by the City of Greeley.

E. APWA – American Public Works Association

F. AS-CONSTRUCTED DRAWINGS – Drawings reflecting actual conditions and information for the project after construction is completed.

G. ASME – American Society of Mechanical Engineers

H. ASTM – American Society for Testing Materials

I. AWWA – American Water Works Association

J. CDOT – Colorado Department of Transportation

K. CDPHE – Colorado Department of Public Health and Environment

L. cfs – cubic feet per second

M. CITY – City of Greeley

N. CONSTRUCTION DRAWINGS – Engineered working drawings including plan, profile, and detail sheets of proposed development and utility improvements accepted by the City.

O. CONTRACTOR – The individual, firm, partnership, corporation, or combination thereof, private, municipal, or public including joint ventures, which, as an independent contractor, has entered into a contract with the Developer/Owner.

P. CRITERIA – City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems.*

Q. DESIGN ENGINEER – The partnership, corporation, or individual who is registered as a Professional Engineer, according to Colorado statutes, who is hired by the Developer/Owner to conduct engineering design services and may be empowered by the Developer/Owner to act as his agent for the project.

R. DEVELOPER – The owner, corporation, association, partnership, agency, or individual who or which shall participate in development, has entered into a development agreement with the City and has entered into an agreement with the Design Engineer and Contractor to perform the development work.

S. DEVELOPMENT – Any construction or activity which changes the basic characteristic or use of land on which construction or activity occurs, including but not limited to, any non-natural change to improved or unimproved real estate, substantial improvements to buildings or other structures, installation of utilities, mining, dredging, filling, grading, paving, extraction, or drilling operations.

T. DEVELOPMENT CODE – A section of the City Municipal Code prepared by the City of Greeley Community Development Department which sets forth requirements and standards for land development, land use, and the *Subdivision Regulations*.

U. DIP – Ductile-iron pipe.

V. EASEMENT – A right granted by the property owner permitting a designated part or interest of the property to be used by others for specific use or purpose.

W. EPA – Environmental Protection Agency

X. ft^2 – square feet

Y. ft/s – feet per second

Z. GEOTECHNICAL ENGINEER – A partnership, corporation, or individual who is registered as a Professional Engineer, according to Colorado statutes, proficient in the area of soil mechanics, and who is hired by the Developer/Owner to conduct subsurface soils investigations and evaluations, ground water assessments, and other related engineering services.

AA. gpcd – gallons per capita per day

BB. gpd – gallons per day

CC. gpm – gallons per minute

DD. HP - horsepower

EE. INSPECTOR – Representative of the City of Greeley designated to conduct construction/field observation.

FF. LAND SURVEYOR – A registered Professional Land Surveyor, according to State of Colorado statutes, who is hired by the Developer/Owner to determine the boundaries and elevations of land and/or a structures and other related surveying services.

GG. LIVING UNIT - one or more connected rooms, constituting a separate, independent housekeeping establishment for owner occupancy, or rental or lease as a single unit on a monthly basis or longer, physically separated from any other room or dwelling units which may be in the same structure and served by no more than one gas meter and one electric meter.

HH. MAY – A permissive condition. Where the word "may" is used, no requirement for design or application is intended.

II. NEC – National Electric Code

JJ. NFRWQPA – North Front Range Water Quality Planning Association (regional 208 agency)

KK. NON-POTABLE – Water that is not treated to approved drinking water standards and is not suitable or intended for human consumption, but is produced and delivered for irrigation use.

LL. OSHA – Occupational Safety and Health Administration

MM. OWNER – Any person having title or right of ownership in the surface estate of real property or leasehold interest within.

NN. PGI – PVC Geomembrane Institute

OO. PLANNING COMMISSION – Appointed members to advise the City Council on land use planning and development and to make decisions on land use matters.

PP. PLANS – See CONSTRUCTION DRAWINGS.

QQ. PLC – Programmable Logic Controller

RR. PROFESSIONAL ENGINEER – An engineer registered with the State of Colorado according to State of Colorado statutes.

SS. PROFESSIONAL LAND SURVEYOR – A land surveyor registered with the State of Colorado according to State of Colorado statutes.

TT. psi – pounds per square inch

UU. PVC – Polyvinyl chloride

VV. SDC – City of Greeley *Design Criteria and Construction Specifications, Volume 1, Streets.*

WW. SDDC – City of Greeley *Design Criteria and Construction Specifications, Volume II, Storm Drainage.*

XX. SDR – Standard Dimension Ratio (pipe outside diameter over minimum pipe wall thickness).

YY. SHALL – A mandatory condition. Where certain requirements in the design or application are described with the "shall" stipulation, it is mandatory that these requirements be met.

ZZ. SHOULD – An advisory condition. Where the word "should" is used, it is considered to be advisable usage, but not mandatory. Deviations may be allowed when reasons are given which show that the intent of the standard is met.

AAA. SPECIFICATIONS – The construction specifications portion of the City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems.*

BBB. STRUCTURE - Anything constructed or erected on or in the ground, the use of which requires a more or less permanent location on or in the ground, and, including, but not limited to, walls, retaining walls, fences, parking lots, parking slabs and oil and gas production facilities.

CCC. STANDARDS – The design criteria portion of the City of Greeley *Design Criteria and Construction Specifications, Volume III, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems.*

DDD. SUBCONTRACTOR – Any person, firm or corporation, other than the employees of the Contractor, who enters into contract with the Contractor, to furnish labor, materials, or labor and materials.

EEE. SUBDIVISION REGULATIONS – A section of the Development Code prepared by the City of Greeley Community Development Department, which contains requirements for various land use, land development, and subdivision processes.

FFF. UNCC – Utility Notification Center of Colorado.

GGG. UNDERDRAINS – Private line or system that controls or managing any subsurface water on individual foundation lot or lots. No private underdrain systems shall be allow in Water & Sewer easements.

HHH. UTILITY – City of Greeley Water and Sewer Department.

III. UTILITIES – Shall mean all utilities, wet and dry, on site prior to the time of any design and development and all utilities proposed with design. Wet utilities shall include, but are not limited to potable water lines, sanitary sewer lines, non-potable irrigation lines, transmission gas lines, storm water lines, ditches and other runoff conveyance elements. Dry utilities shall include, but are not limited to electric lines, telephone lines, gas service lines, fiber optic lines, and cable television lines.

JJJ. VFD – Variable Frequency Drive

KKK. WATER AND SEWER DIRECTOR – Shall mean the Director of the City of Greeley Water and Sewer Department or their designated representative.

LLL. WQCD – Water Quality Control Division of CDPHE

1.03 MINIMUM STANDARDS

A. The City of Greeley's Community Development Department has Development Code documents that can help define the various processes required for projects within the City.

B. The City's review and acceptance will only be to determine if the plans and specifications conform to the City's requirements. The City's review and acceptance will not relieve the Developer, Design Engineer and Contractor from responsibility for any variation from the City requirements or adequate design standards. The City's review and acceptance shall not constitute any assumption of responsibility or liability for the design or construction. It is the intent and purpose of these standards and specifications to obtain high quality construction throughout, with the completed work complying with the City standards and specifications.

C. All vertical and horizontal control shall be based on the currently adopted City of Greeley vertical and horizontal monumentation. Proposed reference monumentation shall be approved by the City prior to survey. A list of approved monuments may be obtained from the City.

1.04 RELATIONSHIP TO OTHER STANDARDS

A. Whenever a provision of these Criteria and any other provision in any law, ordinance, resolution, rule, policy, or regulation of any kind contain any restrictions covering any subject matter within these Criteria, the most restrictive standard shall apply.

B. The provisions of these Criteria and standards are minimum requirements that do not preclude the use of more restrictive standards by the Design Engineer or City.

C. Adherence to these Criteria does not remove the Developer's responsibility to investigate and obtain any other regulatory permits or approvals, from either local, regional, state, or federal agencies, that may be required for a particular project.

1.05 REVIEW AND ACCEPTANCE

A. All potable water, sanitary sewer, and non-potable irrigation construction plans and specifications submitted to the City for review preliminary and final, comment, and acceptance shall be prepared by, or under the direct supervision of a Professional Engineer. Said Professional Engineer shall be responsible for the design, preparation of the construction drawings and reports, determining material specifications, and reviewing the field survey for accuracy.

B. The construction plan review process for all development as outlined in the *Development Code* shall be followed.

1. The preliminary plan set shall be reviewed by the City for general compliance with these Criteria and the City shall provide comments to the Developer or their agents regarding corrections, additions, and omissions.

2. All submittals to the City shall be done in accordance with the city Development Code.

3. It is the responsibility of the Design Engineer to confirm that submittals are in conformance with these current standards. Any preliminary or final submittal not meeting these criteria may be rejected without review.

4. After final corrections are made and the plans are accepted, the plans set shall be signed by the Water and Sewer Director or designated representative(s). The signing of the plans will constitute acceptance. The acceptance is qualified in that: ***The plans are reviewed and accepted for concept only and the plan acceptance does not imply responsibility by the Water and Sewer Department or the City of Greeley for accuracy and correctness. The plans acceptance does not imply that quantities of items indicated on the plans are the final quantities required. The plans acceptance shall not be construed for any reason as acceptance of financial responsibility by the Water and Sewer Department or City of Greeley for additional items not shown that may be required during the planning or engineering phase and the construction phase.***

C. See Section 6 *Landscape and Irrigation Design Criteria* to determine if additional review and supervision by a registered Landscape Architect is required.

D. If the Design Engineer responsible for the plans disagrees with any requested changes to the submitted plans that may be required by the City for acceptance, such disagreement shall be brought to the attention of the City, and if required by the City, in writing.

E. The Seal of the Design Engineer on plans so corrected and accepted for construction will signify that the Professional Engineer has reviewed, approved, and authorized said corrected plans for construction.

F. No construction shall be undertaken without a City accepted and signed set of Construction Drawings and a recorded plat or required potable water, sanitary sewer, and/or non-potable irrigation easements.

SECTION 2

SUBMITTAL REQUIREMENTS

2.01 GENERAL

Requirements discussed in this section are the minimum for potable water distribution, sanitary sewer collection, and non-potable irrigation systems and are not meant to be all-inclusive. Other requirements may be needed for a complete design. The Design Engineer shall consider the maintenance and operational aspects of the potable water distribution, sanitary sewer collection, and non-potable irrigation systems' infrastructure, as well as constructability in their design.

A. All construction drawings shall be legible and submitted on PDF 22" x 34" or 24" x 36" sheets. Additional sizes may be accepted with prior approval.

B. A legend describing all line types, symbols, and abbreviations shall be shown either on the cover sheet or each individual sheet.

C. Each sheet in the Construction Drawings shall be marked "PRELIMINARY, NOT FOR CONSTRUCTION" with the date of submittal. This statement shall be removed on the final City accepted Construction Drawings.

D. City accepted and signed construction plans are required prior to the City's issuance of construction permits.

2.02 PRELIMINARY CONSTRUCTION PLAN REQUIREMENTS

For Preliminary subdivisions, plans shall be submitted to the City for review and acceptance prior to the preparation of final Construction Drawings. Acceptance of the preliminary submittal shall constitute only a conceptual acceptance and shall not be construed as acceptance of specific design details. The preliminary plans' submittal requirements are outlined below and in the City of Greeley Community Development Department's Construction Plan checklist.

A. Utility Sheet

1. A general overview of the entire project including, but not limited to, streets (complete with names), alleys, lot and block numbers, all proposed and existing utilities on and within 100 feet of the project site, all existing and proposed easement, rights-of-way on and adjacent to the project site, and storm water facilities.

2. The entire project shall be shown on one (1) sheet unless the project is too large to show sufficient detail. City acceptance must be granted to show the project on more than one sheet and a key map to aid in drawing orientation and locating the sheet construction in relation to the overall project will be required on each sheet.

3. Proposed project phasing for utilities and structures.

4. Proposed point(s) of connection for potable water, sanitary sewer, or non-potable irrigation mains to the existing system(s). All existing potable and non-potable water lines shall be labeled with the pipe diameter, type of material, and year of installation

(available from the City). All existing sanitary sewer lines shall show existing manholes, complete with rim and invert elevations, and pipe diameter.

5. Geotechnical bore locations shall be shown in plan view within the utility plans.

6. Any other information deemed necessary by the Design Engineer or City.

2.03 FINAL CONSTRUCTION PLAN REQUIREMENTS

A. Final Construction Plans shall contain the same information as indicated in the Preliminary Construction Plan Requirements section 2.02 of these Criteria with additional requirements as outlined below and in the City of Greeley Community Development Department's Final Construction Plan checklist. After one (1) year from the original acceptance date, the City may require resubmittal of the plans for review and acceptance due to revised or updated City design criteria or construction specifications.

B. City accepted easements or a City accepted final plat must be executed before final Construction Plan acceptance.

C. One set of 22" x 34" or 24" x 36" plans shall be submitted to the City for acceptance signatures when all known issues have been addressed to the satisfaction of the City. Additional sizes may be accepted with prior approval. Once the plans receive City signatures, the Developer or their agents shall make copies of the signed plans and provide them to the City.

D. An electronic version, in a format acceptable to the City, of the final Construction Drawings shall be provided to the City at the time of plan signatures.

E. Potable water, sanitary sewer, and non-potable irrigation main designs shall be provided on separate plan and profile sheets specific to potable water, sanitary sewer, and non-potable irrigation.

F. The Cover Sheet shall contain a signature line for all Ditch Companies, or end user(s) if the ditch is not controlled by a Ditch Company, that have their facilities impacted or modified by the project.

G. All utility verifications shall be in compliance with Colorado Revised Statute 9-1.5 as updated.

H. "Call Utility Notification Center of Colorado (UNCC) at 1-800-922-1987 or dial 811 for utility locates 72 hours prior to any excavation work" shall be put on all drawing sheets.

I. Conduit Plan

1. The conduit plan serves to show all proposed utility conduits crossing public rights-of-way and easements. ***The conduit plan may be a separate sheet from the utility plan as requested by the City.***

2. Provide a general overview of the project including but not limited to street names, street rights-of-way, all proposed and existing utilities, all proposed and existing easements, and lot and block numbers.

3. Show all utility conduits crossing the public rights-of-way and easements and indicate the utility conduit diameter, number of conduits, depth of installation, and name of utility using the conduit.

4. Add the following note to the conduit plan: "All utility conduit crossings of potable water, sanitary sewer and non-potable irrigation lines shall be encased in High Density Polyethylene (HDPE) or fusible C900-16 PVC Pipe, with minimum Standard Dimension Ratio (SDR) 11 across the entire easement or right-of-way width. The encasement joint shall be butt fused. Flexible joints are not allowed."

J. Construction Plan View

1. Clear distance between utilities shall be outside wall to outside wall.

2. Show and label proposed and existing easements, rights-of-way, and property lines.

3. Indicate the proposed method of connection to existing potable water distribution, sanitary sewer collection, and non-potable irrigation systems.

4. Show all proposed and existing potable water, sanitary sewer, and non-potable irrigation services. Indicate the station of service locations on the potable water, sanitary sewer, and non-potable irrigation mains or include a tabular list of stations.

5. Where the minimum cover over sanitary sewer mains provides less than 10 feet of elevation difference between the top of foundation grade and the top of the sewer main, a note shall indicate the lot is served by a "shallow sewer" and appropriate elevation information shall be provided. Shallow sewer is defined in *Section 4* of these Criteria.

K. Pothole information of all water or sewer mainlines and impacted services. At critical locations and as determined by City, with date including month and year, elevation, depth and datum.

L. Construction Profile View

1. Show all existing and proposed utility crossings in compliance with Colorado Revised Statute 9-1.5 as updated. Existing utility crossing locations and elevations shall be obtained from the current project design field survey. Existing utilities shall be potholed as required to perform complete and accurate design prior to construction plan acceptance. Field obtained elevations shall be provided on the Construction Drawings complete with when the field information was gathered, the exact location where it was collected, the Firm that performed the potholing and surveying, and the date the survey was conducted.

   a. Clear distance between utilities shall be outside wall to outside wall.

2. Where the potable water and sanitary sewer mains are within two feet vertically of each other, all water and sewer services that cross a main shall be shown.

3. Provide all pertinent information for existing utilities, refer to checklist for details.

4. Provide pipe slope, manhole inverts in and inverts out (main and service line), and rim

elevations and manhole stationing for proposed sanitary sewer lines.

5. Any other information deemed necessary by the Design Engineer or City.

M. Standard Drawing (Detail) Sheets

1. Include all project applicable City of Greeley Standard Drawings as part of the construction plans set. Water and Sewer Department Standard Drawings are provided in these Criteria. Refer to the Department of Public Works' *SDC* and *SDDC,* latest revision, for other project related details.

2. All City of Greeley Standard Drawings shall contain the City logo in the bottom left corner. If any standard City detail is modified, the City logo shall be removed from the detail and placed on a separate sheet before standard details. All modified detail shall be stamped by design engineer.

3. Where Standard Drawings are not applicable to the work, provide project specific construction details. These shall include construction details of critical connections, atypical crossings, special fittings and appurtenances, and any other details deemed necessary by the Design Engineer or City.

N. Requirements for Changes to Final Accepted Plans

1. Should circumstances warrant changes from the City accepted Construction Plans, acceptance of the changes shall be obtained from the City prior to construction.

2. All modified drawings shall be on 22" x 34" or 24" x 36" sheets. Depending on the extent of the changes, the City will decide if revised plans are required.

O. Wastewater Pumping Station (Lift Station) Final Construction Plans

1. Lift station final construction plan requirements are specific to the design requirements of the lift station in addition to state and regional guidelines. Refer to *Section 4* for lift station requirements.

P. Geotechnical bore logs and groundwater data shall be shown in the Construction Plans.

2.04 FINAL PLAT AND REPLAT REQUIREMENTS

A. Final plats shall adhere to the requirements set forth in the City of Greeley Development Code Chapter 3: *Subdivision Regulations* and the Department of Public Works' *SDC,* latest revision. The following requirements shall also apply:

1. Clearly show, label, and dimension newly dedicated and existing potable water, sanitary sewer, and non-potable irrigation easements.

2. Clearly denote the allocation of any new or existing water dedication credits between the parcels included on the plat.

3. Where minimum cover over sanitary sewer provides less than 10 feet of elevation difference between the finished top of foundation elevation and the invert of the sewer

main, the plat shall indicate that the lot is served by a "shallow sewer". Shallow sewer is defined in *Section 4* of these Criteria.

4. Where a single service is allowed for multiple buildings on a single lot the plat shall indicate that if the lot is ever subdivided the service and main configuration must be brought into alignment with the current City of Greeley Design Criteria.

5. All platted lots shall be adjacent to a public potable water distribution and sanitary sewer collection main. No potable water or sanitary sewer services shall cross lot lines.

B. For all replats where lot lines or street locations change, all existing potable water, sanitary sewer, and non-potable irrigation mains, services, fire hydrants, fire sprinkler lines, etc. shall be relocated to their appropriate location or abandoned. Potable water distribution, sanitary sewer collection, and non-potable irrigation system designs in this replatted area must conform to the current City of Greeley Design Criteria.

2.05 LANDSCAPE PLANS REQUIREMENTS

A. No plant material with mature growth greater than three (3) feet in height shall be planted within potable water, sanitary sewer, or non-potable irrigation easements.

B. No shrubs shall be planted within five (5) feet or trees within ten (10) feet of potable and non-potable water meters, fire hydrants, sanitary sewer manholes, or potable water, sanitary sewer, and non-potable irrigation mains and services.

C. Clearly show and label all proposed and existing potable water and non-potable irrigation meter pits/vaults, mains and services, sanitary sewer mains and services, fire hydrants, and easements on the landscape plans.

D. Show and label all proposed water taps that will be used for landscape irrigation.

E. Provide a table summarizing irrigation water use by area per Section **20-254** of municipal code

F. See Section 6: *Landscape and Irrigation Design Criteria* for additional landscape plan requirements that may apply.

G. Add sections 2.05-A and 2.05-B of these Criteria as notes on the landscape plans.

2.06 EASEMENTS

A. When it is not feasible for potable water, sanitary sewer, or non-potable irrigation main installation to be in a dedicated street right-of-way, the installation shall be made within a dedicated easement. The conditions for allowance of such an exception shall be determined for each individual case. The minimum easement width acceptable to the City is as follows:

1. For a dedicated potable water, sanitary sewer, or non-potable irrigation main easement containing just one (1) main, the width shall be twenty (20) feet or twice the depth to the invert of the pipe, whichever is greater. This easement shall be for the exclusive use by City of Greeley potable water, sanitary sewer, or non-potable irrigation mains. The easement name, which shall be "PERMANENT POTABLE WATER EASEMENT",

"PERMANENT SANITARY SEWER EASEMENT" or "PERMANENT NON-POTABLE WATER EASEMENT", and the easement width shall be labeled on the Construction Drawings and plat.

2. For any combination with two utilities, potable water, sanitary sewer or non-potable irrigation main easements, the total width shall be thirty (30) feet or twice the maximum depth to the invert of each utility, whichever is greater. This easement shall be for the exclusive use by the City of Greeley. The easement name and the easement width shall be labeled on the Construction Drawings and plat.

3. For any combination with three utilities, potable water, sanitary sewer or non-potable irrigation main easements, the total width shall be forty (40) feet or twice the maximum depth to the invert of each utility, whichever is greater. This easement shall be for the exclusive use by the City of Greeley. The easement name and the easement width shall be labeled on the Construction Drawings and plat.

4. Where pipes of diameters greater than sixteen inches (16") are installed additional easement width may be required to account for pipe width.

B. The mains within the easement shall be located as centrally as feasible within the easement while maintaining required separation from other mains and accounting for the depths of mains where necessary.

C. There shall be no detention ponds, berms greater than three (3) feet, permanent structures, fences, trees, shrubs with mature height greater than three (3) feet, or other obstructions that will impede the ability of the City to adequately maintain and service the main(s) located within the easement.

D. Easements not dedicated with a plat, shall be dedicated by separate document and recorded prior to City acceptance of the Construction Drawings. Easement dedication by separate document shall include:

1. Easement Dedication Form. An easement dedication form shall be completed by the Developer. Standard easement dedication forms are available in the appendix. The completed easement dedication form must be signed by the property Owner and notarized.

2. Exhibit Map. An exhibit map (8 ½" x 11") with sufficient description information to establish the legal boundary of the easement shall be provided. The exhibit map shall show and label all existing easements, property lines, and public rights-of-way. The City may request additional information, not listed here, for the exhibit at the city's discretion.

3. A Written Legal Description of the dedicated easement boundary.

4. Funds for Recording. The Developer shall provide cash or a check made out to the **City of Greeley** for the easement recording fees. The City shall provide the recording fee sum once all easement documents are finalized**.** ***The City does not provide the funds for recording easement documents.***

5. Once the easement dedication documents are accepted by the City and the recording fees

have been provided in the appropriate amount, the City shall have the easement documents recorded with Weld County.

2.07 HYDRAULIC REPORT – POTABLE WATER & SANITARY SEWER

A hydraulic analysis for the potable water distribution and sanitary sewer collection systems for a given project shall be submitted by the Design Engineer, as a report, to the City for review and acceptance. The report shall be accepted by the City prior to final Construction Drawing acceptance. The hydraulic analysis report will be reviewed by the City, along with the Construction Drawings, in the same review and acceptance process as outlined in *Section 1*of these Criteria. Projects that move forward to final design without a City accepted potable water distribution and sanitary sewer collection system hydraulic analysis report are subject to possible design changes, including but not limited to, pipe re-alignment, upsizing, extensions, and additional stubouts.

The objective of the hydraulic analysis report is to assist the Design Engineer with designing a project's potable water distribution and sanitary sewer collection systems to adequately serve peak demands while adhering to the design requirements set forth in these Criteria. For the potable water distribution system, the hydraulic analysis report serves as a tool for demonstrating the necessary number of connection points to the existing system for adequate water line looping, system reliability and required pipe sizing. For the sanitary sewer collection system, the hydraulic analysis report evaluates peak flow quantities, flow type, pipe capacity, and flow velocity and establishes appropriate pipe sizing.

Non-potable irrigation system hydraulic and design reports are also required for projects utilizing non-potable water for irrigation purposes; however, since non-potable irrigation systems are unique, the non-potable hydraulic and design report requirements have been provided in section 2.08 of these Criteria.

The written hydraulic report shall include the following information:

A. Title Page

1. Report title.

2. Project name and location.

3. The name, address, and phone number of the Owner, Developer and Design Engineer that prepared the report.

4. Report preparation date.

B. Engineer Certification Sheet

1. The report shall be prepared by or under the supervision of a Professional Engineer, licensed to practice in the State of Colorado, possessing adequate experience in the design of potable water distribution and sanitary sewer collection systems. The report shall contain a certification sheet with the following statement to be signed and sealed by the Design Engineer:

   "I understand the City's acceptance does not relieve the Design Engineer's responsibility for errors, omissions, or design deficiencies for which the City is held harmless.

_____

Registered Professional Engineer

(Affix Seal)

C. Table of Contents

D. Project Description and Location

1. Clearly state the location of the project. Provide a site vicinity map specifying the project's geographical location and the project area in acres. The project acreage shall be the same as on the project plat.

2. Clearly state the land use zoning, estimated number of residential lots or living units, commercial square footages, and the irrigated acreages.

3. Indicate if the project will be phased. Elaborate on the anticipated timing for each project phase and the phase's associated building and infrastructure construction.

4. For multifamily, commercial, or industrial developments, indicate if potable or non-potable water will be used for landscape irrigation.

5. Identify the locations of all potable water, sanitary sewer, and non-potable irrigation connection points to the existing systems.

6. Provide the pipe diameter, pipe material, and year of installation for the existing potable water, non-potable water, and sanitary sewer lines.

E. References and Appendices

1. Provide a page referencing all design criteria, resources, and modeling software used in preparing the hydraulic report.

2. Provide appendices as necessary to include modeling result printouts, copies of demand assumption data, and fire flow test results.

3. Hydrant flow tests results may be available from Greeley Fire Department (970-350-9511). Obtained fire flow test pressures will be evaluated for use by the City on a case by case basis.

F. Potable Water System Report Requirements and Assumptions

1. Provide all used equations, demand assumptions, and essential design requirements, parameters, and constraints.

2. Indicate the software package(s) and version used for the water system modeling.

3. Indicate in which City of Greeley potable water pressure zone the project is located.

4. Provide calculations for estimated population, design flows and velocities, irrigated acreage, irrigation application rates, peaking factors, and any other necessary design

calculations.

5. Provide hydrant fire flow and fire sprinkler system flow requirements.

G. Potable Water System Analysis and Modeling

1. Modeling Scenarios

a. Static. The static scenario shall establish the available water pressure for the site with no demands on the system and serves to check that pressure requirements are maintained.

b. Peak hour demand plus fire flow. This scenario shall include peak hour domestic water use[1] demands plus fire flow[2].

c. Peak hour demand plus fire flow with one (1) water connection closed. While using the determined potable water demands for the peak hour plus fire flow scenario, each connection to the existing potable water system shall be closed, in turn, and modeled. Fire flow shall be placed at a hydrant nearest to the closed connection. This scenario represents a worst-case water demand condition and shall only serve to demonstrate how the potable water distribution system within the development functions during this condition. It is acceptable to have the potable water system velocity requirements violated in this scenario only. The system must maintain a minimum pressure of 20 psi with fire flow.

d. Phasing. Water modeling shall be required for the incomplete potable water system as indicated per the planned phasing on the Construction Drawings, in order to demonstrate that peak hour demand plus fire flow can be met for the interim phased condition.

The hydraulic report shall verify that a proposed potable water system can provide the required water demands for a given development, at an acceptable pressure, and meet the overall potable water system design requirements set forth in these Criteria. At the City's discretion all ultimate connections to existing water mains may be required regardless of development phasing. Upsizing water mains within a development as a means to increase water system capacity in lieu of making a connection to another water source, is not permitted.

If the hydraulic water model demonstrates that a larger main is required to serve the phased condition than would be needed for the full build out condition, the Developer is required to install the larger pipe at their expense and is not eligible for pipe oversizing reimbursement from the City when the larger pipe is no longer needed.

e. Additional scenarios. At the City's discretion, the City may require additional

[1] Domestic water use shall refer to all household and corresponding lot irrigation for single family and applicable multifamily residential potable water use. It shall also refer to all potable water use, including potable irrigation, for commercial and industrial uses.

[2] Fire flow shall be inclusive of fire hydrant and fire sprinkler flow. Residential, commercial, or industrial developments requiring fire sprinkler systems shall have fire sprinkler demands, in addition to hydrant fire flows, placed in the hydraulic water model at appropriate node locations.

scenarios, adjustments to the fire flow placement, reservoir elevations, and existing system connections, revisions to the pipe and node schematic layout, and other model modifications as necessary to verify that the proposed potable water system will meet the design requirements and potable water demands of the development and the City as a whole.

f. At the City's discretion, the hydraulic analysis may be required to extend beyond the limits of the project boundary.

g. Demands for undeveloped parcels shall be calculated based on the higher of the current or anticipated land use or zoning of the property.

h. Model must be compatible and capable of being integrated with City's hydraulic model developed with InfoWater. Model must be provided to Water and Sewer upon request.

2. Modeling Procedure

a. Connections to the existing potable water distribution system are typically denoted as reservoirs with the same hydraulic grade elevation. The City shall provide inflow pressure.

b. Place estimated domestic water, fire sprinkler, and irrigation tap demands at appropriate node locations within the model as they relate within the project.

c. Locate fire flow demands at hydrant locations according to the modeling scenarios in section 2.07-G of these Criteria. The maximum allowable fire flow provided from any one (1) hydrant shall be 1,500 gpm. If the required fire flow is in excess of 1,500 gpm, the next closest hydrant shall be used until the required fire flow is met.

d. Depending on the location of the development, existing potable water system performance and reliability in the area, number of available potable water connections, and surrounding land uses, some of the project's proposed potable water connections may require modeling as a demand point or no connection instead of a water source. The City shall provide additional outflow demands for a development on a case by case basis.

H. Potable Water System Report Results

1. Provide a schematic layout of the potable water distribution system showing and labeling the reservoir connections, pipe network, and demand nodes as presented and analyzed for each water model scenario.

2. Provide a Reservoir Report for the static condition. The Reservoir Report shall include the following information:

a. Reservoir Identification Label

b. Elevation (ft) per City of Greeley datum

3. Provide Pipe Reports for all modeled scenarios. Pipe Reports shall include the following

information.

a. Modeled Scenario Title

b. Pipe Identification Label

c. Pipe Length (ft)

d. Pipe Diameter (in)

e. Pipe Material

f. Hazen-Williams Coefficient

g. Pipe Control Status (open or closed)

h. Pipe Velocity (ft/s)

i. Upstream Calculated Pressure (psi)

j. Headloss (ft)

4. Provide Junction/Node Demand Reports for all modeled scenarios. Junction/Node Demand Reports shall include the following information:

a. Modeled Scenario Title

b. Node Identification Label

c. Node Elevation (ft) per City of Greeley datum

d. Node Demand (gpm)

e. Calculated Hydraulic Grade (ft)

f. Pressure (psi)

I. Potable Water System Design Conclusions

1. Discuss hydraulic analysis results for all modeled scenarios.

2. Confirm that the pipe velocity and pressure requirements during the peak hour demand plus fire flow operating condition are met per *Section 3* of these Criteria.

3. Confirm that the pressure requirements during the peak hour demands plus fire flow operating conditions, with one water connection closed, are met per *Section 3* of these Criteria.

4. Discuss any potable water line oversizing required by the City over and above what is necessary for the development's potable water needs.

5. For phased developments, discuss phased construction of the potable water distribution

system and confirm that potable water pipes are sized and looped appropriately to meet the peak hour, plus fire flow demand velocity and pressure requirements during the interim condition.

J. Sanitary Sewer System Design Requirements and Assumptions

1. Provide all used equations, demand assumptions, and essential design requirements, parameters, and constraints.

2. If a model is required, it must be compatible with the City's InfoSWMM model. Model must be provided to Water and Sewer upon request.

3. Provide calculations for estimated population, design flows, peaking factor(s), hydraulic design, infiltration, flow type, and any other necessary design calculations.

K. Sanitary Sewer Systems Analysis and Modeling

1. If the development is phased, the sanitary sewer system shall be analyzed for full build out. This evaluation shall include the development's sanitary sewer flows and anticipated offsite sanitary sewer flows impacting the sanitary sewer system within the development.

2. Evaluate the development's sanitary sewer sizing for capacity to convey offsite flows.

3. Undeveloped areas shall have sanitary sewer flows calculated based on the higher of the current or anticipated land use or zoning of the property.

4. The City may require additional analysis in order to further verify that the proposed sanitary sewer system will meet the design requirements and needs of the development and the City. The City will evaluate sanitary sewer system hydraulic evaluations on a case by case basis.

L. Sanitary Sewer System Report Results

1. Provide a schematic layout of the sanitary sewer collection system showing and labeling all manholes, design points used for analysis, pipe slopes, and pipe sections.

2. Provide written calculations or printouts of software analysis results for each pipe evaluation including the following information:

   a. Pipe Diameter (in)

   b. Material

   c. Date of installation

   d. Pipe Slope (%)

   e. Sub and Super Critical Calculations, when a model is required

   f. Manning's n Value

g. Pipe Discharge-(gpm)

h. Pipe Flow Velocity (ft/s)

i. Pipe Flow Depth (in)

j. d/D (depth of flow/diameter of pipe)

k. Maximum Capacity at d/D of 50% and/or 80% – (gpm) dependent on date of installation

M. Sanitary Sewer System Conclusions

1. Discuss analysis results for all pipe evaluations.

2. Confirm that acceptable pipe velocities and flow depth criteria are met.

3. If design constraints arise and pipe velocity, flow depth, minimum allowable slope per pipe diameter, or any other Criteria requirements cannot be maintained, the Design Engineer shall provide the City written explanation as to why the Criteria is violated, why the non-standard sewer system design should be accepted, and request a variance to the Criteria. Water & Sewer Department acceptance is required for the variance.

4. Discuss any sanitary sewer main oversizing required by the City over and above what is necessary for the development needs.

5. Indicate if the development is served by "shallow sewer." Shallow sewer is defined in *Section 4* of these Criteria.

6. Discuss potential impacts that future upstream developments may have on the sanitary sewer capacity through the proposed development. Explain the capacity issues within the development and the proposed solutions for resolving them.

N. Supplemental Engineering Calculations

1. These calculations shall include but are not limited to pipe restrained lengths, external pipe load analysis, traffic loadings, casing pipe wall thickness, and air and vacuum release valve sizing.

2. Any calculations deemed necessary by the Design Engineer or City.

O. Wastewater Pumping Stations (Lift Station) Design Report

1. Refer to *Section 4* of these Criteria and CDPHE for lift station design and approval guidelines and lift station design report requirements.

2.08 DESIGN REPORT – NON-POTABLE IRRIGATION SYSTEM

The objective of the non-potable irrigation system design report is to assist the Design Engineer with designing a non-potable irrigation system and storage facility to adequately serve peak season irrigation demands while adhering to the design requirements set forth in these Criteria. Refer to section 2.07 of these Criteria regarding report review and acceptance.

The non-potable irrigation system design report shall include, but is not limited to, the following information:

A. Title Page, Engineer Certification Sheet, and Table of Contents requirements, refer to section 2.07 of these Criteria.

B. Project Description and Location

1. Clearly state the location of the project. Provide a site map identifying the project area and location of the non-potable storage facility (pond), pump station, discharges/fill lines, and overflow works.

2. Indicate if the non-potable system will be phased. Elaborate on the anticipated timing of the project phasing and how it will affect the overall design and construction of the non-potable irrigation system.

3. If connecting to an existing non-potable irrigation system, identify locations of pipe connections. Provide the pipe diameter, pipe material, and year of installation of the existing main.

C. References and Appendices

1. Provide a page referencing all design criteria, resources, and modeling software used in preparing the design report.

2. Provide appendices as necessary to include supplementary information.

D. Non-potable Irrigation System Report Requirements and Assumptions

1. Provide all used equations, assumptions, design methodologies, essential requirements, parameters, and constraints.

2. Indicate any software package(s) and version used for the non-potable pipe system modeling. The model should be compatible with Innovyze InfoWater for incorporation into the City's model.

3. Provide calculations for determining irrigated acreage, required storage volume, pond design including high and low operating elevations, watering requirements, application rates, and design flow.

4. Provide the number and type of pumps, motor horsepower, system head curves, head computations, discharge pressure, and any other pertinent information for the pump system design.

E. Discussion Items

1. Discuss specific design features of the non-potable irrigation system and their requirements, including but not limited to, non-potable/potable water sources and means of delivery into the system, the lining and aeration system, pond shoreline treatment, overflow works, and pond design.

2. General design requirements for the pump station, including but not limited to, power

and electrical requirements, control and monitoring systems, and building requirements.

F. Non-Potable Irrigation System Analysis and Modeling

1. The non-potable irrigation system shall be modeled for the static scenario and the design irrigation demands scenario. Refer to section 2.07 of these Criteria for modeling procedures and report results requirement.

G. Non-potable Irrigation System Design Conclusions

1. Discuss hydraulic analysis results for all modeled scenarios.

2. Confirm that the pipe velocity and pressure requirements during irrigation demand are met per *Section 5* of these Criteria.

H. The City may require electronic copies of the hydraulic models be submitted.

2.09 GEOTECHNICAL SOILS REPORT

A. A geotechnical soils evaluation, prepared by or under the supervision of a Geotechnical Engineer, licensed in the State of Colorado, shall be submitted to the City for review and shall be accepted by the City prior to final Construction Drawing acceptance. The geotechnical soils report shall describe the classifications and characteristics of the soils encountered on the project and include recommended methods of backfilling and compaction. Refer to the Department of Public Works' *SDC,* latest revision, for soils testing and geotechnical soils report requirements.

B. The Geotechnical Engineer shall evaluate groundwater conditions for the site and provide recommendations for sanitary sewer main groundwater barriers.

C. The geotechnical soils evaluations shall include information required to determine potential corrosive soils with pH and resistivity, refer to section 3.11 of these Criteria.

2.10 VERIFICATION SURVEY DRAWING REQUIREMENTS

A. Prior to paving, the Design Engineer shall provide the City with a survey of the installed potable water, sanitary sewer, and non-potable irrigation systems. The purpose of this survey is to verify that the mains and appurtenances were installed per design and within allowable construction tolerances. Once the City has accepted the verification survey, the City shall give the Contractor written notice to proceed with paving construction. ***Verification Survey plans <u>are not</u> As-Constructed Record drawings***. See section 2.11 of these Criteria for As-Constructed Record Drawing requirements.

B. The Verification Survey drawing(s) shall be prepared for easy modification and transition to final As-Constructed Record drawings.

C. The Verification Survey drawings shall be modified from the original construction plan and profile sheets showing the design information as well as the surveyed information. The original design information shall be shown as "lined through" if as constructed conditions differs from approved construction plans. The surveyed information shall be located in the same area as the design information and shall be either "clouded" or made with a heavier line weight than the design information for clear differentiation.

D. Verifications Survey drawings shall be prepared by a Professional Engineer. Surveyed elevations for the Verification Survey shall be obtained by a Colorado Registered Land Surveyor. The Surveyor shall obtain horizontal locations, surveyed elevations and information for the following: To the same precision and datum as design drawings.

1. Potable and non-potable – Horizontal locations of valves, fire hydrants, blow-offs, air/vacuum release valves, and top of pipe elevations at all valves.

2. Sanitary sewer – Horizontal locations of manholes, diameter of manholes, sizes of installed pipe, invert elevations of all mainline pipes and services entering and exiting a manhole, distances between manholes, pipe slopes based on the surveyed invert elevations, and proposed manhole rim elevations.

3. Utilities – Provide horizontal and vertical location of all existing and proposed utility crossings.

4. For potable and non-potable water lines, provide the proposed final ground elevations at all valve boxes. ***Surveyed top of valve nut and valve nut key extension elevations. This information must be used to calculate top of pipe elevation based on the height of the installed valve bonnet, which varies due to pipe diameter and valve manufacturer.***

5. Any other surveyed information as required by the City.

A. Construction tolerances shall be:

1. Water System - Horizontal locations: ± 0.30 feet and Elevations: ± 0.30 feet

2. Sanitary System - Horizontal locations: ± 0.30 feet and Elevations: ± 0.02 feet

B. Survey measurement accuracy shall be:

1. Horizontal locations: ± 0.10 feet

2. Elevations: ± 0.01 feet

2.11 AS-CONSTRUCTED RECORD DRAWING REQUIREMENTS

A. The Contractor and Design Engineer shall be responsible for recording As-Constructed information on a set of Record Drawings kept at the construction site. A representative of the Developer shall monitor construction to assure that changes in construction (as approved in writing) and other pertinent details, such as horizontal location of fittings and manholes, valves, top of pipe elevations, manhole inverts, service tap locations, pipe sizes, depths, etc. are kept current on the As-Constructed Record Drawings.

B. Where the construction is phased with a more than 30-day lapse between phases, As-Constructed Record Drawings shall be submitted to the City after each completed phase. The Construction Drawings for all future phases shall also reflect the "As-Constructed" conditions of the previous phases.

C. At a minimum, the As-Constructed Record Drawings set shall include the following sheets from the original accepted Construction Drawings:

1. Cover Sheet

2. Utility Plan

3. All potable water, sanitary sewer, and non-potable irrigation plan and profile sheets.

4. All construction details and City of Greeley Standard Drawings that were used in the construction of the potable water distribution, sanitary sewer collection, and non-potable irrigation.

5. Landscape plans.

D. The As-Constructed Record Drawings shall show the original design information as well as the As-Constructed information. The original design information shall be shown as "lined through". The As-Constructed information shall be located in the same areas as the design information and shall be either "clouded" and/or made with a heavier line weight as the design information for clear differentiation. The month and year of the construction shall also be noted.

E. A Colorado Registered Land Surveyor shall certify the As-Constructed horizontal locations and surveyed elevations of all items listed in section 2.10 of these Criteria in addition to:

1. Final sanitary sewer manhole rim elevations and Inverts.

2. Final top of water valve box elevations, top of pipe.

3. Construction tolerances shall be evaluated based on original design and City design criteria.

4. Measurement tolerances shall be:

   i. Horizontal locations: ± 0.10 feet

   ii. Elevations: ± 0.01 feet

F. The project responsible Design Engineer and Land Surveyor shall observe construction, as required, in order to certify the conditions and information recorded on the As-Constructed Record drawings is true and correct.

G. The General Contractor for the project shall sign each drawing sheet of the As-Constructed Record plans set with the following statement:

I, _____, hereby state that this project was constructed to City of Greeley accepted Construction Drawings and standards, as designed by the project Design Engineer, and as field staked by the project Land Surveyor. All deviations to the approved Construction Drawings, standards, design, or survey were so noted on field drawings and these were provided to the project Design Engineer for acceptance and inclusion in the As-Constructed Record Drawings.

_____

Construction Company

_____

Address

_____

Authorized Representative

_____

Title Date

H. A Professional Land Surveyor shall perform or directly supervise all field survey data collection to verify the As-Constructed conditions and shall stamp and seal each drawing sheet in the As-Constructed Record Drawing set with the following statement:

I, _____, hereby state that this project was field staked for construction per City of Greeley accepted Construction Drawings and standards and in accordance with the project design. I certify that the field survey information obtained for the As-Constructed Drawings was obtained in accordance with City current standards and is accurately represented on these As-Constructed Record Drawings.

_____

Registered Professional Land Surveyor

(Affix Seal)

I. A Professional Engineer shall review all the As-Constructed information for compliance with the original approved design and standards and shall stamp and seal each drawing sheet in the As-Constructed Record plan set with the following statement:

I, _____, hereby state that I have reviewed the As-Constructed information provided by the project Contractor and project Land Surveyor. I certify that according to the information provided the As-Constructed Record Drawings are in compliance with the City of Greeley accepted Construction Drawings and standards and will function as designed.

_____

Registered Professional Engineer

(Affix Seal)

J. As-Constructed Record signed and sealed drawings shall be submitted to and accepted by the City prior to issuance of Substantial Completion, in the form of one electronic PDF version and one file package containing GIS spatial data compatible with ESRI ArcGIS using the coordinate system referenced in the most recent City of Greeley Control Points Datasheet. The two (2) year warranty period for the installed potable water, sanitary sewer, and non-potable irrigation systems will begin **after** the Certificate of Substantial Completion has been issued by the City. The request for the Substantial Completion Certificate may be initiated by the City or requested by the Developer, but in all cases is the sole responsibility of the Developer.

K. The City will compare the certified As-Constructed Record Drawing information with the approved Construction Drawings, previously submitted Verification Survey, and information the City may be aware of during the construction process. Any corrections, additions, or omissions to the As-Constructed Record Drawings shall be provided to the Design Engineer who prepared the As-Constructed Drawings for changes.

L. The Certificate of Substantial Completion, will NOT be granted until the As-Constructed Drawings for the potable water, sanitary sewer, and non-potable irrigation systems are accepted by the City. (Ordinance 44, 2002)

M. The Certificate of Final Acceptance occurs at the end of the two year warranty period and final walk through of the project.

2.12 REIMBURSEMENT FOR PUBLIC INFRASTRUCTURE DESIGN AND INSTALLATION COSTS

A. The City may require the Developer to install a potable water, sanitary sewer or lift station, non-potable irrigation main or non-potable pond and pump station larger than is needed to adequately serve development.

B. For the installation of mains the City will reimburse the Developer for the materials costs above that required for the development. The difference in materials costs shall only include the difference in pipe materials, manhole materials, valve materials, and fitting materials. Additional materials costs, if any, shall be agreed upon in writing, prior to commencement of construction.

C. For sanitary sewer collection main oversizing, the City may reimburse the Developer for additional costs due to sanitary sewer main installation excavation depth or width beyond that required for the development.

D. If the City requested oversizing results in significant change to horizontal or vertical alignment, additional reimbursement may be agreed to prior to construction.

E. For the installation of sanitary sewer lift stations and non-potable ponds and pump stations the City will reimburse the Developer for the materials costs above those required by the development on a pro rata basis using the portion of the lift or pump station capacity that is not required for the development. The scope of the reimbursement and the reimbursement ratio shall be agreed upon in writing prior to the commencement of construction.

F. For non-potable pond oversizing, the City may reimburse the Developer for extra excavation and materials costs due to additional depth above that required size for the development.

G. The Developer shall submit a materials list with unit prices, quantities, and, if appropriate, a cost comparison between the two pipe sizes under consideration. Reimbursement will only be paid after the As-Constructed Record Drawings have been accepted by the City. Copies of material invoices for materials delivered to the development site and used in construction shall be provided along with the Developer's request for reimbursement.

H. If the Developer is required to design and construct off site potable water, sanitary sewer, or non-potable irrigation mains in order to serve the development, the Developer may be eligible for design and construction cost reimbursements from other developments that connect to that main. Conversely, if the Developer connects to potable water, sanitary sewer, or non-potable irrigation mains constructed by another Developer or the City, the Developer may be required to participate in the design and construction costs of those lines. Refer to the *City of Greeley Charter and Code, Title 20: Public Services*, sections 20-159, 20-160, 20-161, 20-322, 20-323, and 20-324 for additional reimbursement requirements.

2.13 Subsurface Utility Engineering

A. All new underground facilities, including laterals up to the structure or building being served shall be electronically locatable when installed as required by Colorado Revised Statute 9-1.5-103 as amended

B. All services including potable water, non-potable irrigation water, and sanitary sewer must be locatable up to the structure using tracer wire. See Water & Sewer standard details for the required tracer wire specifications.

C. Potable and non-potable irrigation water mains shall be locatable using tracer wire. See Water & Sewer standard details for the required tracer wire specifications.

D. Sanitary sewer mains do not require tracer wire as they are electronically locatable by other means, including. robots, sonde, and camera systems.

SECTION 3

POTABLE WATER DISTRIBUTION SYSTEM DESIGN CRITERIA

3.01 GENERAL

The purpose of this section is to provide information for the design and layout of a potable water distribution system. Potable water distribution system design shall be in accordance with the City of Greeley *Water Master Plan*, latest revision, and these Criteria.

This section is not intended to be inclusive of all situations and the Design Engineer may be required to use additional engineering judgment to meet the overall design intent for constructability and long-term operations and maintenance. **This Design Criteria typically applies to potable water mains sixteen inches (16") in diameter and smaller.** The City of Greeley Water and Sewer Director reserves the right to make final determinations of the system design based on the best interest of the City's system. Refer to standard detail drawings for additional design information.

3.02 DEFINITIONS

A. Potable Water Distribution Mains

1. A potable water distribution main is a water pipe that primarily serves as a delivery conduit to transport potable water from transmission mains or reservoirs directly to individual water services.

2. Potable water distribution mains within the City are eight inches (8"), twelve-inches (12"), and sixteen-inches (16") in diameter.

B. Potable Water Transmission Mains

1. A potable water transmission main is a water pipe that primarily serves as a delivery conduit to transport potable water directly to the distribution reservoirs and mains.

2. Potable water transmission mains are generally larger than sixteen inches (16") in diameter.

C. Potable Water Services

1. Potable water services include all piping, fittings, and appurtenances used to convey potable water from the distribution main to the customer.

3.03 DESIGN FLOW

A. The potable water distribution system shall be designed to transport peak hour plus fire flow demands in accordance with these Criteria.

B. All water demands used in the design of potable water distribution systems are subject to approval by the City.

C. Design Flow

1. The water demand criteria presented in the following table are minimum criteria and the City reserves the right to modify the Criteria, at any time, for the design of specific projects. Potable water demand criteria for uses not provided in the table shall be determined during system design.

TABLE 3-1: Potable Water Design Flow

Residential			
Zoning based on *City of Greeley Charter and Code*, *Chapter 24.401, Zoning*			
Use	**Units Per Acre***	**Occupancy**	**Peak Hour Demand**
R-E	3	3.1 persons	1.9 gpm/unit
R-L	5	3.1 persons	1.9 gpm/unit
R-M	10	2.7 persons	1.7 gpm/unit
R-H	20	1.7 persons	1.1 gpm/unit
R-MH	15	1.7 persons	1.1 gpm/unit
*Use these unit per acre values unless specific unit counts are known			
Commercial			
Where uses are known, use the specific demand values. Commercial demands based on 1000 ft^2 of building area unless noted otherwise. Otherwise use the appropriate zoning demand values.			
Use	**Average Day Demand without Irrigation**		
C-L	1500 gpd per acre		
C-H	3000 gpd per acre		
I-L & I-M	1500 gpd per acre		
I-H	3000 gpd per acre		
Use	**Average Day Demand**		
Restaurant	500 gpd		
Retail/Office	200 gpd		
Grocery	430 gpd		
Laundry, Dry Cleaning	1000 gpd		
Auto Dealer, Repair/Servic	115 gpd		
Car Wash with Water	1500 gpd		
Hospital	380 gpd		
Hotel/Motel	350 gpd		
Retirement & Nursing	350 gpd		
School	12 gpd/student without showers 36 gpd/student with showers		
Religious Building	300 gpd		

Warehouse (Non-industrial)	25 gpd
Irrigation	25 gpm per acre

2. Irrigation is included in the residential water demand, but not included in the commercial water demand. Irrigation demands for commercial uses shall be determined using the provided irrigation demand criteria and the commercial development's estimated irrigated acreage.

3. For residential demands without irrigation flows, a base flow of 60 gallons per capita per day shall be used.

4. Treat Mixed-Use High Intensity Zoning as 50% R-H and 50% C-H and Mixed-Use Low Intensity Zoning as 50% R-H and 50% C-L unless a more detailed breakdown is known.

5. Due to the extreme variation in water consumption amongst the different types of industry, industrial water demands shall be determined during system design when the industrial use is known.

D. Peaking Factor

1. The peaking factor for indoor water use should align with the peaking factor for sanitary sewer in most situations. Instances where the two peaking factors do not align will require approval by the City of Greeley.

2. A domestic peaking factor shall be obtained from ASCE Peak Flow Curve G[1]:

$$P_f = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

Where P = Population in thousands (example: P = 2 for population of 2,000)

$$P_f = \frac{18 + \sqrt{\frac{F}{60000}}}{4 + \sqrt{\frac{F}{60000}}}$$

Where F = Flow in gallons per day (based on 60 gpcd in Table 4-1)

E. Fire Flows

1. Contact City of Greeley Fire/Rescue Department (970-350-9510) for the latest adopted fire code and to confirm project fire flow requirements.

2. For design purposes, the maximum allowable fire flow provided from any one (1)

[1] American Society of Civil Engineers (ASCE). 1982. *Gravity Sanitary Sewer Design and Construction. Manuals and Reports on Engineering Practice – No. 60.* Reston, VA: American Society of Civil Engineers.

hydrant is 1,500 gpm. Fire flow may be obtained from more than one (1) fire hydrant providing the additional hydrants are accessible to any possible fire location and meet the spacing requirements and distances from structures as specified in section 3.19 of these Criteria and by the City of Greeley Fire Department.

3.04 PRESSURE REQUIREMENTS

Potable water distribution systems must be designed to provide minimum and maximum system pressures as discussed in the following sections. Water system pressure information for the City's existing system shall be verified by the City.

A. The potable water distribution system in all areas shall be designed for a maximum pressure of 125 psi and a minimum pressure of 40 psi at peak hour demands without fire flow.

B. Twenty (20) psi residual pressure is required at any one (1) hydrant with peak hour demand plus fire flow with one (1) water connection closed.

C. Pressure zones shall conform to existing City of Greeley pressure zones as provided in the *Water Master Plan*, latest revision. Specific information on the pressure zones or to confirm which pressure zone a development or site is actually located may only be obtained from the City. See Table 3.2 for ground elevation ranges for each pressure zone.

D. Pressure regulating valves (PRV) or control valves will be required between pressure zones. The final PRV location shall be determined by the City.

TABLE 3-2: Pressure Zone Elevation Ranges

Zone1: 4740' – 4500'
Zone 2: 4840' – 4740'
Zone 3: 4940' – 4840'
Zone 4: 5060 – 4940'

3.05 HYDRAULIC DESIGN

A. Friction Coefficient

1. Potable distribution mains shall be designed using a Hazen-Williams friction coefficient "C" equal to 120.

B. Velocity

1. All pipes shall be sized for a maximum water velocity of no greater than five (5) feet per second (fps) at peak hour demand and seven (7) fps at peak hour demand plus fire flow.

3.06 POTABLE WATER MAIN SIZE

A. Unless specifically indicated in the *Water Master Plan*, sixteen-inch (16") mains are required every mile and twelve-inch (12") mains are required every half-mile. Other distribution mains shall have a minimum diameter of eight inches (8").

B. Hydrant leads connecting to the potable distribution system shall be six inches (6") in diameter. Other pipe diameters for hydrant leads are prohibited.

3.07 DEPTH OF BURY

A. The minimum depth of cover shall be five (5) feet and the maximum depth of cover should generally not exceed six (6) feet. Design preference is to minimize lowering which can be challenging to locate and maintain.

B. When design or constructability constraints are present, deeper or shallower water main installation may be permitted only with acceptance from the City. Additional design and installation considerations may be required by the City depending on the situation. Design considerations should minimize additional fittings and elevation changes where feasible.

3.08 CONNECTIONS TO THE EXISTING POTABLE WATER SYSTEM

A. Main connections to the existing potable water distribution system shall be made by wet tap or cut in tee. All wet taps and all cut-in tees on mains smaller than 16" diameter shall be made by the Contractor under the direct supervision of the City. It is the Contractor's responsibility to provide all approved tapping materials (tapping sleeves, tapping valves, insulator kit, etc.). Taps for new 8" and 12" main connections to existing 16" or larger mains shall be performed by the City unless otherwise directed.

B. Connections to the existing transmission mains or distribution mains larger than sixteen-inch (16") shall be limited and must be approved by City.

C. For wet taps on existing transmission mains or sixteen-inch (16") and larger distribution mains, manufacturer's shop drawings and specifications for the proposed tapping sleeve shall be submitted to the City for review and acceptance prior to installation of the tapping sleeve by the Contractor.

D. Taps on existing transmission mains or sixteen-inch (16") and larger distribution mains shall require the installation of an insulator kit between the tapping sleeve and tapping valve.

E. Connection to cast iron mains constructed prior to 1950 may require replacement or non-standard fittings which must be reviewed and approved by City of Greeley Water & Sewer department.

F. Construction documents shall include a note for all wet taps: "Contractor to reference specifications for approved tapping materials and prior to installation shall contact Distribution for direct supervision of installation by the City."

3.09 LOCATION AND LOOPING OF POTABLE WATER MAINS

A. Potable water mains shall be located in the center of a dedicated street right-of-way, where feasible, or within a dedicated exclusive easement of appropriate width. If narrow street

sections do not allow the water line to be located in the center of the street right-of-way while maintaining clearances from other utilities and the lip of street gutter, the City may allow the potable water main to be located five (5) feet offset from centerline of the street right-of-way. City approval is required for all other proposed potable water main locations.

B. The centerline of potable water mains shall not be placed closer than five (5) feet to the lip of street gutter without prior acceptance by the City. Preferred location is to maximize distance from lip of gutter.

C. Potable water mains serving a cul-de-sac shall be extended to within ten (10) feet of the lip of street gutter at the end of the cul-de-sac and shall have a hydrant assembly placed on the line.

D. A potable water main serving one (1) lot shall extend all the way across the frontage for that lot.

E. Where non-compliant or private water mains or service lines exist within or adjacent to a new development, replacement of lines or additional connections to those lines may be required.

F. Permanent dead-ends are prohibited without prior approval by Water & Sewer. City preference is no dead-end lines and may require additional infrastructure to meet water quality requirements.

G. Temporary dead-ends with services shall have a fire hydrant or a flushing station with an acceptable discharge point at the end of the line.

H. Temporary dead-ends with no services shall have a closed valve at the point of connection with the active distributions system and will not require a hydrant or flushing station after the valve.

I. For temporary phasing, an adequate number of connections to the existing potable water distribution system as determined through hydraulic modeling and approved by the Water & Sewer shall be provided.

1. Potable water mains shall extend to the extremities of the property or the subdivision served. Extensions shall be in appropriate locations to provide adequate water connections and to maintain looping requirements for adjacent, future developments and to facilitate the completion of the grid described in section 3.06 of these Criteria.

2. Water mains shall be extended offsite when required to tie into the existing distribution system for additional water source connections. Appropriately sized easements shall be provided.

J. In all instances, the City shall determine the potable water system looping, connections, and valving in order to maintain overall water system performance. Ultimately, the required source connections to the existing potable water system shall be solely determined by the Water & Sewer Department.

1. New developments shall have at minimum two separate and distinct connections to the existing system to provide reliability for maximum fire flows in case of pipe failure and

better system circulation to maintain acceptable water quality. Source connections shall be made on opposite sides of the development.

3.10 POTABLE WATER SYSTEM PHASED INSTALLATION AND STUBOUTS

A. Potable water distribution system phasing, if proposed by the Developer, shall be clearly identified on the overall utility plan. Water plan and profile sheets shall clearly show and label the phasing transitions in the potable water line design.

B. The proposed potable water system phasing shall maintain looping integrity within the system as described in section 3.09 of these Criteria.

C. The phased potable water system design shall meet the phased water demands for the development and adhere to all potable water system and hydraulic design requirements provided in these Criteria.

D. Locate line valves and temporary fire hydrant and flushing station at the end of each phase or stub out, as described in section 3.09 of this criteria. The stubout shall be shown on the potable water plan and profile sheets.

E. Phased water line or stubout construction shall be extended a minimum ten (10) feet beyond phased street paving to avoid asphalt removal during excavation for future connections.

F. Phased potable water mains or stubouts intended for future connections shall be valved such that only one (1) valve needs to be closed when the main is extended and no customers are without water service when the line is extended. The valve must be appropriately restrained so it will not "blow off" when the water line is exposed and all thrust blocking is removed for the extension. See section 3.14 of these Criteria regarding pipe restraint.

G. The maximum length of a stubout shall be fifty (50) feet unless otherwise approved by the City.

H. Potable water main stubouts not utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

3.11 PIPE MATERIAL

A. Potable water pipes less than or equal to sixteen-inches (16") in diameter shall be AWWA C151 cement-lined ductile iron pipe or AWWA C900-16 polyvinyl chloride (PVC) pressure pipe.

1. HDPE pipe and fused PVC may be used with City approval for specifically identified purposes, location and uses such as horizontally bored crossings.

B. The Design Engineer shall specify the pipe material and class, as required for specific project conditions. The pipe material and class shall be called out on the Construction Drawings.

C. All ductile iron pipe shall be protected against soil corrosion based on the corrosion level determined from pH and Resistivity levels in accordance with the following table. If the corrosion level is found to be Medium or lower, the pipe shall be wrapped with 8-mils of V-Bio Enhanced Polyethylene Encasement in accordance with AWWA C105. If the Corrosion level is Medium-High or High, then additional Zinc coating of the pipe shall be required.

TABLE 3-3: Corrosive Soil Function of pH and Resistivity

pH	Resistivity (Ohms-cm)	Corrosion
<3.5	Any	High
3.5-4	<4,500	High
	>4,500	Medium-High
4.5-5.5	<4,500	High
	4,500-5,000	Medium-High
	>5,000	Medium
5.5-6.0	<1,000	High
	1,000-5,000	Medium-High
	5,000-10,000	Medium
	>10,000	Medium-Low
6.0-9.0	<1,000	High
	1,000-3,000	Medium-High
	3,000-10,000	Medium
	10,000-20,000	Medium-Low
	>20,000	Low

3.12 VALVES

A. All valves shall be located in dedicated street right-of-way or within a dedicated exclusive easement of appropriate width. City approval is required for all other proposed valve locations.

B. Gate Valves

1. Gate valves are assigned in the potable water distribution system so that no single accident, break, or repair necessitates shutting down a length of pipe greater than 1,000 feet in all directions or no more than one hundred fifty (150) people are out of service at any one time.

2. At street intersections, gate valves shall be located at the extension of property lines, wherever possible.

3. Gate valves shall be located a minimum five (5) feet away from the edge of concrete cross pans or cutters and away from intersection. This requirement has precedence over section 3.12-B. of these Criteria.

4. Fire hydrant and fire sprinkler line gate valves shall be placed at the main. These gate

valves shall be mechanical joint valves and fasten to a mechanical joint anchor tee (swivel tee) on the main.

5. All potable water line valves shall have a concrete collar around the valve box in accordance with *SDC* Standard Drawings.

6. City may require additional valves to allow for maintenance and control and minimizing service outages. Final valve locations shall be solely determined by the City.

7. Valves shall be provided at both ends of water pipelines where the potential of inaccessibility for repairs may exist, this may include; rivers, ponds, ditches, railroads and highways. Where looping is required, valves shall be located at easement lines or ROW to maintain potable service.

C. Combination Air Valves

1. Sixteen-inch (16") diameter mains shall have combination air valves installed at high points along the main and shall be properly sized by the Design Engineer in accordance with the manufacturer's recommendation. The City shall have final determination on valve size, placement, and type of valve to install.

D. Pressure Regulating Valves

1. Pressure regulating valves (PRVs) control pressures between potable water distribution system and shall be placed at pressure zone boundary. The final installation location shall be determined by City.

2. The standard PRV size is eight inches (8") for all 8" mains unless otherwise approved by the City. For all mains larger than 8", duplex PRVs are required and shall be sized according to hydraulic calculations unless otherwise approved by the City.

E. Blowoffs

1. Any required blowoff location shall utilize a city approved fire hydrant or flushing station.

3.13 PIPE ALIGNMENT

A. Potable water mains may have a change in alignment or grade to avoid obstructions, within the limits of the pipe joints. If joint deflections is not feasible or permitted by the City, an appropriate bend fitting shall be used.

B. Allowable Joint Offset for PVC Pipe

TABLE 3-4: Maximum PVC Pipe Joint Deflection or per manufacturers limits whichever is more restrictive

Pipe Diameter (in)	Maximum Joint Deflection (°)
8"	1°

12”	1°
16”	1°

C. PVC pipe can be joined with High Deflection (HD) Couplings which allow five degrees (5°) of pipe joint deflection per coupling. HD couplings can be used in the place of small bends or where it is undesirable or impossible to joint deflect the pipe.

D. Allowable Joint Deflection for DIP Pipe

TABLE 3-5: Maximum DIP Pipe Joint Deflection or per manufacturers limits whichever is more restrictive

Pipe Diameter (in)	Maximum Joint Deflection (°)
6”	4.0°
8”	4.0°
12”	4.0°
16”	2.5°

3.14 THRUST BLOCKING AND PIPE RESTRAINT

A. Concrete thrust blocks or pipe restraints shall be constructed at all mainline bends, tees, dead ends, and valves as shown in the City of Greeley Standard Drawings.

B. Thrust Blocks

1. The thrust block details, as shown in the City of Greeley Standard Drawings, are to be used as minimums only. The Design Engineer shall determine the required size of thrust blocks to use.

2. If for any reason (i.e. temporary dead end line), concrete thrust blocks cannot be used, restrained push-on or mechanical joint restraints shall be required.

C. Pipe Restraint

1. The pipe restraint details, as shown in the City of Greeley Standard Drawings, are to be used as minimums only. The Design Engineer shall determine the required size of thrust blocks to use.

2. For transmission mains, the Design Engineer shall determine the length of required pipe restraint, for the pipe material being used, PVC or DIP, in accordance with AWWA M41 *Ductile-Iron Pipe and Fittings* or AWWA M23 *PVC Pipe – Design and Installation*, latest revision.

D. In some instances (i.e. fire hydrants, large diameter fire lines, water line lowering’s, etc.) thrust blocks may be required in addition to pipe restraint. The design engineer or City shall make such determinations on a case-by-case basis.

3.15 POTABLE WATER MAIN AND SERVICE ENCASEMENTS FOR WET UTILITIES

Wet utilities should be defined as any pipeline that could contaminate the potable water system.

A. No general statement can be made to cover all encasement conditions, therefore only typical encasement situations are addressed in this section. Encasement requirements shall ultimately be determined by the City on a case-by-case basis.

B. Refer to construction specification *Section 02445, Casing Pipe – Borings and Encasements* for encasement pipe material, diameter, and wall thickness (if applicable), casing spacers, and standard detail end seals, and installation requirements. No encasements shall be constructed from poured concrete.

C. The use of "line" or "lines" in this section shall refer to both mains and services.

1. Where sanitary sewer lines cross beneath potable water lines with less than eighteen inches (18") clearance or any sanitary sewer lines cross above potable water lines, or the ten (10) feet horizontal clearance between potable water lines and sanitary sewer lines cannot be maintained, pipe encasement shall be designed and constructed so as to protect the potable water line.

2. Where non-potable Distribution lines cross above or below potable water lines with less than eighteen inches (18") clearance, pipe to be center on potable water Main or Fused and shall be designed and constructed so as to protect the potable water line.

3. Pipe encasement shall be placed on the sanitary sewer line or non-potable irrigation line except in situations where the sanitary sewer or non-potable irrigation line is existing. Where the sanitary sewer or non-potable irrigation line is already constructed, the pipe encasement shall be placed on the potable water line. Priority shall be given to encase service lines before main lines.

4. The encasement pipe shall extend a minimum ten (10) feet on either side of the crossing measured from the outside diameter of the crossed pipe. Longer casing pipes may be required depending on the encasement situation.

5. For any atypical encasement sizing situations, the Design Engineer shall size the encasement pipe such that the inside clearance is at least one inch (1") greater than the maximum outside diameter of the casing spacer runners.

6. Where storm water lines cross above potable water mains, storm water pipe joints shall utilize rubber gaskets and exterior joint wrap a minimum ten (10) feet on either side of the crossed potable water main, measured from the outside diameter of the pipe.

D. Potable water main crossings under any open irrigation ditch shall have a minimum five (5) feet of cover and shall be encased.

E. Bored utility crossings shall have a minimum twenty-four inches (24") of vertical clearance from the outside diameter of the utility casing to the outside diameter of the potable water line if the bored utility crosses above the potable water line and a minimum thirty-six inches (36") of vertical clearance from the outside diameter of the utility casing to the outside diameter of the potable water line if the bored utility crosses below the water line.

F. If there are horizontal or vertical clearance conflicts between the potable water line and gravity utilities, the City may require that the potable water main be lowered, raised, or realigned in order to maintain the required clearances.

3.16 POTABLE WATER MAIN BORINGS & ENCASEMENTS REQUIRED BY OTHER AGENCIES

A. Installation of potable water mains through City of Greeley or another agency's right-of-way, easement, or other, may require a bored casing pipe to facilitate main installation. The type of bored casing material and its properties will be specified by the agency granting permission to cross. Such crossings shall be subject to approval by the City to avoid conflicts in requirements or standards between the City and the agency granting permission to cross.

1. A letter, permit, or approved crossing application from the agency granting permission to cross, must be provided to the City prior to the boring.

2. The City shall not accept any bored crossings imposed with an annual user or crossing fee from the agency granting permission to cross. All bored crossing fees, if applicable, shall be paid by the Developer prior to the boring.

B. The minimum requirements for bored casings within the City shall be in accordance with construction specification *Section 02445, Casing Pipe – Borings and Encasements. & standard drawings*

1. The required bore length of casing pipe shall be determined by the Design Engineer and must be accepted by the City.

2. All bored casing shall have a minimum of twenty-four inches (24") of vertical clearance from the outside diameter of the casing pipe to the outside diameter of the utility line if the bored casing crosses above the utility and a minimum thirty-six inches (36") of vertical clearance from the outside diameter of the casing pipe to the outside diameter of the utility line if the bored casing crosses below the utility, unless more stringent requirements by other utility.

3.17 POTABLE WATER SERVICES AND FIRE SPRINKLER LINES

A. General

1. Potable water service lines shall not be installed in trenches with other wet or dry conduits/utilities. A service line shall be separated from other conduits a minimum ten (10) feet horizontally and eighteen inches (18") vertically. The only exception will be a fire sprinkler line. In this instance, the horizontal separation may be a minimum of five (5) feet, from outside diameter of the pipe and final determination. This shall be evaluated by the City on a case-by-case basis.

2. Potable water services and fire sprinkler lines for a given lot must be tapped on the potable water main within the confines of the extended property lines. Certain lots and cul-de-sacs may have the potable water service line or fire sprinkler line located anywhere along the lot frontage but shall be a minimum three (3) feet and preferred location is five (5) feet inside the property line being served.

3. No potable water service taps shall be made on fire sprinkler lines.

4. All taps shall require a tapping saddle or tapping sleeve and valve as shown in standard detail. No direct taps are allowed.

5. Potable water services and fire sprinkler lines not intended to be utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

B. Water Services

1. Refer to construction specification *Section 02514, Water Service Lines, Meters, and Appurtenances,* for service pipe materials and installation requirement.

2. A separate potable water service line and meter must serve each building with individual owners.

3. No potable water service lines shall cross property lines, including irrigation systems, unless otherwise approved by the City for irrigating multiple outlots. Irrigation systems from a single potable water service shall only be allowed for use on that single property. Refer to appendix section *A2 – Compound Tap Exemption Policy for Irrigation of Multiple Outlots.*

4. No compound potable water taps are allowed. Refer to *City of Greeley Charter and Code, Title 20: Public Services*, Section 20-253.

5. Where one or more master meters are allowed for residential units, meters shall be configured to serve contiguous groups of units on one lot with no more than an estimated twenty-five residents served by a single master meter. The master metered system shall also be designed and constructed such that the property owner does not become a public water provider under state or federal regulations.

6. Pressure boosters are prohibited without adequate backflow protection.

7. Potable water services shall be located a minimum five (5) feet inside the property being served.

8. Under no condition is a potable water service to be located under driveways, trees, or other permanent structures.

9. Potable water service taps shall be separated by at least five (5) feet, measured along the potable water main length, including when taps are on opposite sides of the potable water main. Potable water service taps shall also be a minimum five (5) feet from all joints, fittings, or valves.

10. The corporation stop, curbstop, meter, that portion of the service line between the corporation stop and the meter, and five (5) feet past the meter shall all be the same internal diameter.

11. Potable water service curb stops shall be located ± one (1) foot from the property line or easement boundary and preferred inside the row. Potable water service meter

pits/vaults shall be located as close as possible beyond the curb stop. See City of Greeley Standard Drawings for additional service and meter installation requirements.

12. Potable water service meter pits/vaults shall normally be located after the curbstop in a landscaped area or streetscape. Meter pits/vaults shall not be installed in any street, parking area, driveway, or sidewalk unless otherwise approved by the City. If a meter pit/vault is permitted by the Water & Sewer Department to be located in any traffic area, the pit/vault shall be designed to withstand HS-20 traffic loadings. Curbstops with tracer wire test stations shall be in a valve box.

13. There shall be no major landscaping (trees, boulders, or shrubs with mature growth greater than three (3) feet), buildings, or other permanent structures within ten (10) feet of the meter pit/vault.

14. The maximum allowable number of living units on a single tap may be determined using a fixture analysis per the process outlined in the most recent edition of AWWA Manual of Water Supply Practices M22 – Sizing Water Service Lines and Meters. If no analysis is provided, the maximum values are shown below: Any residential project requesting a domestic tap larger than three inches (3") shall be reviewed on a case-by-case basis.

TABLE 3-6: Living Units Allowed Per Tap Size

Tap Size (inch)	Maximum Allowable Living Units
3/4"	2
1"	4
1 ½"	10
2"	25
3"	45

15. Commercial and industrial developments may provide potable water service stubouts, if the end user is known.

C. Fire Sprinkler Lines

1. Fire sprinkler lines two-inch (2") or smaller shall be type "K" copper. Fire sprinkler lines larger than two-inch (2") shall be restrained DIP. Restrained DIP fire sprinkler lines require concrete thrust blocking at the main and a gate valve at the main. Fire sprinkler lines are not metered.

2. Fire sprinkler lines must be connected to the potable water distribution system. Connections to non-potable irrigation system are prohibited.

3.18 POTABLE WATER MAINS AND SERVICES IN RELATION TO DRY UTILITIES

Dry utilities shall be defined as any utility pipeline that could not contaminate the potable water system.

A. Potable water services and distribution mains shall have a minimum ten (10) feet horizontal and eighteen inches (18") vertical separation from all utilities measured from outside

diameter.

B. Dry utility crossings shall be encased in high density polyethylene pipe (HDPE), Standard Dimension Ratio (SDR) 11 or approved equal from edge to edge of the easement or right-of-way, or ten (10) feet on either side of the potable water main, whichever is greater. Final determination shall be accepted only by the City

C. Right angle utility crossings are only permitted above and below the potable water main with adequate clearance. Non-right-angle crossings shall be approved by the City. Parallel installation of other utilities in exclusive water easements are not permitted.

D. For a potable water line crossing situation not specifically mentioned in this section, the crossing requirements provided in these Criteria shall be applied to that particular situation to the best extent possible.

3.19 FIRE PROTECTION AND HYDRANT SPACING

A. All fire protection, fire flow, and hydrant requirements are subject to approval by the Greeley Fire Department.

B. Hydrant Spacing

1. Residential structures shall be no further than 250 feet, fire access distance[2], from a fire hydrant.

2. In R-L zoned areas, fire hydrant spacing shall be no further than 600 feet measured along the street curb line.

3. In R-M and R-H zoned areas, fire hydrants shall be spaced equal to or less than 500 feet apart, measured along the street curb line. Structures shall be 250 feet or closer, fire access distance, from a fire hydrant.

C. In commercial and industrial areas, structures shall be 250 feet or closer, fire access distance, from a fire hydrant.

D. Where potable water mains are extended along streets where hydrants are not needed for the protection of structures, hydrants shall be provided at spacing not to exceed 1,000 feet.

E. Hydrants shall be located at intersections whenever possible. Hydrants located mid-block shall be aligned with the extension of a property line.

F. Fire hydrants shall be installed in accordance with construction specification *Section 02516, Water Utility Distribution Fire Hydrants* and City of Greeley Standard Drawings.

G. A three (3) foot radius in all directions around the hydrant shall be clear of obstructions.

1. Where hydrants are vulnerable to vehicular damage, crash posts shall be provided outside of the three (3) foot radius clearance in all directions from the hydrant and a

[2] Fire access distance is the distance a fire pumper must travel to lay a standard hose line from a hydrant to the primary access point of a structure. The hose lay distance is not measured over unimproved areas that may be impassable due to weather conditions, obstructions, etc.

minimum of one foot from edge of sidewalk.

2. When hydrants are located less than 4 feet from a vehicular travel path, or not protected by curb and gutter then crash posts shall be provided. Crash posts shall be concrete filled pipes that are four-inches (4") in diameter and a minimum of four (4) feet in height above the finished ground surface with two (2) feet of post below the finished ground surface.

H. All hydrants must be within dedicated exclusive easements or public rights-of-way. Refer to *Section 2* of these Criteria for easement requirements.

3.20 CROSS CONNECTION AND BACKFLOW PREVENTION

A. Potable water service lines on any property or inside any building shall have NO physical connection with any pipes, pumps, hydrants, tanks or non-potable irrigation systems that could draw or discharge any unsafe or contaminated water (including steam condensation or cooling water) into the potable water distribution system.

B. For additional information on cross connection or backflow prevention requirements, refer to appendix section *A1 – Cross Connection and Backflow Prevention Policy*.

SECTION 4

SANITARY SEWER COLLECTION SYSTEM DESIGN CRITERIA

4.01 GENERAL

A. The purpose of this section is to provide information for the design and layout of a sanitary sewer collection system. Sanitary sewer collection system design shall be in accordance with the City of Greeley Sanitary Sewer Master Plan, latest revision, and these Criteria.

B. This section is not intended to be inclusive of all situations and the Design Engineer may be required to use additional engineering judgment to meet the overall design intent for constructability and long-term operations and maintenance. **This Design Criteria typically applies to sanitary sewer mains twelve inches (12") in diameter and smaller.** The City of Greeley Water and Sewer Director reserves the right to make final determinations of the system design based on the best interest of the City's system. Refer to standard detail drawings for additional design information.

4.02 DEFINITIONS

A. Sanitary Sewer Collection Mains

1. A sanitary sewer collection main is a sanitary sewer pipe that gathers wastewater flows directly from individual sanitary sewer services or private sewer mains and transports.

B. Sanitary Sewer Interceptor Lines

1. Sanitary sewer interceptors within the City are fifteen inches (15"), eighteen inches (18"), or twenty one inches (21") in diameter.

C. Sanitary Sewer Trunk Lines

1. A sanitary sewer trunk line is a sanitary sewer pipe that collects sewage flows from the collection mains and interceptors and carries those flows to the wastewater treatment facility.

2. Sanitary sewer trunk lines are larger than twenty-one inches (21") in diameter.

3. All sanitary sewer trunk lines require additional approval through the Colorado Department of Public Health and Environment (CDPHE), and all permitting shall be completed by Developer and Design Engineer and must be approved and signed by City.

D. Sanitary Sewer Services

1. Sanitary sewer services include all piping, fittings, and appurtenances used to convey sanitary sewage from the plumbing system of a structure to a sanitary sewer collection main.

2. Sanitary sewer services are typically four inches (4") or six inches (6") in diameter.

4.03 **DESIGN FLOW**

A. The sanitary sewer collection system shall be designed to carry peak wastewater flows plus infiltration/inflow in accordance with these Criteria.

1. Depending on a development's location, consideration of upstream and offsite flow contributions may be required by the City to ensure proper sizing of the sanitary sewer collection mains within the development. This will be determined by the City on a case by case basis.

2. Depending on the existing capacity of the downstream sanitary sewer collection system, the City may require verification that the downstream sewer system can convey the development's peak flows. If the downstream capacity is inadequate, the Developer may be required to make appropriate downstream sewer system upgrades. This will be determined by the City on a case by case basis.

3. Any infill or redevelopment project that is an intensification of use shall require the Developer to verify that the downstream sewer system can convey the development's peak flows. If the downstream capacity is inadequate, the Developer may be required to make appropriate downstream sewer system upgrades.

B. Design Flow

1. The wastewater flows presented in the following table are minimum criteria and the City reserves the right to modify the Criteria, at any time, for the design of specific projects. Wastewater flows for uses not provided in the table shall be determined during system design.

TABLE 4-1: Sanitary Sewer Design Flow

Residential			
Zoning based on City of Greeley Charter and Code, Chapter 24.401, Zoning District Development Standards			
Use	Units Per Acre	Occupancy	Average Day Wastewater Flows*
R-E	3	3.1 persons	0.13 gpm/unit
R-L	5	3.1 persons	0.13 gpm/unit
R-M	10	2.7 persons	0.11 gpm/unit
R-H	20	1.7 persons	0.07 gpm/unit
Commercial			
Use			Average Day Wastewater Flows*
C-L (not specified)			1,500 gpd/acre (minimum)
C-H (not specified)			3,000 gpd/acre (minimum)
Retail/Offices			200 gpd/1,000 SF
Hotels/Motels			350 gpd/1,000 SF
Restaurants			500 gpd/1,000 SF

Bars and Lounges	300 gpd/1,000 SF
Neighborhood Stores	200 gpd/1,000 SF
Department Stores	200 gpd/1,000 SF
Laundry and Dry Cleaning	1,000 gpd/1,000 SF
Banks	300 gpd/1,000 SF
Nursing Homes	350 gpd/1,000 SF
Warehouses	25 gpd/1,000 SF
Car Washes with Water Reuse	1,500 gpd/1,000 SF
Auto Dealer/Repair/Service	115 gpd/1,000 SF
Grocery Store	430 gpd/1,000 SF
Religious Buildings	300 gpd/1,000 SF
Factories	800 gpd/1,000 SF
Hospitals	380 gpd/1,000 SF
Schools (without showers)	12 gpd/student
Schools (with showers)	36 gpd/student
Industrial	
Use	Average Day Wastewater Flows*
I-L (not specified)	1,500 gpd/acre
I-M (not specified)	1,500 gpd/acre
I-H (not specified)	3,000 gpd/acre
**1cfs = 448.33 gpm* *Average day wastewater flow per capita = 60 gpcd*	

2. All flows used in the design of sanitary sewer collection systems are subject to approval by the City.

C. Peaking Factor

1. A domestic peaking factor shall be obtained from ASCE Peak Flow Curve G[1]:

$$P_f = \frac{18 + \sqrt{P}}{4 + \sqrt{P}}$$

Where P = Population in thousands (example: P = 2 for population of 2,000)

[1] American Society of Civil Engineers (ASCE). 1982. *Gravity Sanitary Sewer Design and Construction. Manuals and Reports on Engineering Practice – No. 60.* Reston, VA: American Society of Civil Engineers.

$$P_f = \frac{18 + \sqrt{\frac{F}{60000}}}{4 + \sqrt{\frac{F}{60000}}}$$

Where F = Flow in gallons per day (based on 60 gpcd in Table 4-1)

4.04 INFILTRATION AND INFLOW (I/I)

A. Infiltration and inflow (I/I) is extraneous water flow that enters the sanitary sewer collection system.

1. Infiltration is water entering the sanitary sewer collection system from the ground through service connections, defective pipes, pipe joints, and manhole connections.

2. Inflow is unintentional water entering the sanitary sewer collection system from roof drains, underdrains, surface stormwater runoff, and natural drainage. Any direct connections to the sanitary sewer system shall be removed and directed to the appropriate locations.

B. 200 gallons per day per inch-diameter per mile of pipe shall be added to the peak design wastewater flow as the allowance for I/I.

C. 500 gallons per day per inch-diameter per mile of pipe located in groundwater shall be added to the peak design wastewater flow as the allowance for I/I.

D. I/I flows are not subject to a peaking factor.

4.05 HYDRAULIC DESIGN

A. The required pipe size shall be computed by Manning's Equation below:

$$Q = \frac{1.49}{n} A R^{2/3} \sqrt{S}$$

Where:

Q = Flow (cfs)
n = Manning's Coefficient of 0.013
A = Area of Flow (ft^2)
R = Hydraulic Radius (A/P)
Where: P = Wetted Perimeter
S= Slope of pipe (ft/ft)

B. All sanitary sewer collection mains shall be designed to a maximum depth of flow, depending on age.

1. Half full (d/D=0.5) for all mains constructed prior to 2022 due to historical tap locations on the mark.

2. 4/5 full (d/D=0.8) for all new development.

Where:
d = Depth of Flow
D = Diameter of Pipe

C. Minimum design velocity at peak flow shall not be less than two (2) ft/s or greater than seven (7) ft/s. Where 2 ft/s is not feasible, the minimum slope shall be 1% slope for 8" pipe.

1. Sewer shall be designed for velocities less than seven (7) ft/s whenever possible and for subcritical flows whenever possible.

2. When conditions require velocity to be greater than seven (7) feet per second, special provisions shall be made to avoid scour and protect against displacement caused by erosion or impact.

D. When lines are 10" and larger, Developer shall analyze flows for hydraulic jumps and special provisions shall be made to avoid H2S and protect against its effects.

4.06 SANITARY SEWER MAIN SIZE AND SLOPE

A. The following table shows the minimum allowable slopes per sanitary sewer main diameter. These minimum slopes may be used provided that the hydraulic design requirements in 4.05 of these Criteria are met.

TABLE 4-2: Minimum Sanitary Sewer Main Slopes (ASCE)

Pipe Diameter (in)	Minimum Slope (%)
8"	0.40%
10"	0.28%
12"	0.22%
15"	0.15%
18"	0.12%
21"	0.10%

B. The maximum slope for any sanitary sewer collection main shall be 5%

C. The City requires sanitary sewers to maintain a consistent slope throughout the sewer alignment in order to maintain capacity.

D. All proposed sanitary sewers shall maintain the same inner diameter (ID) pipe size to match the existing City collection system; no downsizing shall be allowed.

E. The City may require the Developer to install a sanitary sewer collection main larger than is needed to adequately service the development. Refer to *Section 2* of these Criteria for oversizing reimbursement.

4.07 DEPTH OF BURY

A. Sanitary sewer collection mains shall have four (4) feet minimum depth of cover from the top of pipe to finished ground surface.

B. Where grading, existing field conditions, or service constraints demonstrate that a sanitary sewer main must have less than four (4) feet of cover or when sewer main installation is deeper than twenty (20) feet at the invert, refer to section 4.10.

C. Installation of sanitary sewer mains with depths greater than twenty (20) feet at the invert shall require written approval from Water & Sewer after all reasonable effort is made to keep depths to less than twenty feet.

D. Where the elevation difference between the top of foundation and the top of the sanitary sewer collection main is less than ten (10) feet, the Construction Drawings and the plat shall indicate the lot is served by a “shallow sewer” and appropriate elevation information shall be given.

4.08 LOCATION OF SANITARY SEWER COLLECTION MAINS

A. All sanitary sewer collection mains shall be located in dedicated street right-of-ways. Any other sanitary sewer collection mains shall be in a dedicated easement of appropriate width (refer to section 2.06). City approval is required for all proposed locations.

B. The centerline of sanitary sewer collection mains shall not be placed closer than five (5) feet to the lip of the street gutter without prior acceptance by the City. The sewer collection mains centerline should avoid traffic wheel paths where feasible.

C. Sanitary sewer collection mains shall extend to the upstream extremities of the property or subdivision being served. Main extensions shall be in appropriate locations to provide adequate sanitary sewer system connections for adjacent, future developments.

1. A sanitary sewer collection main serving one (1) lot shall extend all the way across the frontage for that lot.

2. The City may grant exceptions to sanitary sewer collection main extensions if development of an adjacent property is located in a different sewer basin, or if the

property can currently connect to the sanitary sewer system. This will be determined by the City on a case by case basis.

3. Sanitary sewer mains shall be extended offsite when required to tie into the existing collection system.

D. Sanitary sewer collection mains shall be straight between manholes, both in alignment and slope.

E. Stormwater and underdrain piping shall be distinguishable by color from sanitary sewer collection mains.

4.09 SANITARY SEWER COLLECTION SYSTEM PHASED INSTALLATION AND STUBOUTS

A. Sanitary sewer collection system phasing, if proposed by the Developer, shall be clearly identified on the master utility plan. Sewer plan and profile sheets shall clearly show and label the phasing transitions in the sanitary sewer main design.

B. The phased sanitary sewer collection system shall be designed for full build out of the development being served including any additional offsite flows that must be passed through the development. Stub-out shall be designed for future development flows.

C. Phased sanitary sewer main or stub-out construction shall be extended a minimum ten (10) feet beyond phased street paving to avoid asphalt removal during excavation for future connections.

D. A stub-out for future connection shall be provided for an adjoining phase or adjacent future developments.

E. The stub-out design and installation shall maintain both vertical and horizontal alignment in accordance with these Criteria. The stub-out shall be shown on the sanitary sewer plan and profile sheets with the length and end of pipe invert labeled.

F. The end of the stub-out shall be sealed with a removable watertight plug restrained by half (1/2) a cubic yard of concrete behind the plug until the time of future connection.

G. The maximum length of a stub-out shall be forty (40) feet unless otherwise approved by the City. If the maximum stub-out length must be exceeded, the sewer main installation shall end at a terminal manhole or be extended to the next upstream manhole.

H. Sanitary sewer main stub-outs not utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

4.10 PIPE MATERIAL

A. Sanitary sewer collection mains shall be polyvinyl chloride (PVC) SDR 35 pipe suitable for sanitary sewer flows.

B. Alternative pipe materials shall only be used in the following situations:

1. Where sanitary sewer collection mains are installed less than four (4) feet from the finished ground elevation to the top of pipe, approval by Water & Sewer Department is required.

    a. The pipe material shall be PVC SDR 26 with flow fill from bottom of trench to one (1) foot above top of pipe, and the full trench width, and manhole to manhole.

2. Where sanitary sewer collection mains are installed deeper than twenty (20) feet at the invert, polyvinyl chloride (PVC) SDR 26 shall be used.

    a. For alternative pipe material installation situations, external load (earth and live load) analysis is required to verify the minimum alternative pipe material is suitable for the specific project conditions. If the alternative pipe material is unsuitable, the Design Engineer shall specify an acceptable pipe material. External pipe load calculations shall be submitted to the City for review and acceptance.

    b. The length of alternative pipe material to install shall be called out on the Construction Drawings.

C. Changes between pipe materials are not permitted along a continuous sewer main. The alternative pipe material shall be installed from manhole to manhole.

D. To allow new connections to mains that are damaged, the main shall be replaced or rehabilitated per specifications from the upstream to downstream manhole.

4.11 MANHOLE LOCATION AND SIZE

A. General

1. Manholes shall be installed at every change in direction, slope, or connection with other sanitary sewer collections mains.

2. There shall be no more than three (3) lines designed to discharge into any one manhole. This includes both main and service lines.

3. The Design Engineer shall determine if conditions require an interior protection on the manhole from microbial induced corrosion. Acceptable protections for new construction are polymer concrete, concrete with Xypex Bio-San C500 admixture, or approved HDPE manhole liner systems. Acceptable protections for existing manholes are polymer concrete liner systems or coatings. Water & Sewer Department reserves the right to require additional locations where interior coatings may be required. Locations that require interior manhole protections may include, but are not limited to:

    a. Locations where hydraulic jump may occur and the next downstream manhole.

    b. Every drop manhole and the next adjacent downstream manhole.

c. Any manhole where invert slope exceeds 5% or velocities exceed 5 ft/s or where flows change from supercritical to subcritical.

4. Buoyancy calculations shall be provided for manholes and pipes where groundwater may be encountered, has been identified in the geotechnical report, is located in the floodplain or other water sources are present. The manhole shall be sealed from the outside with an approved seal wrap, where groundwater or other water sources are present.

5. Connection and modifications of existing manholes that are constructed of bricks or show signs of damage shall be replaced or rehabilitated and coated per specifications.

B. Manhole Location

1. All manholes shall be located in dedicated street right-of-way or within a dedicated easement of appropriate width (refer to section 2.06). City approval is required for all other proposed manhole locations.

2. The center of manholes shall not be placed closer than eight (8) feet to the lip of the street gutter without prior acceptance by the City.

3. The edge of the manhole cover shall be located a minimum five (5) feet from the edge of cross pans, wherever feasible.

4. Manholes located outside of the street section shall be located in areas not subject to flooding, stormwater conveyance, ponding or detention.

a. If locating manholes in stormwater conveyance areas cannot be avoided, a solid, watertight, bolt down manhole cover with an integral rubber gasket, shall be used.

b. Manholes located within the 100-year flood plain shall have a solid, watertight, rubber gasket, bolt down manhole cover. The manhole cover and grade ring shall be bolted to the manhole cone, and all manhole joints and grade rings shall be sealed from the outside with an approved seal wrap.

c. Manholes located within groundwater or where other water sources are present, shall have all manhole joints and grade rings sealed from the outside with an approved seal wrap.

5. Manholes outside of road rights-of-way shall be provided with direct access by means of an all-weather road. All-weather road requirements are as follows:

a. All-weather roads shall be designed to support City maintenance vehicles up to thirty-five (35) tons with a minimum turning radius of sixty (60) feet.

b. At a minimum, all-weather roads shall be ten (10) feet wide with eight (8) inches of compacted aggregate base course. Subgrade preparation, compaction, and aggregate base course shall be in accordance with *SDC* construction specifications.

c. If the all-weather road is longer than fifty (50) feet and does not have a public road access from both ends, an appropriately sized turn around shall be provided.

d. The Design Engineer shall verify that these minimum requirements for the all-weather road are suitable for the specific project conditions.

e. The all-weather road shall be located in a dedicated sanitary sewer or access easement.

C. Manhole Size and Spacing

1. The following table displays the diameter of standard manholes and the maximum manhole spacing for each sanitary sewer pipe diameter:

TABLE 4-3: Standard Manhole Diameter and Spacing

Sewer Pipe Diameter (in)	Manhole Diameter (ft)	Manhole Spacing (ft)
8”	4 ft	450 ft
10”	4 ft	450 ft
12”	4 ft	550 ft
15”	5 ft	550 ft
18”	5 ft	550 ft
21”	5 ft	550 ft

2. The following table displays the diameter of inside drop manholes. Use standard manhole spacing from Table 4-3 for inside drop manhole spacing. Inside drop manhole shall only be allowed for utility conflicts and pipe sizes up to eight inches (8”). City approval is required for all other proposed inside drops.

TABLE 4-4: Inside Drop Manhole Diameter

Inside Drop Pipe Diameter (in)	Manhole Diameter (ft)
4” or 6”	4 ft
8”	5 ft

4.12 MANHOLE INVERTS

A. The minimum elevation drop across a manhole shall be one-tenth of a foot (0.1 ft) except where cast-in-place manholes are to be installed over existing sanitary sewer mains. In such cases, the existing sanitary sewer pipe grade determines the elevation drop across the manhole, by constructing the cast-in-place manhole over the existing, straight sewer main and removing the upper half of the pipe.

B. Where a smaller sanitary sewer main joins a larger one, the smaller sanitary sewer main crown elevation shall match the crown elevation of the larger sanitary sewer main. This includes sanitary sewer service lines.

C. Where the invert elevation difference between the invert in and invert out is twenty four inches (24”) or more and eight inches (8”) or smaller pipe size, an inside drop apparatus

shall be constructed. Refer to City of Greeley Standard Drawings for drop manhole construction.

D. Sanitary sewer mains and services entering a manhole with less than twenty four inches (24") but greater than six inches (6") of elevation difference between the invert in and invert out shall be avoided. If unavoidable, the invert shall have a sloping bench to prevent solids deposition.

4.13 GROUNDWATER BARRIERS

A. Groundwater barriers shall be installed across the sanitary sewer collection main, ten (10) feet upstream of every manhole, in areas where sanitary sewer collection mains are below groundwater.

B. Refer to the Standard Drawings and construction specification *Section 02315, Excavation and Fill* for additional information and installation requirements for groundwater barriers.

4.14 SANITARY SEWER MAIN AND SERVICE ENCASEMENTS

A. Refer to 3.15 of these Criteria and construction specification Section 02445, Casing Pipe – Borings and Encasements for typical sanitary sewer main and service encasement requirements.

4.15 SANITARY SEWER MAIN BORINGS

A. Refer to 3.16 of these Criteria and construction specification Section 02445, Casing Pipe – Borings and Encasements for sanitary sewer main boring requirements.

4.16 SANITARY SEWER SERVICES

A. General

1. Sanitary sewer service lines shall not be installed in trenches with dry conduits/utilities. A service line shall be separated from other conduits a minimum of five (5) feet horizontally and eighteen inches (18") vertically.

2. Sanitary sewer service lines shall not be installed in trenches with wet conduits/utilities. A service line shall be separated from other conduits a minimum of ten (10) feet horizontally and eighteen inches (18") vertically.

3. Sanitary sewer services for a given lot must be tapped on the sanitary sewer collection main within the confines of the extended property lines. The sanitary sewer service line shall be located a minimum five (5) feet inside the property being served.

4. Sanitary sewer services not utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

B. Sewer Services

1. Sanitary sewer services shall be polyvinyl chloride (PVC) SDR 35 pipe

2. Sanitary sewer services are four inches (4") or six inches (6") in diameter and shall have a minimum slope of 1% (1/8" per foot).

3. The maximum allowable slope for a sanitary sewer service is 8%.

4. If a sanitary sewer service line is required to be greater than six inches (6") in diameter, its design and connection to the existing sanitary sewer system shall be considered as a

collection main. Even though the sanitary sewer service is larger than six inches (6") in diameter, it is still considered private and maintained by the property owner.

5. A separate sanitary sewer service line must serve each structure.

6. No sanitary sewer service lines shall cross property lines.

7. Compound sanitary sewer services shall be avoided where feasible.

8. Sanitary sewer service connections at manholes shall be avoided where feasible.

9. Sanitary sewer services shall be located a minimum ten (10) feet downstream of the potable water service, wherever feasible.

10. Sanitary sewer service connections at manholes shall be avoided where feasible.

11. The sanitary sewer service line shall be electronically locatable and have tracer wire installed per *Section 02534, Sanitary Sewer Service Lines* and Standard Detail Drawings.

12. Tapping new connections to the existing sanitary sewer system shall be completed by City.

13. Sanitary sewer service connections to the sanitary sewer collection main shall be made with a tee or tapping saddle and shall be separated by at least five (5) feet along the

sewer main length, including when connections are on opposite sides of the sanitary sewer collection main.

14. Sanitary sewer service wyes are not allowed on the sanitary sewer collection main except in cul-de-sacs where a manhole or tee connection is not feasible.

15. Sanitary sewer service clean-outs are not permitted in the public right-of-way or sanitary sewer easement.

16. Sanitary sewer service connections to 15", 18" or 21" collection system interceptors or trunk lines are not permitted unless approved by the Water & Sewer Department.

4.17 SANITARY SEWER MAINS AND SERVICES IN RELATION TO OTHER UTILITIES

A. Refer to 3.18 of these Criteria and construction specification Section 02510, Water Utility Distribution Piping for sanitary sewer main and service separation in relation to other utilities requirements.

4.18 SANITARY SEWER LIFT STATIONS AND FORCE MAINS

A. All lift stations with capacities at 2,000 gallons per day (gpd) or greater are subject to Colorado Department of Health and Environment (CDPHE) Regulation 22.

B. Cost Responsibilities

1. Design and Construction

   a. The Developer shall be solely responsible for all costs associated with the design and construction of the lift station and force mains. This includes the cost of any easements, land acquisition, documents associated with permitting approval through CDPHE and North Front Range Water Quality Association (NFRWQPA), and any other cost associated with the project.

2. Reimbursement

   a. Where additional service area outside of the proposed development is anticipated, the City of Greeley will require the lift station and associated improvements to provide additional capacity than what is necessary for the initial development. Refer to Section 2.12 of this criteria for additional clarification.

3. Operations and Maintenance

   a. Public Facilities: Public lift stations are defined as any lift station serving more than one user and accepted by the Public utility. Operations and maintenance activities shall be the responsibility of the City for all public lift stations only upon completion and acceptance of the proposed improvements. The Developer shall provide an operations and maintenance manual and procedures for all equipment and processes associated with the lift station. The Developer shall coordinate with the City during

the planning and design phases on equipment operations and maintenance requirements.

b. Private Facilities: Private lift stations are defined as any lift station serving only one user. Operations and maintenance responsibilities for private lift stations are the sole responsibility of the owner or private entity.

C. Planning and Permitting

1. General

a. Gravity based solutions are preferred to lift stations as it provides the most reliable and lowest cost service for our customers. The use of a lift station and force main shall be evaluated on a case-by-case basis. If there is an appropriate gravity solution, then the developer shall design and construct the proposed improvements meeting the City of Greeley Criteria. Any lift station or force main shall first be approved by the City following proper justification by the Developer. Where a lift station is determined to be required it shall be designed to allow for an eventual connection into a gravity system.

b. The lift station and force main design shall adhere to state and regional approval processes and the Developer shall keep informed and notify the City of major milestones during the design and approval processes. The Developer shall adhere to the submittal requirements previously stated in Section 2 of these Criteria.

2. Procedures

a. The Developer shall employ the services of an engineer licensed in Colorado that has successfully designed and permitted at least two lift stations of similar size as proposed, within the State of Colorado. The Developer and the engineer shall adhere to the following procedures through the planning and design phases:

i. Coordinate a conceptual project meeting with the City to provide justification for the project and initial design considerations including site location, force main alignments, land acquisition requirements, preliminary design criteria, project schedule, and permitting requirements.

ii. Upon initial conceptual acceptance for consideration of the need for a lift station, provide written project justification for the project and design considerations including site location, force main alignments, land acquisition requirements, preliminary design criteria, project schedule, and permitting requirements.

iii. Attend follow up meeting following completion of the review of conceptual documents.

iv. It is the expectation that the developer keep the City informed of the project's progress from design through construction approval. This includes notifying the City of the major project milestones associated NFRWQPA and CDPHE review and approval process and allowing for City review of major reports and documents. Major milestones include but are not limited to:

- Site Application submittal to NFRWQPA

- Signed and approved Site Application submitted to CDPHE
- Basis of Design Report (BDR) submittal to CDPHE
- Design approval from CDPHE
- Funding requests
- Public meetings/outreach

v. Upon the City's review and acceptance of the conceptual design, the applicant may proceed with the Lift Station Site Application process in accordance with CDPHE Regulation 22.

- The Site Application shall be submitted to NFRWQPA following review and acceptance by the City
- Following NFRWQPA and local agencies approval of the Site Application, the applicant shall submit the Site Application and required counterparts in accordance with Regulation 22 to CDPHE for review and approval

vi. The Lift Station BDR shall be reviewed by the City prior to submitting the BDR to CDPHE for review and approval. The BDR shall include at least a 60 percent design package and shall only be submitted to CDPHE upon City approval of 60 percent design package.

vii. Prepare and deliver final design plans and technical specifications for the City's review and approval.

viii. Applicant shall coordinate with the City through the construction bidding process as necessary.

ix. Applicant shall coordinate construction inspections with City Inspectors.

x. Applicant shall submit all construction submittals for review including shop drawings and data and operation and maintenance manuals.

xi. Applicant shall coordinate with the City for start-up testing and required training.

xii. Applicant shall submit final record drawings to the City in AutoCAD and pdf format.

3. Colorado Department of Public Health and Environment (CDPHE)

a. The design and construction of all lift stations and force mains shall adhere to CDPHE's most recent version of Regulation 22 – Site Location and Design Approval for Domestic Wastewater Treatment Works (The City reserves the right to review all procedures and reports required under Regulation 22 and request revision if necessary. Where CDPHE's Regulation 22 and the City's Criteria differ, the more restrictive of the conditions shall apply.

4. North Front Range Water Quality Planning Association (NFRWQPA)

a. The planning and Site Application process of the proposed lift station and force main shall be in accordance with NFRWQA wastewater utility plan guidance. The applicant will be required to provide updates to the City's Wastewater Utility Plan

(WUP) for the proposed lift station and force main as part of the Site Application process.

b. The process for obtaining lift station approval from the Water Quality Control Division (WQCD) begins with the NFRWQPA (www.nfrwqpa.org). CHPHE *Regulation 22*, latest revision, requires that prior to WQCD final design review and approval, the lift station Site Application must be submitted to the NFRWQPA. Refer to the NFRWQPA website and *Regulation 22* for guidelines and requirements on the lift station site location and design approval process.

5. City of Greeley

a. The Developer shall coordinate with the following City's departments to ensure all procedures and policies are adhered to.

i. Water and Sewer Department

ii. Community Development

ii-a. Engineering Development Review

ii-b. Planning Department

ii-c. Building Inspections

iii. Other Departments as Required

6. Lift Station Design Criteria

a. Applicable Codes, Environmental Compliance, and Health and Safety

i. Applicable Codes: For work done in the City, work shall be performed in accordance with the codes established by the City's building department.

ii. Environmental Compliance: Environmental assessments and/or environmental reviews may be required as a preliminary investigation to determine if a particular parcel of real property is subject to recognized environmental constraints such as, and not limited to the following: floodplain areas, wetlands, endangered species, and hazardous conditions. Should environmental constraints exist as identified above, it is the Developer's responsibility to incorporate mitigation measures to comply with environmental requirements in accordance with applicable and current rules and regulations.

iii. Health and Safety: Public lift stations are required to conform to all City and OSHA health and safety requirements. City operation staff safety shall also be considered during the design and construction of the lift station including, but not limited to:

- Readily accessible equipment placement for maintenance activities
- Classified areas in accordance with the National Fire Protection Association (NFPA) 820 Regulations
- Lifting assistance for heavy equipment

- Nonslip floor finishes
- Handrails
- First-aid and safety equipment
- Fall protection
- Limitation of confined spaces – it is desired by the City to limit confined space entries where possible

b. Determination of Wastewater Flows

i. Existing wastewater flows shall be calculated using the calculation methods stated in Section 4.03, 4.04, and 4.05. Should the project area not fit the previously stated design flow estimation methods, applicable and industry-standard calculation methods shall be utilized. Methods include real-time flow monitoring or calculations based on land-use. Methods and calculations shall be included in relevant planning documents and subject to City's review.

ii. Proposed and future wastewater flow projections shall be estimated for the build-out conditions of the service area. Estimation methods shall be based on projected land-use. The planning period and projected land-use within the service area shall be coordinated with the City during the planning phases.

iii. Organic and other applicable wastewater constituent loadings shall be considered and evaluated based on existing and projected land-use. It is the Developer's responsibility to calculate based on most current available information, flows and constituent loadings for accessing available sewer and wastewater treatment capacities.

c. Impacts on Downstream Lift Stations or Sewer Capacities

i. Ultimate peak hour design flows shall be used to determine the impact to downstream collection system infrastructure including treatment facilities, lift stations, and sewers. Existing infrastructure needs to be able to accommodate peak flows and loadings from new lift stations and force mains. The capacity of existing infrastructure to accommodate flows from new lift stations shall be justified to the City as part of the planning and design documents.

d. Lift Station Capacity

i. Lift station capacity shall be designed to accommodate existing and future projected peak flows for the entire service area.

ii. Hydraulic calculations and system/pump curves require consideration and shall be submitted for review during the planning phases to the City of Greeley and as part of the CDPHE's approval process.

iii. Receiving sewers shall be evaluated to ensure adequate capacity to accommodate the ultimate lift station flow.

e. Emergency Storage

i. The lift station shall be designed for at least 60 minutes of emergency storage at peak hour flow conditions or as required by CDPHE. Emergency storage can utilize volume within the wet well above the high level alarm and upstream collection system piping provided that it is demonstrated that back-up will not occur into any existing or potential future service connections or taps. No future taps shall be constructed within the section of influent sewer or sewers to the lift station designated to provide emergency storage. If a piping connection is required to accommodate emergency storage provisions, the invert of the pipe connecting the wet well to emergency storage shall be above the high level alarm. Additional emergency storage may be required at the discretion of the City based on site location, emergency response time, and potential environmental concerns.

ii. Emergency storage can be accomplished using an additional storage vault structure. The emergency storage structures shall provide adequate access and floor slope for cleaning and shall be designed with pre-cast concrete, cast-in-place concrete, fiberglass reinforced plastic, or other approved equals. If constructed of concrete, adequate protection (i.e. polymer concrete or concrete admixtures) shall be provided to mitigate corrosion caused by hydrogen sulfide. If used, the emergency storage vault shall be designed to provide flow to and from the wet well to the vault and with adequate access for pumping via vacuum truck or other appropriate method.

iii. If emergency storage can be accomplished through gravity flow from the lift station to another existing collection system, the City may consider that as an option to meet emergency storage requirements. It shall be demonstrated that the gravity overflow, existing collection system, and downstream facilities be adequately sized to accept increased flow. Additionally, should the collection system be operated by another entity, a legal agreement stating the entity can and shall receive emergency flows shall be coordinated and presented to the City during the design review process.

7. Force Main Design Criteria

a. Materials and Sizing

i. Force main material shall be AWWA C900-16 with minimum wall thickness of at least DR-25. DR-18 or DR-14 shall be required if pressure or surface loading at any location in the system exceeds the DR-25 pressure rating.

ii. Force mains shall be minimum 4-inch diameter. Force mains shall be sized appropriately for a minimum fluid velocity of 2 feet per second and maximum velocity of 7.5 feet per second. Sizing shall also conform to CDPHE design requirements, whichever is most limiting. Parallel force mains are strongly preferred by the City for maintenance procedures, emergency conditions, and capacity optimization between existing and build-out flows. If parallel force mains are not considered feasible for a specific installation, it shall be demonstrated that the force main diameter is optimal for existing and build-out flow velocities.

iii. If force main diameter is such that the wastewater velocity is less than 2 feet per second at initial operating conditions, the design shall include VFDs on the pumps to allow the motors for the pump or pumps to increase frequency to increase the wastewater velocity in the force main to be a minimum of 3 feet per second for a minimum flushing time of 5 minutes. Reference the Electrical and Controls section of this criteria.

b. Access / Cleaning Stations

i. Force main clean-out access shall be provided every 500-feet in situations where the force main is 950-feet or longer. Clean-outs shall provide adequate access to allow for pipeline condition observations via video camera and maintenance.

c. Protection, Bedding and Compaction

i. Pipe bedding and backfill of force mains shall conform to the specifications in Section 02315 of these standards.

d. Force Main Alignments and Separation

i. The minimum buried depth of the force main shall be 48-inches from top of pipe.

ii. Wastewater force mains shall adhere to CDPHE and City standards for separation between potable water lines and other utilities. Wastewater force mains shall travel below existing potable water lines meeting the minimum requirements as outlined in Section 4.18. Should minimum separation requirements not be possible, refer to encasement requirements in Section 4.15 of the Criteria.

iii. Should the wastewater force main alignment be such that it cannot accommodate these separation requirements vertically or horizontally, provisions shall be provided to safeguard the existing utilities in accordance with the City design criteria and construction standards.

e. Special Permitting Requirements

i. In situations where the force main alignment crosses areas that include wetlands, floodplains, irrigation ditches, railroads, and waterways, the Developer shall be responsible for all permitting during the design phase to ensure that local and state requirements are adhered to. The Developer shall document all required permits with the City prior to proceeding with construction. In all cases, the Developer shall evaluate alternative force main alignments to minimize impact to sensitive areas described herein.

ii. Easements required for the force main alignment shall adhere to Section 2.06 of these criteria. All easements required for the force main shall be approved by the City and granted to the City prior to City of Greeley approval of construction documents.

8. Land Acquisition and Easements

   a. All land area requests for the lift station sites shall be submitted and approved by the City prior to starting the land acquisition process. Lift Stations shall be located on property deeded to the City. The minimum size for the lift station site shall allow for adequate equipment access, maintenance activities, and ancillary equipment (i.e. generator, odor control, emergency storage, etc.). In no cases shall the lift station site be less than 2,500 square feet in size. Applicant shall provide preliminary lift station site drawings showing major lift station components, security, buildings, and access for the City to review and determine required site size.

   b. Force main alignments exiting the lift station site up to the point of gravity connection shall be contained within an sewer easement and shall be dedicated to the City per Section 2.06 of this criteria.

D. Lift Station Site

1. Location and Topography

   a. The lift station and site location shall be designed and constructed to limit disturbance to the surrounding properties both aesthetically and during construction activities. The site shall allow adequate access to the site from existing public right of way. The lift station site shall be designed to provide adequate drainage away from the lift station and building and conform to City standards for drainage and storm water management plans. Developer shall perform a geotechnical evaluation of the site to determine soil conditions and hydrology as well as recommendations for lift station construction. Lift station sites shall be located outside of the FEMA 100-year floodplain with the finished floor elevation of the lift station a minimum of 2-feet above the floodplain. All lift station site locations are subject to review and approval by the City and CDPHE Regulation 22.

2. Lift Station Building / Enclosure

   a. The lift station shall be enclosed in a weatherproof structure. The lift station enclosure and lift station pumping components as a minimum shall be accessible without permitting for confined space access. As a minimum the lift station enclosure shall be ventilated and heated and conform to the City's planning and building department requirements and applicable structural and building codes. The size of the building or enclosure shall allow for adequate clearance to maintain pumping equipment, piping, valves, electrical gear and controls. The minimum spacing between pumps shall be 30 inches, spacing around pumps of 36 inches, and electrical panel clearance shall be no less than 48 inches or as required by the National Electrical Code. Building or enclosure entry ways, hatches and overhead doors shall allow for convenient access and equipment removal for maintenance and replacement. All lift station enclosures or buildings must be approved by the City

and applicable architectural committees that are associated with the subdivision or local association.

3. Aesthetics

   a. The lift station shall be subject to the City's Development Review process and applicable development standards. The lift station architecture and aesthetics shall be designed to match the surrounding structures. Landscaping shall be considered and planned to match the surrounding environment with low maintenance and water use. Appropriate screening and other methods shall be utilized to minimize noise and visual impacts.

4. Access

   a. All wastewater lift stations shall be sited to allow access by all-weather surface roads capable of accommodating maintenance trucks from public right of way to the lift station site. The access shall at a minimum support HS-20 loading with a minimum width of 15 feet. The access points and site shall be designed to allow WB-50 trucks to maneuver within the site and exit the site without backing into public right of way. The site layout shall allow for access to the wet well and vacuum/jetter truck to clean out accumulated material in the wet well. All hard or concrete surfaces shall be designed for the expected vehicle and equipment loads.

5. Security Fencing

   a. The lift station site shall contain perimeter security fencing minimum 6' in height. The fencing is subject to the City of Greeley Municipal Code and shall be reviewed and approved by the City.

   b. The lift station site access gate shall have a minimum size full width opening of 18-feet and of lockable type.

6. Lighting

   a. Lighting shall be provided at the lift station site to allow for necessary activities during night and times of low visibility. The lighting system shall be designed to provide illumination best suited for the station layout which may include suspended, wall, or ceiling mounted fixtures and shall be suitable for routine maintenance activities and inspections. Site lighting equipped with photocells shall not be

allowed. Refer to Chapter 18 of Greeley Municipal Code for more information, as applicable.

7. Potable Water

   a. The site shall have access to potable water. Potable water connection, service size, backflow device and meter shall be coordinated with the City. At a minimum, there shall be a frost proof yard hydrant located in the vicinity of the wet well.

E. Lift Station Components

1. Pumping System

   a. Each Lift Station shall have a minimum of 2 pumps. The pumps shall be designed to accommodate existing flows and future flows from fully developed contributing area. Firm capacity of the pump system shall be designed (or phased) to pump ultimate peak flow at maximum computed total dynamic head. Pump operation shall be automatic but fitted with the capability to run the system in manual control.

   b. Lift Stations shall be designed as a duplex system as a minimum. Duplex system for ultimate flow of the service area, shall be designed so that each pump is sized for peak hourly flow. The applicant shall provide a spare pump of the same capacity. Lift stations serving service areas that are phased over several years shall be designed initially as a duplex system as a minimum with room to add additional pumps for meeting the ultimate flow demands of the service area. Lift stations that are designed with more than two pumps shall be capable of pumping peak hourly flows with the largest pump out of service. The applicant shall provide a spare pump matching the size of the largest pump in service.

   c. In all cases pumping systems shall be designed to accommodate existing and build-out flows with adequate redundancy as defined by CDPHE Regulation 22 and in these criteria. If future build-out conditions require pumps (greater than 2) that are not needed for near term flow conditions, the lift station shall be designed to add additional pumps, piping, valves, electrical and controls without the need for a major system shutdown and / or bypass pumping.

   d. Pumping system shall be designed to allow for adequate access between other pumps, piping, and ancillary equipment for maintenance activities including, but not limited to, routine maintenance and inspection and pump removal.

   e. Required Pumping System Type: Above Ground Mounted Self-priming Suction

      The pumping system is self-priming suction pumps placed on grade with minimal piping to suction from the wet well. The only accepted manufacturer for the pumping system is Gorman Rupp. Pumping systems shall be site-specific designs or pre-packaged systems meeting site requirements. All designs are contingent upon review and approval by the City.

f. Alternate Pumping System

If the Developer, with approval from the City, determines above ground mounted self-priming suction pumps are insufficient for the application, the Developer can seek a variance to utilize either wet well / dry well or submersible pump configurations. The Developer must adequately prove that the alternative pump configuration is the optimal choice for the application and include evaluations between both dry-pit and submersible configurations.

i. Submersible Pumps: Where above ground mounted self-priming suction pumps are insufficient, City of Greeley will only consider submersible pumps where the ultimate build out peak hour flow rate is less than 100 gallons per minute. Where submersible pumps are approved by City of Greeley, the pumps must be removable without entering the wet well by providing rail and crane system. Control Panels and associated equipment shall be located within an enclosure of adequate size. The Developer shall provide two spare pumps to the City of Greeley.

ii. Wet Well/Dry Well: Where above ground skid mounted self-priming suction pumps are insufficient and flow rate is greater than 100 gallons per minute during peak hour flow at full build out, the lift station shall be configured to provide separate wet wells and dry wells. Common walls between wet wells and dry wells shall be water and gas tight. Suitable and safe means of access shall be provided to the dry well for operations staff, maintenance, and removal of all equipment from the dry well. Access shall include separate equipment and access hatches. Access to the dry well shall be provided through stairs. Ladder access is not allowed. Where dry wells are considered, the lift station shall be designed to ensure that surface runoff cannot enter the lift station. Where groundwater may exist above the dry well, adequate measures shall be provided to prevent infiltration of groundwater into the dry well and wet well.

g. Pumping System Components

i. Each pump shall have a dedicated check valve, plug valve, and air-relief valve on the discharge side of the pump. Pressure gauges shall be provided on both the suction and discharge (prior to the check valve) side of the pump. Pressure gauges shall be provided with a pulsation snubber constructed of 316 stainless steel and an isolation valve. It is preferred that these pump system components are supplied by the pump manufacturer if supplied as a skid-type system to ensure compatibility, performance, and single point of supply.

h. Hydraulics

i. Pumps shall be designed to accommodate existing and future flows. Pump design calculations shall be included in the design reports and subject to City review. Hydraulic calculations shall include pipe friction losses using appropriate friction coefficients and minor friction losses. Net positive suction head available ($NPSH_A$) and net positive suction head required ($NPSH_R$) shall be considered to ensure pump cavitation will not occur. Control descriptions for the pumps shall consider water levels required to maintain adequate $NPSH_A$ and $NPSH_R$.

2. Station Piping

    a. Material and sizing

        i. Station piping shall be 316 stainless steel or ductile iron pipe and sized to accommodate the necessary flow ranges. Flanged header pipe shall be ductile iron complying with ANSI/AWWA A21.51/C115 and Class 53 thickness. Flanges shall be ductile iron class 150, or as required by pumping application and pressures, and comply with ANSI B16.1. Generally, the liquid velocity in the station piping shall be no less than 3 feet per second and no greater than 7 feet per second.

        ii. All ductile iron piping shall be glass lined in accordance with ASTM B1000, use pipe suitable for glass lining with minimum Class 53 thickness.

    b. Expansion Joints/Victaulic Coupling

        i. Station piping shall include expansion joints, flanged coupling adaptors and/or grooved couplings to allow for dismantling of station piping for maintenance and parts replacement.

3. Grinders

    a. Grinders may be required, which the City will determine on a case by case basis, depending on expected flows and loading.

        i. Grinders shall be in-line only.

        ii. Accepted manufacturers are Franklin-Miller or approved equal.

        iii. All grinders are contingent upon review and approval by the City.

4. Valves

    a. Plug Valves

        i. Isolation valves shall be eccentric non-lubricated plug valves. Each pump discharge shall have a dedicated isolation valve so that each pump can be isolated from the common discharge header. Plug valves shall be of cast iron body, ASTM A126 Class B. Valve plugs shall be cast iron ASTM A126 Class B covered with a Buna-N Rubber compound. The seats are to be a corrosion resistant alloy either 316 stainless steel or nickel. Valve body shall be semi steel with flanged end connections drilled to 150 pounds, or higher as required by application pressures. Valve shall be operated with a single lever actuator providing lift, turn, and reseat action. The lever shall be equipped with a locking device to hold the plug in the desired position. Valves shall be able to pass a spherical solids not less than 3 inches diameter. Accepted manufacturers include DeZurik, Valvmatic, Milliken.

b. Check Valves (4” or more in diameter)

i. Check valves shall be swing check valves capable of passing a 3-inch spherical solid. Check valves shall meet the latest AWWA C508 standard and be of the resilient hinge check valve type. All internal hardware shall be stainless steel. Valve shall be equipped with flanged ends and be fitted with an external lever and spring. Valves shall be equipped with removable cover plate to permit entry or for complete removal of internal components without removing the valve from the line. Valve shall be rated at 175 PSI water working pressure, 350 PSI hydrostatic test pressure. For high pumping head applications (150 feet or greater), the Developer shall submit a type of check valve that will minimize hydraulic surges or slam to the system. Each pump discharge shall have a dedicated check valve. Accepted manufacturers include Val-matic, DeZurik, Victaulic, Golden Anderson.

c. Combination Air and Vacuum Valves

i. Sewage rated combination air and vacuum valves shall be placed at the discharge of pumps as close to the check valve as possible and at any local high points in the station piping. Route discharge line to sump. Accepted manufacturers include Val-matic and Golden Anderson.

5. Bypass Pumping Assembly

a. Lift Station Out of Service

i. A bypass pumping configuration shall be designed to bypass the lift station should it ever need to be taken offline. The bypass pumping configuration shall include provisions to bypass the entire lift station as well as lift station components including the wet well and pumping equipment and station piping. Bypass connections shall also be included on the common discharge header to the lift station pumps (station piping) as well as the force main (site piping) along with isolation valves. All bypass connections shall be at a minimum 6” camlock.

b. Approach Manhole

i. An approach manhole shall be constructed upstream of the wet well within the lift station site boundaries. The approach manhole shall serve as a common connection for the gravity sewer or sewers feeding the pump station and shall connect to the wet well by a single gravity pipe.

c. Wet well

i. Lift Station wet wells shall be Polymer Concrete or concrete with Xypex Bio-San C500 admixture to prevent corrosion on the interior surfaces caused by concentrated levels of H2S and other corrosive properties of raw wastewater.

ii. All wet well penetrations shall be link sealed and grouted to prohibit any leakage from the wet well or groundwater infiltration.

d. Coatings and Paintings

i. All exposed carbon steel or ductile iron surfaces, piping and equipment shall have field-applied protective painting or coating except where material (i.e. PVC, stainless steel, hot-dipped galvanized or aluminum) or factory coating warrants exception. All paint and coatings systems shall be approved by the City and shall adhere to City standards for color coding.

6. Electrical and Controls

a. Arc Flash

i. Study

i-a. Provide arc flash study on the electrical equipment per NFPA 70E.

ii. Labeling

ii-a. Provide labeling per NFPA 70E.

b. Electrical Equipment

i. All electrical control panels with controls and wiring shall be built in accordance with NEC, UL, NFPA 70E, NFPA 820 and ETL standards. The electrical components and enclosure shall be labeled as a complete UL listed assembly with manufacturer's UL label applied to the door. Developer shall coordinate with City Building Department on applicable codes.

ii. Developer shall coordinate with the City for electrical utility providing electrical service. Station shall be provided with a separate utility transformer and meter/main with ground fault protection. Primary power to the station shall be 480-volt, 60 Hz, 3-phase service per utility provider standards. Developer is required to pay permitting, design, and costs for primary power to the lift station site. Secondary power service shall be designed by a certified electrical engineer licensed in the State of Colorado. As a minimum, the station shall include service disconnect panel, automatic transfer switch (ATS), motor control center (MCC) or electrical distribution panel. The service disconnect panel shall be mounted on the exterior face of the lift station building common wall to the indoor electrical switch gear.

iii. The ATS shall be provided to switch from normal utility power to standby emergency power upon power outage and switch back to normal power once the power outage is restored. The ATS shall have indicating lights for normal power, emergency power, and a digital panel indicating volts and amps. The ATS shall be mounted inside the lift station building integral to the MCC. The ATS manufacturer shall be compatible and approved by the accepted lift station pump manufacturer, Gorman Rupp. The City's standard for standby emergency power is natural gas-powered engine generators manufactured and provided with the lift station pumps manufacturer, Gorman Rupp. If the lift station pumps are provided by a manufacturer other than Gorman Rupp, the Developer shall

provide the ATS and standby emergency power generator specifications and manufacturer for City review and approval.

iv. Electrical switchgear (480 volt) shall be mounted in a NEMA 1 MCC with removable buckets within a NEMA 3R wrapper. A step-down transformer shall be included to provide power service to a separate light or power panel rated for 120 / 240-volt service. The light or power panel is required to provide service for interior and exterior lighting, receptacles, ventilation and controls. Switchgear shall be manufactured by Cutler-Hammer, Allen Bradley, Square "D", or approved equal by the City.

v. Transient voltage suppression rated at 80 KA minimum shall be provided at the main electrical service panel and shall be installed in accordance with the latest requirements of NEC Article 285.

vi. Wiring to any instrumentation shall be multi-conductor shielded cable suitable for Class 2 low voltage controls. Must use Black and red wiring in cable for all class 2 low voltage controls.

vii. All wiring that that is running from VFD to motor shall be VFD rated cabling if shared with other VFDs.

viii. All wiring from control panels to motors shall be in liquid-tight conduit with copper conductors rated not less than 600 volts AC. All wiring shall follow NEC code and local code.

c. VFDs and Soft Start and Stop

i. All motor sizes greater than 20 HP shall be equipped with a reduced voltage solid state start and stop or also known as soft start and stop. The use of variable frequency drives (VFD) for the lift station pumps shall be evaluated on a case-by-case basis. The Developer will be required to demonstrate the advantages for installing VFDs for the ranges of pumped flows. The soft start / stop device and / or VFD shall be mounted adjacent to the MCC. Accepted manufacturers for the soft start / stop and VFD equipment shall be Allen-Bradley, Eaton or Mitsubishi.

d. Level Controls

i. The primary level control system used for the lift station to turn pumps on and off and sequence lead and lag operations shall consist of the radar level measurement type. The primary level control system shall have a minimum of five differential level set points including low liquid level, start / stop lead pump, start / stop lag pump, start / stop standby pump (if required), and high water level. The level control shall be equipped with a transmitter device and user interface screen for user set points and display of liquid level in the wet well. Contacts shall be provided for selected alarm outputs for integrating into the SCADA and telemetry system. Accepted manufacturers for level control shall be Endress Hauser or a manufacturer approved by the City.

ii. In addition to the primary level control system, the lift station shall be equipped with a secondary level control system for back-up. The secondary level control

shall consist of electro-mechanical float switches for low water cut-off, pump on / off, and high-water alarm. Accepted manufacturers for float switches shall be Siemens Water Technologies Model 9G-EF or approved equal.

iii. The secondary level control system would be based on a PID loop and use wet well levels to modulate the VFD speed.

e. Lift Station Control Systems

i. Controls shall provide automatic reset of alarm conditions for normal power fail, high water level, standby pump run, and a common alarm contact. However, alarm conditions shall activate an alarm light that is mounted at the roof line of the lift station building or enclosure. Any pump alarm conditions shall require manual reset and SCADA reset. All lift station alarm outputs shall be transmitted via telemetry system to on-call City operation staff and master SCADA control center.

ii. The lift station PLC shall be an Allen Bradley CompactLogix 5069-L320ER. Alternative PLC's must be approved by the City.

7. Control Panel

a. Each control panel shall contain adequate surge protective devices.

b. The PLC control panel shall be sized to adequately contain all PLC and communication equipment and rated for NEMA 4X/12 enclosure.

8. Human Machine Interface (HMI)

a. Redlion G15C1100

b. HMI program shall be unlocked and copy of program given to City of Greeley I&C department after commissioning of Control Panel.

9. PLC (Programmable Logic Controller)

a. Allen Bradley Studio 5000 Platform

b. Compactlogix or Controllogix Series

c. IO check to be done after completion of control panel being installed.

d. Each PLC shall have a minimum of a 2-hour uninterrupted power supply (UPS).

e. Program shall be unlocked and copy of program given to City of Greeley I&C department after commissioning of PLC.

10. Instrumentation

a. Vibration Sensor must be provided on each motor.

i. Acceptable Manufacturer

i-a. Allen Bradley

i-b. Banner

b. Radar

i. Must install one radar to read the level of the wetwell and also backup floats

ii. Only acceptable manufacturer is Endress Hauser

c. Backup Floats

i. Must be approved by the City.

d. Discharge Flow Meters

i. Acceptable Flow Meter Manufacturers

i-a. Endress Hauser

i-b. Rosemount

i-c. Must have an approved vendor do a start up on the flow meter.

ii. Communication

ii-a. Ethernet IP

ii-b. Modbus TCP

iii. Flow totals must come from the meter and not be calculated in the PLC.

iv. The flow meter shall be fitted with grounding rings as required with 150 pound flanged connections.

b. Upstream Flow Meters

i. Acceptable Flow Meter Manufacturers

i-a. ISCO or approved equal

i-b. It will need to have a Tienet box in the manhole.

i-c. Must have an approved vendor do a start up on the flow meter.

i-d. Manufacture: Isco Tienet 360 LaserFlow. Signature Laser flow meter transmitter.

ii. Communication

ii-a. Ethernet IP

ii-b. Modbus RTU

11. Programming

a. Alarms

   i. Contact City of Greeley I&C Department for list.

b. Trending

   i. All analog signals

c. PLC (Programmable Logic Controller)

   i. Communication

      i-a. PLC to PLC messaging must be done through Ethernet.

      i-b. PLC to VFD communication must be done through Ethernet.

d. HMI/SCADA

   i. Status Colors

   ii. Motor Status

      ii-a. Green - Running in Auto

      ii-b. Red – Off

      ii-c. Yellow – Running in Hand or Manual

      ii-d. Red flashing - Faulted

e. Back-up Power Supply

   i. Back-up power shall be supplied at the lift station to power the pumps and ancillary equipment in the event of a power outage. The back-up power system shall be natural gas powered. The Gorman Rupp standby engine system is preferred, and the Developer shall determine if that system is suitable for the application. Other back-up power systems will be considered if application is not suitable for the Gorman Rupp system. If not provided by Gorman Rupp, alternate back-up power system will be evaluated and approved by the City on a case-by-case basis. The City's preference for alternate back-up power systems is Cummins for both the generator and ATS.

f. Telemetry and SCADA

   i. The Remote Telemetry Unit (RTU) shall communicate by way of Ethernet or Allen Bradley Ethernet. Use approved City of Greeley radio system. Programming of SCADA system must be done by an approved and qualified contractor.

   ii. Provide 40-foot pole for SCADA radio, which can be integrated into light pole.

   iii. Required Data and Inputs in SCADA

iii-a. Intrusion alarm

iii-b. Wetwell Level - Floats

iii-c. Wetwell Level - Radar

iii-d. Wetwell Low Level activated

iii-e. Wetwell High Level activated

iii-f. VFD Running Amps from VFD or Softstart

iii-g. Flow (gpm)

iii-h. Flow Totalization - must be the totalizer from flow meter

iii-i. Flow total from yesterday

iii-j. Pump motor status

iii-k. Softstart or VFD status “"Faulted”

iii-l. Softstart or VFD status on/off

iii-m. Power Fail

iii-n. Amperage for each pump

iii-o. VFD status on/off

iii-p. VFD speed (Hz)

iii-q. VFD Reference

iii-r. Station common alarm

iii-s. Generator Running

iii-t. Generator Switch in Normal or Emergency

iii-u. Generator common alarm

iii-v. Runtime for each pump

iii-w. Pump starts

iii-x. Control Panel Temperature

iii-y. Pump Selector Switches status

iii-z. H2S Monitoring System in wetwell or discharge manhole

iii-aa. Calculated Inflow (gpm)

iii-bb. Flood Alarm

iii-cc. Phase Monitor power status

iii-dd. Generator battery voltage

iii-ee. Vibration sensors on motors

iii-ff. Building or Vault temperature

g. Alternate Communication

i. Provide an option to install fiber from Lift Station to closest City of Greeley fiber pull box.

ii. Must use a City of Greeley approved vendor.

h. H2S Monitoring Systems in Wet well or discharge manhole

i. The City may require that the Developer design and install H2S monitoring and mitigation in the manhole the force main discharges into. Factors that may require H2S monitoring in the manhole include pump flow, force main length and location of the discharge manhole.

12. Mechanical

a. Ventilation

i. Adequate ventilation shall be designed in buildings and vaults as required and adhere to all applicable State, NFPA, and OSHA requirements. Ventilating system shall consist of electric or natural gas make-up air units sized to provide a minimum of 6 air changes per hour and shall automatically begin operation upon user selected indoor temperature settings for both summer and winter modes. Supplemental cooling and heating will be required if building temperatures exceed 85 degrees Fahrenheit (F) or fall below 55 degrees F. Ventilation shall be accomplished by the introduction of fresh air in the station and be filtered to remove debris and minimize particles. Ventilation fans shall automatically come on upon entry of the lift station enclosure or building or activated by the light switch adjacent to the entry door.

ii. In addition to the make-up air ventilation system, supplemental heat shall be required using electric or natural gas unit heaters to maintain a minimum temperature of 55 degrees F. Unit heaters shall be automatically controlled thermostatically. Heating systems shall be designed based on an outside ambient temperature of negative 20 degrees F.

b. Air Conditioning

i. Air conditioning shall be provided if ventilation system cannot ensure inside air temperate of below 85 degrees F within a reasonable time period of ventilating.

Cooling systems shall be designed based on an outside ambient temperature of 105 degrees F.

c. Drains

iii. Lift station enclosures or buildings shall contain no floor drains that connect to the wet well. The enclosure at the level the pumps are located shall include a trench drain which slopes to a sump pit equipped with a duplex submersible sump pump system controlled with weighted float level switches. The sump pump system shall discharge to the top of the wet well with an air gap. The pump system shall be sized based on expected drain flows such as air release valves, maintenance, etc. Each sump pump discharge shall contain a check valve and isolation valve along with a pump removal system. The sump pump system shall be connected to the back-up or emergency power system.

iv. Pumps shall be equipped with drains that flow via gravity to the wet well for evacuating wastewater during maintenance.

v. The lift station site shall be equipped with a perimeter drain if recommended from the geotechnical study.

13. Odor Control and H2S Generation

a. The lift station shall be evaluated for the odor mitigation system and final determination of implementing odor control measures will be reviewed and determined by the City. Supporting data, calculations, or assumptions for hydrogen sulfide generation based on estimated wastewater characteristics and industry standards shall be included in the evaluation. In the absence of supporting data and / or calculations, the Developer shall utilize the latest edition of "Metcalf and Eddy Wastewater Engineering Treatment and Resource Recovery" for medium strength sulfide concentrations in wastewater. Other factors to consider in the evaluation include but are not limited to:

- Proximity to and use of neighboring properties
- Wastewater composition (BOD5, COD, TSS, Sulfides, TKN, Ammonia-N)
- Wind direction and downwind properties
- Operation and maintenance requirements of odor control system

b. If odor control is determined necessary, the type of system shall be selected based on the site-specific needs of the lift station. All ancillary equipment and necessary provisions shall be incorporated into the design of the lift station to provide a functional system. Odor control systems may include but are not limited to the following mitigation technologies:

- Carbon absorption systems
- Biological scrubber or filter
- Chemical scrubber

c. If odor control is not required, provisions for future addition of odor control facilities (i.e., installation of ventilation ducts and penetration into the wet well for future connections) shall be provided.

14. Force Main Components

a. Connection to Existing Gravity Sewer and Discharge Manhole

i. Force mains shall connect to a gravity wastewater system at a manhole, or a structure designed to receive pumped wastewater. At a minimum the discharge manhole and the next two downstream manholes shall be polymer concrete, concrete with Xypex Bio-San C500 admixture, or approved HDPE manhole liner systems. The force main discharge shall be designed to minimize turbulence and scour within the connecting structure. The City will determine on a case by case whether odor control is required at the receiving structure.

b. Isolation Valves

i. It is desired by the City to design the force main to limit required valves along the force main alignment. High points and low points shall be minimized along the pipe alignment.

ii. If required, isolation valves shall be plug valve type. All direct buried plug valves shall normally remain open (with exception of bypass connection and isolation valves) and be installed with a valve box and lid. Accepted manufacturers include DeZurik, Valvmatic, Milliken

c. Air and Vacuum Relief Valves

i. High points and low points shall be minimized along the pipe alignment.

ii. Air relief valves shall be provided on ultimate and local high points throughout the force main alignments. All air relief valves shall be located in an access manhole or vault appropriately sized for the application and maintenance staff access. Air and vacuum relief valves shall be minimized along the pipe alignment and must be approved by City.

d. Fittings

i. Piping shall be PVC or ductile iron and sized to match the force main size.

i-a. PVC force main material shall be in accordance with AWWA C900-16 with minimum wall thickness of at least DR-25. DR-18 or DR-14 shall be required if pressure or surface loading at any location in the system exceeds the DR-25 pressure rating.

i-b. All ductile iron piping shall be glass lined in accordance with ASTM B1000, use pipe suitable for glass lining with minimum Class 53 thickness.

15. Testing and Start-up

    a. Lift Stations

        i. The Developer shall develop a plan to test and demonstrate successful and flawless performance of all equipment and components of the lift station in manual and automatic mode. The start-up and testing plan shall be submitted to the City for review prior to commencing the start-up. A factory representative for the pumps and controls and City I&C and Operations representatives shall be on site for the start-up operations.

    b. Force Mains

        i. Force mains shall undergo hydrostatic pressure testing for at least two hours at two times the working pressure. Test results shall be documented and demonstrate holding pressure within the criteria and specifications described in the City's Design Criteria and Construction Specifications (see Section 01713 Water Distribution System Testing for requirements).

16. Operation and Maintenance Procedures and Warranties

    a. Operations and Maintenance

        i. The Developer shall supply the Water and Sewer Department with two (2) complete sets of operation and maintenance instructions, shop drawings, and pump curves. An electronic set on a thumb drive shall also be submitted. Developer and/or manufacturer shall provide one half day training on operations of the lift station for City Staff.

        ii. Operation and maintenance instructions shall be specific to the equipment installed. All non-relevant reference material shall be removed or clearly crossed out using heavy red line.

        iii. All emergency power generation equipment shall have operation and maintenance instructions. Must provide training for operations and maintenance staff. Contractors to verify that generator alarms work in SCADA.

    b. Warranties

        i. A two (2) year warranty shall be provided for the lift station system including performance, materials, and installation.

        ii. The date of substantial completion shall be specifically determined, in writing, for the lift station system.

        iii. Any warranties associated with the lift station shall be transferred to the City after final acceptance and construction is complete.

17. Standard Details

    a. Flow Schematic

    b. Below Grade Lift Station

    c. Above Grade Lift Station

    d. Bypass Pumping Detail

SECTION 5

NON-POTABLE IRRIGATION SYSTEM DESIGN CRITERIA

5.01 GENERAL

The City of Greeley (City) uses non-potable (untreated) water to irrigate both public and private property throughout the City. The City has a network of irrigation ditches for supplying source water for irrigation purposes. The typical irrigation system arrangement is a "hub-and-spoke" layout where irrigation water is diverted from an irrigation ditch to an irrigation water storage pond and then pumped to the distribution system to provide sufficient pressure and capacity to serve many customers. Another arrangement specifically for a small irrigation system is a direct connection between the ditch and pump station excluding the storage pond. The goal of the City is to expand the non-potable water system and reduce the use of potable water for irrigation purposes and improve irrigation practices, which is key to the City's long-term water conservation plan.

The purpose of this section is to provide information for the design and configuration of a non-potable irrigation system. Non-potable irrigation system design shall align with the City of Greeley's *Non-Potable Water Master Plan* (Master Plan), latest revision. The City of Greeley Water and Sewer Director reserves the right to make final determinations of the system design based on the best interest of the City's system. Refer to standard detail drawings for additional design information.

This section is not intended to be inclusive of all situations and the Design Engineer may be required to use additional engineering judgment to meet the overall design intent for constructability and long-term operations and maintenance.

The Design Engineer shall meet with Engineering Development Review (EDR) and Water and Sewer (W&S) Departments to discuss how new developments fit into the City's overall Non-Potable Water Master Plan to provide non-potable irrigation service at acceptable pressures in both new and existing areas.

The Master Plan shows proposed service area boundaries and conversion areas. These service area boundaries are subject to change during the planning phase based on property boundaries, non-potable water supplies, planned conversion areas, existing system capacities, and other factors. Final service area boundaries shall be determined by the Water & Sewer Department.

The City has the right to oversize the irrigation system to serve customers outside the development's improvements limits. The City will reimburse the developer for oversizing based on Section 2.12 of these Criteria.

The Design Engineer shall also meet with the ditch company from where the raw water is being diverted. The City will assist in coordinating the meeting and have a City representative present. The purpose of this meeting is to discuss the diversion requirements such as check structures,

head gates, and flow measurement, and determine if there is sufficient capacity within the ditch to serve the new Non-potable Irrigation System.

The non-potable irrigation storage pond and pump station facility shall be located on property deeded to the City. The raw water supply line and its appurtenances between the water source (i.e. ditch) and the storage pond shall be within a utility easement dedicated to the City.

The Design Engineer shall provide supporting calculations, design methodologies, and references documentation used to establish the design parameters. All information shall be included in the Non-Potable Irrigation System Design Report. Refer to Section 2.08 of these Criteria for Non-Potable Irrigation System Design Report requirements and formatting.

The Non-Potable Irrigation System Design Report shall be stamped and certified by a Professional Engineer registered in the state of Colorado. The design report shall verify that the proposed non-potable irrigation system can provide the required irrigation demands for the service area, at an acceptable pressure, and meet the overall non-potable irrigation system design requirements set forth in these Criteria.

The City of Greeley Water and Sewer Director reserves the right to make final determinations of the system design based on the best interest of the City's system.

5.02 DEFINITIONS

A. Non-potable Irrigation System – The non-potable irrigation system consists of (1) ditch headgate and appurtenances to divert flows, (2) raw water supply line and appurtenances between the water source and storage pond, (3) storage pond, (4) pump station facility, and (5) distribution mains and appurtenances.

B. Non-potable Irrigation Main - A pressurized pipeline that conveys non-potable water to individual non-potable irrigation services.

C. Non-potable Irrigation Services – Non-potable irrigation services include all piping, fittings, and appurtenances used to convey non-potable water from the irrigation main to the consumer.

D. Air Gap – A method of backflow prevention defined as the unobstructed, physical distance of two (2) feet minimum of free atmosphere between the discharge point of a potable water supply line and the highest level of the irrigation storage pond or the FEMA 100-year floodplain, whichever is greater.

E. Reduced Pressure Zone (RPZ) Backflow Preventer – A device that can be connected to a potable water system to supply water to a non-potable water system and protect the potable

water system from backflow contamination. The device consists of two check valves with a pressure vacuum breaker in the middle. This devise can be used in lieu of an Air Gap.

F. Shoulder month/season – The periods in early spring and late fall where non-potable customers require some irrigation water, but the agricultural ditches are not operational, occasionally resulting in the non-potable water system being supplied by potable water.

G. Shoulder tap – A connection from the potable water distribution system to the non-potable water system to provide water for irrigation purposes during the early spring and late fall shoulder months.

H. Service Area – The general geographic area that is served by or expected to be served by an individual non-potable irrigation supply system.

I. Conversion Area – A previously developed parcel that is currently irrigated by potable water but may consider switching to non-potable irrigation in the future; the amount of irrigated area for this type of customer is typically known.

5.03 DESIGN FLOW

A. The non-potable irrigation system shall be designed to transport peak season irrigation demands in accordance with these Criteria.

B. All irrigation demands used in the design of non-potable irrigation systems are subject to approval by the City.

C. Pump Station Design Capacity

1. The non-potable irrigation demand criteria presented below are the minimum criteria and the City reserves the right to modify the criteria, at any time, for the design of specific projects. The non-potable irrigation application rates includes provisions for evapotranspiration and operational efficiency losses in the non-potable irrigation system.

2. The City's goal is to minimize the size of the pump station by having a balanced system. A balanced system is where half the irrigable areas within a service area are being irrigated on any given irrigation day. Refer to Section 6 *Landscape Irrigation Criteria* for additional information regarding irrigating operational requirements.

   a. Weekly Irrigation Application Rates:

      i. Bluegrass turf, arborvitae, willows = 1.9 inches/week

      ii. Tall Fescue, columbine, potentilla purple coneflower = 1.6 inches/week

      iii. Buffalograss turf, sedums, succulents, iris, penstemon = 0.9 inches/week

      iv. Native grasses, yarrow, rabbitbrush = 0.2 inches/week

b. Daily Watering Window = 8 hours

c. Irrigation Days/Week = 6 days (Monday through Saturday)

i. Single family residential may irrigate up to three (3) days per week on their assigned days.

ii. All other areas including, but not limited to civic and open spaces, common areas for all customer classes, right-of-ways, municipal buildings, multi-family residential, and non-residential areas may irrigate 6 days per week (Monday through Saturday) with half of the area being irrigated on any given irrigation day.

3. Sizing the design capacity of a pump station shall be based on the following equation:

$$\sum Q_{i,ii,iii,iv} = \frac{a}{b} \, x \, \frac{c}{d} \, x \, \frac{e}{f \, x \, g}$$

Where:

Q = Pump Station Design Capacity (gpm)

a = Irrigation Application Rate (inches/week)

b = Number of Irrigation Days per Week (days/week)

c = Total Irrigable Area (acres)

d = 12 inches/foot (conversion factor)

e = 325,829 gallons/acre-foot (conversion factor)

f = Daily Watering Window (hours/day)

g = 60 minutes/hour (conversion factor)

5.04 HYDRAULIC DESIGN

A. Raw Water Supply Pipe

1. The design flow shall be based on the time it takes to replace two (2) full days' worth of storage over a 24 hour period.

2. Pipe size shall be computed by Manning's Equation up to a maximum 80% full and friction coefficient of 0.015, but shall not be less than 12-inches in diameter.

B. Pump Station Intake Pipe

1. The design flow shall be based on the Pump Station Design Capacity.

2. Pipe diameter shall be based on a maximum velocity of 1.0 feet per second (fps) when the pipe is flowing full, but shall not be less than 24-inches in diameter.

3. The intake pipe shall be equipped with a passive intake screen. Refer to 5.21 of these Criteria for additional information.

C. Distribution System

1. Distribution System Pressure

a. For new developments with no conversion areas within the non-potable pump station's service area, the non-potable irrigation pump station and distribution system within the service area shall be designed for a maximum pressure of 125 psi and a working pressure range of 70 - 100 psi at high points and the furthest service point of application.

b. For new developments that include conversion areas within the service area, the Design Engineer shall consider potable water system pressures based on fire hydrant static pressures provided by the City when sizing the pump station and distribution system. Static pressures that exceed 90 psi shall be brought to the W&S Department's attention.

2. Friction Coefficient

a. Non-potable irrigation lines shall be designed using a Hazen-Williams friction coefficient "C" equal to 120.

3. Velocity

a. All pipes shall be sized for maximum water velocity of no greater than five (5) feet per second (fps) at peak flow.

4. The minimum size of non-potable irrigation mains shall be six-inches (6") in diameter.

5.05 DEPTH OF BURY

A. The minimum depth of cover shall be four (4) feet and the maximum depth of cover shall be six (6) feet for non-potable irrigation mains.

B. When design or constructability constraints are present, deeper or shallower main installation may be permitted only with acceptance from the City. Additional design and installation considerations may be required by the City depending on the situation.

5.06 CONNECTIONS TO THE EXISTING NON-POTABLE IRRIGATION SYSTEM

A. Connections to the existing non-potable irrigation system shall be in accordance with the *Construction Specifications, Section 02510, Water Utility Distribution Piping*.

5.07 LOCATION AND LOOPING OF NON-POTABLE IRRIGATION MAINS

A. All non-potable irrigation mains shall be located in dedicated street right-of-way or within a dedicated easement of appropriate width. City approval is required for all other proposed non-potable irrigation main locations.

B. The centerline of non-potable irrigation mains shall not be placed closer than three (3) feet

to the inner edge of concrete gutter without prior acceptance by the City.

C. A non-potable irrigation main serving one (1) lot shall extend all the way across the frontage for that lot.

D. Non-potable irrigation mains shall extend to the extremities of the property or the subdivision served. Extensions shall be in appropriate locations to provide adequate connections.

E. The City shall determine on a case by case basis if non-potable irrigation system looping is required for a development.

5.08 NON-POTABLE IRRIGATION SYSTEM PHASED INSTALLATION AND STUBOUTS

A. Non-potable irrigation system phased installation and stubouts shall be in accordance with Section 3.10 of these Criteria.

B. Locate temporary blowoff assemblies at the end of each phase or stubout.

5.09 PIPE MATERIAL

A. PVC: AWWA C900-16 DR 18 (235 PSI) polyvinyl chloride (PVC) pressure pipe, purple color for direct buried applications only. Refer to construction specification *Section 02513, for Polyvinyl Chloride Pressure Pipe* for additional information.

B. DIP:

1. ANSI/AWWA C151/A21.51 ductile iron pipe with mechanical joints for direct buried applications only. Refer to Section 3.11 C. of these Criteria for corrosion protection requirements.

2. ANSI/AWWA C115/A21.88 flanged ductile iron pipe with flat faced flanges for exposed applications only.

3. Refer to construction specification *Section 02512, for Ductile Iron Pipe* for pipe additional information.

C. Steel: AWWA C200 steel pipe for both direct bury and exposed applications. Design Engineer shall determine required thickness for each application. The Design Engineer shall submit proposed interior and exterior coatings for City review and approval.

5.10 VALVES

A. All valves shall be located in dedicated street right-of-way or within a dedicated easement of appropriate width. City approval is required for all other proposed valve locations.

B. Gate Valves

1. Gate valves shall be installed in accordance with Section 3.12 of these Criteria and *W&S Standard Drawings*, latest revision.

2. All non-potable water line valves located in paved areas shall have a concrete collar

around the valve box in accordance with *W&S Standard Drawings*, latest revision.

3. Refer to construction specification *Section 02515, Water Utility Distribution Valves* for gate valve requirements.

C. Air/Vacuum Valves

1. Air/Vacuum Valves shall be installed at all high points along the non-potable irrigation main and shall be properly sized by the Design Engineer in accordance with the manufacturer's recommendation. The City shall have final determination on valve size and placement. NOTE: It is the City's preference that the number of high points within the pipeline be minimized.

2. Refer to construction specification *Section 02515, Water Utility Distribution Valves* for Air/Vacuum valve requirements.

3. Reference *W&S Standard Drawings* for installation requirements.

D. Non-potable Blowoffs

1. Non-potable blowoffs shall be installed at the end of all non-potable irrigation mains. The City may also require that non-potable blowoffs be located at low points within the system.

2. Reference *W&S Standard Drawings* for installation requirements.

5.11 PIPE ALIGNMENT

A. The curved pipe alignment design requirements for non-potable irrigation mains shall be in accordance with Section 3.13 of these Criteria.

5.12 THRUST BLOCKING AND PIPE RESTRAINT

A. Thrust blocking and pipe restraint requirements for non-potable irrigation mains shall be in accordance with Section 3.14 of these Criteria.

5.13 NON-POTABLE IRRIGATION MAIN AND SERVICE ENCASEMENTS

A. Refer to Section 3.15 of these Criteria and construction specification Section 02445, Casing Pipe – Borings and Encasements for typical non-potable irrigation main and service encasement requirements.

5.14 NON-POTABLE IRRIGATION MAIN BORINGS

A. Refer to section 3.16 of these Criteria and construction specification Section 02445, Casing Pipe – Borings and Encasements for non-potable irrigation main boring requirements.

5.15 NON-POTABLE IRRIGATION SERVICES

A. General

1. Non-potable irrigation service lines shall not be installed in trenches with other

conduits/utilities.

2. There shall be no physical connections between the non-potable irrigation system and the potable water system unless an approved backflow device is used to prevent non-potable water from entering the potable water system (i.e. RPZ device).

3. Non-potable irrigation services not utilized shall be abandoned. Refer to appendix section *A3 – Policies Impacting Design and Construction* for abandonment procedures.

B. Irrigation Services

1. Non-potable irrigation services 3/4" to 2" in diameter shall be crosslinked PEXa in accordance with AWWA C904 with acceptable manufacturers is Municipex®, Uponor AquaPEX®, or approved equal.

2. The non-potable irrigation service for a given lot must be tapped on the non-potable irrigation main within the confines of the extended property lines unless excepted by the City for the irrigation of multiple outlots under single ownership. Refer to appendix section *A2 – Compound Tap Exemption Policy for Irrigation of Multiple Outlots.* Otherwise, irrigation systems from a single non-potable irrigation service shall only be allowed for use on that single property. Refer to *City of Greeley Charter and Code, Title 14: Public Services*, Section 14.04.200 for compound tap restrictions.

3. Non-potable irrigation services shall not be located under driveways, trees, or other permanent structure.

4. Non-potable irrigation services shall be located a minimum three (3) feet inside the property being served.

5. Non-potable irrigation service taps shall be separated by at least two (2) feet, measured along the non-potable irrigation main length, including when taps are on opposite sides of the non-potable irrigation main. Non-potable irrigation service taps shall also be a minimum two (2) feet from all joints, fittings, or valves.

6. The corporation stop, curbstop, meter, the service line between the corporation stop and the meter, and five (5) feet past the meter shall all have the same equivalent inside pipe diameter.

7. Non-potable irrigation shutoff valves (curb stops and gate valves) shall be placed within one (1) foot of the property line or easement boundary (inside or outside).

8. Non-potable irrigation meter vaults pits/vaults shall normally be located after the curbstop in a landscaped area or streetscape. Meter pits/vaults shall not be installed in any street, parking area, driveway, or sidewalk unless otherwise approved by the City. If a meter pit/vault is permitted by the Water & Sewer Department to be located in any traffic area, the pit/vault shall be designed to withstand HS-20 traffic loadings. Curbstops with tracer wire test stations shall be in a valve box.. See *W&S Standard Drawings* for additional service and meter installation requirements.

9. There shall be no major landscaping (i.e. boulders, and trees, or shrubs with mature growth greater than three (3) feet), and buildings, or other permanent structures within

ten (10) feet of the meter vault.

10. Pressure boosters are allowed if required. Booster pumps must be prefabricated units with variable speed controls. Provide submittal cut sheets for City approval prior to ordering booster pump.

5.16 NON-POTABLE IRRIGATION MAINS AND SERVICES IN RELATION TO OTHER UTILITIES

A. Non-potable irrigation mains and services shall have a minimum eighteen-inch (18") vertical separation and minimum five (5) feet horizontal separation or twice the depth of the invert of the pipe, whichever is greater from all utilities measured from outside diameter.

B. Where non-potable irrigation lines cross above or below potable water lines with less than eighteen-inch (18") clearance, pipe encasement shall be designed and constructed so as to protect the potable water line. Note: It is the City's preference to have non-potable waterlines located below potable water lines.

C. Non-potable irrigation main crossings under any open irrigation ditch shall have a minimum five (5) feet of cover and shall be encased.

D. Dry utility crossings shall be encased in high density polyethylene (HDPE) pipe, Standard Dimension Ratio (SDR) 11 from edge to edge of the easement or right-of-way, or ten (10) feet on either side of the non-potable irrigation main, whichever is greater. Perpendicular utility crossings are permitted above and below the non-potable irrigation main. Parallel installation of other utilities in non-potable irrigation easements is not permitted.

E. Bored utility crossings shall have a minimum twenty-four inches (24") of vertical clearance from the outside diameter of the utility casing to the outside diameter of the non-potable irrigation line if the bored utility crosses above or below the non-potable irrigation line.

F. If there are horizontal or vertical clearance conflicts between the non-potable irrigation line and a utility, the City may require that the non-potable irrigation main be lowered, raised, or realigned in order to maintain the required clearances.

G. For a non-potable irrigation line crossing situation not specifically mentioned in this section, the crossing requirements provided in these Criteria shall be applied to that particular situation to the best extent possible.

5.17 UNDERGROUND MARKING AND IDENTIFICATION

A. Underground un-detectable marking tape shall be installed 18-inches above non-potable irrigation mains.

B. Reference construction specification Section 02315, Excavation and Fill for Marking Tape Requirements.

5.18 NON-POTABLE IRRIGATION WATER STORAGE FACILITIES (PONDS)

A. General

1. All water to be stored in the non-potable irrigation pond and the pond location shall be approved by the Water and Sewer Department prior to proceeding with facility design.

2. Combining non-potable irrigation storage with storm water detention requires approval by both the Water and Sewer Department and Public Works Department Storm Water Division. A written explanation shall be submitted describing the circumstance as to why a combined pond is needed.

3. The Design Engineer shall determine the high and low operating levels, required design storage volume, and the invert elevation of the pump station intake pipe.

4. The Design Engineer shall design a gravity flow raw water supply pipe from the water source (i.e. ditch) to the irrigation storage pond.

5. There shall be no major landscaping (trees, shrubs) with mature height greater than three (3) feet planted within ten (10) feet of the liner anchor trench.

B. Storage Volume Design

1. Non-potable irrigation ponds shall be sized to accommodate a minimum four (4) days of supply based on the Pump Station Design Capacity. The four day supply volume shall not include the dead storage.

2. Dead storage shall be based on the water level that limits the wet well inflow below 75% of the Pump Station Design Capacity. For example, if the Pump Station Design Capacity is 1,000 gpm, the dead storage begins when the inflow is less than 750 gpm.

3. A minimum freeboard of 12-inches shall be provided for storage ponds not combined with storm water and 18-inches for combined storage ponds.

4. Minimum usable storage volume of an irrigation storage pond shall be based on the following equation:

$$V = \frac{Q \; x \; a \; x \; b \; x \; c}{d}$$

Where:

V = Total Useable Storage Volume (acre-feet)

Q = Pump Station Design Capacity (gpm)

a = Daily Watering Window = 8 hours/day

b = 60 minutes/hour (Conversion Factor)

c = Days of Storage (days) = 4 minimum

d = 325,829 gallons/acre-foot (Conversion Factor)

5. The minimum depth of the pond shall be 8-feet from the full pond surface level to the bottom.

6. Pond side slopes shall include a 4:1 safety bench for 12-feet horizontally and 3:1 slope thereafter to achieve maximum depth of pond. If steeper side slopes are required to meet storage volume requirements due to site constraints, then fencing must be installed around the pond for safety purposes. Fencing materials must match architectural components of development or HOA fencing requirements.

7. The non-potable irrigation pond shall be designed with either an overflow spillway if topography allows or an overflow structure hydraulically connected to storm sewer.

    a. Spillway or overflow structure shall be designed to convey a minimum of 150% of the pond fill rate based on 5.04 A. 1. of these Design Criteria.

    b. The Design Engineer shall provide necessary design information and construction details on the Construction Drawing for the irrigation pond overflow/spillway.

8. If the non-potable irrigation pond is intended to also function as a stormwater detention facility, with approval from the City, the Design Engineer shall include the additional detention storage volume over and above that required for irrigation operations. Refer to the *SDDC*, for stormwater detention pond design requirements. In addition, the irrigation source water flow shall be measured and recorded. Refer to 5.22 of these Criteria for additional information.

C. Non-Potable Irrigation Pond Liner

1. All non-potable irrigation ponds shall be designed with an approved liner system. Field conditions, constructability, storage volume fluctuations, costs, warranty, and operation and maintenance shall be considered in the selection and design of the pond liner system.

2. Approved pond liner materials are listed in Section 02666 Pond Liners. A layer of 10 oz/sy. geotextile must be included on top and bottom of pond liner material for protection purposes.

3. The Design Engineer may specify a pond liner alternative depending on the project conditions. The alternative pond liner system is subject to approval by the City.

4. Lining installation in areas where groundwater pressure can occur shall be avoided. The bottom of the liner shall be above the water table to prevent the liner from floating.

5. Additional Pond Liner Information:

    a. Site structures such as piping, concrete, and drains shall be completed prior to lining installation.

    b. The design and construction requirements for special liner installations such as anchor trenches, pipe protrusions through the liner, liner vents, batten attachments to concrete structures, seaming methods/testing, subgrade preparation, and cover treatment over the liner shall be in accordance with the manufacturer's specifications and the design shall ensure that the liner warranty is not invalidated. Coordination with and approval by the liner manufacturer is required. The proposed special liner installation details are subject to approval by the City.

c. Construction details for special liner installation items shall be provided by the Design Engineer to be included on the Construction Drawings.

D. Shoreline Protection Treatment

1. Non-potable irrigation ponds shall be designed with a perimeter shoreline protection treatment to protect against wave action erosion. Due to the numerous shoreline protection treatments available (i.e. riprap, boulders, perimeter concrete walls, geotextile products, riparian plantings) the Design Engineer shall propose a suitable shoreline protection treatment depending on the project conditions. The proposed shoreline protection treatment for erosion protection is subject to approval by the City.

2. The Design Engineer shall make special considerations regarding the selection, design, and installation of shoreline protection treatment to ensure that the liner warranty is not invalidated. Coordination with and approval by the liner manufacturer is required.

3. Areas subject to scouring water velocities, such as at the raw water supply pipe discharge conveyance into the pond or beneath the pond fill line/service, shall be adequately protected against erosion and wash out (i.e. concrete splash pad, grouted riprap, large boulders, or appropriately sized riprap).

4. Appropriate construction details for shoreline protection treatment and erosion protection shall be provided by the Design Engineer to be included on the Construction Drawings.

5.19 AERATION SYSTEMS

A. The Criteria provided here offer generic guidelines for the design of non-potable storage pond aeration systems. Each aeration system is unique and requires special design, therefore, it is the Design Engineer's responsibility to design a fully operational system for the given conditions and provide necessary construction details and specifications to accompany the design.

B. Refer to construction specification *Section 11230, Aeration System* for additional non-potable pond aeration system requirements.

C. Aeration System Design

1. Coordinate the aeration system design and construction with the non-potable irrigation pump station design. House and incorporate aeration system components within the irrigation pump station building.

2. Aeration system design components shall include, but are not be limited to, air compressors, aftercoolers, condensate separators, electrical controls, valves, pipe manifolds, flow meters, gauges, aeration pods/diffusers, housing requirements, installation and operational instructions, and recommended maintenance.

3. The Construction Drawings for the aeration system shall show a typical layout, elevation and plan views, and critical dimension for the aeration system design and construction. The aeration system manufacturer is responsible for the layout and design of the aeration system supplied and any special coordination issues that affect

the critical dimensions, layout or orientation of the aeration system.

4. Aeration system shall be sized to provide four (4) pond volume turnovers per day based on the following equation:

$$X = \frac{V\ x\ b}{c}$$

Where:

X = Number of Fine Bubble Diffusers

V = Pond Volume (millions of gallons)

b = 4 (Turnovers/day)

c = Effective Turnover Rate = d x e / f

Where (numbers below are based a disk aeration module with model ADS LWA-3, other manufactures and models will require calculations changes based on specific equipment):

d = Diffuser Depth (feet)

e = Diffuser Turnover Rate = 3.5 mgd

f = Diffuser Effective Depth = 15 ft

5. Fine Bubble Diffusers shall be spaced to provide even coverage.

5.20 NON-POTABLE IRRIGATION PUMP STATION

A. General

1. All pump station site locations are subject to review and approval by the City.

2. Pump station sites shall be located outside of the FEMA 100-year floodplain.

3. The pump station finished floor elevation shall be a minimum of 2-feet above the storage pond's highest water surface elevation to prevent water overflowing the wet well into the pump station building.

4. The non-potable irrigation pump station location shall allow adequate access to the site from new or existing public right of way. The site shall be designed to provide adequate drainage away from the pump station building, pond, and conform to City standards for drainage and storm water management plans.

5. The building shall be sited to allow access by all-weather surface roads capable of accommodating maintenance trucks from public right of way to the pump station site. The access shall at a minimum support HS-20 loading with a minimum width of 15

feet. The access points and site shall be designed to allow WB-50 trucks to maneuver within the site and exit the site without backing into public right of way. The site layout shall allow for access to the wet well and vacuum/jetter truck to clean out accumulated material in the wet well. All paved surfaces shall be designed for the expected vehicle and equipment loads.

6. Developer shall have a geotechnical evaluation completed of the site to determine soil conditions and hydrology as well as recommendations for storage pond, pump station foundation and wet well construction. Refer to Section 2.09 of these Criteria for Geotechnical Soils Report for additional information.

7. The Criteria provided here offer guidelines for the design of non-potable irrigation pumping systems. Each pumping system is unique and requires special design, therefore, it is the Design Engineer's responsibility to design a fully operational system for the given conditions and provide necessary construction details and specifications to accompany the design.

8. Refer to construction specification *Section 15140, Irrigation Pump Station* for additional non-potable irrigation pump system requirements.

B. Pump System Design

1. The pump system shall be designed with a reinforced concrete one common wet well and multiple vertical turbine pumps to provide irrigation flows at varying demands and constant discharge pressure. Pump redundancy is not required.

2. Each pump shall have a dedicated VFD to control the pump.

3. The bottom of the wet well shall be a minimum 4-feet below the invert of the intake pipe.

4. The wet well shall be designed to prevent vortexes and cavitation which can adversely affect pump performance.

5. Pump efficiency shall be a minimum eighty percent (80%) at the specified operating point.

6. The pump system design shall include a skid assembly to support all pump components during shipping and to serve as the installed mounting base. The base shall be of sufficient size and strength to resist twisting and bending from hydraulic forces and support the full weight of all components (i.e. pumps, motors, filters, piping, valves, etc.).

7. The pump system shall include a pressure maintenance pump for sustaining the pressure in the non-potable irrigation system during non-irrigated times and shall operate no more than every 15-minutes to maximize pump life. If the pressure maintenance pump operates more frequently then allow larger pressure differential (in pump controls) to reduce operating cycles to recover lost water pressure.

8. Pump system design components shall include, but not be limited to, motors, filters, valves, gauges, mounting and support structures, power and electrical equipment,

control systems, operator interface devices, alarms, data acquisition and telemetry, and monitoring devices.

9. Pump discharge piping and filter waste pipe shall be supported 6 to 18-inches off the building floor and exit through the wall before pipe burial.

10. Filter to waste pipe shall discharge into the storage pond a minimum distance of 100-feet from the Pump Station Intake Pipe inlet and liner protection is required.

11. The Construction Drawings for the irrigation pumping system shall show a typical layout, elevation and plan views, and critical dimensions or clearances for the pump system, building, wet well, electrical, etc.

12. The pump system manufacturer is responsible for the layout and design of the pump system supplied and any special coordination issues that affect the critical dimensions, layout or orientation of the pump system.

13. The pump system design is subject to approval by the City.

5.21 PUMP STATION INTAKE PIPE AND INTAKE SCREEN

A. Intake pipe shall be AWWA C900-16 DR32.5 (125 PSI) polyvinyl chloride (PVC) pressure pipe, color purple or green or ASTM F679 PVC gravity sewer pipe.

B. The exposed section of the intake pipe shall have intermediate concrete pipe cradles with a stainless steel strap to secure the pipe to the cradle. The maximum length of unsupported pipe shall be 9-feet.

C. Intake Screen

1. Intake pipe shall be equipped with a square shaped passive intake screen constructed of 16 gauge, flattened 304 stainless steel, with 3/8 x 7/8 inch openings. The frame shall be constructed of stainless steel.

2. The intake screen shall be sized such that the velocity through the screen does not exceed 0.25 feet per second (ft/s).

3. The bottom of the screen shall be a minimum 16-inches above the bottom of the pond. The intake screen shall be supported by and mounted on top of a reinforced concrete block.

D. Intake Pipe Isolation

1. The wet well shall be equipped with a slide gate or the intake pipe equipped with a buried gate valve to shut off flow between the storage pond and wet well. Refer to Construction Specification *Section 15140 for Slide Gates and Gate Valves*.

5.22 RAW WATER SUPPLY SYSTEM

A. Raw water supply pipes shall have a minimum eighteen-inch (18”) vertical separation and minimum five (5) feet horizontal separation or twice the depth of the invert of the pipe, whichever is greater from all utilities measured from outside diameter.

1. Pipe Material: PVC, DIP, or RCP. Refer to City of Greeley *Stormwater Design Standards*, Section 6, subsection 9.3.7 for additional culvert information.

B. The raw water supply line shall be located on the opposite side of the pond as the non-potable pump station intake structure to promote water turnover within the pond and minimize stagnation that leads to water quality degradation.

C. Flow shall be controlled by a hand wheel operated slide gate (headgate) mounted to a reinforced concrete headwall. The headwall shall be equipped with a steel trash rack anchored to the concrete headwall with stainless steel hardware.

1. Head Gate Manufactures/Models: Refer to Construction Specification *Section 11285, Slide Gates*.

2. Refer to City of Greeley *Stormwater Design Standards*, Section 9, subsection 9.3.7 for additional trash rack requirements.

3. The headgate configuration shall be approved by both the City and the associated ditch company.

D. Flow Measurement

1. A parshall flume shall be used to measure flow in close proximately to the headgate. Construction of the parshall flume shall be dictated by the ditch company.

2. The flow approaching the parshall flume shall be subcritical and operate under free-flow conditions.

a. The parshall flume shall be equipped with an 8-inch diameter stilling well to measure the flow depth using either a stage recorder or a non-contact level radar measurement device with the signal transmitted to the City's SCADA system via the Pump Station's Remote Telemetry Unit (RTU). Power shall be brought from the non-potable pump station to power either unit. Refer to Section 5.2 of these Design Criteria for additional SCADA information.

b. Where the Colorado Department of Natural Resources (DNR) requires flow data, a stage discharge recorder shall be mounted on top of the stilling well to compute and log discharge flow and totals.

i. Manufacturer and Model: Sutron Corporation, model SDR-0001-4 or approved equal.

c. For locations where the DNR does not require flow data, a radar level measuring unit may be used in place of the stag recorder.

i. Manufacturer and Model: Endress and Hauser - Micropilot FMR10 or approved equal.

E. Check Structures

1. A check structure may be required where there is not sufficient depth within the irrigation ditch to provide sufficient head to achieve the raw water supply design flow. If the Design Engineer determines that a check structure is needed, a HEC-RAS model shall be created to compute water surface profiles. The check structure shall not prevent deliveries of water to downstream users.

2. The check structure shall be constructed of reinforced concrete with removable boards.

5.23 PUMP BUILDING

A. The pump building shall be a precast concrete building sufficiently sized to house all the equipment including but not limited to pump skid, electric and controls cabinets, telemetry cabinet, and aeration system.

B. There shall be a minimum 4-feet spacing between the building walls and pump skid.

C. There shall be sufficient space between the pump skid filter(s) and building walls to allow removal of the filter screen for servicing and replacement. Space must be also provided to meet all electrical code requirements.

D. The minimum wall height shall be 8-feet 6-inches with equipment doors sufficiently sized to be remove and replace electrical and controls panels.

E. The pump building shall be equipped with two trench type floor drains that run either the width or length of the building and connect directly and perpendicular to the wet well.

F. Refer to construction specification *Section 15140, Irrigation Pumps for additional requirements*.

5.24 SHOULDER MONTH WATER SUPPLY

A. All non-potable irrigation systems require a backup potable water tap (shoulder tap) for providing irrigation water when non-potable water is unavailable (“shoulder months”). There is no Plant Investment Fee (PIF) required for a shoulder tap.

B. Shoulder month water supplies must be approved by the City.

C. Shoulder month water shall be discharged into the non-potable irrigation system’s water storage facility (pond). A candy cane configured discharge pipe with a minimum two (2) foot air gap shall be provided between the shoulder tap discharge and the maximum operating or overflow elevation of the pond water surface, whichever is greater.

D. The shoulder tap shall be size based on the maximum water demands during shoulder months or at least four (4) inches in diameter and metered. Only City personnel may operate the shoulder tap.

5.25 SCADA

A. A Remote Telemetry Unit (RTU) shall be provided to communicate with the City's SCADA system. The RTU shall communicate with the City's SCADA via City fiber optic if within 1,500-feet of the pump station. If fiber optic is not available, the RTU shall communicate via XetaWave radios.

B. The RTU shall communicate with the pump system and instrumentation by way of Modbus serial or Ethernet, or Allen Bradley Ethernet or serial. If there is no ability to communicate with the Control Panel, analog and digital inputs may be utilized.

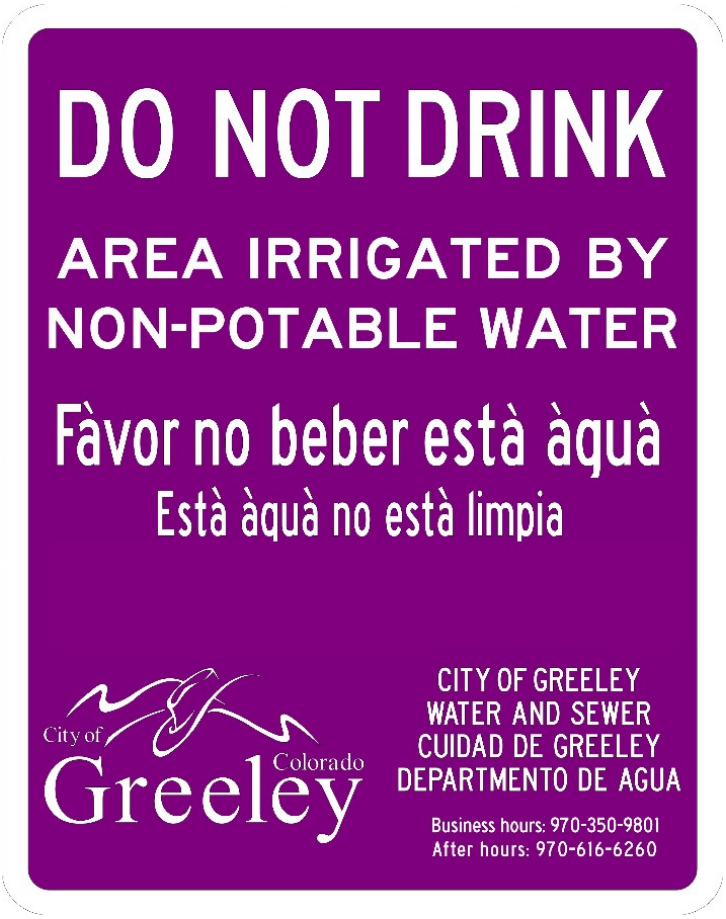
C. Refer to construction specification *Section 15140, Irrigation Pumps for additional requirements*.

5.26 SIGNAGE

A. Signage must be posted at sites where non-potable water is utilized for irrigation. Signs shall be posted near sidewalks and paths that provide access into the non-potable irrigated area(s). Where neighborhoods use non-potable water for irrigating individual homes, all street access points into the neighborhood shall also be posted. Coordinate signage locations with the City of Greeley during design process.

B. An example of an approved sign is provided below (sign design/layout provided by Area Wide Protective).

C. Signs shall be 12-inches wide by 18-inches tall. Holes for fastening the sign to post shall not damage nor cover any text.



5.27 WATER DEDICATION REQUIREMENTS FOR NON-POTABLE IRRIGATION

A. Contact the Water and Sewer Department and refer to *City of Greeley Charter and Code, Title 20: Public Works and Utilities* regarding water dedication requirements.

5.28 WATER SUPPLY WELLS

A. Under certain circumstances the City may, at its election and in its sole discretion, accept use of a well(s) to meet non-potable needs. In that case, ownership of the well(s) would need to be transferred to the City and the well(s) permit changed to non-exempt irrigation well permit. Depending on the development layout and capacity of the well(s), the well could be used directly for irrigation without filling a storage pond first. The Design Engineer would need to evaluate each system individually and obtain City approval. Sufficient information regarding the well(s) such as condition and sustainable yield will be required to assist in the evaluation.

SECTION 6

LANDSCAPE AND IRRIGATION DESIGN CRITERIA

6.01 GENERAL

The City of Greeley Landscape and Irrigation Criteria and Standards, hereafter referred to as the "Criteria", is intended to provide information for the design, review, installation and maintenance of landscape and irrigation systems within the City of Greeley to promote the efficient use of water and the reduction of water waste through best management practices. Both landscape and irrigation systems should be designed for non-potable water as outlined in Section 5 of these criteria.

It is the purpose and intent of this Criteria to support the City of Greeley Comprehensive Plan, the Greeley Water Master Plan, and the Landscape Policy Plan for Water Efficiency to:

Promote water conservation

- Reduce or eliminate outdoor water waste
- Reduce peak summer water usage
- Reduce water demand of new construction and development
- Reduce overall per capita demand
- Guide smart development by incorporating land use and water planning principals
- Guide smart development through practices, problem solving, technology and innovation
- Utilize onsite stormwater runoff to supplement landscape irrigation through rainwater harvesting

Support attractive and sustainable landscapes

- Use of low-water plants like native landscapes and xeriscape
- Stormwater and rain garden utilization, such as bio-retention practices, stormwater wetlands, dry wells
- Support an urban canopy by strategically placed trees to reduce heat islands and energy use

These Criteria shall be regarded as the minimum requirements and performance standards for the design, installation and maintenance of landscape and irrigation systems.

Whenever a provision of these Criteria and any other provision of the City of Greeley Municipal Code or any provisions in any law, ordinance, resolution, rules or regulations of any kind, contains any requirements covering any of the same subject matter, the requirements that are more restrictive or impose higher standards shall govern. If there is a discrepancy in the interpretation of these Criteria, the Water and Sewer Director or designee thereof, shall make the final determination of the intent of these Criteria.

Supplemental information including but not limited to forms, checklists, notes, etc. are available on the City of Greeley's website and shall be referenced or submitted in accordance with the requirements set forth in these Criteria. It is the responsibility of the owner, designer, installer or maintenance contractor to obtain the latest version of any submitted document, as the City will periodically update these items.

- Landscape and Irrigation Criteria Checklists

- Irrigation Performance Audit Guidelines
- Irrigation Performance Audit Form
- Water Budget Chart and Example
- Pressure calculations worksheet
- WaterWise Best Management Practices
- Example of median and right-of-way designs
- Preferred plant list database

6.02 DEFINITIONS

A. APPLICATION RATE: The depth of water applied to a given area and during a specific time, usually expressed in inches per hour or inches per week.

B. CHECK VALVE OR ANTI-DRAIN VALVE*:* A valve located under or incorporated within a sprinkler head or other location within the system to prevent the system from draining on the lowest head(s) when the system is off.

C. COMPOST: Fully finished, stabilized, and mature product, derived from decomposed plant and organic material that can be added to the soil as an amendment. Compost provides increased nutrient uptake, increased water holding capacity, and improves the soil structure of the site. This is not the same as topsoil.

D. CYCLE AND SOAK: Method of irrigation where water is applied in multiple, short cycles. This allows the water to be applied more slowly, allowed to soak into the soil and prevent run-off, promoting deeper roots and healthier plants.

E. DISTRIBUTION UNIFORMITY: The measure of the uniformity of the irrigation water over a defined area.

F. DROUGHT: Periods or seasons with below average precipitation.

G. EMITTERS: A pressure compensating emitter component of an irrigation system that disperses water to the landscape (i.e., sprinklers, bubblers, micro-sprays, etc.)

H. ESTABLISHED LANDSCAPE*:* The point at which plants in the landscape have developed roots into the soil beyond the root ball, which promotes long-term health and growth.

I. ESTABLISHMENT PERIOD: The first year after installing the plant in the landscape or the first two years if irrigation will be terminated after establishment. Typically, most plants are established after one or two years of growth. Native habitat mitigation areas and trees may need three (3) to five (5) years for establishment.

J. HARDSCAPES: A non-living landscape feature that is made of any durable material (pervious and non-pervious) such as building, pavement, walkways and parking areas-including those of crushed stone, patios, and decks.

K. HYDROZONE: An area within a landscape where the plant materials require a similar amount of water. For this document, hydrozones are divided into four (4) categories:

- *Very-Low Hydrozone:* Plant materials that require less than one gallon per square foot of area per growing season of supplemental water once established. The plant materials within this zone are typically drought-tolerant natives. This hydrozone is designated by the letter "V" on landscape plans.
- *Low Hydrozone:* Plant materials that require between one (1) and nine (9) gallons per square foot of area per growing season of supplemental water. This hydrozone shall be designated by the letter "L".
- *Moderate Hydrozone*: Plant materials that require between ten (10) and 14 gallons per square foot of area per growing season of supplemental water. This hydrozone shall be designated by the letter "M".
- *High Hydrozone*: Plant materials that require more than 14 gallons per square foot of area per growing season of supplemental water. The plant material within this zone is intended for high-pedestrian traffic areas such as sport fields or community gathering spaces. This hydrozone shall be designated by the letter "H".

L. IRRIGATION EFFICIENCY: The measurement of the amount of water beneficially used divided by the amount of water applied. Irrigation efficiency is derived from measurements and estimates of irrigation system characteristics and management practices. Greater irrigation efficiency can be expected from well designed and maintained systems.

M. LOW FLOW IRRIGATION OR DRIP IRRIGATION: The application of irrigation water at low pressure through a system of tubing or lateral lines and emitters such as point source, pressure compensating compents, dripper lines, micro-sprays and bubblers. Low flow irrigation systems apply small volumes of water, measured in gallons per hour, slowly at or near the root zone of plants.

N. MAINTENANCE OR MAINTENANCE OF LANDSCAPING: Shall mean but not be limited to regular watering, mowing, pruning, fertilizing, clearing of debris and weeds, the removal and replacement of dead plants and the repair and replacement of an irrigation system. Any activity undertaken to prevent the deterioration, impairment, or need for repair of an area, structure, rights-of-way, or land use.

O. MASTER SHUT-OFF VALVE*:* An automatic valve installed at the irrigation supply point which controls water flow into the irrigation system. When this valve is closed water will not be supplied to the irrigation system.

P. MONOCULTURE: Large planting of the same species or even cultivar.

Q. MULCH: Organic material such as leaves, bark, straw, wood chips or inorganic mineral materials such as rocks, gravel, decomposed granite or pebbles smaller than a half-inch in diameter left loose and applied to the soil surface for the beneficial purposes of reducing evaporation, suppressing weeds, moderating soil temperature, and preventing soil erosion.

R. NON-ESSENTIAL AREAS: A high hydrozone with traditional turf that receives little, if any, use (i.e., the only person who walk on those areas is the person maintaining the turf).

S. PREFERRED TURF: Very-low to low hydrozones grasses such as Buffalo Grass (*Buchloe dactyloides*), Blue Grama (*Bouteloua gracilis*), or other native species.

T. REFERENCE EVAPOTRANSPIRATION or ET: A standard measurements of environmental parameters which affect the water use of plants. ET is typically expressed as the depth of water in inches or the volume of water in gallons used by an irrigated landscape area over a period of time.

U. RIGHT-OF-WAY LANDSCAPING Shall mean landscaping located within the public or private right-of-way adjacent to a privately owned lot, outlot, or tract, including parkways.

V. SEASONAL WATERING SCHEDULE: The programmed schedule set in the Smart Irrigation Controller. The schedule is based on the summation of the water that has been lost to evaporation and that has been used by the plant materials. The amount of water required to meet the needs of the plant materials change with the weather (seasons).

W. SMART IRRIGATION CONTROLLER: A contractor-grade automatic timing device with nonvolatile memory that automatically adjusts the programmed run time or watering frequency based on changes in weather or soil moisture. Smart controllers may have local weather-based (ET) sensors or soil moisture-based sensors directly, or the smart controllers may be linked to a weather station via internet connection or cellular data card. Acceptable controllers must be selected from the Environmental Protection Agency's WaterSense labeled irrigation controller list. Retail grade controllers are not acceptable.

X. SOIL AMENDMENT: An organic and inorganic material that is added to native soil to improve texture, moisture holding capacity, nutrient capacity, and water and air infiltration.

Y. SUSTAINABLE LANDSCAPES: Landscapes that feature climate-appropriate landscape design and efficient technologies and are maintained through efficient irrigation practices to support community water objectives.

Z. TRADITIONAL TURF: High hydrozones grasses defined as Bluegrass (*Poa pratensis*), genus Poa and turf type tall fescue (*Festuca arundinacea*) and cultivars thereof having dense tufts blades and creeping rhizomes.

AA. WATER BUDGET: The water that is applied annually from an irrigation system to an established landscape area. It is based upon the area's reference evapotranspiration and is adjusted for plant factors and irrigation efficiency, two major influences upon the amount of water that needs to be applied to the landscape.

BB. XERIC LANDSCAPING OR XERISCAPE OR WATERWISE: Shall mean the use hydrozones that are very-low to low-water use in place of plants that typically require more water to survive and include, but are not limited to, plants having a low or very low water requirement.

CC. ZONE: Typically, an area served by a single irrigation control valve, sometimes referred to as a "station." Zones are comprised of plant materials and soil types with similar water requirements.

6.03 APPLICABILITY

A. These Criteria shall apply to all landscape and irrigation system designs, installation, and maintenance performed as a requirement of Chapter 8 – Landscape Standards of the Greeley Development Code and any other code, policy or criteria adopted by the City of Greeley. Areas that fall under these Criteria include but are not limited to:

- Civic and Open spaces
- Common areas for all customer classes (outlots, pocket parks, usable detention, private/on-lot required/usable areas)
- Right-of-ways
- Areas not responsible of a single-family and up to four (4) units per lot
- Municipal buildings
- Multi-family residential
- Non-residential (institutional, commercial, and industrial)

B. Applicability for these Criteria shall follow major development as defined in Chapter 8, Section 24-801(b) – Landscape Standards of the Greeley Development Code.

C. These Criteria shall govern over privately enforced guidelines or requirements related to landscaping and irrigation (i.e., business association, homeowners association design guidelines, regulations and requirements, etc.).

D. Exemptions or where these criteria do not apply to:
- Single-family and up to four (4) units per lot
- Row houses/townhomes individual parcels
- Ecological restoration projects not requiring a permanent irrigation system
- Exemptions listed in Chapter 8, Section 24-801(b)(3)- Landscape Standards

6.04 ENFORCEMENT

A. The City of Greeley shall be provided the opportunity to review all landscape and irrigation plans, site and soil amendments, design, and installation for compliance with these Criteria. The Criteria are enforced by the City or authorized representative.

B. All landscape improvements, indigenous plant material, and irrigation system components shall meet performance standards and supporting criteria. The City shall review all submittals for general compliance with these Criteria. An approval by the City does not relieve the owner, designer, installer or maintenance contractor from the responsibility of ensuring the design, plans, specifications, construction, maintenance, and record drawings are in compliance with these Criteria.

C. In the event of Level 3 or 4 drought declared by the Water and Sewer Board, extreme drought water use planting and temporary irrigation may occur at the discretion of the Water and Sewer Director or designee thereof. For drought declarations visit City of Greeley's website.

6.05 HANDLING OF TOPSOIL

A. Stripping and stockpiling of native topsoil onsite shall be required during construction. This topsoil shall be incorporated as the final layer of soil for landscaping unless soil contamination has been determined. Stockpiling shall be handled by the Stormwater Management Plan and applicable Best Management Practices- see Stormwater Section 12-Construction Water Quality, as amended. Soil contamination determinations shall be at the discretion of the Public Works Director or his or her designee.

B. The onsite replacement of topsoil and the addition of soil amendments are critical to successful establishment and ongoing health of plant material and efficient use of water through the life of the project.

6.06 SOIL AMENDMENTS

A. Soil amendments (organic or inorganic) shall adhere to the Greeley Municipal Code, Section 24-804(e)(3) – Landscape Standards Installation and Maintenance for all properties.

B. A minimum of four (4) cubic yards of compost per 1,000 square feet of area shall be used for non-native cool season turf.

C. Per Greeley Municipal Code Chapter 8, Section 24-801(b) and 24-804(e)(3) – Landscape Standards, soil amendment verification documentation and receipts shall be submitted to the Water and Sewer Department, Water Conservation Program prior to installation of plant material, and shall include review of adherence to all criteria and performance standards. Written documentation reflecting approved volume, method of tilling and type of soil amendment is required.

6.07 MULCH

A. Mulch (organic or inorganic) shall be used in areas used to cover bare ground, reduce evaporation, suppress weeds, moderate soil temperatures, and prevent soil erosion to promote landscape establishment within landscape beds. Seeding for large areas for grasses and naturalized landscape areas do not require mulch.

1. Organic Mulch
   a. Organic mulch material includes bark, and wood chips. No construction debris such as pallets shall be used.

   b. Shall be applied at one and a quarter (1.25) cubic yard per one hundred (100) square feet at a depth no less than four (4) inches, and as appropriate to each hyrozone.

   c. Shall be applied to soil surface, not against the plant stem, or high against the base of tree trunks to minimize disease.

d. Tree rings of mulch shall be provided for all trees within turf areas subject to mowing operations. Tree rings for evergreen trees shall extend to the dripline of the tree to avoid limbing up of evergreen trees.

2. Inorganic Mulch
   a. Inorganic mulch includes rock, gravel and pebbles (pea gravel) smaller than one and one half-inch (1.5) in diameter for water conservation and weed suppression. Any materials greater than a half-inch is not considered mulch.

   b. Rock mulch shall have a minimum depth of three (3) inches.

   c. Pea gravel shall not be placed adjacent to paved surfaces unless contained by curbing, retaining wall or similar solid structure.

6.08 WEED BARRIER

A. Black plastic (polyethylene) is not allowed. Woven weed barrier fabrics (polypropylene), recycled rubber, and plastic weed barriers are not allowed with any plant material unless they are used for playgrounds, large-scale vegetable/edible plant production, or areas that are designated as rock greater than one and one half (1.5) inch in diameter (dry creek beds without vegetation).

B. Ecologically sound biodegradable weed barrier can be used.

6.09 SUSTAINABLE LANDSCAPE DESIGN

A. Hydrozones
   1. For the purposes of this document, hydrozones are broken into the following four categories:

Table 6-1: Hydrozone Category

Hydrozone Category	Water Needs	Landscape Examples
High	>14 gallons/S.F./season	Bluegrass turf, or other non-native cool season turf, arborvitae, willows
Moderate	10-14 gallons/S.F./season	Columbine, potentilla purple coneflower
Low	1-9 gallons/S.F./season	Buffalo grass turf, sedums, succulents, iris, penstemon
Very-Low	<1 gallons/S.F./season once established	Native grasses, yarrow, rabbitbrush

B. Landscape water budget and plant material

1. Greeley Municipal Code, Chapter 8 – Landscape Standards shall be adhered to.

2. An annual water budget chart shall be submitted for the landscape and irrigation plans. A water budget chart will show the total annual water used, which shall not exceed an average of 15 gallons/square foot for the landscape for all hydrozones per tap.

3. Plants are to be hydrozoned with plants of similar hydrozone (i.e., low with low). Plants of very low hydrozones are not to be planted in moderate to high hydrozones.

4. High hydrozones shall be limited to appropriate high-use areas with high visibility and functional needs. No more than 25% of the design irrigated area shall be high hydrozones. Where commercial and industrial uses include residential or recreational components, such as, but not limited to, assisted living, schools and daycares, picnic grounds, pocket park, outlots, the Water and Sewer Director or his or her designee may approve a greater percentage of high hydrozones. The applicant must demonstrate that the additional high hydrozones (traditional turf grass) areas are being used in high-traffic areas, such as, but not limited to, athletic fields, children's play areas, parks, and courtyards.

5. Preferred turf grass species are not limited in the design.

6. Specifications are found under Stormwater Design Standards, Section 14- Vegetation and Irrigation as amended shall be followed for stormwater detention and retention ponds.

7. Plant material shall be selected from a list of native and other plants determined to be appropriate for and well adapted to the soil and local environmental conditions and solar exposure requirements. The material plant lists can be found under the Water and Sewer Department, Water Conservation's Plant Database and City of Greeley's Forestry Department Front Range Tree Recommendation List. Upon request to the Water and Sewer Director or their designee, additional plants may be added to the list that are appropriate for these criteria.

8. Plant materials should provide an enriched quality of life by providing multi-season interest, color, texture, and diversity in plant material using the City of Greeley's WaterWise Best Management Practices found under Water and Sewer Department, Water Conservation website www.greeleygov.com/wc.

9. Plant material that is banned for use by the City of Greeley, Weld County and/or the State of Colorado shall not be used. This applies to all builders, installers, and owners. See the Colorado Department of Agriculture website for detailed list of restrictions.

10. The following landscape practices are highly recommended:
    a. Methods outlined in the City of Greeley's WaterWise Landscaping Best Practices created by the Water Conservation program.

    b. Protection and preservation of native species and natural vegetation.

c. Plant selection based on water needs, disease and pest resistance.

d. Implementing stormwater best management practices into the landscape and grading areas to minimize runoff and to increase on-site retention and infiltration.

e. Rain gardens, water quality ponds, bioswales and other landscape feature and practices that increase rainwater capture and create opportunities for infiltration while adhering to Colorado Statute 37-92-602(8) the water right of less than 72 hours of water retention and Storm Drainage Design Criteria and Construction Specification manual.

6.10 LANDSCAPE PLANS

Landscape Plan requirements shall be used to aid the applicant, designer, installer and maintenance contractor in the analysis, design, installation, and maintenance of landscapes. These requirements presented herein are the minimum necessary for landscape plan submittals and shall be considered in conjunction with the requirements set forth by the City's Community Development Department and Greeley Municipal Code, Chapter 8 – Landscape Standards.

A general landscape plan shall be included with the Site Development Plan submittal and a more detailed landscape and irrigation plan shall be submitted with the Construction Document submittal. All required forms, checklists and plant list can be found online at the City's website (www.greeleygov.com/wc)

All landscape plans shall adhere to the Water and Sewer Department's Design Criteria and Construction Specification-Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation System.

A. The proprosed landscape plans shall include:

1. All existing features that may influence landscape design such as prevailing winds, exposures, topography, hardscapes, and existing features like utilities, fences, structures etc. The design shall adhere to local zoning and codes related to utility easements, sight distance requirements, and buffer zones.

2. Design incorporating water efficient techniques described as follows:

   a. Group landscape material accordingly based upon hydrozones.

   b. Selected plants shall be well-adapted to the Greeley climate and site conditions. Plants shall be grouped according to water and light requirements.

   c. Irrigation equipment shall be appropriate to the hydrozone. Water should be applied deeply and infrequently to develop greater drought tolerance.

3. The identification of the landscape function and activities. This includes the overall theme of the site and neighborhood, onsite traffic patterns, and activity and service area needs.

4. Biodiversity in plant material such as trees and shrubs. Monoculture landscapes are not allowed to avoid drastic negative environmental and economic impacts from tree and shrub pests and diseases.

5. A water budget chart that shows the total annual water use, which shall not exceed an average of fifteen (15) gallons/square foot/year for each water tap and percentage of each landscape hydrozone type.

6. Accurate and clear identification of all applicable hydrozones as categorized in Section 6.09 A. and marked as defined in Section 6.02 K.

7. Final landscape design plans shall be stamped by a Colorado registered landscape architect.

6.11 IRRIGATION SYSTEM REQUIREMENTS

Per section Chapter 8, Section 24-804(h) of the Greeley Municipal Code, an irrigation system design shall be submitted in conjunction with a landscape plan. The irrigation system design shall incorporate the required items set forth below:

A. Irrigation Methods and Layout

1. Provisions shall be made for permanent, automatic irrigation of all plant material, with the following exceptions:

   a. Very-low hydrozone plantings that do not require supplemental irrigation beyond establishment.

   b. Trees and other plants placed within the landscape area along residential local street parkways for single-family detached dwellings.

2. The irrigation method shall be selected to correlate the hydrozones shown on the landscape plan and irrigation water type (non-potable versus potable). The following criteria shall be followed during the design of the irrigation system:

   a. Drip irrigation or bubblers shall be used for trees and shrubs greater than three (3) feet apart.

   b. Rotors and pop-up heads with rotary nozzles shall be used for turf grass. Spray heads are not allowed unless pressure-compensating and retrofitted with rotary nozzles.

   c. Only drip irrigation or strip pattern rotary nozzles shall be used to irrigate strips eleven (11) feet wide or less. Spray and rotor irrigation is strictly prohibited in these areas.

d. Inline emitter driplines are encouraged for higher density of planting.

e. Each hydrozone shall be irrigated based on a landscape with similar site and soil conditions and plant material with similar water needs. To the extent reasonably feasible, areas with significantly different solar exposures shall be zoned separately.

f. Traditional turf and non-turf areas shall be irrigated on separate hydrozones.

g. On steep grades, an irrigation method with a lower application rate shall be used in order to minimize runoff and, to the extent feasible, these areas shall be zoned separately and zoned in lines parallel to the slope rather than in blocks. On steep grades, traditional and preferred turf shall not be allowed on slopes greater than 25 percent where the toe is adjacent or within ten (10) feet to an impermeable hardscape.

h. All zones are designed with matching heads with matched precipitation rates and full coverage. Drip, micro-sprays, retrofitted spray heads with rotary nozzles, and rotors shall not be combined on the same zone.

i. Parking lot medians and islands that are surrounded by pavement shall be located in separate zones from other landscape areas.

B. Equipment

1. All equipment used in non-potable irrigation systems including but not limited to valves, valve box lids, sprinkler head tops, valve ID tags, and fittings must be clearly identified most commonly indicated by the manufacturer’s addition of the color purple to the components.

2. Valves

a. A backflow prevention assembly shall be installed in accordance per Section 20-191 of the Greeley Municipal Code-Cross-connection control. All backflow assemblies shall be equipped with adequately sized winterization ports downstream of the backflow assembly and must be the same material type

b. To reduce water leaks from the irrigation system, a master shut-off valve shall be installed downstream of the backflow device to shut off water to the system automatically when not operating.

c. Flow sensors integrated with the Smart Irrigation Controller are required for single or combined point of connection flows of 15 gallons per minute (GPM) or greater and one (1) inch or greater water taps.

d. All valves shall have a manual ball value installed prior to the lateral valve.

e. One two (2) inch valve ID tag shall be attached to each control valve one-and-one-half (1.5) inches or greater water tap. Each tag must be labeled with controller and station number.

f. Valve box lids shall be branded with minimum two (2) inches characters stating the controller and the zone (station) number for all irrigation systems served by a one-and-one-half (1.5) inches or greater water tap.

g. For branching or T's of the main irrigation line that are served by a one-and-one half (1.5) inches or greater water tap isolation valves upstream of the branching or T's shall be required.

h. For irrigation mainline distances over 500 feet, upstream isolation valves are required.

3. Submeters for irrigation systems are encouraged to enable the owner and landscape maintenance contractor to monitor water use. The installation and maintenance of the submeter shall be borne by the owner of the property and not by the City. All such submeters shall be installed in accordance with the specifications established by the City.

4. Irrigation controllers shall be smart controllers as defined in 6.02.V. Taps sized one-and-one-half (1.5) inches and greater water tap shall have a constant data connection via Wi-Fi or cellular data card so weather-based (ET) data can be received by controller. Controllers shall be installed and programmed according to the manufacturer's specifications.

   a. Post at each smart irrigation controller a data input chart including the precipitation rate from the audit, water budget, and zone descriptions.

   b. Within thirty (30) days of the installation of new landscaping, the irrigation system Smart Controller(s) shall be reset to the normal seasonal watering schedule. Minor schedule adjustments for establishing the trees, shrubs, and perennials may be necessary.

   c. Irrigation days of the week shall follow Section 20-226 of the Greeley Municipal Code-Water conservation and use restrictions; drought response along with the current declaration of the City's water supplies.

5. Sprinklers and nozzles shall meet the following requirements:

   a. The type of sprinkler and associated nozzles shall be selected to correlate with the size and geometry of the zone being irrigated.

b. Sprinklers shall be spaced no closer than seventy-five (75) percent of the maximum radius of throw for the given sprinkler and nozzle. Maximum spacing shall be head-to-head coverage.

c. Coverage arcs and radius of throw for turf areas shall be selected and adjusted to water only turf areas and minimize overspray onto vegetated areas, hard surfaces, buildings, fences, or other non-landscaped surfaces.

d. Sprinklers, bubblers, or emitters on each zone shall be of the same manufacturer. Multiple manufactures can be used throughout the system if each zone has the same manufacturer.

e. Sprinkler heads in turf areas shall have a minimum six (6) inch pop-up riser height. A four (4) inch pop-up riser height is permitted when the irrigation head is in line with a curb along a parking space. If pop-ups are installed within a perennial and groundcover beds, a twelve (12) inch pop-up riser shall be used.

f. Spray nozzles are not allowed.

g. Nozzles for rotors shall be selected to achieve an approximate uniform precipitation rate throughout the zone.

h. All pop-up heads s shall be equipped with check valves and pressure-regulating stems in accordance with Colorado House Bill 19-1231.

i. Rotors shall be equipped with internal check valves and pressure regulation.

j. Pressure-compensating emitters shall be used for drip irrigation. For sloped areas, check valve(s) shall be installed in the drip line whenever the valve is at a lower elevation.

k. Drip line shall be parallel to the slope whenever feasiable.

l. Properties with single or combined point of connection flow of 15 GPM or greater for a one (1) inch water tap or greater, shall have a control system capable of providing real-time flow monitoring and the ability to shut down and/or isolate the problem area(s) with isolation valve(s) in the event of a high flow condition.

m. Emitters shall be set back from foundations in accordance with Chapter 8, Section 24-802- Landscape standards.

n. Pop-up heads in turf areas shall be matched precipitation nozzles. Variable Arc Nozzles (VANS) are not acceptable for 90-, 180-, and 360-degree applications. High-Efficiency Variable Arch Nozzles (HE-VANS) are allowed in odd shaped areas (non-linear or triangular head spacing) where 90-, 180- and 360- degree nozzles are not applicable.

6. Sleeving shall meet the following requirements:

   a. Sleeves shall be installed beneath paved areas to route irrigation pipes and wiring bundles. The diameter of sleeve shall be a minimum of twice that of the pipe and wiring bundle but no smaller than a two (2) inch diameter pipe. The ends of the sleeves shall extend past the edge of the curb, gutter, sidewalk, or other hardscape a minimum of eighteen (18) inches.

   b. The sleeve material beneath sidewalks, drives and streets shall be PVC Class 200 pipe with solvent welded joints.

   c. For all sleeving located under concrete, the pavement or other hard surfacing shall be notched on both sides to mark the sleeve location, and tracer wires shall be installed on the upper side and both ends of the sleeving.

   d. Contain no joints when length is less than twenty (20) feet.

   e. Separate sleeving used for irrigation lines and wiring bundles.

C. Water Pressure

1. The irrigation system designer shall verify the existing available water pressure.

   The irrigation system shall be designed such that the point-of-connection design pressure, minus the possible system pressure losses, is greater than or equal to the design sprinkler operating pressure at final build out.

2. All newly installed sprinkler bodies shall operate at the manufacturer's specific optimum performance pressure range, All pop-up bodies retrofitted with rotary nozzles shall operate at no less than twenty (20) psi and no more than forty-five (45) psi.

3. If the operating pressure exceeds the manufacturer's specified maximum operating pressure for any sprinkler body or nozzle, pressure shall be regulated at the zone valve or sprinkler heads.

4. Pressure boosters are allowed if required. Booster pumps must be prefabricated units with variable speed controls.

6.12 IRRIGATION DESIGN PLAN

The purpose of a preliminary irrigation design plans is to provide a general design and annual water allotment for landscapes. The final irrigation design plans build upon the preliminary design with additional details. In accordance with Greeley Municipal Code, Chapter 8, Section 24-804(h) – Landscape Standards, the irrigation plan shall be designed in conjunction with a landscape plan in a manner to maximize irrigation efficiencies:

A. Preliminary Irrigation Design Plans shall include:

1. Accurately and clearly identify all applicable hydrozones with square footage using the defined four categories in Section 6.10 and using letter marking found in Section 6.2 of these Criteria.

2. Include irrigation methods according to the hydrozones. All heads on a zone shall have matched precipitation nozzles.

3. A water budget chart that shows the total annual water use, which shall not exceed fifteen (15) gallons per square foot over the site.

4. All necessary system components are sized for adequately meeting the highest seasonal landscape demand with a three-day per week watering schedule. Irrigation shall occur within an eight-hour watering window or as allowable by Section 20-226 of the Greeley Municipal Code -Water conservation and use restrictions; drought response.

B. Final Irrigation Design Plans shall include:

1. Same information required for the Preliminary Irrigation Design Plan submittal and;

2. A Smart Irrigation Controller data input chart. Irrigation schedules for landscape establishment period and established planting shall include irrigation frequency, cycles per day, and minutes per cycle, and a note stating that the schedule is a guide only and actual field conditions may require more or less watering time as plants mature. Seasonal adjustment shall be included in the data input chart. The data input chart must provide scheduling for the highest water demand season and fall within the watering window allowable by Section 20-226 of the Greeley Municipal Code- Water conservation and use restrictions; drought response.

3. A pressure calculation worksheet that shall demonstrate the point-of-connection design pressure, minus the possible system pressure losses, is greater than or equal to the design sprinkler operating pressures.

4. A seasonal maintenance schedule beginning on April 15 through October 15 shall be shown on the irrigation plan to establish procedures for optimum irrigation efficiency and preventive maintenance practices that will conserve water resources. The maintenance schedule shall include 6.16- Irrigation System Maintenance

4. Final irrigation design plans must be approved by a licensed Irrigation Association Certified Irrigation Designer (CID).

5. The following General Notes:
   a. Contractor installing the system including name, address, and phone number

   b. All irrigation certifications

   c. All field adjustments or redesign to show “as-built” drawings after installation is complete

6. The owner of the property shall be provided:

a. "As-built" irrigation drawings

b. Water budget chart

c. Smart Irrigation Controller data input chart

d. Two (2) operating keys for each type of manually operated valves

e. Two (2) of each servicing wrench or tool needed for complete access, adjustment, and repair of sprinklers.

6.13 IRRIGATION SYSTEM INSTALLATION

Irrigation system installation shall be consistent with approved plans and meet the City's Criteria prior to issuance of Certification of Occupancy or other City approvals. Release of bonding or surety (if applicable) shall be withheld until approval is given.

Materials, installation, and execution for parks shall follow City of Greeley Design Criteria and Construction Specifications, Section 02810 Irrigation Specifications.

Otherwise the following shall occur for irrigation system installation:

A. Quality Assurance:

1. Irrigation system installation shall be consistent with approved system design and applicable water type (potable versus non-potable systems). For all systems with one and one-half (1.5) inches or greater water tap, it is recommended that the irrigation system be designed and constructed for non-potable water use.

2. Work and materials shall be in accordance with the latest edition of the National Electric Code, the Uniform Plumbing Code as published by the Western Plumbing Officials Association, and applicable laws and regulations of the governing authorities.

3. When contract documents call for material or construction of better quality or larger size than required by the above-mentioned rules and regulations, provide the quality and size required by the contract documents.

4. A Field Supervisor shall review and sign-off on the installation. Field Supervisors shall have at least five (5) years experience in irrigation system installation and be employed by a company that has been established in the green industry for three (3) or more years.

B. Installation

1. Contact the City of Greeley Water and Sewer Department at conserve@greeleygov.com when irrigation construction begins.

2. Installation shall be consistent with approved system design.

3. New and existing tree and shrub locations as shown on the landscape plans take precedence over irrigation equipment locations. Conflicts between irrigation system, planting material and architectural features shall be avoided.

4. Assembling pipe and fittings shall be in a manner recommended by the manufacturer and in accordance with accepted industry practices.

5. Spare wires

    a. In conventional (or traditional, single, multi-stand) systems, two (2) spare control wires and one (1) spare common wire shall be installed for the entire length of the mainline. At each valve location, a minimum of thirty (30) inches wire loop shall be provided and located in the valve box. End of wires shall be capped with water-proof wire connectors.

    b. In 2-wire (or decoder) systems, one (1) spare 2-wire shall be installed the entire length of the mainline. The spare 2-wire installed shall be in a different color than the rest of the 2-wire being used. At each valve location, a minimum of thirty (30) inches wire loop shall be provided and located in the valve box. End of all wires shall be capped with water-proof wire connectors.

6. Sprinkler assemblies shall be installed as per the specifications and at the locations of the irrigation plans. All sprinkler assemblies shall be installed for best performance. The City reserves the right to conduct follow-up audits as deemed necessary at the expense of the customer to ensure irrigation system efficiencies. Any deviations in the installation from the irrigation plan must be noted and included in the as-built drawings.

C. Testing

1. The mainline of the irrigation system shall be tested for each segment of mainline made operational and upon final installation completion to ensure it is free of leaks, defects, or deficiencies. The system shall be brought to normal operating pressure with the all valve manifolds and isolation valves open and all other conveying components closed. Any loss of pressure after two hours should be recorded, investigated, and isolated. Identified leaks shall be repaired and the mainline retested prior to testing any individual irrigation zones.

2. All irrigation zones shall be tested upon final installation completion to ensure the zones are free of leaks, defects, or deficiencies. Each zone shall be activated for five (5) minutes, and the water use shall be recorded from the installed flow sensor installed or calculated from start and stop water meter readings. Deviations from the zone application rate listed in the irrigation plan shall necessitate investigating the zone(s) for correct installation, layout, components, and repair. Post-repair zone testing will be required.

3. It is unlawful for any owner or user of water to fail to comply to the prevision of the Section 20-153 of the Greeley Municipal Code – Bills may be sent; process of bill disputes and to waste water through neglect or by reason of faulty or imperfect plumbing or fixtures per Section 20-123 of the Greeley Municipal Code- Failure to maintain; unlawful;notice;turnoff.

6.14 IRRIGATION PERFORMANCE AUDIT

Per Greeley Municipal Code, Section 24-801(b)(5) and 24-804(h)(5) a letter of substantial completion of the landscape plan and an irrigation performance audit must be completed prior to issuance of Certification of Occupancy or other City approvals. Release of bonding or surety (if applicable) shall be withheld until approval is given. Details of the Irrigation System Installation, Performance Audit and Landscape and Irrigation System Maintenance

A. Exemptions

1. Systems with only drip irrigation.

2. Landscape plans and plant installation without any turf areas.

3. Case-by-case as determined per the Water and Sewer Director or designee.

B. Certification

1. The contractor in charge of the irrigation system installation must contract to have an irrigation performance audit completed by a licensed professional independent of the installation contractor. Acceptable auditors are Greeley's Water Conservation Program personnel, a CLIA, or QWEL:

a. Certified Landscape Irrigation Auditor (CLIA) who is certified by the Irrigation Association, a non-profit industry organization dedicated to promoting efficient irrigation

b. Qualified Water Efficient Landscaper (QWEL) who is certified by EPA WaterSense

2. The cost of hiring a CLIA or QWEL shall be the responsibility of the contractor in charge of the installation.

C. Performance Audit Guidelines

1. Irrigation zones tested in the audit must be a representative sample of the entire irrigation system, and at a minimum shall include the evaluation of no less than twenty-five (25) percent of overhead irrigation zones, to include a minimum of two (2) zones per overhead sprinkler type. At the discretion of Greeley's Water and Sewer's Director or designee, the minimum number of zones may be increased depending on the size and complexity of the irrigation system.

2. The minimum acceptable distribution uniformities shall be seventy (70) percent for rotor and rotary zones.

3. Results below minimum acceptable distribution uniformity will require adjustments and/or repairs made to the irrigation system. These corrections will be noted on the irrigation as-builts and the test area re-audited until acceptable results are produced.

4. A signed copy of the Irrigation Performance Audit shall be submitted to and approved by the Water and Sewer Department, Water Conservation Program Manager before issuance of a Certificate of Occupancy or other City approvals.

6.15 LANDSCAPE MAINTENANCE

Per section 24-804(e) installation and maintenance of the landscape areas of the Greeley municipal code, the developer, owners' association, property managers, property owner and/or tenant, as required by Chapter 8, shall be responsible for maintaining in a healthy condition all on-lot and right-of-way landscaping, buffering, perimeter treatment, and screening improvements. The landscape and irrigation maintenance shall incorporate the required items set forth below:

A. The Owners' Association, property managers, property owner, and/or tenant shall be jointly and severally responsible for the regular maintenance of all landscaping elements and irrigation system in good condition. All landscaping shall be maintained free from disease, pests, weeds and litter.

B. Regular maintenance shall be consistent with the needs of the plant material and shall include pruning, mowing, fertilization, mulching and weeding, and plant materials replacement. Replacement materials shall be healthy plants of comparable size and species, meeting the original intent of the approved landscape design.

C. Preferred turf shall follow the City of Greeley’s Natural Areas & Trails Department No-Mow policy.

D. Best management practices to fix erosion shall be used to maintain landscapes and irrigation systems.

6.16 IRRIGATION SYSTEM MAINTENANCE

A. Annual maintenance of the irrigation system includes backflow prevention assembly testing, rain sensor testing, controller data or Wifi connection testing, and filter and strainer cleaning/replacement, and all other preventive maintenance practices that conserve water resources.

B. Leak repair, replacement of damaged system components, head adjustments, application rate adjustments, and all other preventive maintenance practices that conserve water resources shall be on-going through out the irrigation season.

C. A completed and passing backflow prevention assembly test consistent with the parameters outlined per Section 20-191 of the City of Greeley's Muncipal Code-Connection Control is required for irrigation system start-up. Proper assembly operations shall also be verified through passing backflow prevention assembly test when the assembly is taken out of service for maintenance or repair.

D. All irrigation system elements shall be repaired and replaced to maintain the minimum acceptable distribution uniformities of sixty (60) percent for rotor and rotory zones.

E. Irrigation controllers shall be seasonal adjusted using a cycle and soak method with no programming to irrigate between the times of 10:00 a.m. to 6:00 p.m.

F. Irrigation days of the week shall follow per Section 20-226 of the Greeley Municipal Code-Water conservation and use restrictions; drought response.

G. Subject to Chapter 14.08-Water Rates and Regulation, failure to maintain any plumbing or fixtures of any premises are so defective as to waste any water is unlawful and shall be subject to penalties and/or water shutoff.

H. Irrigation audits should be conducted every five (5) years following the initial irrigation system installation following Section 6.14- Irrigation Performance Audit to support long-term water efficiency.

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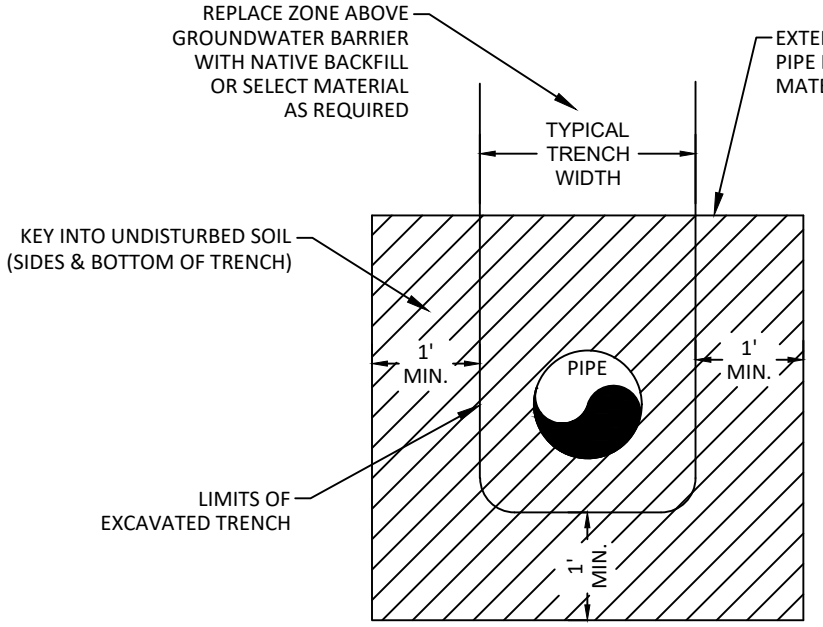
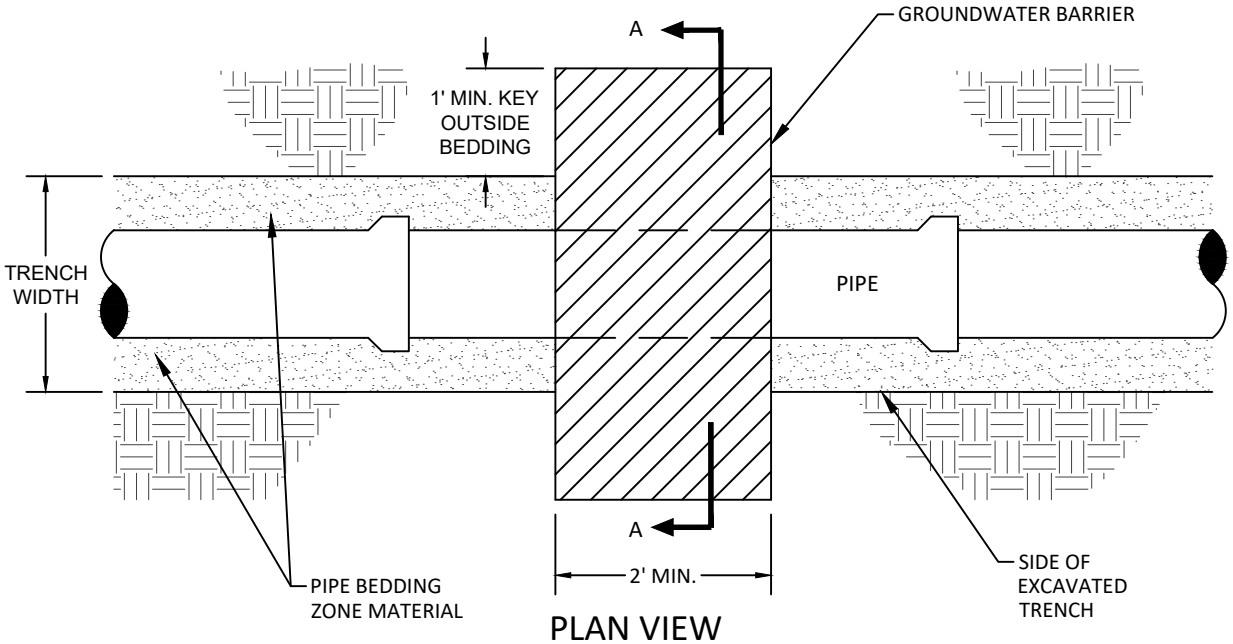


NOTES:

1. REFER TO WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR GROUNDWATER BARRIER MATERIAL AND COMPACTION REQUIREMENTS
2. LOCATE GROUNDWATER BARRIERS PER ACCEPTED CONSTRUCTION DRAWINGS AND SPECIFICATIONS.
3. GROUNDWATER BARRIER TO BE CONCRETE, BENTONITE, CLSM CONCRETE, OR OTHER CITY APPROVED MATERIAL. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

SECTION A-A



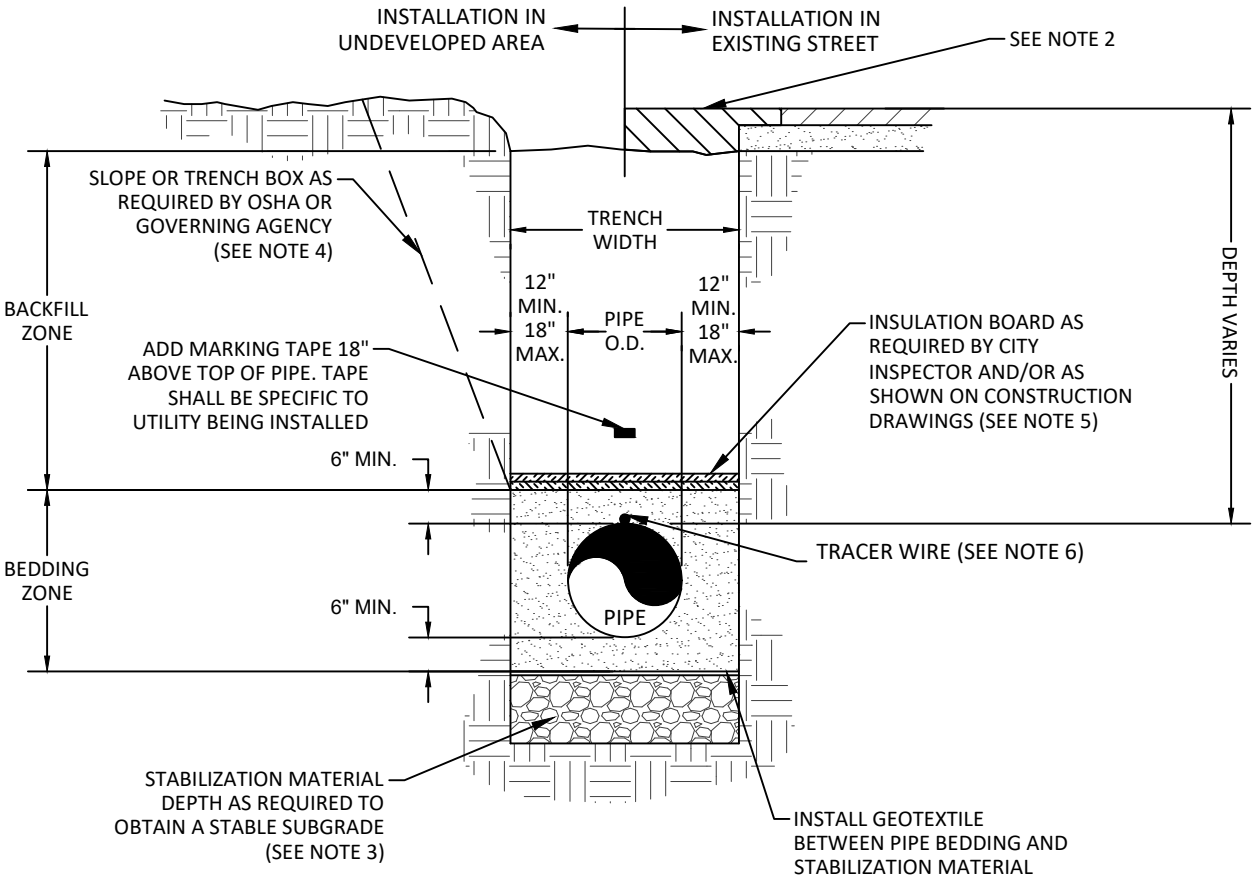
PLAN VIEW

City of Greeley Colorado

GROUNDWATER BARRIER

DETAIL WS-1

DATE: JANUARY 2023 SCALE: N.T.S.



NOTES:

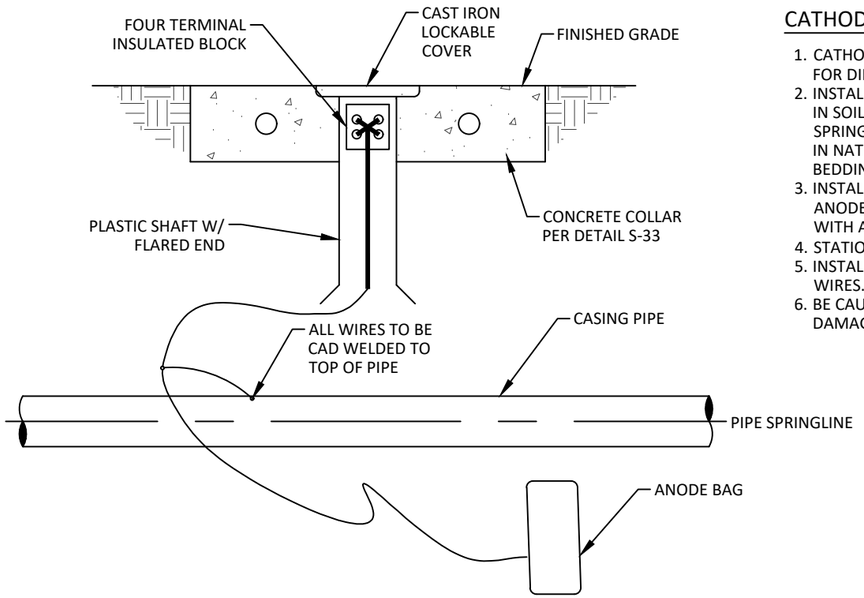
1. REFER TO WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR STABILIZATION, GEOTEXTILE, BEDDING, BACKFILL MATERIAL, COMPACTION, AND MARKING TAPE REQUIREMENTS. FOR ANY CONFLICT BETWEEN WATER AND SEWER AND PUBLIC WORKS BACKFILL MATERIAL SPECIFICATIONS AND COMPACTION REQUIREMENTS, THE MORE STRINGENT SPECIFICATION SHALL APPLY.
2. REFER TO STREETS DETAIL S-31 "EXISTING STREET PAVEMENT PATCH DETAIL FOR ASPHALT & CONCRETE", CURRENT VERSION, FOR STREET CUT REQUIREMENTS.
3. AN OVER EXCAVATED TRENCH SHALL BE BACKFILLED AND COMPACTED WITH STABILIZATION OR BEDDING MATERIALS (AS PER SPECIFICATIONS) UNDER THE DIRECTION OF THE CITY.
4. TRENCHES SHALL BE SHORED, BRACED, OR SHEETED PER OSHA REQUIREMENT AND AS NECESSARY FOR THE SAFETY AND PROTECTION OF PERSONNEL AND OTHER UTILITIES.
5. INSULATION BOARD SHALL BE 2" THICK MINIMUM, CONSISTING OF TWO BOARDS (1" MINIMUM PER BOARD) WITH OFFSET JOINTS PLACED ACROSS FULL TRENCH WIDTH. REFER TO SPECIFICATIONS.
6. INSTALL TRACER WIRE ACCORDING TO SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.

City of Greeley Colorado

TRENCH CROSS SECTION

DETAIL WS-2

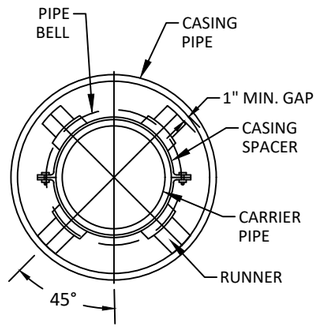
DATE: JANUARY 2023 SCALE: N.T.S.



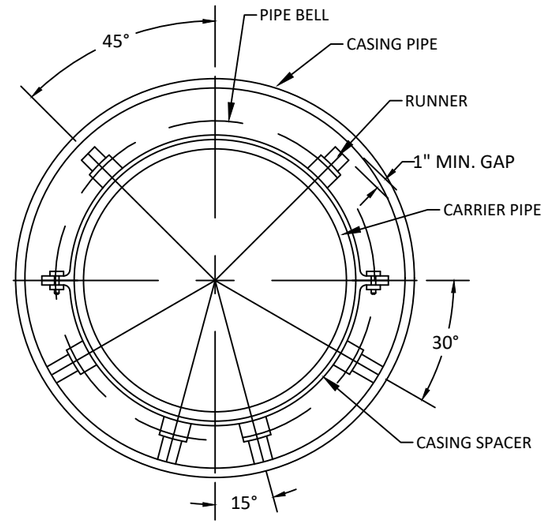
CATHODIC TEST STATION DETAIL

CATHODIC PROTECTION NOTES:

1. CATHODIC PROTECTION SHALL ONLY BE REQUIRED FOR DIP AND STEEL PIPES.
2. INSTALL THE ANODES VERTICALLY OR HORIZONTALLY IN SOIL WITH TOP OF ANODES BELOW THE SPRINGLINE OF THE PIPE. ANODES MUST BE PLACED IN NATIVE SOIL, NOT SELECT BACKFILL SUCH AS SAND, BEDDING, OR CRUSHED ROCK.
3. INSTALL A 17 LB HIGH POTENTIAL MAGNESIUM ANODE BAG ON EACH END OF STEEL CASING PIPES WITH A CATHODIC TEST STATION.
4. STATION TEST WIRES TO BE THHN/THWH.
5. INSTALL A MINIMUM OF 2 FT SLACK AT EACH END OF WIRES.
6. BE CAUTIOUS DURING BACKFILLING. TO NOT DAMAGE OR STRESS WIRES OR CONNECTIONS.



FOR CARRIER PIPES 4"-12"

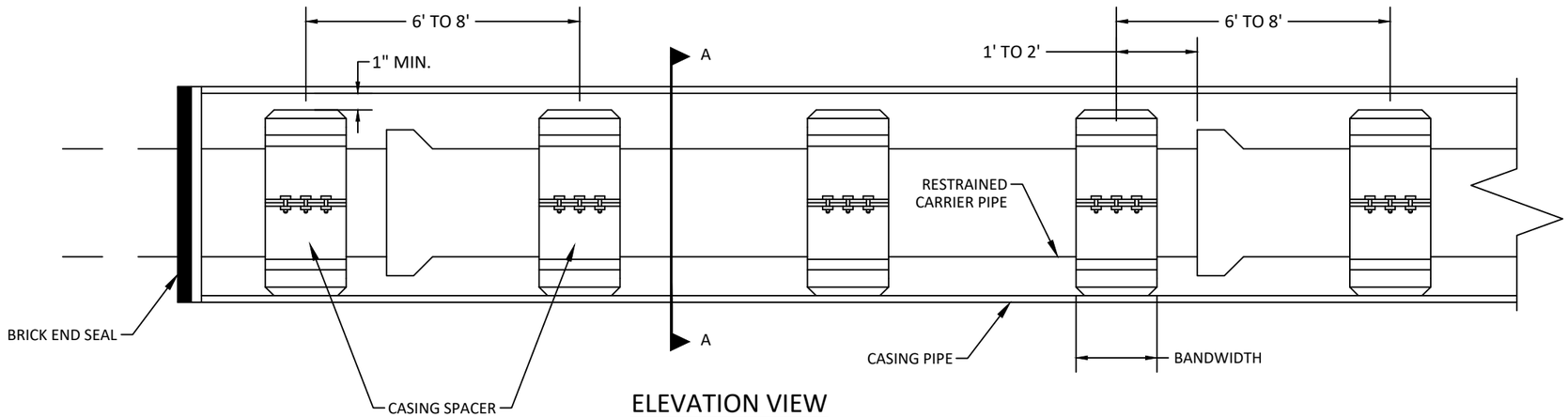


FOR CARRIER PIPES 15" & 16"

SECTION A-A

NOTES:

1. CASING PIPE, CASING SPACERS, AND END SEALS TO BE INSTALLED PER WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS).
2. RECOMMENDED CASING SPACER POSITIONING - PLACE ONE CASING SPACER 1-2 FT ON EITHER SIDE OF THE BELL JOINT AND ONE EVERY 6-8 FT APART THERE AFTER FOR A TOTAL OF 3 CASING SPACERS PER PIPE LENGTH UNLESS OTHERWISE SPECIFIED BY THE MANUFACTURER OR CITY.
3. FOR 12" DIAMETER AND SMALLER CARRIER PIPES, USE 8" CASING SPACER BANDWIDTH.
4. FOR CARRIER PIPES LARGER THAN 12" DIAMETER, USE 12" CASING SPACER BANDWIDTH.
5. CASING SPACERS TO BE IN THE "CENTER RESTRAINED" POSITION.
6. REFER TO SPECIFICATIONS, LATEST REVISION, FOR PIPE CASING SIZES AND MATERIALS.
7. ALL BORINGS & ENCASEMENTS WILL REQUIRE WATERTIGHT END SEALS AS SHOWN AND GROUT FILLED ANNULAR SPACE.
8. RESTRAINTS ARE REQUIRED TO NOT OVER INSERT PIPE AND ALLOWS FOR INSTALLATION OR REMOVAL OF PIPING.



ELEVATION VIEW

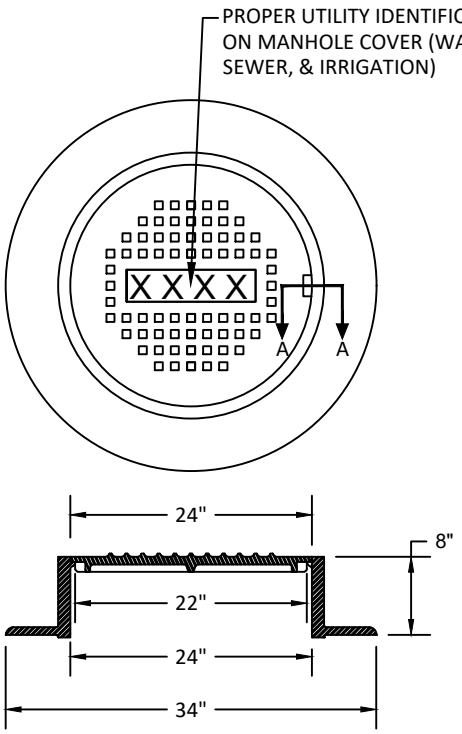
City of Greeley Colorado

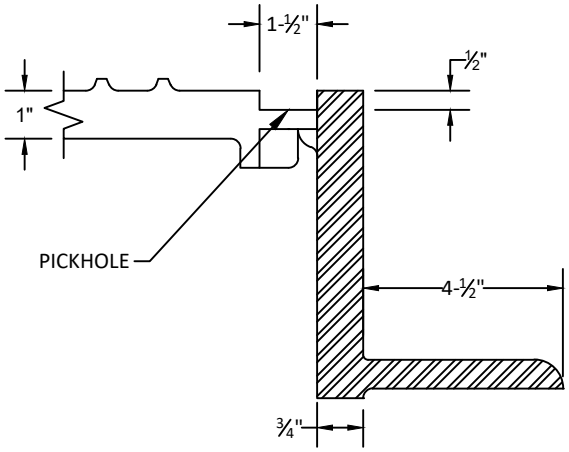
BORING AND ENCASEMENTS

DETAIL WS-3

DATE: JANUARY 2023

SCALE: N.T.S.





SECTION A-A PICK OPENING

NOTES:

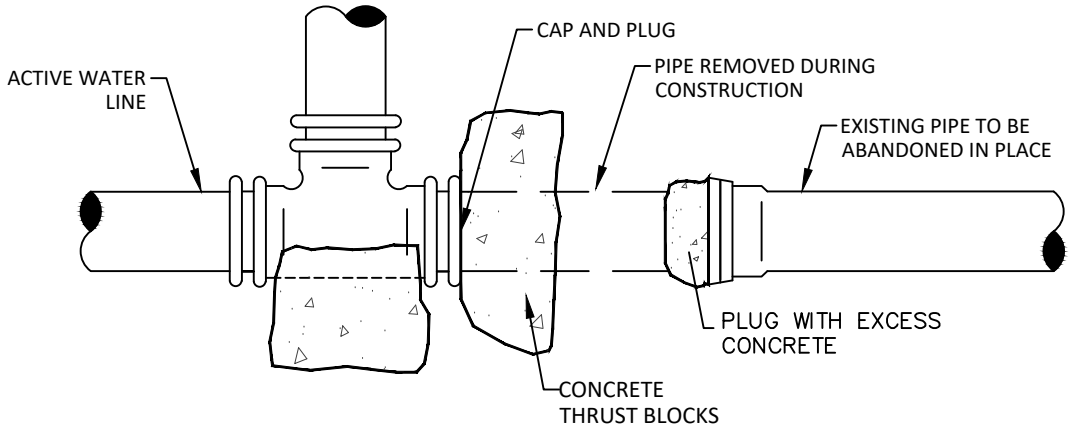
1. THE "PROPER UTILITY" DESIGNATION SHALL BE CAST IN THE COVER (WATER, SEWER, IRRIGATION).
2. ALL RINGS SHALL BE A MAXIMUM EIGHT-INCH (8") IN HEIGHT
3. STANDARD IRON RING AND COVERS SHALL BE HS-20 LOADING, CAPABLE CAST IRON CONFORMING TO ASTM A48 CLASS 305B, WITH A BLACK BITUMINOUS FINISH.
   - 3.1. HORIZONTAL BEARING SURFACES OF ALL RINGS AND COVERS SHALL BE MACHINED TO ELIMINATE ANY ROCKING ACTION OR NON-UNIFORM BEARING.
   - 3.2. PICK-HOLE SHALL BE ONE AND ONE-HALF INCH (1-½") WIDE BY ONE-HALF INCH (½") DEEP.
4. COVERS SHALL BE NON-PERFORATED CHECKER PATTERN WITH MAXIMUM 3/16" "RAISED PATTERN IN NON-PEDESTRIAN TRAFFIC AREAS AND NON-PERFORATED, NON-SKID PATTERN COMPLYING WITH AMERICAN WITH DISABLITIES ACT (ADA) REQUIREMENTS IN PEDESTRIAN TRAFFIC AREAS.
5. MANHOLE COVERS LOCATED WITHIN DESIGNATED 100-YEAR FLOODPLAINS AND AREAS SUBJECT TO WATER INUNDATION SHALL BE THE NON-PERFORATED, WATER TIGHT, SOLID BOLT DOWN, & GASKETED COVER.
6. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION FOR ALL ACCEPTABLE RING AND COVER MANUFACTURERS & MODELS.

City of Greeley Colorado

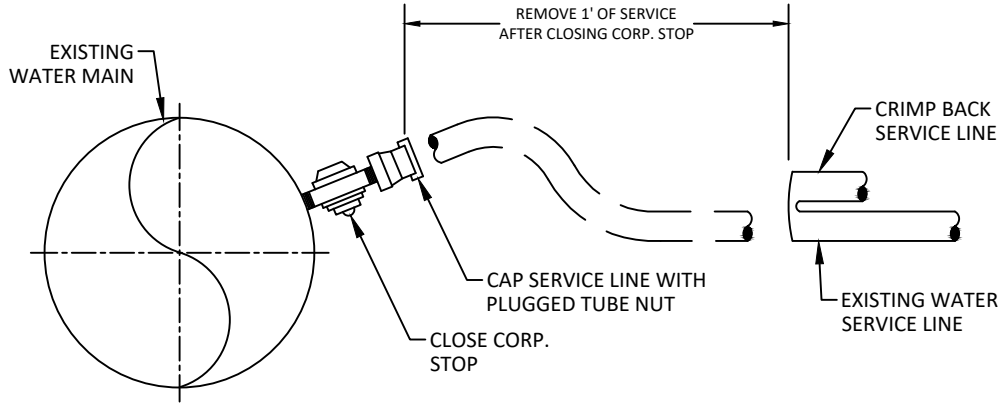
(TYP) MANHOLE COVER

DETAIL WS-4

DATE: JANUARY 2023 SCALE: N.T.S.



EXISTING WATER MAIN ABANDONMENT DETAIL



EXISTING WATER SERVICE ABANDONMENT DETAIL

NOTES:

WATER MAIN ABANDONMENT

1. EXISTING WATER MAINS ABANDONED SHALL BE PLUGGED AND CAPPED AT NEAREST VALVE OR TEE OF ACTIVE WATER LINE AND SHALL HAVE CONCRETE THRUST BLOCK SIZED FOR DEAD ENDS REFERENCED IN DETAILS W-2A AND W-2B.
2. WATER MAIN ABANDONMENT MUST BE SCHEDULED WITH THE CITY 72 HOURS IN ADVANCE AT 970-350-9320.

WATER SERVICE ABANDONMENT

1. EXISTING WATER SERVICES THAT ARE TO BE ABANDONED SHALL BE ABANDONED AT THE MAIN.
2. SERVICE SHALL HAVE THE CORPORATION STOP CLOSED.
3. PLUGGED TUBE NUT SHALL BE INSTALLED NEAREST TO THE CORPORATION STOP.
4. THE END FURTHEST FROM THE CORPORATION STOP SHALL BE CRIMPED BACK.
5. REMOVE CURB STOP AT PROPERTY LINE.
6. IF THE SERVICE TO BE ABANDONED WAS DIRECTLY TAPPED ONTO THE MAIN, THE SERVICE MUST BE ABANDONED AT THE MAIN WITH THE SERVICE PIPE REMOVED AND A STAINLESS STEEL ROMAC REPAIR BAND PLACED OVER THE TAP.
7. WATER SERVICE ABANDONMENT MUST BE SCHEDULED WITH THE CITY 72 HOURS IN ADVANCE AT 970-350-9320.

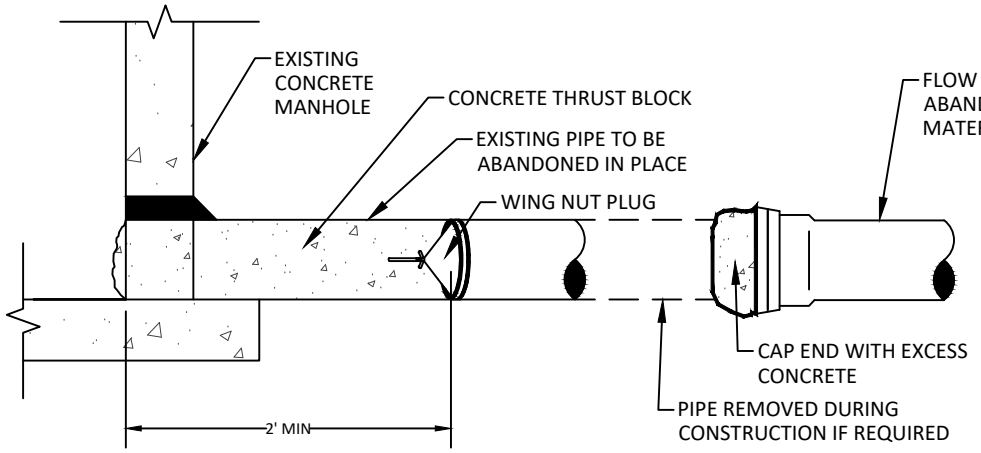
City of Greeley Colorado

EXISTING WATER SERVICE & MAIN ABANDONMENT

DETAIL WS-5

DATE: JANUARY 2023

SCALE: N.T.S.



EXISTING SANITARY SEWER MAIN ABANDONMENT DETAIL

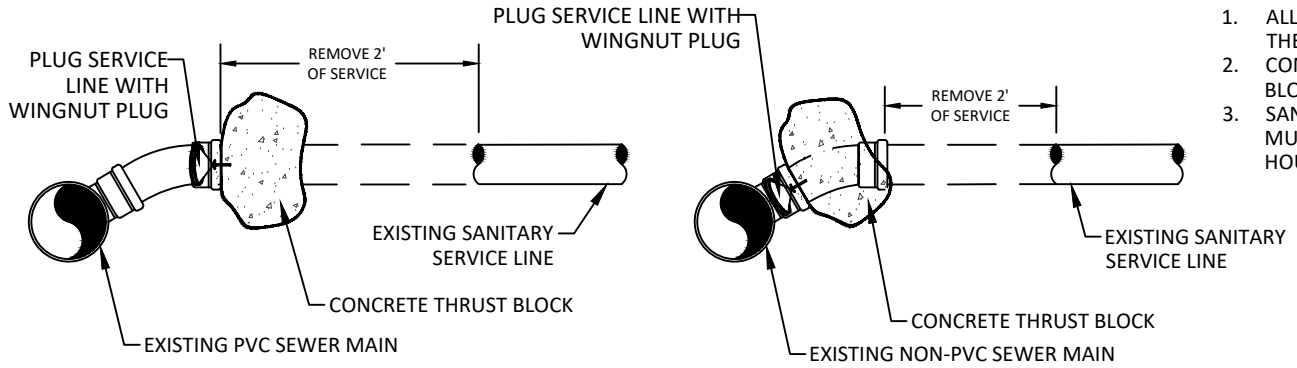
NOTES:

SANITARY SEWER MAIN ABANDONMENT

1. EXISTING SANITARY SEWER MAINS AND SERVICES ABANDONED IN MANHOLES SHALL HAVE A WING NUT PLUG PLACED 2' OUTSIDE OF MANHOLE & HAVE A CONCRETE THRUST BLOCK PLACED FROM INSIDE THE MANHOLE TO THE WING NUT PLUG.
2. ALL ABANDONED MAINS SHALL HAVE BOTH ENDS CAPPED AND ABANDON.
3. ANY EXISTING VITRIFIED CLAY PIPE (VCP) SHALL BE FLOW FILLED COMPLETELY. ALL OTHER PIPE MATERIALS SHALL BE CAPPED ON BOTH ENDS WITH CONCRETE.
4. SANITARY SEWER MAIN ABANDONMENT MUST BE SCHEDULED WITH THE CITY 72 HOURS IN ADVANCE AT 970-350-9322.

SANITARY SEWER SERVICE ABANDONMENT

1. ALL SEWER SERVICES SHALL BE PLUGGED AT THE SEWER MAIN.
2. CONTRACTOR TO INSTALL CONCRETE THRUST BLOCK BEHIND THE WING NUT PLUG.
3. SANITARY SEWER SERVICE ABANDONMENT MUST BE SCHEDULED WITH THE CITY 72 HOURS IN ADVANCE AT 970-350-9322.



EXISTING SANITARY SEWER SERVICE ABANDONMENT DETAIL

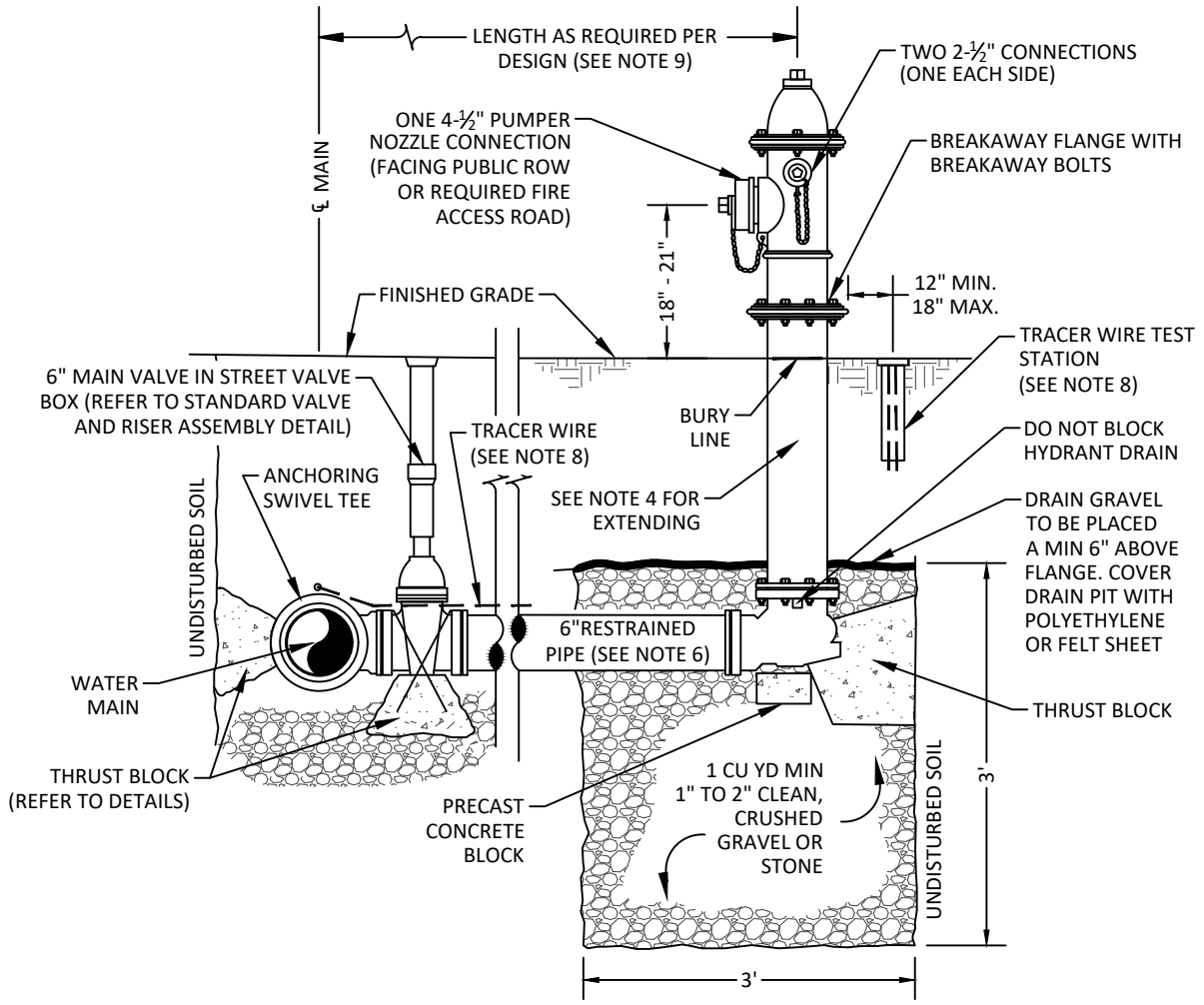
City of Greeley Colorado

EXISTING SANITARY SEWER SERVICE & MAIN ABANDONMENT

DETAIL WS-6

DATE: JANUARY 2023

SCALE: N.T.S.



ELEVATION VIEW

NOTES:

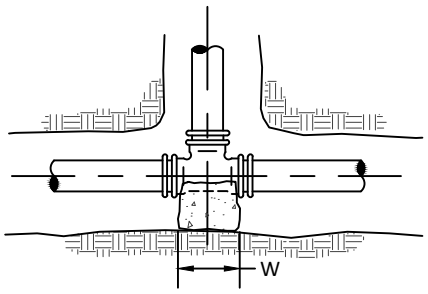
1. MINIMUM DEPTH OF BURY 5'-6' FROM FINISHED GRADE TO TOP OF PIPE.
2. PROVIDE POLYETHYLENE BOND BREAKER BETWEEN ALL PIPE/FITTINGS AND POURED CONCRETE.
3. FIRE HYDRANTS MUST BE PURCHASED FROM W&S OPERATIONS WITH A MINIMUM 48 HOUR NOTICE. CALL TO ORDER 970-350-9320.
4. ONLY A SINGLE FIRE HYDRANT EXTENSION IS PERMITTED. FIRE HYDRANT EXTENSION MAY BE UP TO 36" (MAX) PER WATER & SEWER SPECIFICATIONS (W&S).
5. GRADELOK EXTENSIONS WILL BE ALLOWED FOR UP TO 2' MAXIMUM ELEVATION ADJUSTMENTS. ANY OTHER EXTENSIONS MUST BE APPROVED BY W&S DEPARTMENT.
6. ALL BURIED VALVES, FITTINGS, AND APPURTENANCES SHALL BE RESTRAINED AND INSTALLED PER W&S SPECIFICATIONS, LATEST REVISION.
7. EITHER D.I.P. OR PVC IS ACCEPTABLE FOR HYDRANT LATERAL PIPE MATERIAL.
8. BEDDING AND BACKFILL SHALL BE PLACED PER W&S SPECIFICATIONS
9. INSTALL TEST STATION AND TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.
10. HYDRANT DISTANCE FROM MAIN SHALL BE SUCH THAT THE MINIMUM FIRE FLOW AND PRESSURE MEETS WATER & SEWER DESIGN CRITERIA, LATEST REVISION. THE MAXIMUM DISTANCE A HYDRANT MAY BE FROM THE MAIN SHALL NOT EXCEED 150 FT UNLESS FURTHER HYDRAULIC ANALYSIS IS PERFORMED AND APPROVED BY THE CITY OF GREELEY WATER & SEWER DEPARTMENT.

City of Greeley Colorado

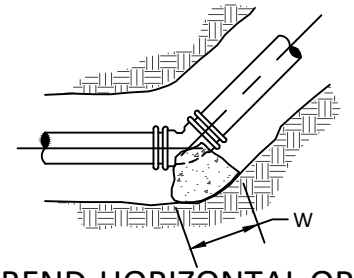
FIRE HYDRANT ASSEMBLY

DETAIL W-1

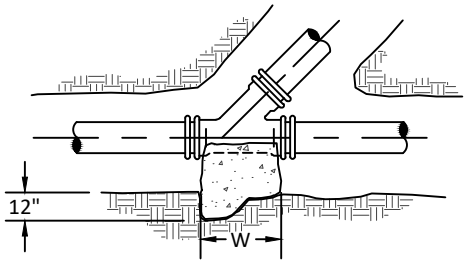
DATE: JANUARY 2023 SCALE: N.T.S.



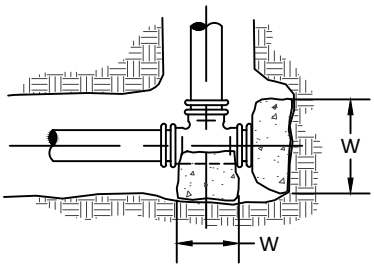
TEE



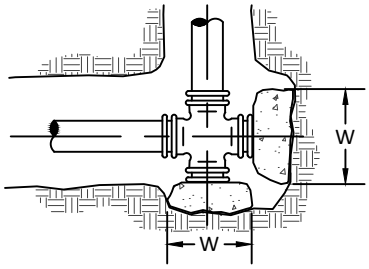
BEND-HORIZONTAL OR BOTTOM OF VERTICAL



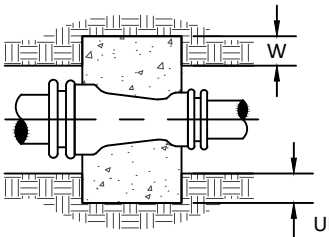
WYE



TEE W/DEAD END ON RUN

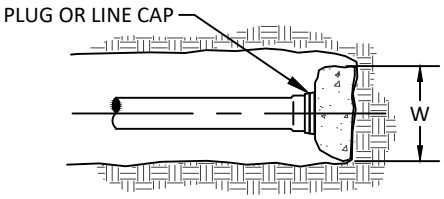


CROSS WITH DEAD END BRANCHES

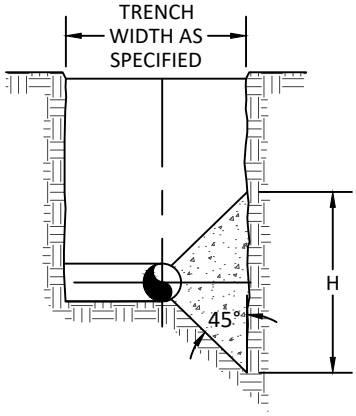


REDUCER

UNDISTURBED EARTH VARIES REFER TO EQUATION ON DETAIL W-4



DEAD END



SECTION (TYPICAL)

NOTES:

1. SEE TABLE ON W-2B OF THRUST BLOCK DETAILS FOR MINIMUM AREA OF CONCRETE TO BEAR ON UNDISTURBED EARTH.
2. POLYETHYLENE BOND BREAKER SHALL BE INSTALLED BETWEEN ALL FITTINGS AND CONCRETE.

City of Greeley Colorado

HORIZONTAL THRUST BLOCKS

DETAIL W-2A

DATE: JANUARY 2023 SCALE: N.T.S.

THRUST BLOCK BEARING AREAS (SQ-FT) FOR INTERNAL STATIC PRESSURE OF 150 PSI, DIP I.D., SOIL BEARING CAPACITY OF 1000 PSF AND 1.5 SAFETY FACTOR (S.F.)

PIPE SIZE	90° BEND	45° BEND	22½° BEND	11¼° BEND	DEAD ENDS, VALVES & TEES, PLUGGED CROSS BRANCHES
4"	3.3	2.5	1.3	0.6	3.3
6"	10.2	5.5	2.8	1.4	7.2
8"	18.3	9.9	5.0	2.5	12.9
12"	39.9	21.6	11.0	5.5	28.2
16"	70.5	38.2	19.5	9.8	49.9
20"	SPECIAL DESIGN REQUIRED				
24"					

UNDISTURBED EARTH [FT^2] = W [FT] X H [FT]

THRUST FORCE FOR REDUCERS [LB] =TEST PRESSURE [PSI] X (A_{LARGE} [IN^2] - A_{SMALL} [IN^2])

$\therefore$ GRAVITY BLOCK SIZE FOR REDUCERS [FT^2] =0.225 X (A_{LARGE} [IN^2] - A_{SMALL} [IN^2])

NOTES:

1. POLYETHYLENE BOND BREAKER SHALL BE INSTALLED BETWEEN ALL FITTINGS AND CONCRETE.
2. ALL THRUST BLOCKING SHALL BE CAST-IN-PLACE CONCRETE WITH A MINIMUM YIELD 28 DAY STRENGTH OF 2500 P.S.I.
3. THRUST BLOCKING SHALL BE CAST AGAINST UNDISTURBED SOIL. FORMS SHALL BE USED AS REQUIRED TO OBTAIN ADEQUATE BEARING AREA AND TO CONFINE THE CONCRETE. THRUST BLOCKING SHALL BEAR ON THE FITTING OR END CAP ONLY AND WILL NOT BE ALLOWED TO SPILL OVER THE JOINT OR AGAINST THE PIPE.
4. THE CITY MAY REQUIRE LARGER THRUST BLOCKS THAN SPECIFIED IF SOILS ARE DETERMINED TO PROVIDE LESS THAN 1000 PSF BEARING CAPACITY.
5. IN THE ABSENCE OF SOIL BEARING CAPACITY INFORMATION USE 1000 PSF.
6. NO LESS THAN 150 PSI TEST PRESSURE SHALL BE USED FOR THRUST BLOCK CALCULATIONS.
7. BEARING AREAS FOR ANY PRESSURE AND SOIL BEARING CAPACITY MAY BE OBTAINED BY MULTIPLYING THE TABULATED BEARING AREAS BY A CORRECTION FACTOR "F":

$$F = \frac{(\text{ACTUAL SPECIFIED TEST PRESSURE IN PSI})/(150\ \text{PSI})}{(\text{ACTUAL SOIL BEARING CAPACITY IN PSF})/(1000\ \text{PSF})}$$

8. EXAMPLE: CALCULATE THE BEARING AREA FOR 8"-90° BEND WITH A TEST PRESSURE OF 200 PSI AND SOIL BEARING CAPACITY OF 3000 PSF.

FROM TABLE BEARING AREA = 18.3 SF

$$F = \frac{(200\ \text{PSI})/(150\ \text{PSI})}{(3000\ \text{PSF})/(1000\ \text{PSF})} = 0.44$$

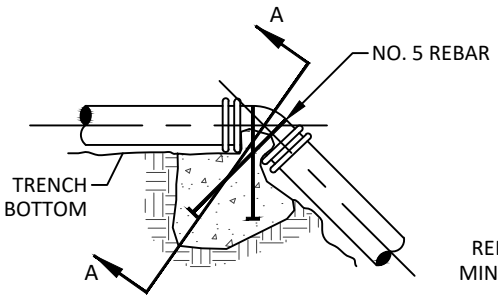
REQUIRED BEARING AREA ON UNDISTURBED SOIL = (0.44)(18.3 SF) = 8.1 SF

City of Greeley Colorado

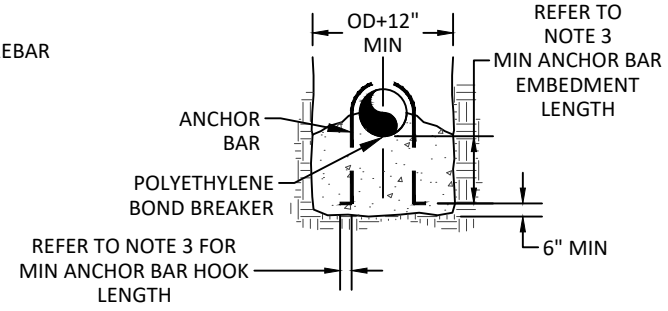
HORIZONTAL THRUST BLOCKS

DETAIL W-2B

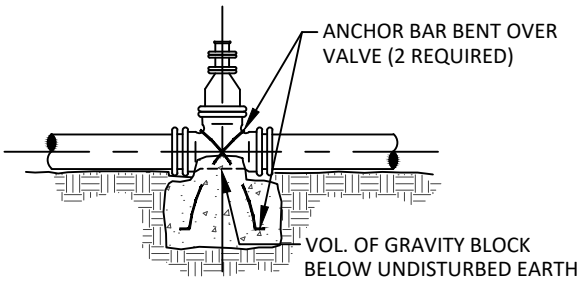
DATE: JANUARY 2023 SCALE: N.T.S.



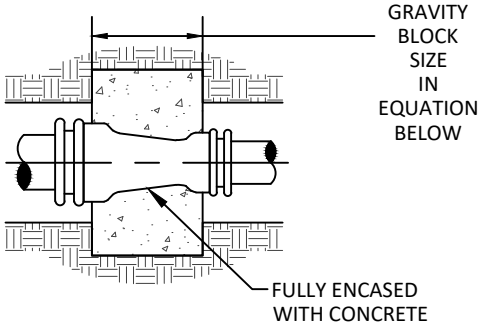
TOP OF VERTICAL BEND



SECTION A-A



VALVE
(GATE OR BUTTERFLY)



REDUCER

VOL. OF GRAVITY CONCRETE BLOCK (CU FT)

PIPE SIZE	BENDS		
	45°	22 ½°	11 ¼°
4"	16.7	8.5	4.3
6"	36.9	18.8	9.5
8"	65.9	33.6	16.9
12"	144.1	73.4	36.9
16"	254.5	129.7	65.2
20"	SPECIAL DESIGN REQUIRED		
24"			

NOTES:

1. POLYETHYLENE BOND BREAKER SHALL BE INSTALLED BETWEEN ALL FITTINGS AND CONCRETE.
2. ALL ANCHOR BARS SHALL BE EPOXY COATED NO. 5 REBAR AND SHALL BE EMBEDDED IN CONCRETE TO WITHIN 6" OF END OF CONCRETE BLOCK AND SHALL HAVE MINIMUM 6" HOOK LENGTH.

GRAVITY CONCRETE BLOCK SIZES SHOWN IN TABLE ARE BASED ON 150 LB/FT^3 DENSITY FOR CONCRETE, 150 PSI TEST PRESSURE, AND A SAFETY FACTOR OF 1.5.

$$\text{GRAVITY BLOCK SIZE } [FT^3] = \frac{\text{SAFETY FACTOR X THRUST FORCE [LB]}}{\text{DENSITY OF BLOCK MATERIAL [LB/FT}^3\text{]}}$$

$$\text{THRUST FORCE FOR REDUCERS [LB]} = \text{TEST PRESSURE [PSI]} \times (A_{LARGE}\ [IN^2] - A_{SMALL}\ [IN^2])$$

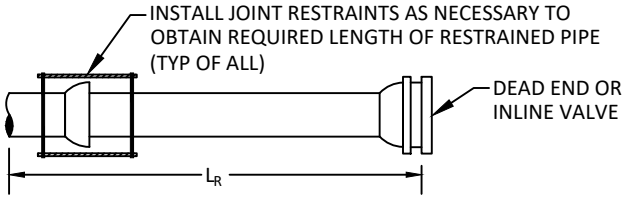
$$\therefore \text{ GRAVITY BLOCK SIZE FOR REDUCERS } [FT^3] = 1.5 \times (A_{LARGE}\ [IN^2] - A_{SMALL}\ [IN^2])$$

City of Greeley Colorado

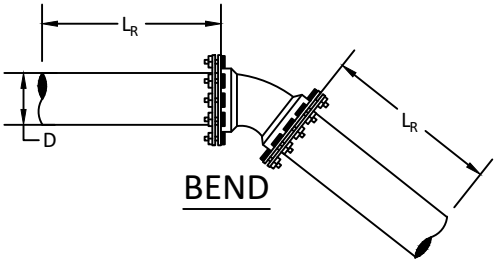
GRAVITY THRUST BLOCKS

DETAIL W-3

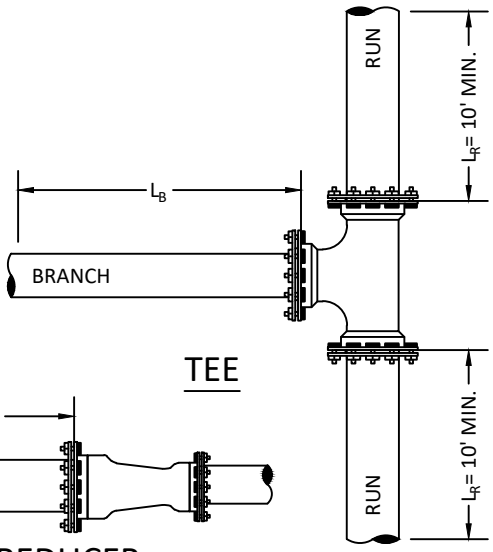
DATE: JANUARY 2023 SCALE: N.T.S.



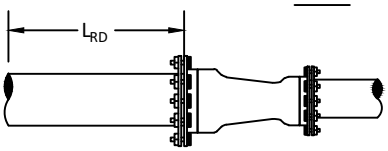
DEAD ENDS OR INLINE VALVES



BEND



TEE



REDUCER

DI PIPE (POLYETHYLENE-ENCASED): MINIMUM LENGTHS OF RESTRAINED PIPE - IN FEET

PIPE SIZES (D")		BENDS (L_R)				TEE (L_B)	DEAD ENDS/ INLINE VALVES (L_R)	REDUCERS (L_{RD})
RUN	BRANCH	11¼° BEND	22½° BEND	45° BEND	90° BEND			
4"	4"	5	5	10	15	5	50	-
6"	4"	-	-	-	-	5	-	40
	6"	5	5	10	20	5	70	-
8"	4"	-	-	-	-	5	-	65
	6"	-	-	-	-	5	-	40
	8"	5	10	15	30	15	90	-
12"	4"	-	-	-	-	5	-	115
	6"	-	-	-	-	5	-	95
	8"	-	-	-	-	5	-	70
	12"	5	10	20	40	55	130	-
16"	4"	-	-	-	-	5	-	155
	6"	-	-	-	-	5	-	140
	8"	-	-	-	-	5	-	120
	12"	-	-	-	-	24	-	70
	16"	5	10	20	50	90	165	-

NOTES:

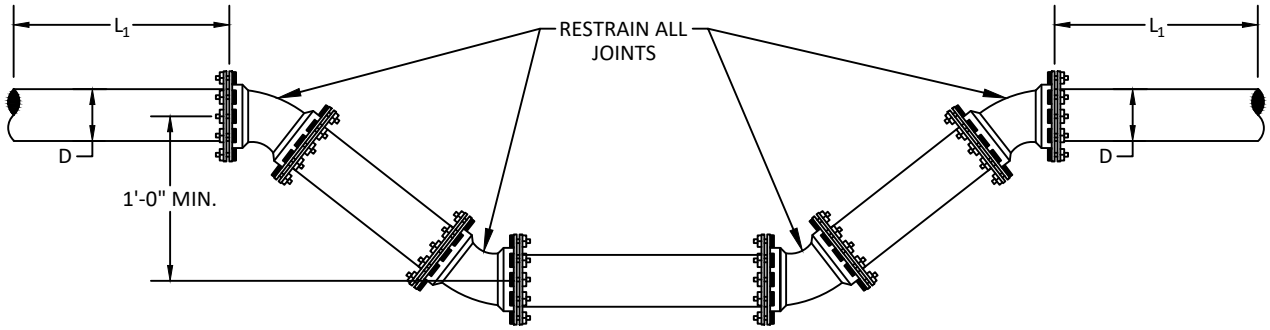
1. RESTRAINED LENGTHS SHOWN IN CHARTS ARE MINIMUM LENGTHS.
2. RESTRAINT SYSTEMS ON PIPE LARGER THAN 16-INCH DIAMETER SHALL BE DESIGNED FOR CONDITIONS EXISTING AT INSTALLATION SITE.
3. THE CHARTS ARE BASED ON THE FOLLOWING ASSUMPTIONS:
   A. 150 PSI TEST PRESSURE
   B. 1.5 SAFETY FACTOR
   C. 4-FT BURY DEPTH
   D. SOIL TYPE: ML, AS DEFINED BY AWWA M23 AND M41
   E. TRENCH TYPE: #4, AS DEFINED BY AWWA M23 AND M41.
4. THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING THE ACTUAL SITE CONDITIONS WITH RESPECT TO THE ASSUMPTIONS LISTED ABOVE.
5. IF LENGTHS CANNOT BE MET FOR DEAD ENDS AND/OR TEES, DESIGN ENGINEER SHALL SPECIFY RESTRAINED LENGTHS OR A COMBINATION OF THRUST BLOCKS AND RESTRAINTS.
6. BOTH ENDS OF INLINE VALVES SHALL BE RESTRAINED AT THE SPECIFIED RESTRAINT LENGTH (L_R) SHOWN IN TABLE.

City of Greeley Colorado

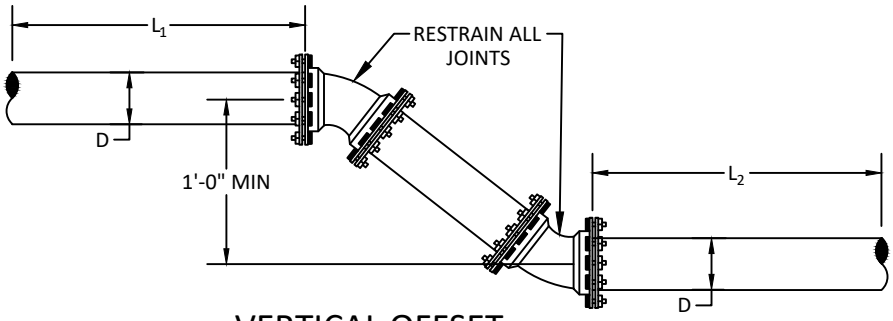
HORIZONTAL PIPE RESTRAINT

DETAIL W-4A

DATE: JANUARY 2023 SCALE: N.T.S.



VERTICAL LOWERING



VERTICAL OFFSET

DI PIPE (POLYETHYLENE-ENCASED): MINIMUM LENGTHS OF RESTRAINED PIPE - IN FEET

PIPE SIZES (D")	VERTICAL BENDS					
	11¼° BEND		22½° BEND		45° BEND	
	L_1	L_2	L_1	L_2	L_1	L_2
4"	5	5	10	5	25	5
6"	10	5	15	5	30	10
8"	10	5	20	5	40	10
12"	15	5	30	10	55	15
16"	20	5	35	10	70	20

NOTES:

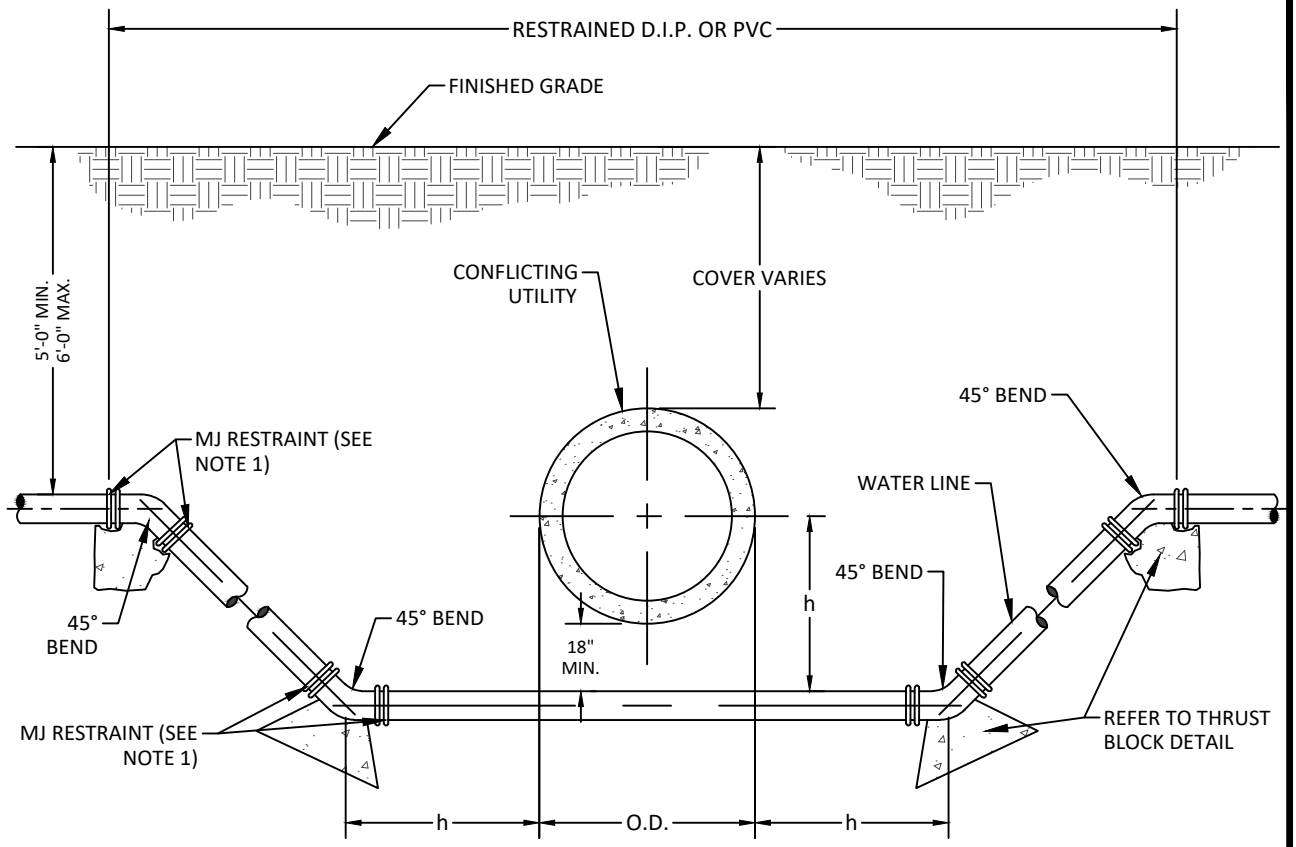
1. RESTRAINED LENGTHS SHOWN IN CHARTS ARE MINIMUM LENGTHS.
2. RESTRAINT SYSTEMS ON PIPE LARGER THAN 16-INCH DIAMETER SHALL BE DESIGNED FOR CONDITIONS EXISTING AT INSTALLATION SITE.
3. THE CHARTS ARE BASED ON THE FOLLOWING ASSUMPTIONS:
   A. 150 PSI TEST PRESSURE
   B. 1.5 SAFETY FACTOR
   C. 4-FT BURY DEPTH
   D. SOIL TYPE: ML, AS DEFINED BY AWWA M23 AND M41
   E. TRENCH TYPE: #4, AS DEFINED BY AWWA M23 AND M41
4. THE DESIGN ENGINEER IS RESPONSIBLE FOR VERIFYING THE ACTUAL SITE CONDITIONS WITH RESPECT TO THE ASSUMPTIONS LISTED ABOVE.
5. IF LENGTHS CANNOT BE MET FOR DEAD ENDS AND/OR TEES, DESIGN ENGINEER SHALL SPECIFY RESTRAINED LENGTHS OR A COMBINATION OF THRUST BLOCKS AND RESTRAINTS.

City of Greeley Colorado

VERTICAL PIPE RESTRAINT

DETAIL W-4B

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

1. ALL FOUR VERTICAL 45-DEGREE BENDS SHALL BE RESTRAINED BY MECHANICAL JOINT RESTRAINTS AND THRUST BLOCKS PER THE LATEST REVISION OF W&S THRUST BLOCK DETAILS. ALL BURIED PIPE, FITTINGS, AND APPURTENANCES SHALL BE RESTRAINED AND INSTALLED PER WATER & SEWER (W&S) SPECIFICATIONS, LATEST REVISION.
2. INSTALL TRACER WIRE ACCORDING TO WATER & SEWER SPECIFICATIONS AND STANDARD UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.
3. MINIMUM CLEARANCE FROM CONFLICTING UTILITY SHALL BE NO LESS THAN 18 INCHES AT THE NEAREST DIMENSION OR ENCASED PER DETAIL WS-3.
4. INSULATION BOARD ABOVE THE WATERLINE IS REQUIRED IF THE WATER LINE CROSSES WITHIN 4 FEET OF STORMWATER CROSSINGS OR OTHER OPEN-AIR CONDUITS. IN SUCH CASES, INSULATION BOARD SHALL EXTEND 5 FT HORIZONTALLY ON EITHER SIDE OF THE CROSSING CONDUIT. PLACEMENT SHALL BE IN ACCORDANCE WITH THE SEPARATE TRENCH CROSS SECTION DETAIL AND W&S SPECIFICATIONS, LATEST REVISION OF EACH.

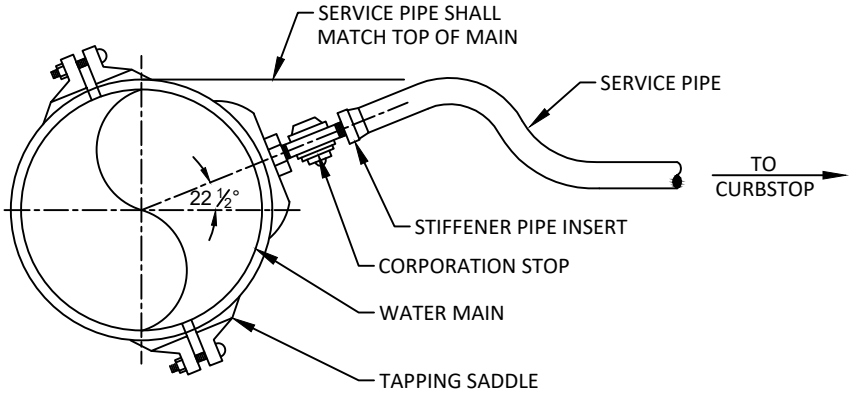
City of Greeley Colorado

VERTICAL PIPE LOWERING

DETAIL W-5

DATE: JANUARY 2023 SCALE: N.T.S.

TAPPING SADDLE:



ELEVATION VIEW

TYPE OF PIPE AND SIZE OF TAP												
PIPE SIZE	CAST IRON					DUCTILE IRON					PVC C-900	
	3/4"	1"	1 1/2"	2"	3"&4"	3/4"	1"	1 1/2"	2"	3"&4"	< 2"	> 2"
4"	S	S	NO	NO	TSV	S	S	NO	NO	TSV	S	TSV
6"	S	S	S	S	TSV	S	S	S	S	TSV	S	TSV
8"	S	S	S	S	TSV	S	S	S	S	TSV	S	TSV
12"	S	S	S	S	TSV	S	S	S	S	TSV	S	TSV
16"	S	S	S	S	TSV	S	S	S	S	TSV	N/A	N/A

"S" - TAPPING SADDLE REQUIRED, ALL SADDLES SHALL HAVE AWWA TAPER THREADS.
"NO" - NO TAP PERMITTED WITH OR WITHOUT A SADDLE, A TEE CONNECTION MAY BE PERMITTED IF SPECIFICALLY AUTHORIZED BY THE WATER DEPARTMENT.
"TSV" - TAPPING SLEEVE AND VALVE REQUIRED.
"N/A" - NOT APPLICABLE.

NOTES:

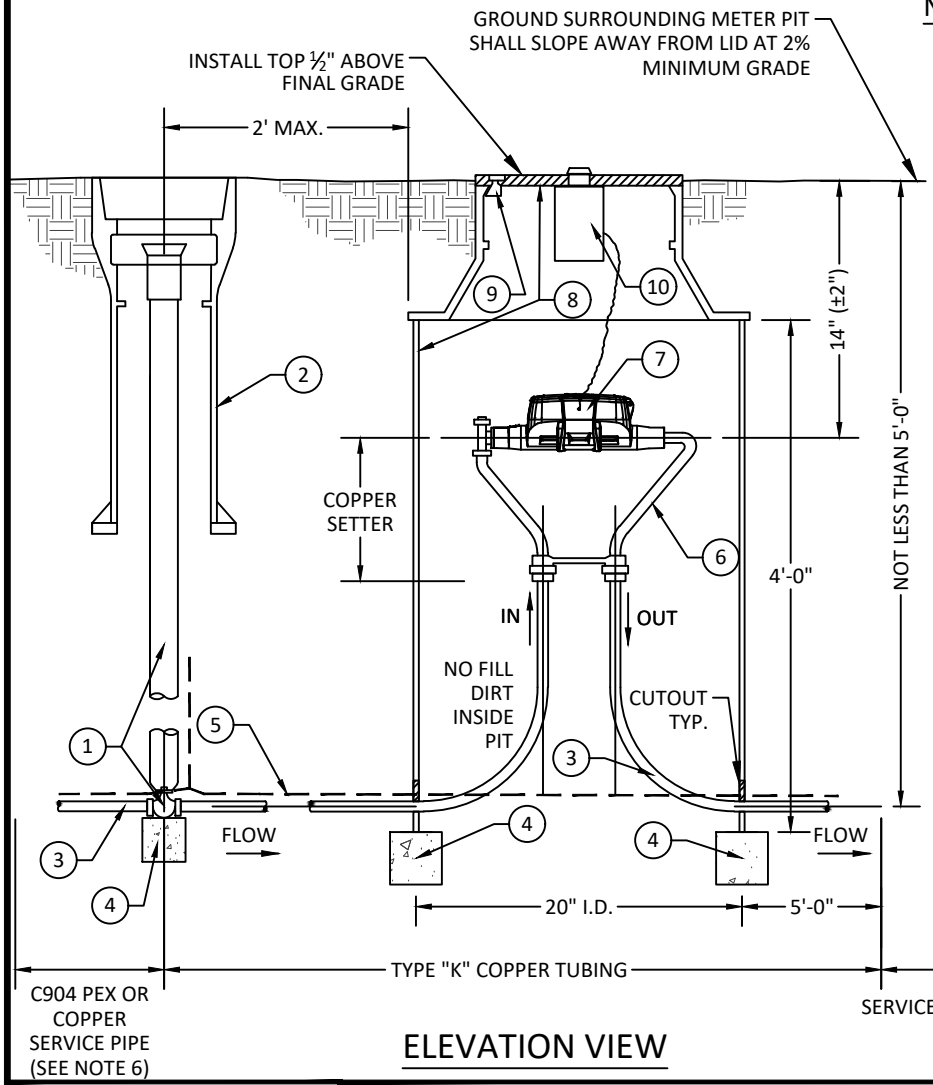
1. REFERENCE CITY OF GREELEY, WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR TAPPING SADDLE SPECIFICATIONS.
2. EXISTING STEEL MAINS, TWELVE INCHES (12") IN DIAMETER OR LESS, SHALL BE TAPPED USING A CITY ACCEPTED TAPPING SADDLE.
3. ALL BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL BE RESTRAINED AND INSTALLED PER CITY OF GREELEY WATER & SEWER SPECIFICATIONS, LATEST REVISION.
4. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.
5. REFER TO CITY OF GREELEY WATER AND SEWER SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MFR SPECIFICATIONS.
6. THIS DETAIL ALSO APPLIES TO NON-POTABLE IRRIGATION SERVICE CONNECTIONS TO NON-POTABLE IRRIGATION MAINS.
7. SERVICE TAPS ON WATER MAINS LARGER THAN 16" MAY BE CONSIDERED UNDER CERTAIN CIRCUMSTANCES WITH SPECIAL DESIGN ON A CASE-BY-CASE SCENARIO.
8. FOR ANY NEW WATER SERVICES TAPPING INTO EXISTING MAINS THE CONTRACTOR SHALL NOTIFY THE CITY 72 HOURS PRIOR AT 970-350-9320.

City of Greeley Colorado

WATER SERVICE CONNECTION

DETAIL W-6

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

1. METER MUST BE PURCHASED FROM THE WATER & SEWER (W&S) DEPARTMENT. NO EXCEPTIONS.
2. NOT FOR INSTALLATION IN ROADWAYS, DRIVEWAYS, OR PARKING AREAS.
3. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF INSTALLATION OF METER, OR GRADE CHANGES AFTER INSTALLATION, PROPERTY OWNER MUST ADJUST PIT TO MEET DEPTH AND SPECIFICATIONS.
4. NO CONCRETE FLOOR SHALL BE POURED IN METER PIT.
5. IF PRESSURE REDUCING VALVE AND/OR BACKFLOW DEVICE IS REQUIRED BY PLUMBING CODE, IT SHALL BE INSTALLED DOWNSTREAM OF METER PER BUILDING AND PLUMBING CODE.
6. COPPER SHALL NOT SHOW ANY VISIBLE SIGNS OF CRIMPING AND SHALL BE INSTALLED FROM CURB STOP TO 5 FEET PAST METER PIT.
7. FOR ADDITIONAL METER INSTALLATION REQUIREMENTS, REFER TO METER INSTALLATION NOTES ON CITY OF GREELEY W&S DETAIL W-15, LATEST REVISION.
8. REFER TO CITY OF GREELEY W&S DETAIL W-9 AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH, FOR CURB STOP, BOX, AND SERVICE PIPE REQUIREMENTS. IF CROSS-LINKED C904 PEX SERVICE LINE USED FROM CORP STOP TO CURB STOP THE PEX LINE MUST BE UPSIZED TO NEXT PIPE SIZE FROM METER SIZE TO REDUCE LOSS OF PRESSURE.
9. FOR PRODUCT AND MANUFACTURER SPECIFICATIONS, REFER TO CURRENT VERSION OF CITY OF GREELEY W&S CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION.
10. ALL BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH WATER & SEWER DEPARTMENT SPECIFICATIONS, LATEST REVISION.
11. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.

LEGEND	
1	CURB STOP VALVE & SERVICE BOX (SEE NOTE 8)
2	UPPER HALF OF STANDARD VALVE BOX (INSTALLED PER SPECIFICATIONS)
3	¾" OR 1" SERVICE PIPE (MATCH SERVICE PIPE I.D.) (SEE NOTE 8)
4	BRICK SUPPORT (PLACE ON UNDISTURBED SOIL)
5	TRACER WIRE (SEE NOTE 11)
6	COPPER METER SETTER (MFR PER SPECIFICATIONS)
7	METER UNIT (ORDER FROM CITY OF GREELEY METER SHOP)
8	COMPOSITE DOUBLE LID CONE OR APPROVED EQUAL (MFR PER SPECIFICATIONS)
9	STANDARD FORGED BRASS WATERWORKS PENTAGON HEAD WITH LOCKING SCREW
10	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)
11	TYPE K COPPER MATCHING METER SIZE

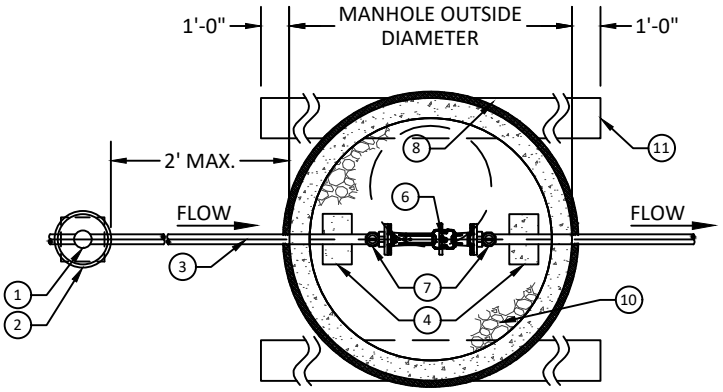
City of Greeley Colorado

OUTSIDE SETTING FOR ¾" & 1" POTABLE WATER METER

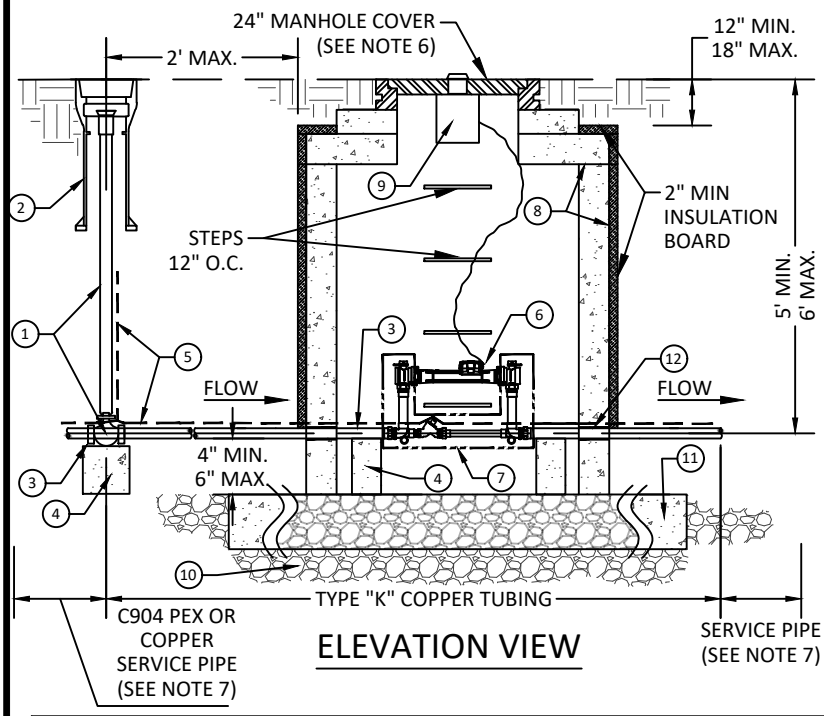
DETAIL W-7

DATE: JANUARY 2023

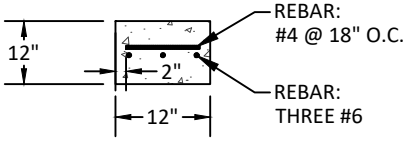
SCALE: N.T.S.



PLAN VIEW



ELEVATION VIEW



BASE BEAM DETAIL

NOTES:

1. METER MUST BE PURCHASED FROM THE WATER & SEWER (W&S) DEPARTMENT. NO EXCEPTIONS.
2. FOR PRODUCT AND MANUFACTURER SPECIFICATIONS, REFER TO CURRENT VERSION OF CITY OF GREELEY W&S CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS).
3. REFER TO W&S DETAIL W-15, LATEST REVISION, FOR ADDITIONAL METER INSTALLATION AND VAULT REQUIREMENTS.
4. ALL VAULTS, BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL MEET CITY OF GREELEY W&S SPECIFICATIONS, LATEST REVISION.
5. NO CONCRETE FLOOR SHALL BE POURED IN METER VAULT.
6. 24" MANHOLE COVER SHALL BE A WORM LOCK LID MARKED "WATER", REFER TO CITY OF GREELEY W&S SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.
7. REFER TO CITY OF GREELEY W&S DETAIL W-9 AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH, FOR CURB STOP, BOX, AND SERVICE PIPE REQUIREMENTS. IF CROSS-LINKED C904 PEX SERVICE LINE USED FROM CORP STOP TO CURB STOP THE PEX LINE MUST BE UPSIZED TO NEXT PIPE SIZE FROM METER SIZE TO REDUCE LOSS OF PRESSURE.
8. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.

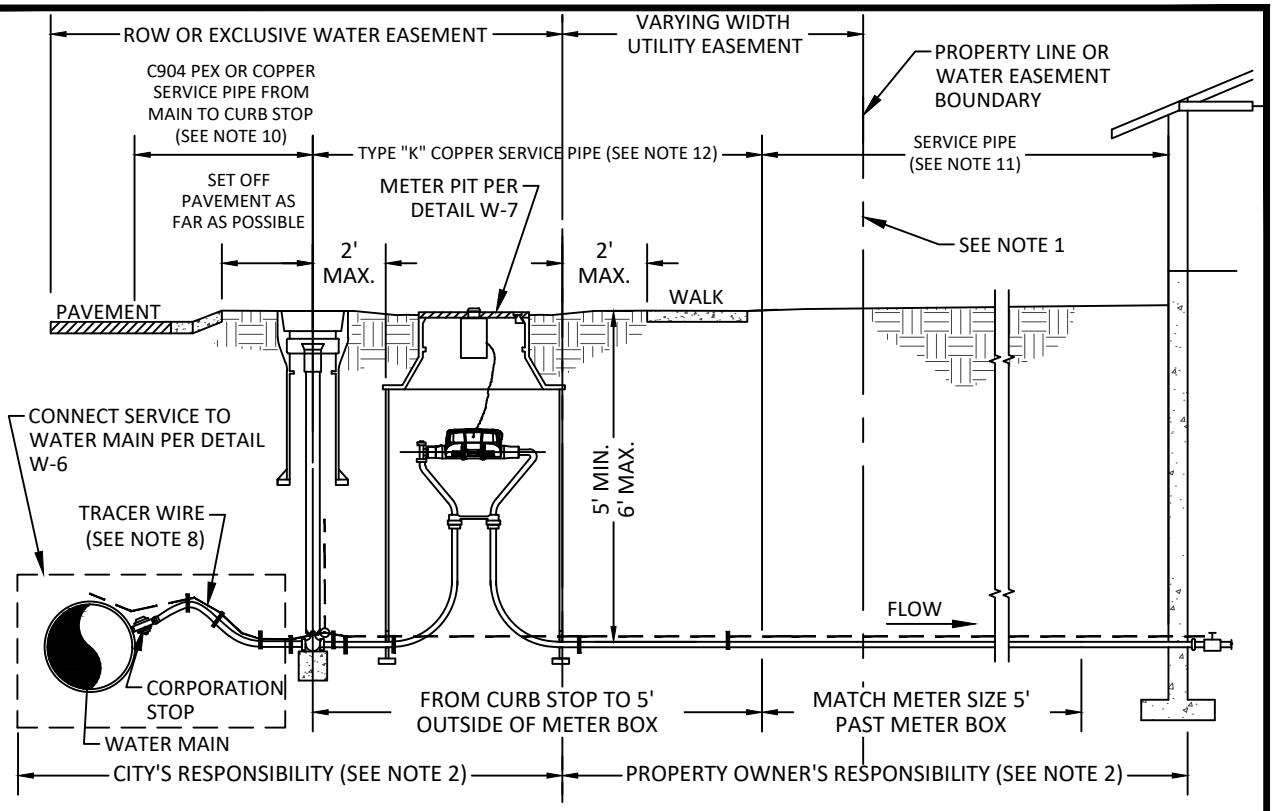
LEGEND	
1	CURB STOP VALVE AND SERVICE BOX
2	UPPER HALF OF STANDARD VALVE BOX (INSTALLED PER SPECIFICATIONS)
3	1-½" OR 2" SERVICE PIPE (MATCH SERVICE PIPE I.D.) (SEE NOTE 7)
4	BRICK SUPPORT (PLACED ON UNDISTURBED SOIL OR 1-½" STABILIZATION ROCK)
5	TRACER WIRE (SEE NOTE 9)
6	METER UNIT (ORDER FROM CITY OF GREELEY METER SHOP) (SEE NOTES 10 & 11)
7	COPPER METER SETTER (MFR PER SPECIFICATIONS)
8	48" DIAMETER OR SQUARE CONCRETE MANHOLE (SEE NOTE 4 FOR PRE-CAST)
9	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)
10	6" MIN OF SUBGRADE MATERIAL UNDER GRADE BEAM AND INSIDE VAULT PER SPECIFICATION
11	CONCRETE MANHOLE BASE BEAM (SEE BASE BEAM DETAIL)
12	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECIFICATION

City of Greeley Colorado

OUTSIDE SETTING FOR 1-½" & 2" POTABLE WATER METER

DETAIL W-8

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

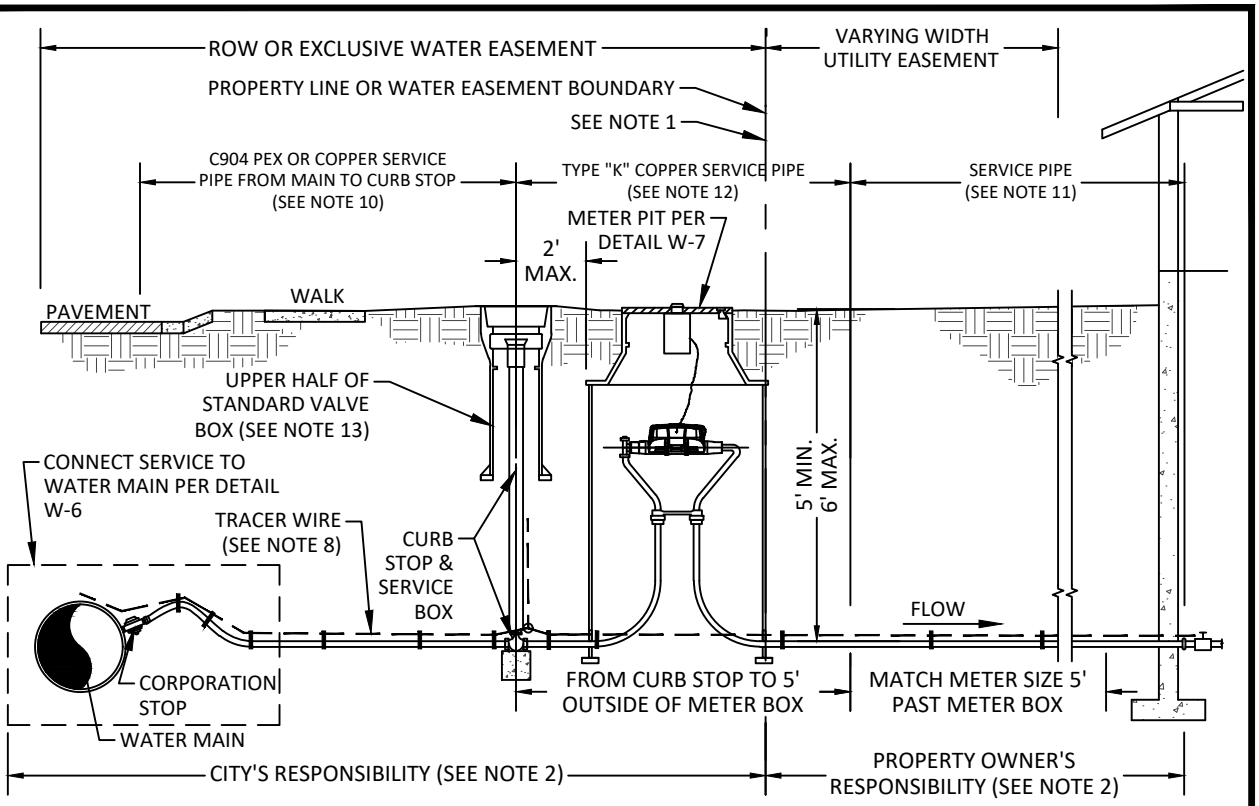
1. PLACEMENT OF CURB STOP SERVICE BOX MAY VARY FROM LANDSCAPE PARKWAY TO A MAXIMUM OF ±1 FOOT OF THE PROPERTY LINE. ANY VARIANCE OF LOCATION OF CURB STOP MUST BE APPROVED PRIOR TO CONSTRUCTION.
2. WATER DEPARTMENT'S RESPONSIBILITY SHALL BE THE WATER MAIN, THE METER INSIDE THE METER PIT, THE CORPORATION STOP, AND SERVICE PIPING FROM THE WATER MAIN UP TO DOWNSTREAM OF METER. PROPERTY OWNER'S RESPONSIBILITY SHALL INCLUDE EVERYTHING DOWNSTREAM OF METER STRUCTURE.
3. SHOULD ANY SITUATION ARISE OTHER THAN SHOWN CONCERNING THE DEPTH OR OBSTRUCTION OF SERVICE LINE OR THE PLACEMENT OF THE METER PIT OR STOP BOX, CALL (970) 350-9317 AND ASK FOR METER SERVICES DIVISION.
4. REFER TO WATER & SEWER (W&S) STANDARD DRAWINGS AND CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR METER INSTALLATION REQUIREMENTS.
5. POTABLE WATER SERVICE METER PITS/ VAULTS SHALL BE LOCATED IN A LANDSCAPE PARKWAY AREA WITHIN 2 FEET OF THE CURB STOP. SEE DESIGN CRITERIA, LATEST REVISION, FOR METER PIT LOCATION.
6. CURB STOP IS TO BE MINNEAPOLIS PATTERN OR APPROVED EQUAL.
7. CURB STOP MUST BE INSTALLED WITH EITHER PLASTIC OR STAINLESS STEEL PIPE INSERTS TO ENSURE PROPER COMPRESSION FITTING ON C904 CROSS-LINKED PEX PIPE.
8. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
9. ALL BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
10. COPPER OR C904 CROSS-LINKED PEX SERVICE LINE SHALL BE INSTALLED FROM THE CORPORATION STOP TO CURB STOP. REFER TO W&S CONSTRUCTION SPECIFICATIONS FOR APPROVED SERVICE PIPE PRODUCT AND MFR REQUIREMENTS.
11. FROM 5 FT PAST THE METER PIT ON THE OWNER SIDE UP TO BUILDING STRUCTURE SHALL BE IN ACCORDANCE WITH BUILDING CODE AND DRINKING WATER REQUIREMENTS.
13. TYPE "K" COPPER SHALL BE PLACED FROM THE CURB STOP, THROUGH THE METER PIT, AND UP TO 5 FEET PAST THE METER PIT ON CUSTOMER SIDE.
14. ALL SERVICE PIPE SHALL BE SIZED ACCORDING TO SERVICE TAP INSIDE DIAMETER AND MUST COMPLY WITH AWWA C904. SEE W&S DESIGN CRITERIA, LATEST REVISION.
15. UPPER HALF OF STANDARD VALVE BOX SHALL BE PLACED OVER CURB STOP AND TRACER WIRE TEST STATION LOOP ACCORDING TO W&S SPECIFICATIONS, LATEST REVISION.

City of Greeley Colorado

POTABLE WATER SERVICE LINE, STOP BOX & METER INSTALLATION (INSIDE LANDSCAPE PARKWAY)

DETAIL W-9A

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

1. PLACEMENT OF CURB STOP SERVICE BOX MAY VARY FROM LANDSCAPE PARKWAY TO A MAXIMUM OF ±1 FOOT OF THE PROPERTY LINE. ANY VARIANCE OF LOCATION OF CURB STOP MUST BE APPROVED PRIOR TO CONSTRUCTION.
2. WATER DEPARTMENT'S RESPONSIBILITY SHALL BE THE WATER MAIN, THE METER INSIDE THE METER PIT, THE CORPORATION STOP, AND SERVICE PIPING FROM THE WATER MAIN UP TO DOWNSTREAM OF METER. PROPERTY OWNER'S RESPONSIBILITY SHALL INCLUDE EVERYTHING DOWNSTREAM OF METER STRUCTURE.
3. SHOULD ANY SITUATION ARISE OTHER THAN SHOWN CONCERNING THE DEPTH OR OBSTRUCTION OF SERVICE LINE OR THE PLACEMENT OF THE METER PIT OR STOP BOX, CALL (970) 350-9317 AND ASK FOR METER SERVICES DIVISION.
4. REFER TO WATER & SEWER (W&S) STANDARD DRAWINGS AND CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR METER INSTALLATION REQUIREMENTS.
5. POTABLE WATER SERVICE METER PITS/ VAULTS SHALL BE LOCATED IN A LANDSCAPE PARKWAY AREA WITHIN 2 FEET OF THE CURB STOP. SEE DESIGN CRITERIA, LATEST REVISION, FOR METER PIT LOCATION.
6. CURB STOP IS TO BE MINNEAPOLIS PATTERN OR APPROVED EQUAL.
7. CURB STOP MUST BE INSTALLED WITH EITHER PLASTIC OR STAINLESS STEEL PIPE INSERTS TO ENSURE PROPER COMPRESSION FITTING ON C904 CROSS-LINKED PEX PIPE.
8. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
9. ALL BURIED PIPE, FITTINGS, VALVES, AND APPURTENANCES SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
10. COPPER OR C904 CROSS-LINKED PEX SERVICE LINE SHALL BE INSTALLED FROM THE CORPORATION STOP TO CURB STOP. REFER TO W&S CONSTRUCTION SPECIFICATIONS FOR APPROVED SERVICE PIPE PRODUCT AND MFR REQUIREMENTS.
11. FROM 5 FT PAST THE METER PIT ON THE OWNER SIDE UP TO BUILDING STRUCTURE SHALL BE IN ACCORDANCE WITH BUILDING CODE AND DRINKING WATER REQUIREMENTS.
13. TYPE "K" COPPER SHALL BE PLACED FROM THE CURB STOP, THROUGH THE METER PIT, AND UP TO 5 FEET PAST THE METER PIT ON CUSTOMER SIDE.
14. ALL SERVICE PIPE SHALL BE SIZED ACCORDING TO SERVICE TAP INSIDE DIAMETER AND MUST COMPLY WITH AWWA C904. SEE W&S DESIGN CRITERIA, LATEST REVISION.
15. UPPER HALF OF STANDARD VALVE BOX SHALL BE PLACED OVER CURB STOP AND TRACER WIRE TEST STATION LOOP ACCORDING TO W&S SPECIFICATIONS, LATEST REVISION.

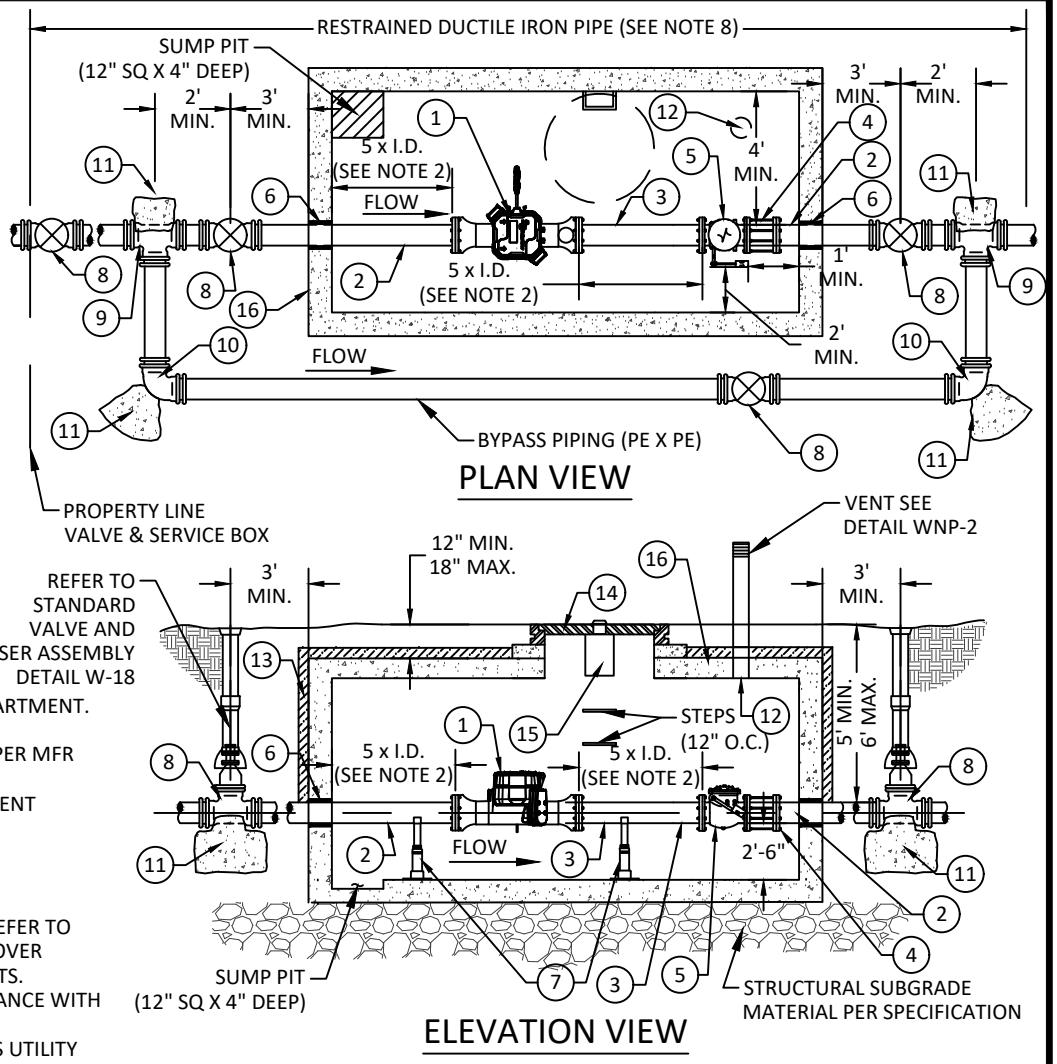
City of Greeley Colorado

POTABLE WATER SERVICE LINE, STOP BOX & METER INSTALLATION (OUTSIDE LANDSCAPE PARKWAY)

DETAIL W-9B

DATE: JANUARY 2023 SCALE: N.T.S.

LEGEND	
1	METER (SEE NOTE 1)
2	FLG X PE SPOOL PIECE WITH WALL RING IN CENTER OF VAULT WALL
3	FLG X FLG SPOOL PIECE (SEE NOTE 2)
4	RESTRAINED FLANGED COUPLING ADAPTER
5	SWING CHECK VALVE
6	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECIFICATION
7	ADJUSTABLE S.S. PIPE SUPPORT
8	GATE VALVE (MJ X MJ)
9	TEE (MJ X MJ)
10	ELBOW (MJ X MJ)
11	THRUST BLOCK
12	6" HOLE FOR VENT
13	2" MIN INSULATION BOARD
14	24" MANHOLE COVER (SEE NOTE 5)
15	RT UNIT
16	PRE-CAST CONCRETE VAULT, SIZE AS REQUIRED FOR COMPONENTS SHOWN



NOTES:

1. METER MUST BE PURCHASED FROM THE WATER & SEWER (W&S) DEPARTMENT. NO EXCEPTIONS.
2. UPSTREAM AND DOWNSTREAM PIPE SPOOL LENGTHS 5X PIPE I.D. OR PER MFR REQUIREMENTS (WHICHEVER YIELDS THE LONGER PIPE LENGTH).
3. FOR PRODUCT AND MANUFACTURER SPECIFICATIONS, REFER TO CURRENT VERSION OF CITY OF GREELEY W&S CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS).
4. SEE DETAIL W-16 FOR ADDITIONAL METER & VAULT INSTALLATION REQUIREMENTS.
5. 24" VAULT COVER SHALL BE A COMPOSITE LID WITH A WORM LOCK. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR APPROVED MANHOLE COVER MATERIALS, MANUFACTURERS, MARKINGS, AND OTHER REQUIREMENTS.
6. ALL BURIED PIPING SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH W&S SPECIFICATIONS.
7. INSTALL TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.

City of Greeley Colorado

(TYP) SETTING FOR 3", 4", 6" & 8" POTABLE WATER METER & VAULT

DETAIL W-10

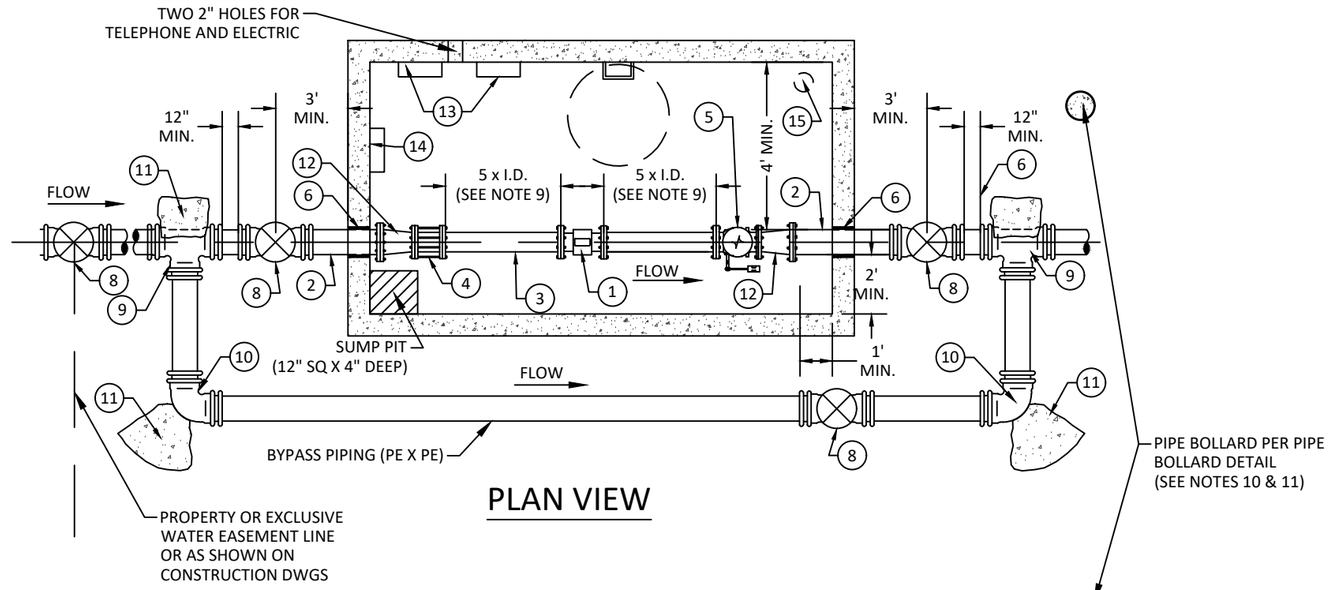
DATE: JANUARY 2023

SCALE: N.T.S.

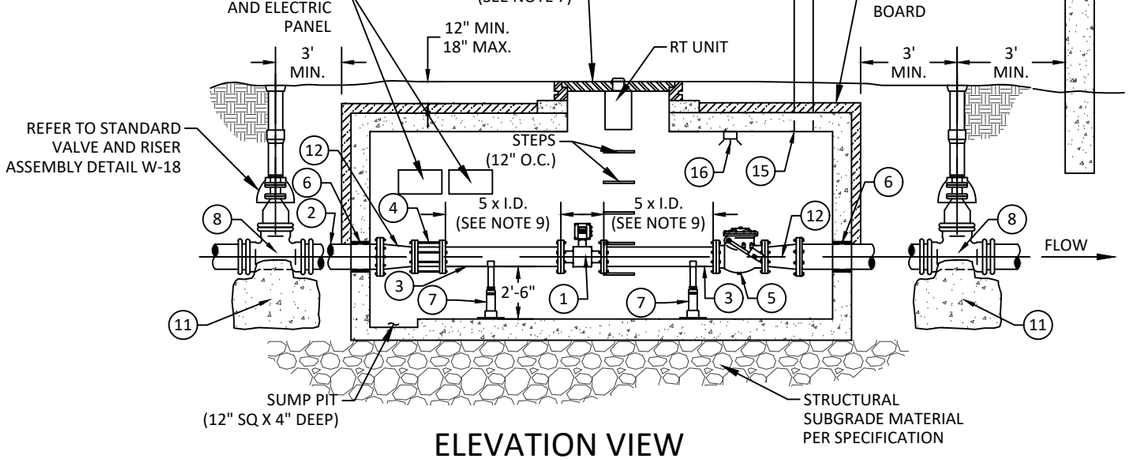
LEGEND	
1	MAG METER (SEE NOTE 1)
2	FLG X PE SPOOL PIECE WITH WALL RING IN CENTER OF VAULT WALL
3	FLG X FLG SPOOL PIECE (SEE NOTE 2)
4	RESTRAINED MECHANICAL COUPLER OR FLANGED COUPLING ADAPTER
5	SWING CHECK VALVE
6	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECIFICATION
7	ADJUSTABLE S.S. PIPE SUPPORT
8	GATE VALVE (MJ x MJ)
9	TEE (MJ X MJ)
10	ELBOW (MJ X MJ)
11	THRUST BLOCK
12	CONCENTRIC REDUCER (AS REQUIRED)
13	ELECTRICAL PANEL
14	DEHUMIDIFIER
15	6" HOLE FOR VENT
16	LED LIGHT

NOTES:

1. PURCHASED METER MUST BE BADGER M2000 MAG METER AND/OR COORDINATED THROUGH THE CITY OF GREELEY METER SHOP. NO EXCEPTIONS. CONTRACTOR TO PROVIDE PIPING, COUPLINGS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM.
2. ALL NOTES ON RELATED CITY OF GREELEY WATER & SEWER (W&S) DETAIL NP-3 APPLY TO THIS DETAIL.
3. CONTRACTOR IS RESPONSIBLE FOR PROVIDING POWER AND TELEMETRY TO THE METER AND VAULT.
4. ELECTRICAL/CONTROL PANEL SHALL BE MOUNTED ABOVE GRADE INSIDE A NEMA 4 ENCLOSURE PER W&S SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION.
5. ALL ELECTRICAL WIRE SHALL BE EQUIPPED WITH WATERTIGHT CONNECTIONS ABOVE AND BELOW GRADE.
6. VAULT & MANHOLE COVER SHALL BE RATED FOR HS-20 TRAFFIC LOADINGS.
7. 36" VAULT COVER SHALL BE A WORM LOCK LID WITH A RECESSED TWO-INCH DIAMETER HOLE FOR RT UNIT. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED MANHOLE COVER MATERIALS, MANUFACTURERS, MARKINGS, AND OTHER REQUIREMENTS.
8. SEE W&S DETAIL W-16, LATEST REVISION, FOR ADDITIONAL METER AND VAULT INSTALLATION REQUIREMENTS.
9. UPSTREAM PIPE AND DOWNSTREAM SPOOL LENGTH 5X PIPE I.D. OR PER MFR REQUIREMENTS (WHICHEVER YIELDS THE LONGER PIPE LENGTH).
10. REFER TO CITY OF GREELEY W&S SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER SPECIFICATIONS.
11. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
12. PIPE BOLLARD MAY BE OMITTED AT THE CITY OF GREELEY W&S DEPARTMENT'S DISCRETION.



PLAN VIEW



ELEVATION VIEW

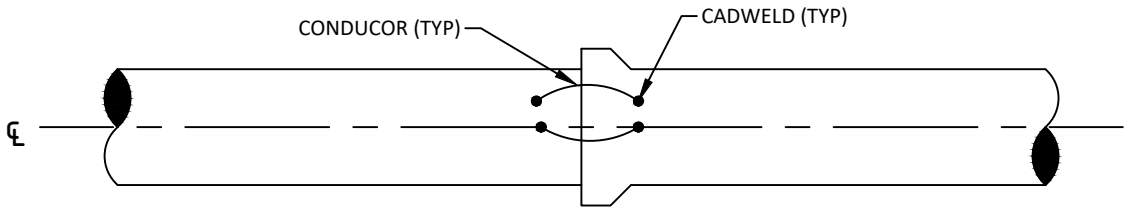
City of Greeley Colorado

(TYP) SETTING FOR 10" & LARGER ELECTROMAGNETIC (MAG) METER & VAULT

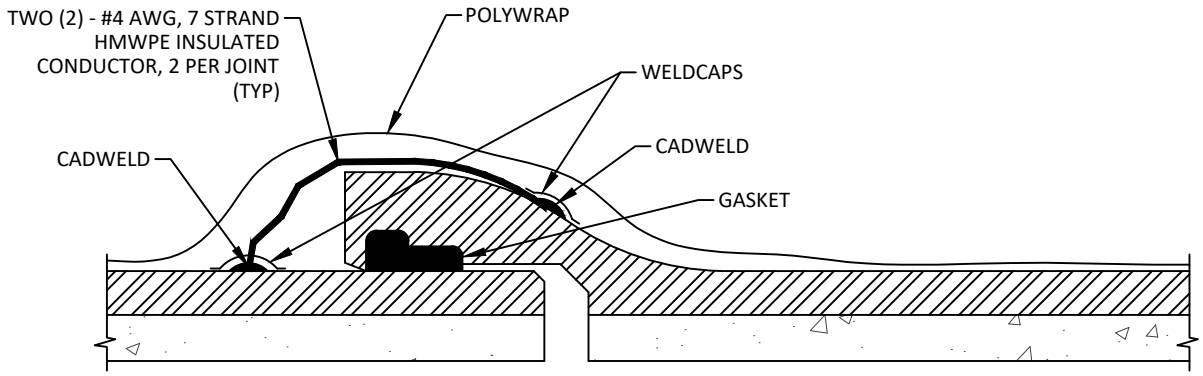
DETAIL W-11

DATE: JANUARY 2023

SCALE: N.T.S.



ELEVATION VIEW



CUTAWAY ELEVATION VIEW

NOTES:

1. CONDUCTOR WIRE SHALL BE RATED FOR DIRECT BURIAL, AND HAVE BOTH ENDS CAD WELDED TO THE PIPE OR BONDING STRAP BOLTED TO PIPE. WIRE SHALL HAVE A MINIMUM OF 2" SLACK.
2. JOINT BONDING SHALL ALSO APPLY TO RESTRAINED AND MECHANICAL JOINT PIPE AND FITTINGS.
3. CONSTRUCT CADWELD CONNECTIONS PER WATER & SEWER CONSTRUCTION SPECIFICATIONS AND DETAILS, LATEST REVISION.
4. ACCEPTABLE ALTERNATIVE TO ANODE CATHODIC PROTECTION IS ZINC COATED D.I.P.

City of Greeley Colorado

DUCTILE IRON PIPE JOINT BONDING

DETAIL W-12

DATE: JANUARY 2023 SCALE: N.T.S.

GENERAL NOTES:

1. POLYETHYLENE (PE) WRAP MAY BE OMITTED WHEN ZINC COATED D.I.P. IS USED.
2. PE WRAP IS REQUIRED FOR ALL STANDARD (NON-ZINC) DUCTILE IRON PIPE, FITTINGS, AND APPURTENANCES.
3. PE WRAP SHALL BE INSTALLED IN ACCORDANCE WITH THE WATER & SEWER SPECIFICATIONS AND STANDARD DETAILS BELOW, LATEST REVISION OF EACH.
4. REPAIR ANY CUTS, TEARS, PUNCTURES, OR DAMAGE WITH ADHESIVE TAPE. TO PREVENT DAMAGE TO THE PE WRAP DURING BACKFILL, ALLOW ADEQUATE SLACK IN THE TUBE AT THE JOINT. AVOID DAMAGING THE TUBE WHEN USING TAMPING DEVICES.

PIPE-SHAPED APPURTENANCES:

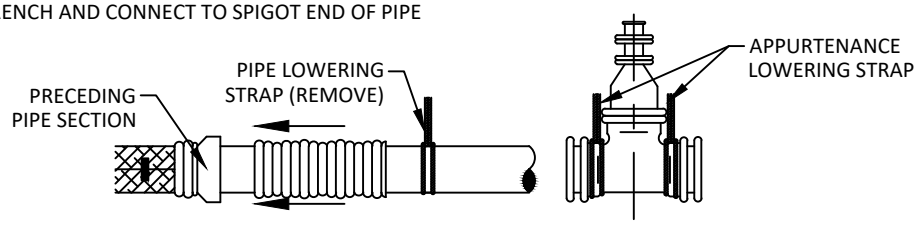
1. COVER BENDS, REDUCERS, OFFSETS, AND OTHER PIPE-SHAPED APPURTENANCES WITH PE IN SAME MANNER AS PIPE ON W&S DETAIL W-13B, LATEST REVISION.

ODD-SHAPED APPURTENANCES:

1. WHEN IT IS NOT PRACTICAL TO WRAP VALVES, FITTINGS, AND OTHER ODD-SHAPED PIECES IN TUBE, WRAP WITH FLAT SHEET OR SPLIT LENGTH OF PE TUBE IN THE FOLLOWING STEPS:

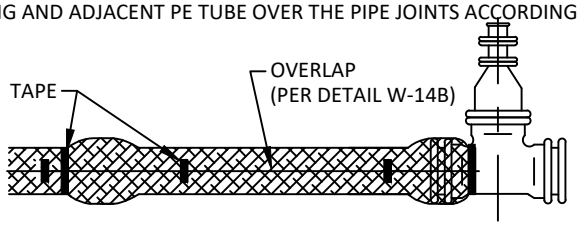
STEP 1

BEFORE CONNECTING THE APPURTENANCE TO THE SPIGOT END OF PIPE, INSTALL THE ADJACENT PIPE AND PE TUBE ACCORDING TO WATER & SEWER DETAIL W-13B, LATEST REVISION. BUNCH THE TUBE IN AN ACCORDIAN- FASHION TO EXPOSE THE SPIGOT END OF THE PIPE. THEN LOWER THE APPURTENANCE INTO THE TRENCH AND CONNECT TO SPIGOT END OF PIPE



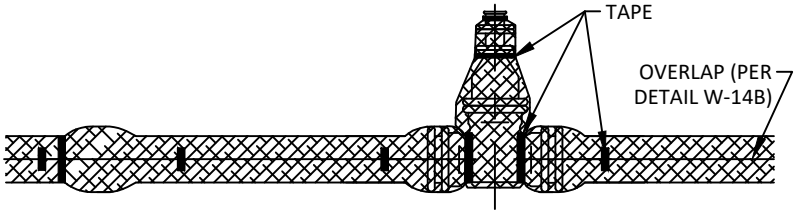
STEP 2

PULL THE PRECEDING AND ADJACENT PE TUBE OVER THE PIPE JOINTS ACCORDING TO STEPS 2 THROUGH 4 IN W-14B.



STEP 3

REPEAT STEP 2 WITH A NEW PIPE ON THE OTHER SIDE OF THE APPURTENANCE. THEN WRAP FLAT PE SHEET OR SPLIT LENGTH OF PE TUBE AROUND APPURTENANCE BY PASSING THE SHEET UNDER THE APPURTENANCE AND BRINGING IT UP AROUND BODY. MAKE SEAMS BY BRINGING EDGES TOGETHER, FOLDING OVER TWICE, AND TAPING DOWN. TAPE PE SECURELY IN PLACE AT VALVE STEM AND OTHER PENETRATIONS.



STEP 4

REPAIR ANY CUTS, TEARS, PUNCTURES, OR DAMAGE WITH ADHESIVE TAPE. TO PREVENT DAMAGE TO THE POLYETHYLENE WRAP DURING BACKFILL, ALLOW ADEQUATE SLACE IN THE TUBE AT THE JOINT. AVOID DAMAGING THE TUBE WHEN USING TAMPING DEVICES.

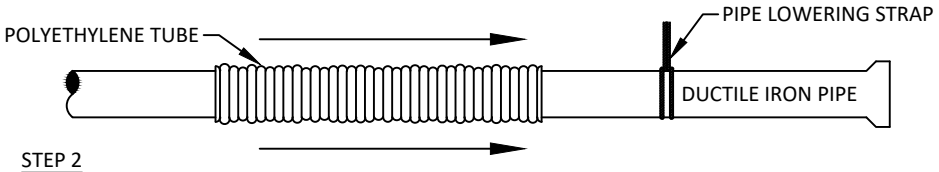
City of Greeley Colorado

POLYETHYLENE WRAP INSTALLATION ON STANDARD DUCTILE IRON FITTINGS & GENERAL NOTES

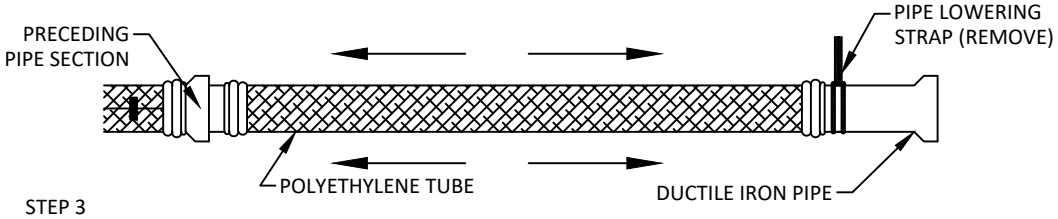
DETAIL W-13A

DATE: JANUARY 2023 SCALE: N.T.S.

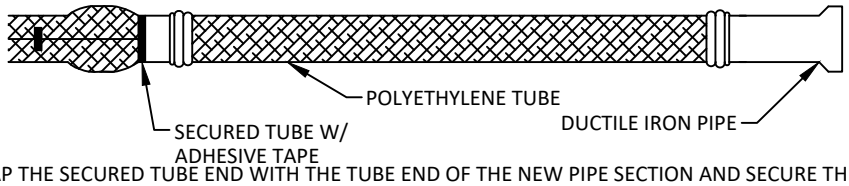
STEP 1
CUT A SECTION OF POLYETHYLENE (PE) TUBE APPROXIMATELY 2' LONGER THAN THE PIPE SECTION. REMOVE ALL DEBRIS FROM THE PIPE SURFACE. SLIP THE TUBE AROUND THE END OF THE PIPE, STARTING AT THE SPIGOT END. BUNCH THE TUBE ACCORDION-FASHION ON THE END OF THE PIPE. PULL BACK THE OVERHANGING END OF THE TUBE UNTIL IT CLEARS THE PIPE SPIGOT END.



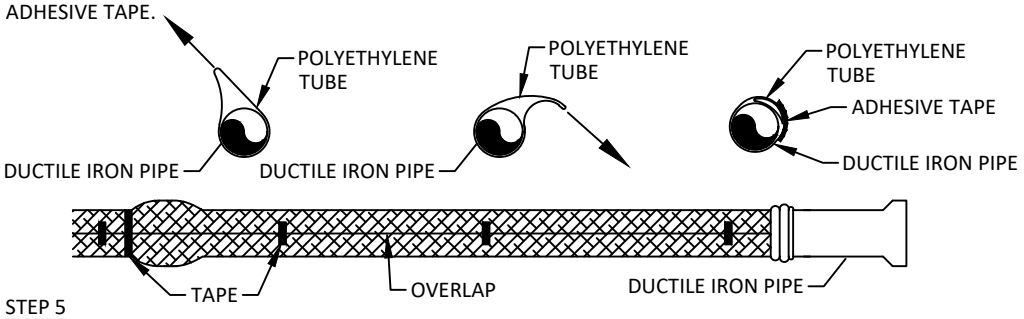
STEP 2
LOWER THE PIPE INTO THE TRENCH AND MAKE UP THE PIPE JOINT WITH THE PRECEDING SECTION OF PIPE. SPREAD THE TUBE OVER THE ENTIRE PIPE BARREL AND REMOVE THE PIPE LOWERING STRAP. MAKE SURE NO DIRT OR BEDDING MATERIAL BECOMES TRAPPED BETWEEN TUBE AND PIPE.



STEP 3
OVERLAP THE JOINT WITH THE TUBE FROM THE PRECEDING LENGTH OF PIPE AND SECURE IT INTO PLACE WITH THREE CIRCUMFERENTIAL TURNS OF 2" ADHESIVE TAPE.



STEP 4
OVERLAP THE SECURED TUBE END WITH THE TUBE END OF THE NEW PIPE SECTION AND SECURE THE NEW TUBE END IN PLACE WITH THE TAPING PROCEDURE IN STEP 3. TAKE UP THE SLACK IN THE TUBE ALONG THE BARREL OF THE PIPE TO MAKE A SNUG, BUT NOT TIGHT, FIT BY FOLDING THE EXCESS TUBE BACK OVER THE TOP OF THE PIPE. SECURE THE TUBE AT 3' TO 5' INTERVALS ALONG THE PIPE BARREL WITH ADHESIVE TAPE.



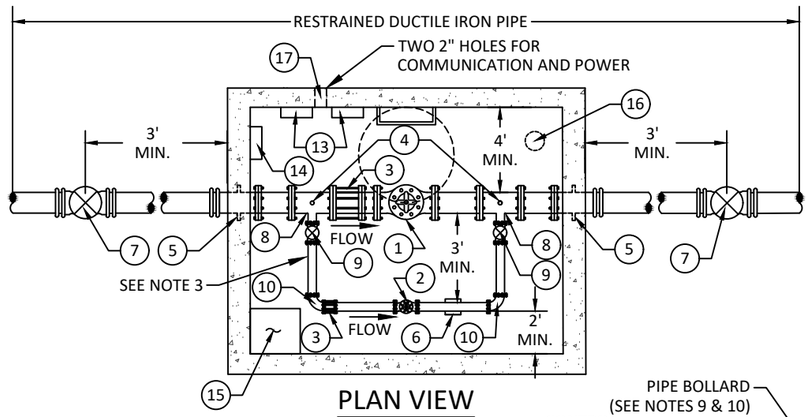
STEP 5
REPAIR ANY RIPS, TEARS, OR OTHER DAMAGE WITH ADHESIVE TAPE. CAREFULLY BACKFILL PIPE. TO PREVENT DAMAGE TO THE TUBE DURING BACKFILL, ALLOW ADEQUATE SLACK IN THE TUBE AT THE JOINT. AVOID DAMAGING THE TUBE WHEN USING TAMPING DEVICES.

City of Greeley Colorado

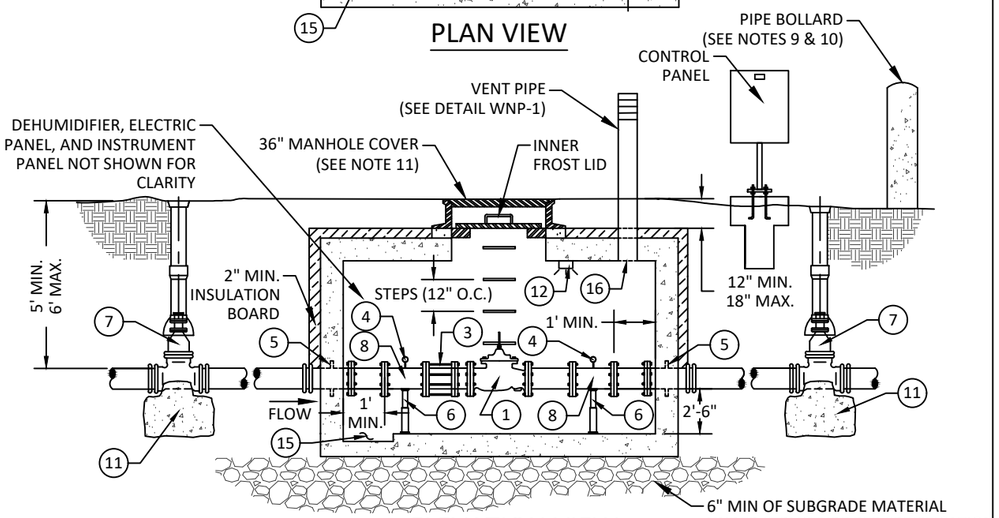
POLYETHYLENE WRAP INSTALLATION ON STANDARD DUCTILE IRON PIPE

DETAIL W-13B

DATE: JANUARY 2023 SCALE: N.T.S.



PLAN VIEW

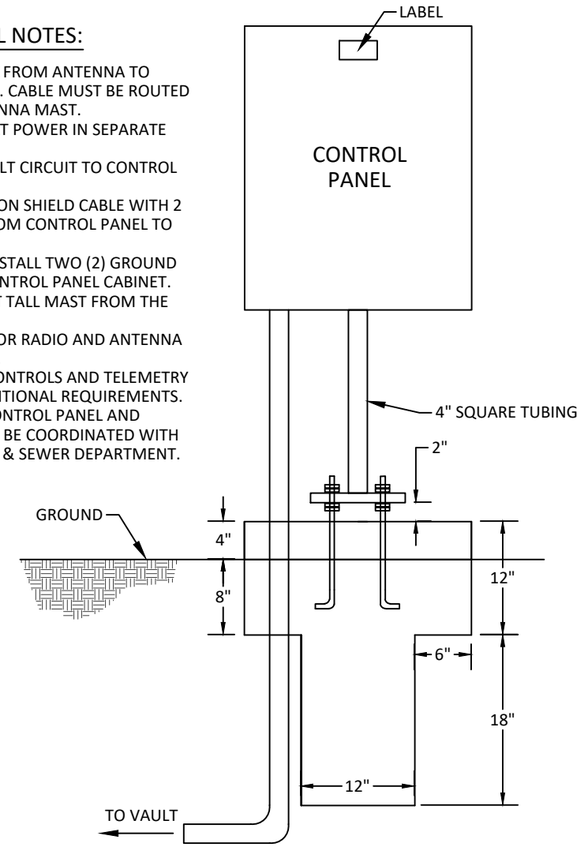


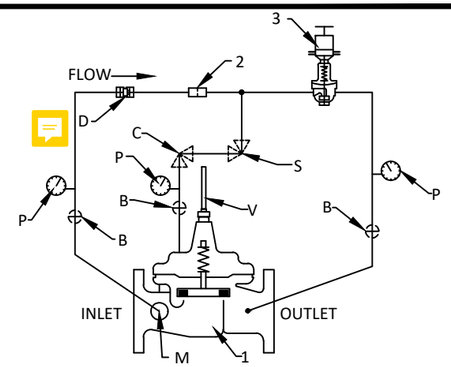
ELEVATION VIEW

LEGEND	
1	8" CLA-VAL 90-01 PRV
2	2" CLA-VAL 90-01 PRV
3	RESTRAINED MECHANICAL COUPLER (MATCH PIPE SIZE)
4	PRESSURE GAGE
5	8" WALL SLEEVE SPOOL
6	ADJUSTABLE STAINLESS STEEL PIPE STAND
7	GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-18
8	8" X 2" REDUCING TEE (FLG X FLG)
9	2" GATE VALVE (FLG X FLG)
10	2" ELBOW (FLG X FLG)
11	THRUST BLOCK
12	LED LIGHT FOR WET CONDITIONS
13	ELECTRICAL JUNCTION BOXES (SEE CONTROLS DETAIL, W-14B)
14	DEHUMIDIFIER
15	SUMP PIT (12" SQ X 4" DEEP) & PUMP
16	6" HOLE FOR VENT (SEE VENT PIPE DETAIL WNP-2)
17	APPROVED RUBBER SEAL PER SPECIFICATIONS

CONTROL PANEL NOTES:

1. ROUTE RF CABLE FROM ANTENNA TO CONTROL PANEL. CABLE MUST BE ROUTED THROUGH ANTENNA MAST.
2. INSTALL 120 VOLT POWER IN SEPARATE CONDUIT.
3. PROVIDE 120 VOLT CIRCUIT TO CONTROL PANEL.
4. PROVIDE 8 BELDON SHIELD CABLE WITH 2 CONDUCTOR FROM CONTROL PANEL TO VAULT.
5. PROVIDE AND INSTALL TWO (2) GROUND RODS AT THE CONTROL PANEL CABINET.
6. INSTALL 30 FOOT TALL MAST FROM THE GROUND.
7. CONTACT CITY FOR RADIO AND ANTENNA SPECIFICATIONS.
8. REFER TO PRV CONTROLS AND TELEMETRY DETAIL FOR ADDITIONAL REQUIREMENTS.
9. LOCATION OF CONTROL PANEL AND ANTENNA SHALL BE COORDINATED WITH GREELEY WATER & SEWER DEPARTMENT.





PRV COMPONENTS SCHEMATIC

PRESSURE REDUCING VALVE COMPONENTS	
ITEM	DESCRIPTION
1	CLA-VAL MODEL 390-02 PRV (100-01 HYTROL MAIN VALVE, SEE NOTE 5)
2	X58C RESTRICTION FITTING
3	CRL-34 ELECTRONIC ACTUATED PRESSURE SUSTAINING PILOT CONTROL (4-20 mA COMMAND SIGNAL)
B	CK2 ISOLATION VALVE
C	CV FLOW CONTROL (CLOSING)
D	CHECK VALVES ISOLATION VALVE
M	X144 E-FLOWMETER (SEE NOTE 4)
P	X141 PRESSURE GAUGE
S	CV FLOW CONTROL (OPENING)
V	X101 VALVE POSITION INDICATOR

NOTES:

1. SEE DETAIL W-15 FOR ADDITIONAL VAULT INSTALLATION REQUIREMENTS.
2. ALUMINUM RING AND COVER TO BE RATED FOR HS-20 TRAFFIC LOADINGS.
3. BYPASS SIZING AND NEED SHALL BE COORDINATED WITH THE CITY OF GREELEY WATER & SEWER DEPARTMENT AND WILL BE EVALUATED BASED ON FLOW AND SITE CONDITIONS.
4. CLA-VAL X144 E-FLOW METER OR APPROVED EQUAL.
5. CLA-VAL 100-01 HYTROL MAIN VALVE SHALL BE CONTROLLED BY ELECTRIC ACTUATOR WITH 4-20 MA CONTROL AND FEEDBACK.
6. ALL BURIED PIPE, VALVES, FITTINGS, AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE WITH WATER & SEWER SPECIFICATIONS, LATEST REVISION.
7. ALL VAULT PIPE, VALVES, FITTINGS, AND APPURTENANCES LARGER THAN 3" SHALL BE FLANGED.
8. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
9. PIPE BOLLARD MAY BE OMITTED AT THE CITY OF GREELEY WATER & SEWER DEPARTMENT'S DISCRETION.
10. IF PIPE BOLLARD IS REQUIRED, BOLLARD SHALL BE INSTALLED IN ACCORDANCE WITH THE WATER & SEWER STANDARD DETAILS AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH.
11. 36" MANHOLE COVER SHALL BE A BOLT DOWN LID MARKED "WATER" WITH INNER FROST LID. REFER TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.

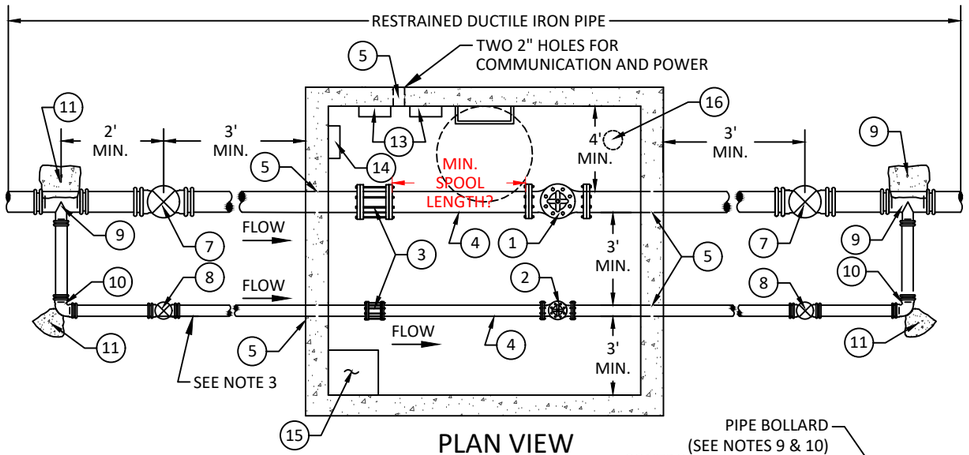
City of Greeley Colorado

(TYP) 8" PRESSURE REDUCING VALVE & VAULT

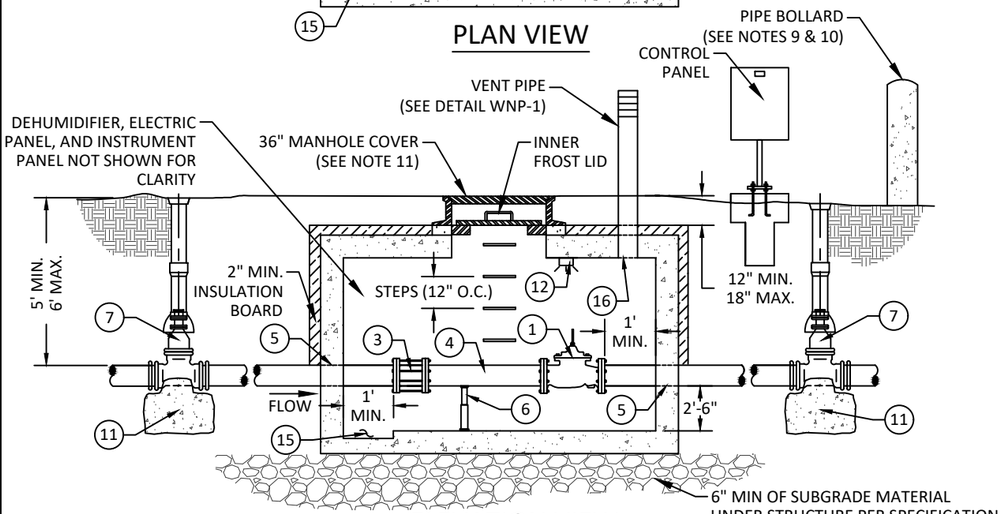
DETAIL W-14A

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW

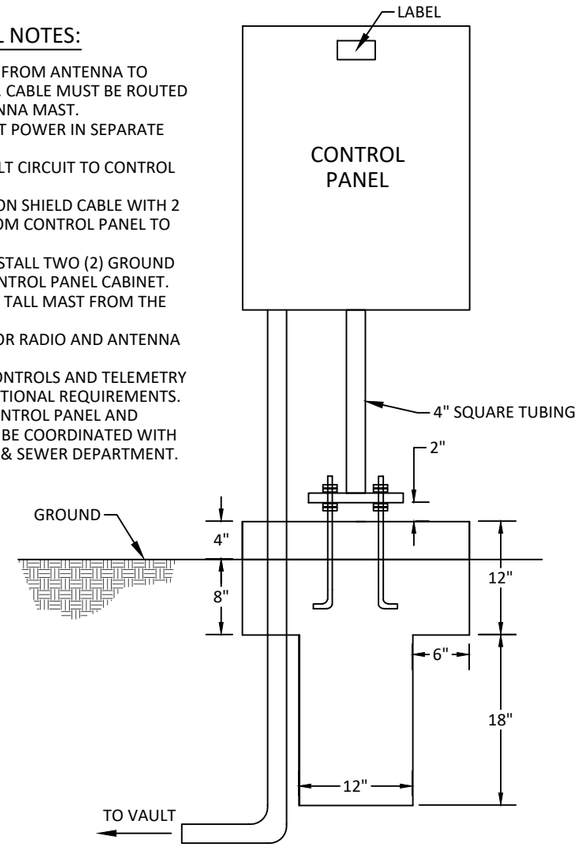


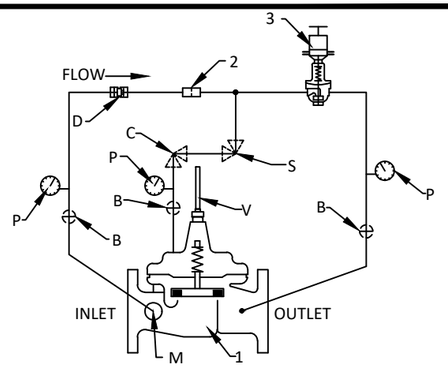
ELEVATION VIEW

LEGEND	
1	12" CLA-VAL 90-01 PRV
2	6" CLA-VAL 90-01 PRV
3	RESTRAINED MECHANICAL COUPLER (MATCH PIPE SIZE)
4	SPOOL PIPE (MATCH PIPE SIZE)
5	APPROVED RUBBER SEAL PER SPECIFICATION
6	ADJUSTABLE STAINLESS STEEL PIPE STAND
7	12" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-18
8	6" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-18
9	12" X 6" REDUCING TEE (MJ X MJ)
10	6" ELBOW (MJ X MJ)
11	THRUST BLOCK
12	LED LIGHT FOR WET CONDITIONS
13	ELECTRICAL JUNCTION BOXES (SEE CONTROLS DETAIL, W-14B)
14	DEHUMIDIFIER
15	SUMP PIT (12" SQ X 4" DEEP) & PUMP
16	6" HOLE FOR VENT (SEE VENT PIPE DETAIL WNP-2)

CONTROL PANEL NOTES:

1. ROUTE RF CABLE FROM ANTENNA TO CONTROL PANEL. CABLE MUST BE ROUTED THROUGH ANTENNA MAST.
2. INSTALL 120 VOLT POWER IN SEPARATE CONDUIT.
3. PROVIDE 120 VOLT CIRCUIT TO CONTROL PANEL.
4. PROVIDE 8 BELDON SHIELD CABLE WITH 2 CONDUCTOR FROM CONTROL PANEL TO VAULT.
5. PROVIDE AND INSTALL TWO (2) GROUND RODS AT THE CONTROL PANEL CABINET.
6. INSTALL 30 FOOT TALL MAST FROM THE GROUND.
7. CONTACT CITY FOR RADIO AND ANTENNA SPECIFICATIONS.
8. REFER TO PRV CONTROLS AND TELEMETRY DETAIL FOR ADDITIONAL REQUIREMENTS.
9. LOCATION OF CONTROL PANEL AND ANTENNA SHALL BE COORDINATED WITH GREELEY WATER & SEWER DEPARTMENT.





PRV COMPONENTS SCHEMATIC

PRESSURE REDUCING VALVE COMPONENTS	
ITEM	DESCRIPTION
1	CLA-VAL MODEL 390-02 PRV (100-01 HYTROL MAIN VALVE, SEE NOTE 5)
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3	CRL-34 ELECTRONIC ACTUATED PRESSURE SUSTAINING PILOT CONTROL (4-20 mA COMMAND SIGNAL)
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D	CHECK VALVES ISOLATION VALVE
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P	X141 PRESSURE GAUGE
S	CV FLOW CONTROL (OPENING)
V	X101 VALVE POSITION INDICATOR

NOTES:

1. SEE DETAIL W-15 FOR ADDITIONAL VAULT INSTALLATION REQUIREMENTS.
2. ALUMINUM RING AND COVER TO BE RATED FOR HS-20 TRAFFIC LOADINGS.
3. BYPASS SIZING AND NEED SHALL BE COORDINATED WITH THE CITY OF GREELEY WATER & SEWER DEPARTMENT AND WILL BE EVALUATED BASED ON FLOW AND SITE CONDITIONS.
4. CLA-VAL X144 E-FLOW METER OR APPROVED EQUAL.
5. CLA-VAL 100-01 HYTROL MAIN VALVE SHALL BE CONTROLLED BY ELECTRIC ACTUATOR WITH 4-20 MA CONTROL AND FEEDBACK.
6. ALL BURIED PIPE, VALVES, FITTINGS, AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE WITH WATER & SEWER SPECIFICATIONS, LATEST REVISION.
7. ALL VAULT PIPE, VALVES, FITTINGS, AND APPURTENANCES LARGER THAN 3" SHALL BE FLANGED.
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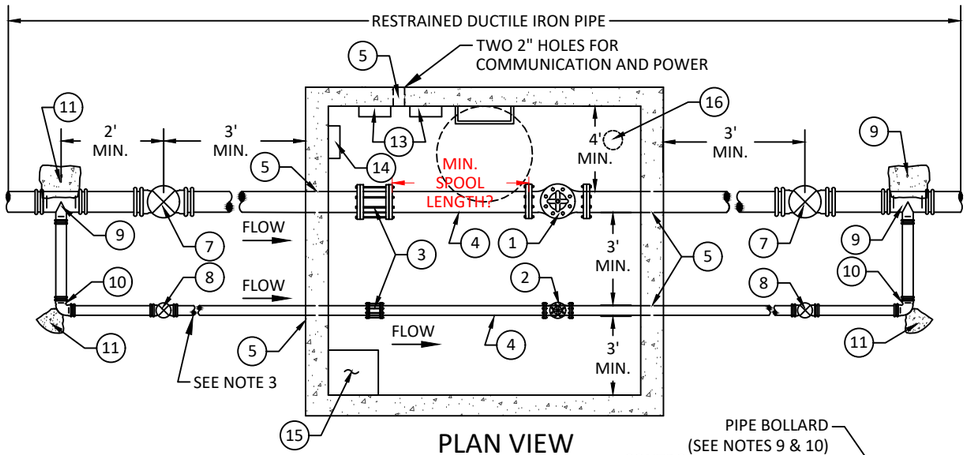
City of Greeley Colorado

(TYP) 12" PRESSURE REDUCING VALVE & VAULT

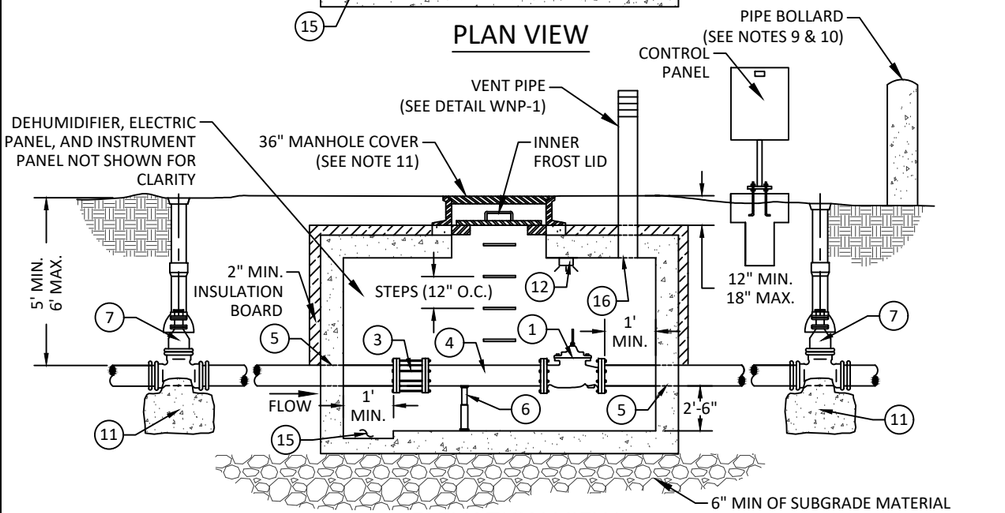
DETAIL W-14B

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW



ELEVATION VIEW

LEGEND	
1	16" CLA-VAL 90-01 PRV
2	8" CLA-VAL 90-01 PRV
3	RESTRAINED MECHANICAL COUPLER (MATCH PIPE SIZE)
4	SPOOL PIPE (MATCH PIPE SIZE)
5	APPROVED RUBBER SEAL PER SPECIFICATION
6	ADJUSTABLE STAINLESS STEEL PIPE STAND
7	16" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-18
8	8" GATE VALVE (MJ X MJ) AND RISER PER DETAIL W-18
9	16" X 8" REDUCING TEE (MJ X MJ)
10	8" ELBOW (MJ X MJ)
11	THRUST BLOCK
12	LED LIGHT FOR WET CONDITIONS
13	ELECTRICAL JUNCTION BOXES (SEE CONTROLS DETAIL, W-14B)
14	DEHUMIDIFIER
15	SUMP PIT (12" SQ X 4" DEEP) & PUMP
16	6" HOLE FOR VENT (SEE VENT PIPE DETAIL WNP-2)

CONTROL PANEL NOTES:

1. ROUTE RF CABLE FROM ANTENNA TO CONTROL PANEL. CABLE MUST BE ROUTED THROUGH ANTENNA MAST.
2. INSTALL 120 VOLT POWER IN SEPARATE CONDUIT.
3. PROVIDE 120 VOLT CIRCUIT TO CONTROL PANEL.
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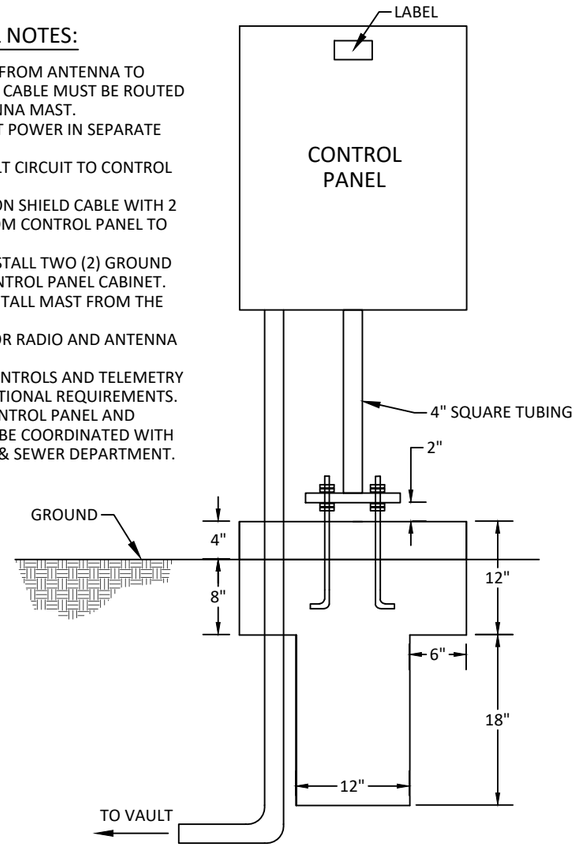
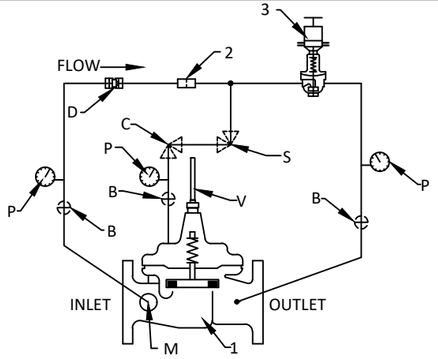
5. PROVIDE AND INSTALL TWO (2) GROUND RODS AT THE CONTROL PANEL CABINET.
6. INSTALL 30 FOOT TALL MAST FROM THE GROUND.
7. CONTACT CITY FOR RADIO AND ANTENNA SPECIFICATIONS.
8. REFER TO PRV CONTROLS AND TELEMETRY DETAIL FOR ADDITIONAL REQUIREMENTS.
9. LOCATION OF CONTROL PANEL AND ANTENNA SHALL BE COORDINATED WITH GREELEY WATER & SEWER DEPARTMENT.





PRV COMPONENTS SCHEMATIC

PRESSURE REDUCING VALVE COMPONENTS	
ITEM	DESCRIPTION
1	CLA-VAL MODEL 390-02 PRV (100-01 HYTROL MAIN VALVE, SEE NOTE 5)
2	X58C RESTRICTION FITTING
3	CRL-34 ELECTRONIC ACTUATED PRESSURE SUSTAINING PILOT CONTROL (4-20 mA COMMAND SIGNAL)
B	CK2 ISOLATION VALVE
C	CV FLOW CONTROL (CLOSING)
D	CHECK VALVES ISOLATION VALVE
M	X144 E-FLOWMETER (SEE NOTE 4)
P	X141 PRESSURE GAUGE
S	CV FLOW CONTROL (OPENING)
V	X101 VALVE POSITION INDICATOR

NOTES:

1. SEE DETAIL W-15 FOR ADDITIONAL VAULT INSTALLATION REQUIREMENTS.
2. ALUMINUM RING AND COVER TO BE RATED FOR HS-20 TRAFFIC LOADINGS.
3. BYPASS SIZING AND NEED SHALL BE COORDINATED WITH THE CITY OF GREELEY WATER & SEWER DEPARTMENT AND WILL BE EVALUATED BASED ON FLOW AND SITE CONDITIONS.
4. CLA-VAL X144 E-FLOW METER OR APPROVED EQUAL.
5. CLA-VAL 100-01 HYTROL MAIN VALVE SHALL BE CONTROLLED BY ELECTRIC ACTUATOR WITH 4-20 MA CONTROL AND FEEDBACK.
6. ALL BURIED PIPE, VALVES, FITTINGS, AND APPURTENANCES SHALL BE INSTALLED IN ACCORDANCE WITH WATER & SEWER SPECIFICATIONS, LATEST REVISION.
7. ALL VAULT PIPE, VALVES, FITTINGS, AND APPURTENANCES LARGER THAN 3" SHALL BE FLANGED.
8. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
9. PIPE BOLLARD MAY BE OMITTED AT THE CITY OF GREELEY WATER & SEWER DEPARTMENT'S DISCRETION.
10. IF PIPE BOLLARD IS REQUIRED, BOLLARD SHALL BE INSTALLED IN ACCORDANCE WITH THE WATER & SEWER STANDARD DETAILS AND CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH.
11. 36" MANHOLE COVER SHALL BE A BOLT DOWN LID MARKED "WATER" WITH INNER FROST LID. REFER TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.

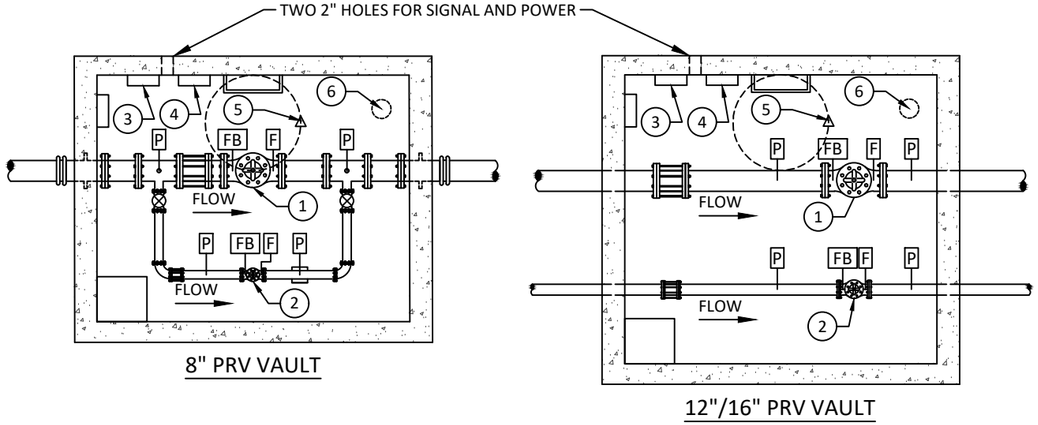
City of Greeley Colorado

(TYP) 16" PRESSURE REDUCING VALVE & VAULT

DETAIL W-14C

DATE: JANUARY 2023

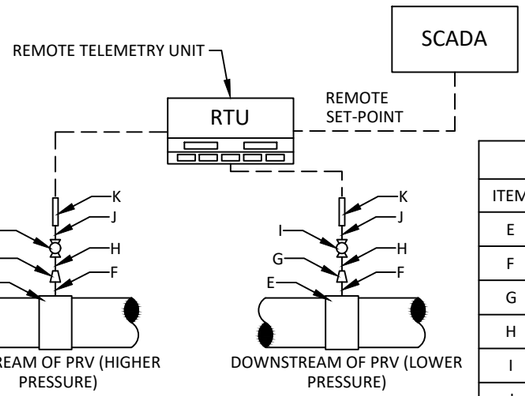
SCALE: N.T.S.



8" PRV VAULT

12"/16" PRV VAULT

PLAN VIEWS



PRESSURE TRANSDUCER INSTALLATION

PRESSURE TRANSDUCER COMPONENTS	
ITEM	DESCRIPTION
E	¾" BRONZE SADDLE
F	¾" X 2" NIPPLE
G	¾" X ¼" BRASS REDUCER
H	¼" X 2" NIPPLE
I	¼" BALL VALVE
J	¼" X 2" NIPPLE
K	UNIK 5000 PRESSURE TRANSDUCER (SEE NOTE 13)

LEGEND	
1	MAIN VALVE (SEE PRV VALVE & VAULT DETAILS)
2	SECONDARY VALVE (SEE PRV VALVE & VAULT DETAILS)
3	SIGNAL WIRING JUNCTION BOX (SEE NOTE 1)
4	120V JUNCTION BOX (SEE NOTE 2)
5	INTRUSION ALARM (SEE NOTE 11)
6	FLOOD ALARM (SEE NOTE 10)
F	X144 E-FLOWMETER (SEE PRV & VAULT DETAIL)
FB	FEEDBACK & SIGNAL
P	PRESSURE TRANSDUCER

NOTES:

1. INSTALL 12x12x6 JUNCTION BOX FOR SIGNAL WIRING. INSTALL TERMINAL BLOCKS FOR SPLICING.
2. INSTALL 12x12x6 JUNCTION BOX FOR 120 VOLT (20 AMP) CIRCUITS:
   - 2.1. GENERAL OUTLETS
   - 2.2. DEHUMIDIFIER
   - 2.3. SUMP PUMP
   - 2.4. VAULT LIGHTING
   - 2.5. CONTROL PANEL
   - 2.6. ELECTRIC HEATER
3. INSTALL WIRING FOR FOUR (4) PRESSURE SENSORS. REFER TO PRESSURE TRANSDUCER INSTALLATION DETAIL FOR MORE INFORMATION.
4. UNIK 5000F GE PRESSURE TRANSDUCER (MODEL#: PTX5032-TA-A2-CA-H0-PF) OR APPROVED EQUAL.
5. INSTALL WIRING FOR PRV MAIN VALVE.
6. INSTALL WIRING FOR FLOW METER.
7. PROVIDE AND INSTALL WIRING FOR 4-20MA FOR CONTROL.
8. INSTALL WIRING FOR 4-20MA FEEDBACK (FB) ON MAIN VALVE.
9. PROGRAM PRV OPEN AND CLOSE TO BE AUTOMATIC OR MANUALLY ADJUSTED FROM SCADA. FEEDBACK TO BE DISPLAYED ON SCADA.
10. INSTALL FLOOD ALARM AND WIRE BACK TO CONTROL PANEL.
11. INSTALL INTRUSION ALARM ON MANHOLE COVER.
12. PROVIDE AND INSTALL ALLEN BRADLEY PLC FOR CONTROLS. USE FIBER OR CONTACT CITY FOR RADIO SPECIFICATION TO COMMUNICATE BACK TO SCADA.
13. SUMP PUMP SHALL BE ROUTED TO STORM INFRASTRUCTURE OR PAN.

PLC INPUT AND OUTPUTS			
FUNCTION	INPUT/OUTPUT	PIN	
	DI – 0	0	INT. ALARM
	DI – 1	1	FLOOD ALARM
	AO – 1	2	PRV SIGNAL
	AI – 1	3	PRV FEEDBACK
	AI – 2	4	INLET PRESSURE
	AI – 3	5	OUTLET PRESSURE
	AI – 4	6	FLOW METER
	AI – 5	7	
		8	
		9	
		10	
		11	
		12	
		13	
		14	
		15	
		16	
		17	

City of Greeley Colorado

(TYP) PRESSURE REDUCING VALVE CONTROLS & TELEMETRY

DETAIL W-15

DATE: JANUARY 2023

SCALE: N.T.S.

TYPICAL VAULT NOTES:

1. ALL METER, VALVE, AND VAULT COMPONENTS AND PRODUCT SPECIFICATIONS SHALL BE IN ACCORDANCE WITH APPROVED CONSTRUCTION DRAWINGS ALONG WITH WATER & SEWER (W&S) DEPARTMENT SPECIFICATIONS, LATEST REVISION.
2. PIPING CONFIGURATION IS GENERAL AND INDICATES MINIMUM REQUIREMENTS. CONTRACTOR TO PROVIDE ADDITIONAL PIPING, COUPLINGS, REDUCERS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM. VAULT MODIFICATIONS MAY BE REQUIRED FOR A COMPLETE SYSTEM.
3. METER OR PRV COMPONENTS, INSTRUMENTATION, AND ELECTRICAL SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
4. CONTRACTOR TO SUBMIT VAULT MANUFACTURER'S SHOP DRAWINGS TO ENGINEERING DEVELOPMENT REVIEW FOR ACCEPTANCE A MINIMUM OF 2 WEEKS PRIOR TO ORDERING AND INSTALLATION.
5. APPROPRIATE LENGTH OF STRAIGHT PIPE SEGMENTS UPSTREAM AND DOWNSTREAM OF METER OR VALVE SHALL BE PROVIDED PER THE METER/VALVE MANUFACTURER'S RECOMMENDATION.
6. FOR INSTALLATIONS LARGER THAN 2", ALL PIPING AND APPURTENANCES WITHIN THE VAULT SHALL BE FLANGED DIP. ALL OTHER EXTERIOR PIPING AND APPURTENANCES, BETWEEN AND INCLUDING THE EXTERIOR TEES AND VALVES, SHALL BE MECHANICAL RESTRAINED JOINT DIP.
7. ALL VAULT JOINTS SHALL BE WATER TIGHT.
8. ALL EQUIPMENT AND PIPING SHALL BE ADEQUATELY SUPPORTED AND ATTACHED TO THE VAULT WALL OR FLOOR USING STAINLESS STEEL FASTENERS AND BOLTS OR APPROVED EQUIVALENT.
9. VAULT COVERS SHALL BE APPROVED MANHOLE COVERS, MARKED “WATER” OR “IRRIGATION” AS REQUIRED, AND INCLUDE AN INNER FROST PROOF LID. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED VAULT COVER MATERIALS AND MANUFACTURERS.
10. FOR VAULTS PERMITTED IN ROAD RIGHT-OF-WAY, VAULT AND RING/COVER SHALL BE RATED FOR HS-20 TRAFFIC LOADING.
11. VAULT LADDER SHALL HAVE OSHA-APPROVED EXTENSION POST INSTALLED.
12. VAULT EXTERIOR SHALL BE COVERED WITH 2” THICK INSULATION BOARD.
13. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF METER VALVE INSTALLATION OR GRADE CHANGES AFTER INSTALLATION, PROPERTY OWNER MUST ADJUST PIT OF VAULT MANHOLE COVER TO MEET SPECIFICATIONS.
14. SLOPE FINAL GROUND SURFACE AWAY FROM PIT VAULT COVER AT A 2% MINIMUM GRADE. MANHOLE LIDS SHALL NOT BE LOCATED IN DRAINAGE AREA OR PAN.
15. SUBGRADE AND SOIL SURROUNDING VAULT SHALL BE BACKFILLED AND COMPACTED IN ACCORDANCE WITH WATER & SEWER SPECIFICATIONS, LATEST REVISION.
16. MANHOLE BASEBEAMS ARE REQUIRED FOR ALL MANHOLE VAULT INSTALLATIONS.
17. ALL PIPING TO BE PRESSURE TESTED PER W & S SPECIFICATIONS, LATEST REVISION.
18. ALL THREADED CONNECTIONS SHALL HAVE TEFLON TAPE OR APPROVED EQUIVALENT TO ENSURE NO LEAKING OCCURS.
19. COPPER SHALL NOT SHOW ANY VISIBLE SIGNS OF CRIMPING.

VAULT ELECTRICAL SPECIFICATIONS:

1. PROVIDE 100 AMP 240/120 VOLT METER LOAD CENTER COMBINATION WITH A MINIMUM 12 SPACES, LOCATED WITHIN 25' OF VAULT.
2. PROVIDE 1-¼" CONDUIT, SCHEDULE 80, FROM LOAD CENTER TO JUNCTION OR PULL BOX IN VAULT WITH ONE SPARE.
3. JUNCTION OR PULL BOX SHALL HAVE 12”X12X8” MINIMUM PANEL LOCATED INSIDE VAULT FOR EXTRA CIRCUIT CONDUIT CONNECTIONS.
4. PROVIDE FIVE 20-AMP BREAKERS FOR LOAD CENTER.
5. PROVIDE OUTLET FOR SUMP PUMP AND DEHUMIDIFIER, 20-AMP 120 VOLT CIRCUIT.
6. PROVIDE LED LIGHTING CIRCUIT: TWO 10-WATT LED LIGHTS WITH OUTDOOR SWITCH LOCATED IN VAULT ON 20-AMP 120 VOLT CIRCUIT.
7. PROVIDE ONE 20-AMP GFI OUTLET FOR SERVICE WORK LOCATED INSIDE VAULT.
8. ALL CONDUIT BOXES, FITTINGS, AND HANGERS SHALL BE PVC, FIBERGLASS, OR STAINLESS STEEL AND SUITABLE FOR OUTDOOR USE.
9. PROVIDE DISCONNECT LOCATED BEFORE METER OR VALVE COMBINATION AS REQUIRED PER ELECTRIC UTILITY IF APPLICABLE.
10. PROVIDE 2” SCHEDULE 80 PVC CONDUITS FROM POLE TO TRANSFORMER TO LOAD CENTER.
11. PROVIDE 240 VOLT SURGE PROTECTION FOR LOAD CENTER.
12. MUST MEET ALL CITY OF GREELEY AND STATE ELECTRICAL CODE REQUIREMENTS.

DEHUMIDIFIER SPECIFICATIONS:

1. DEHUMIDIFIER SHALL BE A LOW TEMP 38 DEGREES OR LOWER AND BE INSTALLED TO MANUFACTURER SPECIFICATIONS.
2. DEHUMIDIFIER SHALL BE INSTALLED A MINIMUM 2' FROM THE VAULT FLOOR.
3. A MINIMUM ½” HOSE SHALL BE INSTALLED FROM DEHUMIDIFIER TO THE SUMP PIT.

METER INSTALLATION NOTES:

1. METER SETTING MUST BE INSPECTED BEFORE BACKFILLING. FOR INSPECTION CALL (970) 350-9317.
2. NO SPRINKLER SYSTEM CONNECTION SHALL BE MADE IN THE VAULT. SPRINKLER PIT SHALL BE MINIMUM 5' DOWNSTREAM FROM THE FINAL VAULT APPURTENANCE (BYPASS TEE).
3. NO MAJOR LANDSCAPING OR STRUCTURES SHALL BE LOCATED WITHIN 10' OF METER VAULT.
4. PRESSURE REDUCING AND BACKFLOW DEVICES SHALL BE INSTALLED INSIDE THE BUILDING SERVED. INSTALL PER CITY OF GREELEY ADOPTED BUILDING CODE.
5. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR PRODUCT SPECIFICATIONS.
6. LOCATION OF METER VAULT SHALL NOT BE MORE THAN 2 FEET DOWNSTREAM OF CURBSTOP UNLESS OTHERWISE APPROVED BY W&S.

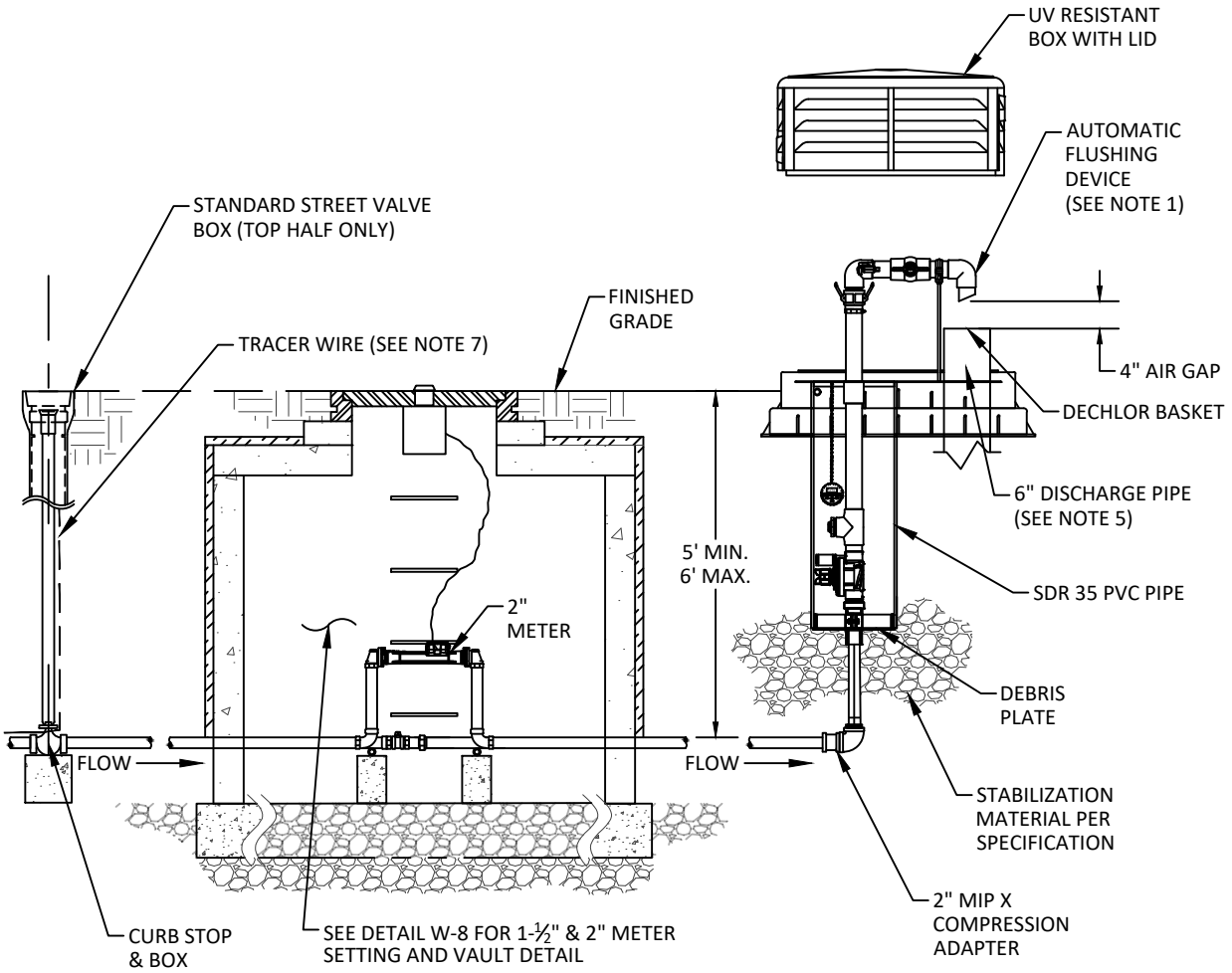
City of Greeley Colorado

(TYP) VAULT NOTES

DETAIL W-16

DATE: JANUARY 2023

SCALE: N.T.S.



NOTES:

1. FLUSHING DEVICE SHALL BE KUPFERLE #9800 FLUSHING STATION OR APPROVED EQUAL.
2. FLUSHING DEVICE SHALL BE INSTALLED PER MFR REQUIREMENTS.
3. REFER TO WATER & SEWER (W&S) DETAIL W-8, LATEST REVISION, FOR METER INSTALLATION AND LOCATION REQUIREMENTS.
4. FLUSH LINES FREE OF DEBRIS BEFORE INSTALLATION
5. CITY MAY REQUIRE INSTALLATION OF STORMWATER LINE UP TO DISCHARGE POINT TO MANAGE FLUSH WATER.
6. ALL BURIED PIPING SHALL BE INSTALLED AND RESTRAINED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
7. INSTALL TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
8. ALL PIPING SHALL BE 2 INCHES.

City of Greeley Colorado

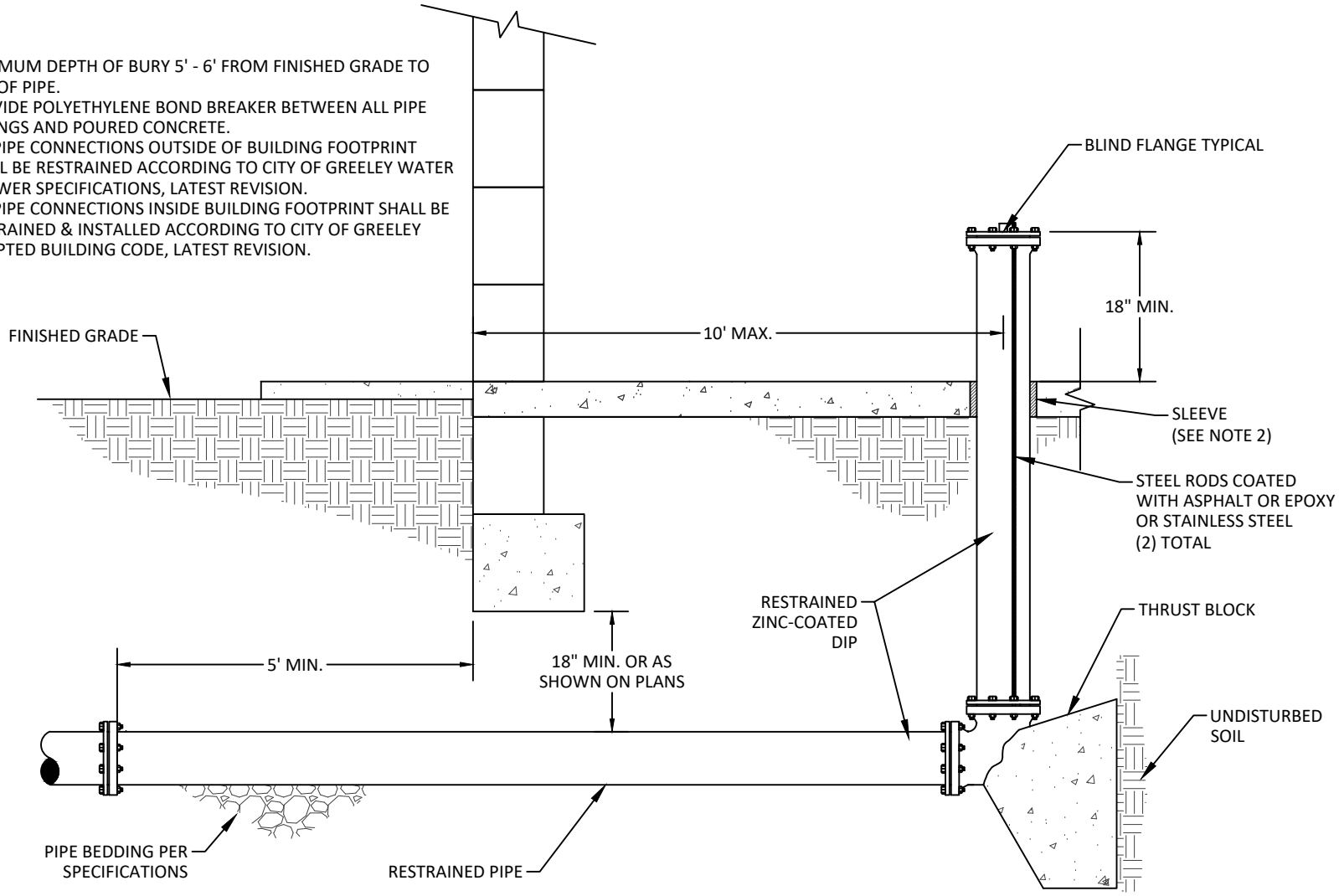
AUTOMATIC FLUSHING STATION WITH METER

DETAIL W-17

DATE: JANUARY 2023 SCALE: N.T.S.

NOTES:

1. MINIMUM DEPTH OF BURY 5' - 6' FROM FINISHED GRADE TO TOP OF PIPE.
2. PROVIDE POLYETHYLENE BOND BREAKER BETWEEN ALL PIPE FITTINGS AND POURED CONCRETE.
3. ALL PIPE CONNECTIONS OUTSIDE OF BUILDING FOOTPRINT SHALL BE RESTRAINED ACCORDING TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS, LATEST REVISION.
4. ALL PIPE CONNECTIONS INSIDE BUILDING FOOTPRINT SHALL BE RESTRAINED & INSTALLED ACCORDING TO CITY OF GREELEY ADOPTED BUILDING CODE, LATEST REVISION.



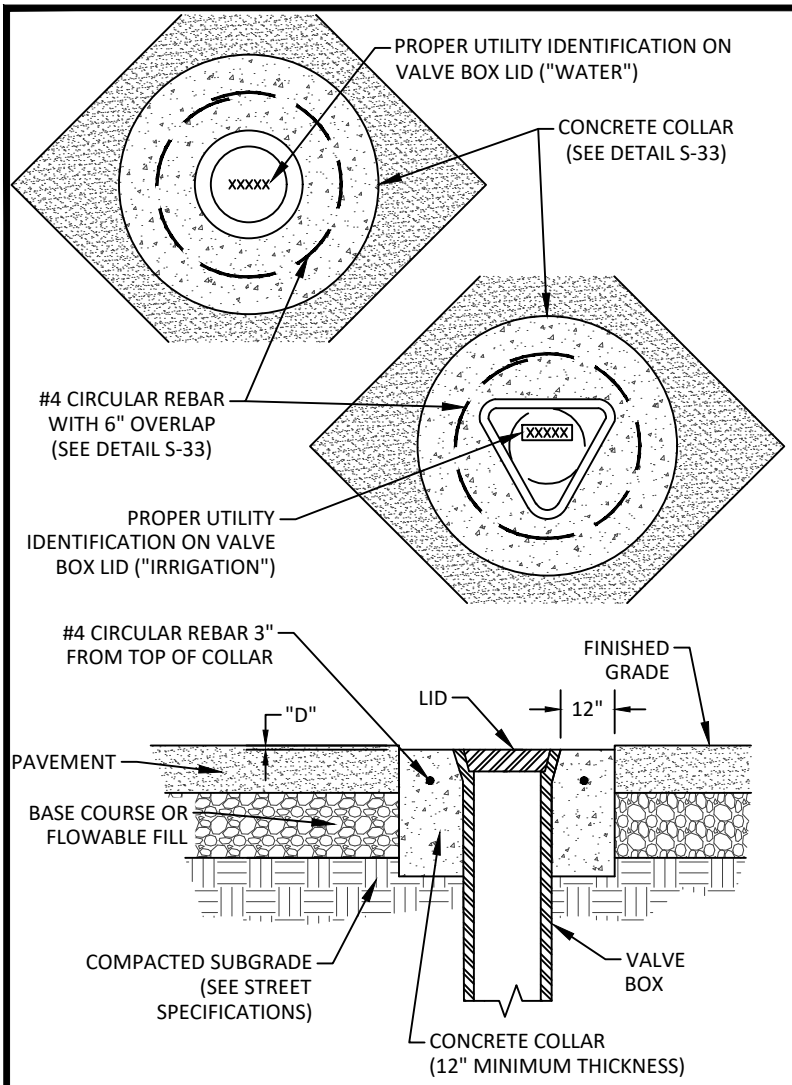
City of Greeley Colorado

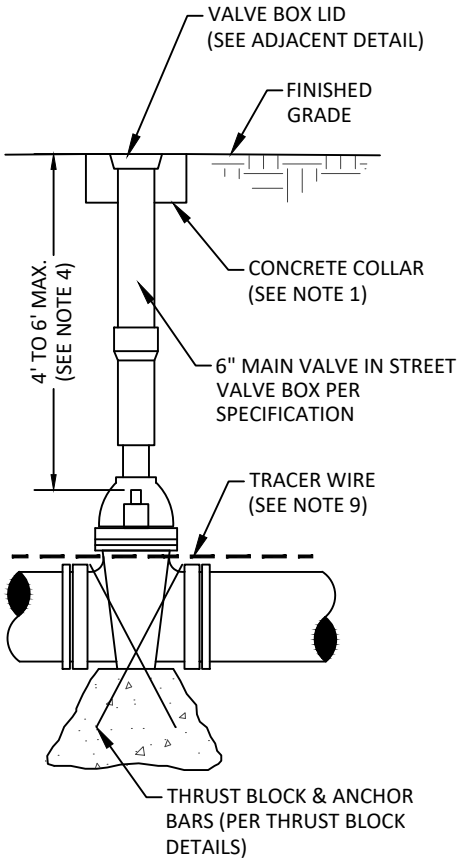
FIRE RISER INSTALLATION

DETAIL W-18

DATE: JANUARY 2023

SCALE: N.T.S.





NOTES:

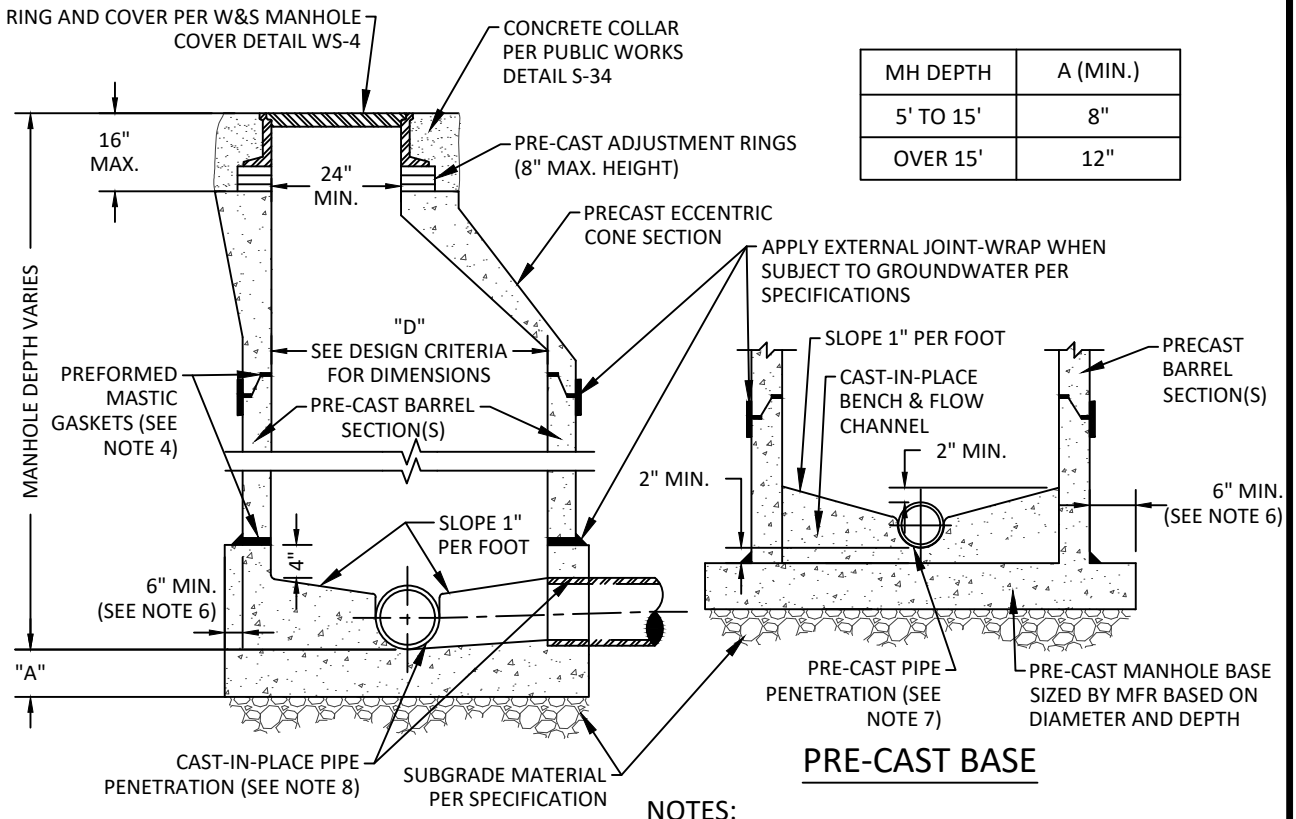
1. VALVE BOX SHALL BE PLACED IN A CONCRETE COLLAR AT THE SURFACE FOR STABILIZATION. REFER TO STREETS STANDARD DETAILS, LATEST REVISION, FOR VALVE BOXES LOCATED IN PUBLIC STREETS AND ROADWAYS (S-33).
2. VALVE BOX SHALL BE CENTERED & PLUMB OVER THE OPERATING NUT.
3. OPERATING NUT ON BURIED VALVES SHALL BE BETWEEN 4' & 6' BELOW FINISHED GRADE. EXTENSION REQUIRED IF DEEPER THAN 6' TO BRING THE OPERATING NUT TO THE SPECIFIED RANGE.
4. PROVIDE POLYETHYLENE BOND BREAKER BETWEEN ALL PIPE/FITTINGS AND POURED CONCRETE.
5. ALL BURIED VALVES, FITTINGS, AND APPURTENANCES SHALL BE RESTRAINED AND INSTALLED PER WATER & SEWER (W&S) SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION.
6. ALL BURIED VALVES TO BE INSTALLED ACCORDING TO W&S THRUST BLOCK DETAILS AND SPECIFICATIONS, LATEST REVISION OF EACH.
7. BEDDING AND BACKFILL AROUND VALVE SHALL BE PLACED PER W&S SPECIFICATIONS, LATEST REVISION.
8. INSTALL TEST STATION AND TRACER WIRE ACCORDING TO W&S SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.
9. UNLESS OTHERWISE SPECIFIED, THIS DETAIL ALSO APPLIES TO BOTH POTABLE WATER AND NON-POTABLE IRRIGATION STANDARD VALVES.

City of Greeley Colorado

STANDARD VALVE & RISER ASSEMBLY

DETAIL W-19

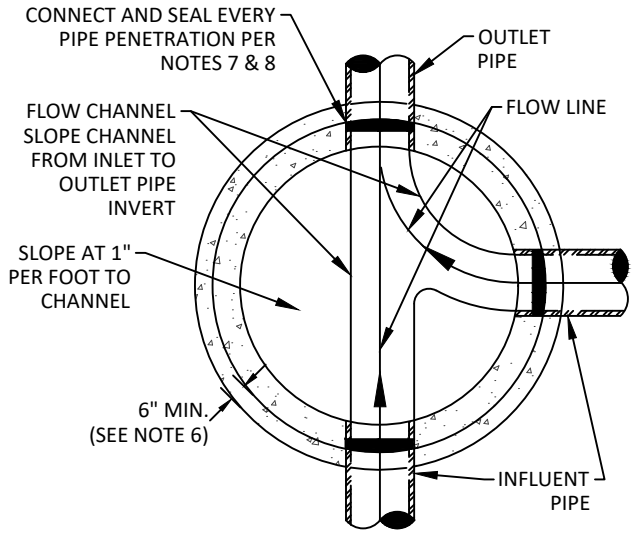
DATE: JANUARY 2023 SCALE: N.T.S.



MH DEPTH	A (MIN.)
5' TO 15'	8"
OVER 15'	12"

CAST-IN-PLACE BASE

PRE-CAST BASE



PLAN VIEW

NOTES:

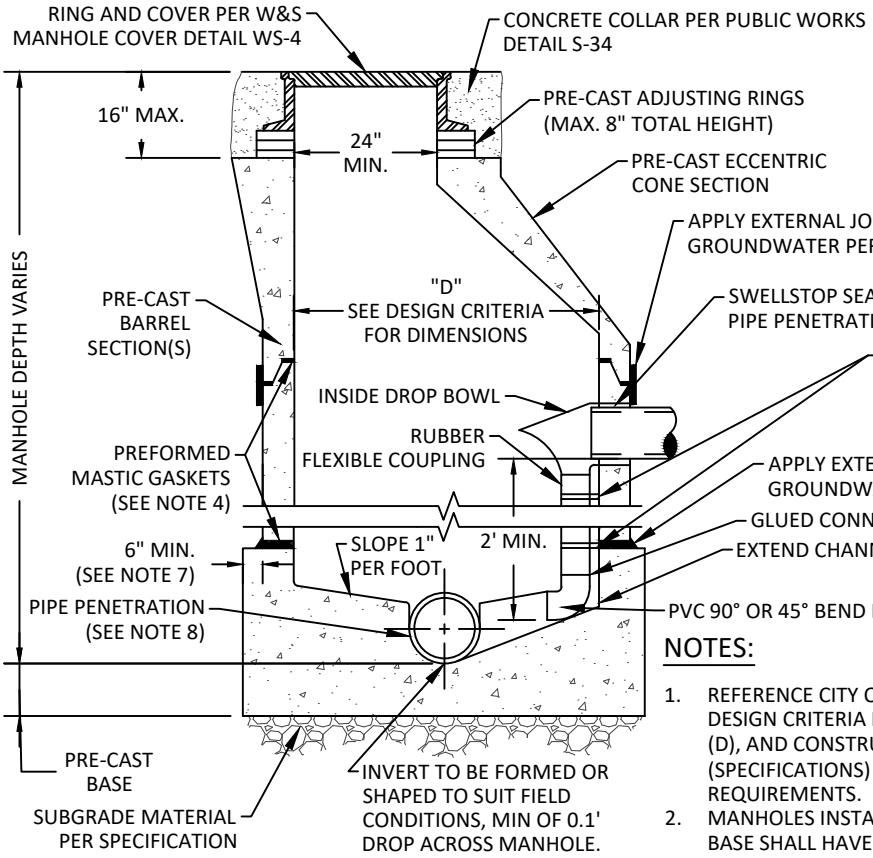
1. REFERENCE CITY OF GREELEY WATER & SEWER (W&S) DESIGN CRITERIA FOR MINIMUM MANHOLE DIAMETER (D), AND WATER & SEWER CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) AND MATERIAL/INSTALLATION REQUIREMENTS, LATEST REVISION.
2. MANHOLES INSTALLED IN GROUNDWATER ABOVE THE BASE SHALL HAVE ALL MANHOLE SECTION JOINTS SEALED PER W&S SPECIFICATIONS.
3. ALL SEWER MANHOLES SHALL BE VACUUM TESTED PER SPECIFICATIONS.
4. SEE W&S SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE MFR FOR PREFORMED MASTIC GASKETS.
5. ALL BURIED PIPING SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS.
6. BASE SHALL BE AT LEAST 6" WIDER THAN THE BOTTOM PRE-CAST BARREL SECTION AND WIDE ENOUGH TO PREVENT FLOTATION AS DESIGNED BY THE ENGINEER.
7. FOR PIPE PENETRATIONS IN CAST-IN-PLACE BASE, AN APPROVED SWELLSTOP SEAL ON PIPE BARREL SHALL BE USED. SEE SPECIFICATIONS FOR APPROVED MFR AND INSTALLATION REQUIREMENTS.
8. FOR PRE-CAST BASE, PIPE PENETRATIONS SHALL BE INSTALLED WITH A-LOK RUBBER BOOT CONNECTORS OR APPROVED EQUAL.
9. CHANNEL INVERT TO BE FORMED OR SHAPED TO SUIT FIELD CONDITIONS AND MATCH PIPE SIZE, MIN. OF 0.1' DROP ACROSS MANHOLE.
10. ALL PIPES WITH MULTIPLE SIZES MUST HAVE MATCHING CROWNS TO ELIMINATE POSSIBLE SEWER BACKUPS.

City of Greeley Colorado

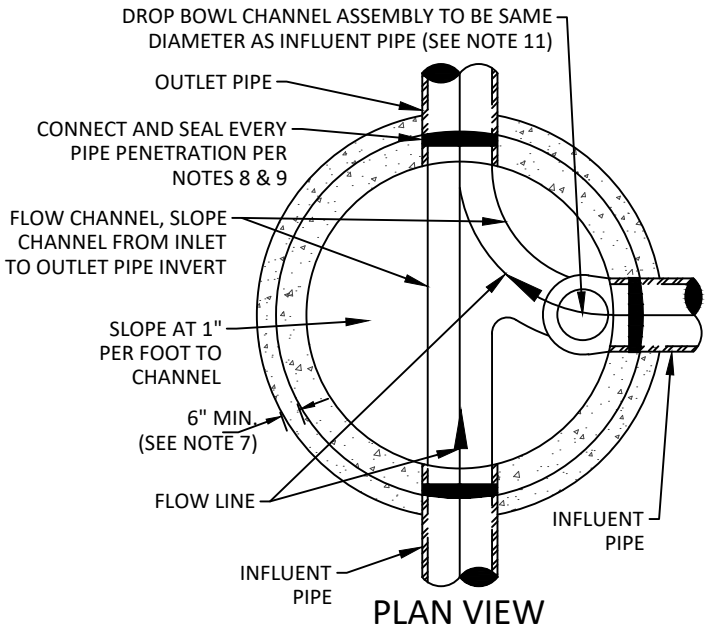
STANDARD SANITARY SEWER MANHOLE

DETAIL SS-1

DATE: JANUARY 2023 SCALE: N.T.S.



PRE-CAST BASE



PLAN VIEW

NOTES:

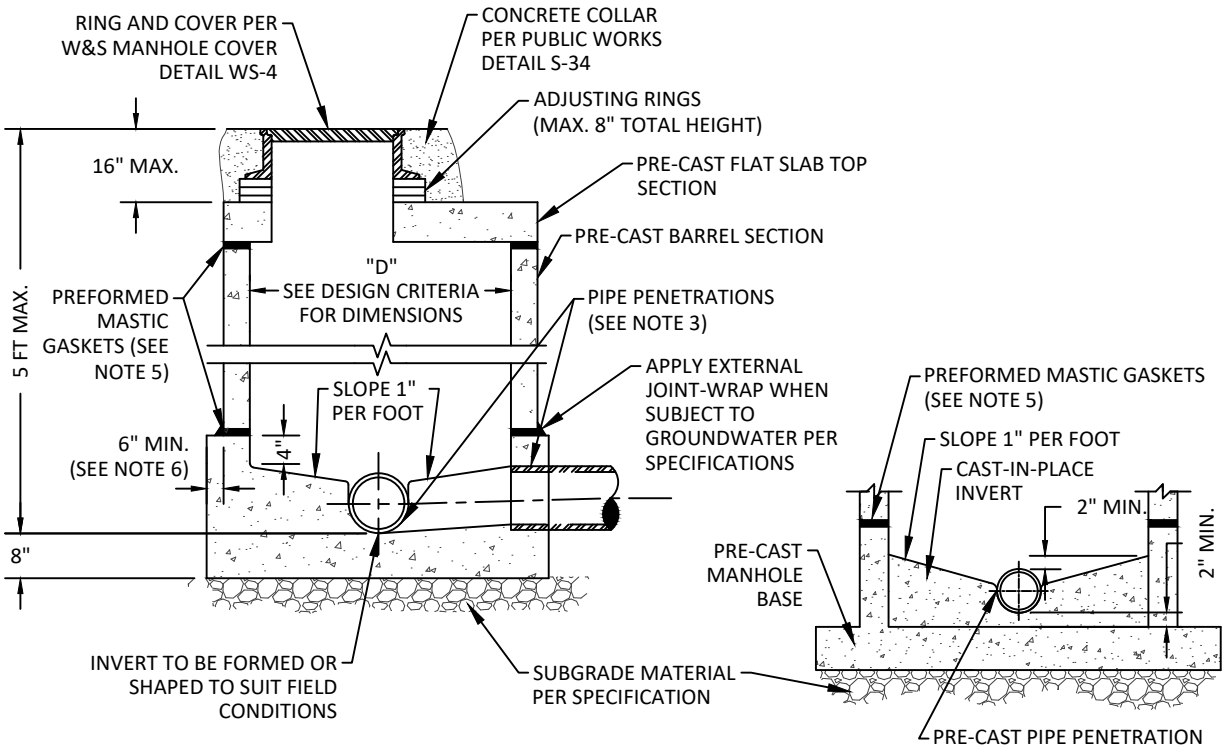
1. REFERENCE CITY OF GREELEY WATER & SEWER (W&S) DESIGN CRITERIA FOR MINIMUM MANHOLE DIAMETER (D), AND CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR MATERIAL/INSTALLATION REQUIREMENTS.
2. MANHOLES INSTALLED IN GROUNDWATER ABOVE THE BASE SHALL HAVE ALL MANHOLE SECTION JOINTS SEALED PER W&S SPECIFICATIONS.
3. ALL WASTEWATER MANHOLES SHALL BE VACUUM TESTED PER SPECIFICATIONS
4. MANHOLE RETROFITS CAN ROUTE DROP EQUIPMENT PIPING INTO INSIDE FLOW LINE CHANNEL.
5. SEE W&S SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE MFR FOR PREFORMED MASTIC GASKETS
6. ALL BURIED PIPING SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS.
7. BASE SHALL BE AT LEAST 6" WIDER THAN THE BOTTOM PRE-CAST BARREL SECTION AND WIDE ENOUGH TO PREVENT FLOTATION AS DESIGNED BY THE ENGINEER.
8. FOR PIPE PENETRATIONS IN CAST-IN-PLACE BASE, AN APPROVED SWELLSTOP SEAL ON PIPE BARREL SHALL BE USED. SEE SPECIFICATIONS FOR APPROVED MFR AND INSTALLATION REQUIREMENTS.
9. FOR PRE-CAST BASE, PIPE PENETRATIONS SHALL BE INSTALLED WITH A-LOK RUBBER BOOT CONNECTORS OR APPROVED EQUAL.
10. ALL PIPES WITH MULTIPLE SIZES MUST HAVE MATCHING CROWNS TO ELIMINATE POSSIBLE SEWER BACKUPS.
11. DROP BOWL CHANNEL ASSEMBLY TO BE SAME DIAMETER AS INFLUENT PIPE, OR SIZED TO MEET FULL PIPE CAPACITY OR SPECIFICALLY APPROVED BY W&S DEPARTMENT.
12. ALL SECTIONS OF DROP MANHOLES MUST BE PROTECTED AGAINST MICROBIAL INDUCED CORROSION PER W&S DESIGN CRITERIA AND SPECIFICATIONS.

City of Greeley Colorado

INSIDE DROP SANITARY SEWER MANHOLE

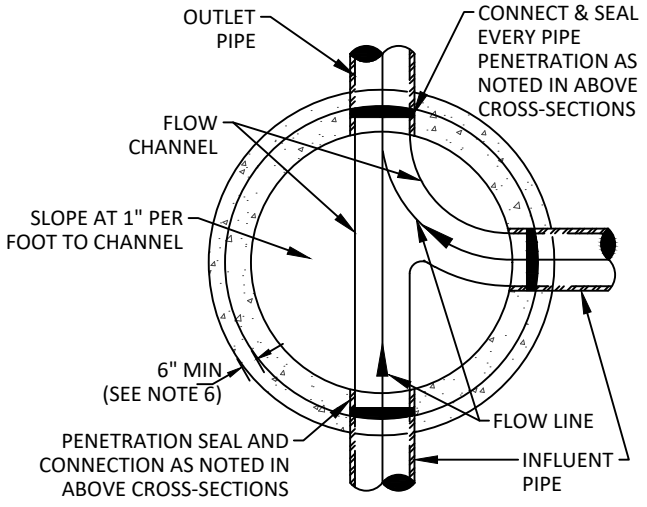
DETAIL SS-2

DATE: JANUARY 2023 SCALE: N.T.S.



CAST-IN-PLACE BASE

PRE-CAST BASE



PLAN VIEW

NOTES:

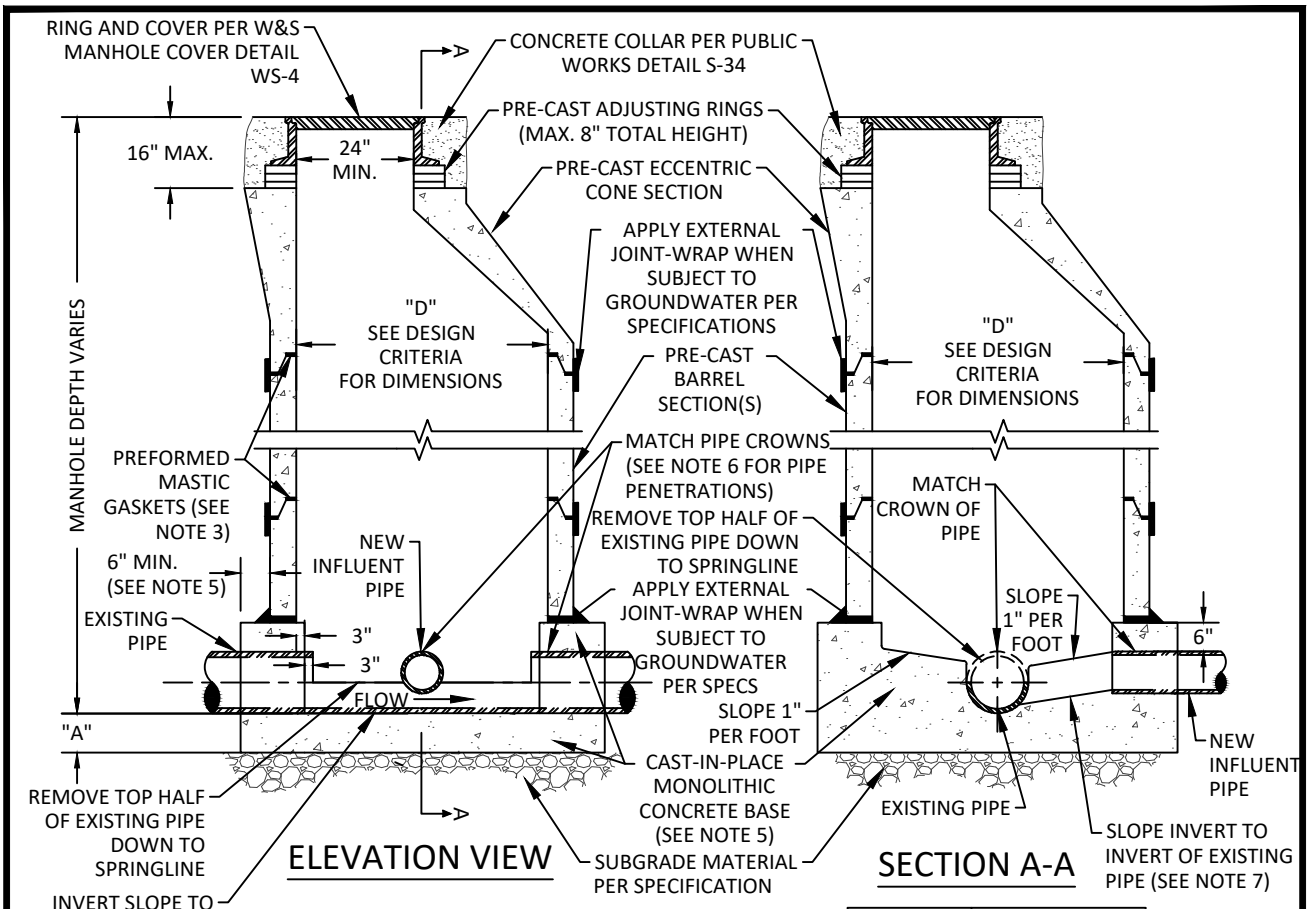
1. REFERENCE CITY OF GREELEY WATER & SEWER (W&S) DESIGN CRITERIA FOR MINIMUM MANHOLE DIAMETER (D), AND CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS) FOR MATERIAL/INSTALLATION REQUIREMENTS.
2. FOR PIPE PENETRATIONS IN CAST-IN-PLACE BASE, AN APPROVED SWELLSTOP SEAL ON PIPE BARREL SHALL BE USED. SEE SPECIFICATIONS FOR APPROVED MFR AND INSTALLATION REQUIREMENTS.
3. FOR PRE-CAST BASE, PIPE PENETRATIONS SHALL BE INSTALLED WITH A-LOK RUBBER BOOT CONNECTORS OR APPROVED EQUAL.CONNECTORS OR APPROVED EQUAL.
4. ALL SEWER MANHOLES SHALL BE VACUUM TESTED PER SPECIFICATIONS
5. SEE SPECIFICATIONS FOR ACCEPTABLE MFR FOR PREFORMED MASTIC GASKETS
6. ALL BURIED PIPING SHALL BE INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS.
7. BASE SHALL BE AT LEAST 6" WIDER THAN THE BOTTOM PRE-CAST BARREL SECTION AND WIDE ENOUGH TO PREVENT FLOTATION AS DESIGNED BY THE ENGINEER.

City of Greeley Colorado

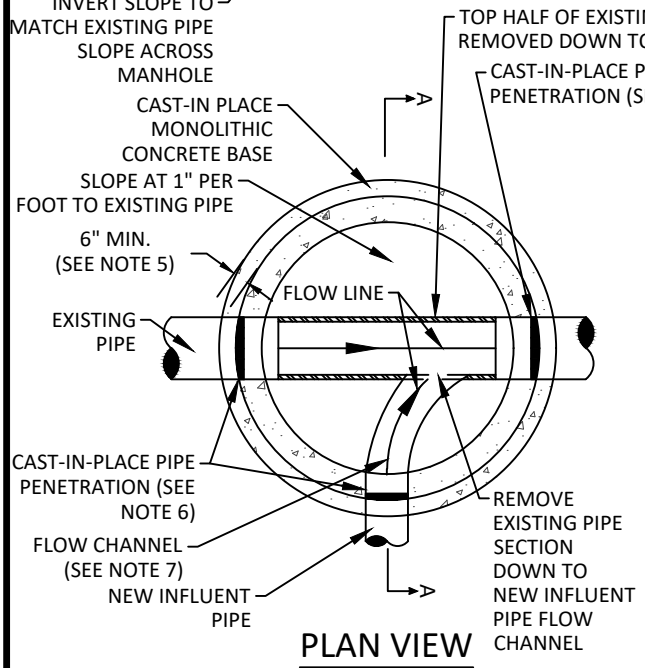
SHALLOW SANITARY SEWER MANHOLE

DETAIL SS-3

DATE: JANUARY 2023 SCALE: N.T.S.



MH DEPTH	A (MIN.)
5' TO 15'	8"
15' TO 25'	10"



NOTES:

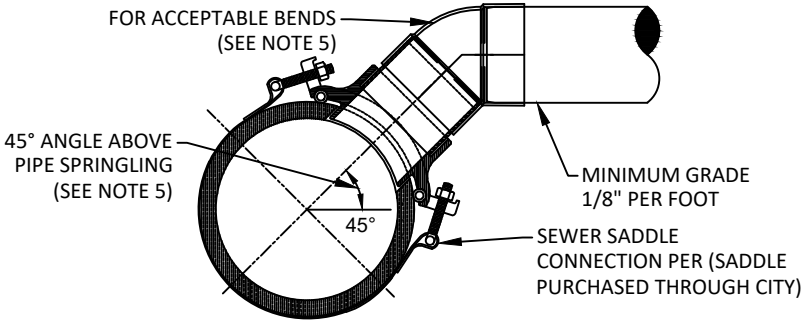
1. REFERENCE CITY OF GREELEY WATER & SEWER (W&S) DESIGN CRITERIA FOR MINIMUM MANHOLE DIAMETER (D), AND CONSTRUCTION SPECIFICATIONS FOR MATERIAL/INSTALLATION REQUIREMENTS.
2. ALL WASTEWATER MANHOLES SHALL BE VACUUM TESTED PER SPECIFICATIONS
3. SEE WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE MFR FOR PREFORMED MASTIC GASKETS
4. ALL BURIED PIPING SHALL BE INSTALLED IN ACCORDANCE WITH WATER & SEWER SPECIFICATIONS, LATEST REVISION.
5. CAST-IN-PLACE BASE SHALL BE AT LEAST 6" WIDER THAN THE BOTTOM PRE-CAST BARREL SECTION AND WIDE ENOUGH TO PREVENT FLOTATION AS DESIGNED BY THE ENGINEER.
7. FOR PIPE PENETRATIONS IN CAST-IN-PLACE BASE, AN APPROVED SWELLSTOP SEAL ON PIPE BARREL SHALL BE USED. SEE SPECIFICATIONS FOR APPROVED MFR AND INSTALLATION REQUIREMENTS.
8. MANHOLE BASE THICKNESS ARE MINIMUMS OR AS DESIGNED BY PRECAST MANUFACTURER AND TO PREVENT FLOATATION.

City of Greeley Colorado

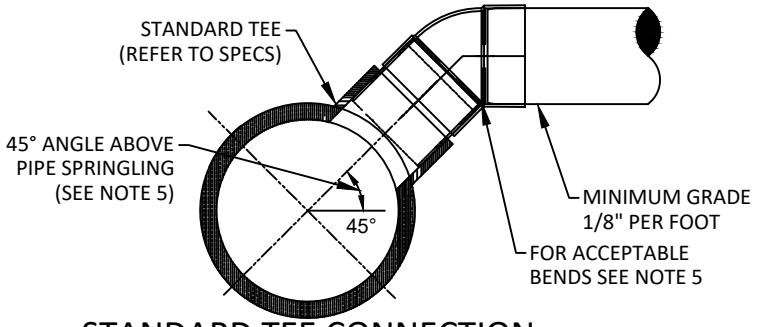
MANHOLE OVER EXISTING SANITARY SEWER LINE

DETAIL SS-4

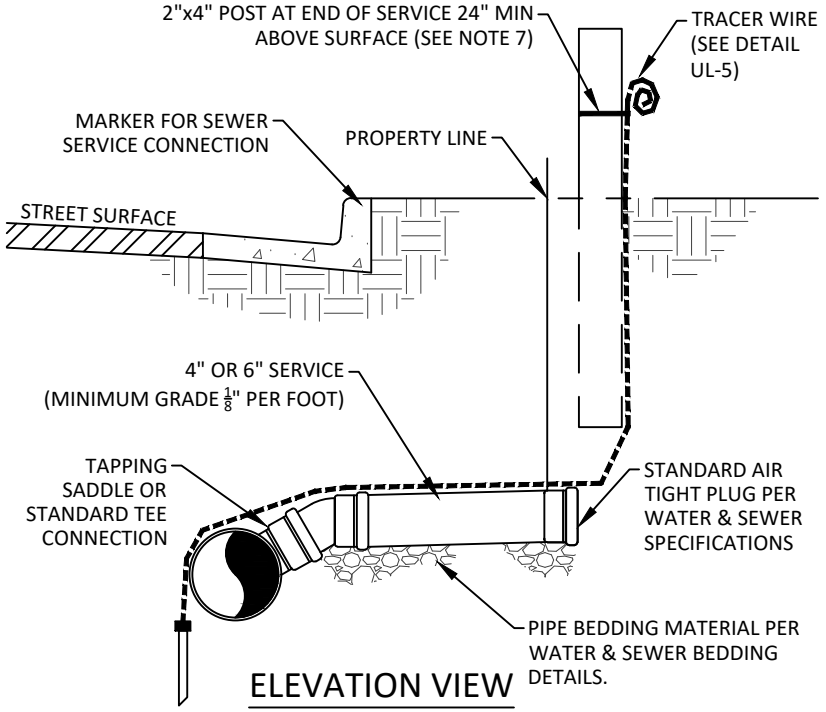
DATE: JANUARY 2023 SCALE: N.T.S.



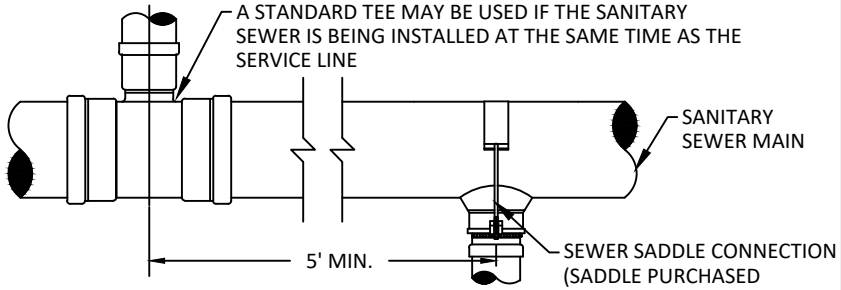
STANDARD SADDLE CONNECTION



STANDARD TEE CONNECTION



ELEVATION VIEW



PLAN VIEW

NOTES:

1. IN NO CASE SHALL THE SERVICE LINE PROTRUDE INTO THE MAIN.
2. SERVICES ARE 4" OR 6" IN DIAMETER AND SHALL HAVE A MINIMUM SLOPE OF 1.0% (1/8" PER FOOT) AND A MAXIMUM SLOPE OF 8.0%.
3. SERVICES 8" DIAMETER AND LARGER SHALL BE CONNECTED TO A MANHOLE.
4. SERVICES SHALL EXTEND TO THE PROPERTY LINE UNLESS OTHERWISE SHOWN ON CITY ACCEPTED CONSTRUCTION DRAWINGS.
5. SERVICE CONNECTIONS SHALL BE INSTALLED AT A POSITION 45° ABOVE PIPE SPRINGLINE. ACCEPTABLE BENDS FOR SERVICE CONNECT ARE 45°, 22.5° & 11.25°.
6. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY WATER & SEWER SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.
7. 2 X 4 POST SHALL BE EXTERIOR GRADE, PRESSURE TREATED, LUMBER.
8. TAPPING OF EXISTING SEWER LINE TO BE SCHEDULED WITH CITY AT LEAST 72 HOURS PRIOR TO CONSTRUCTION (970) 350 - 9322.

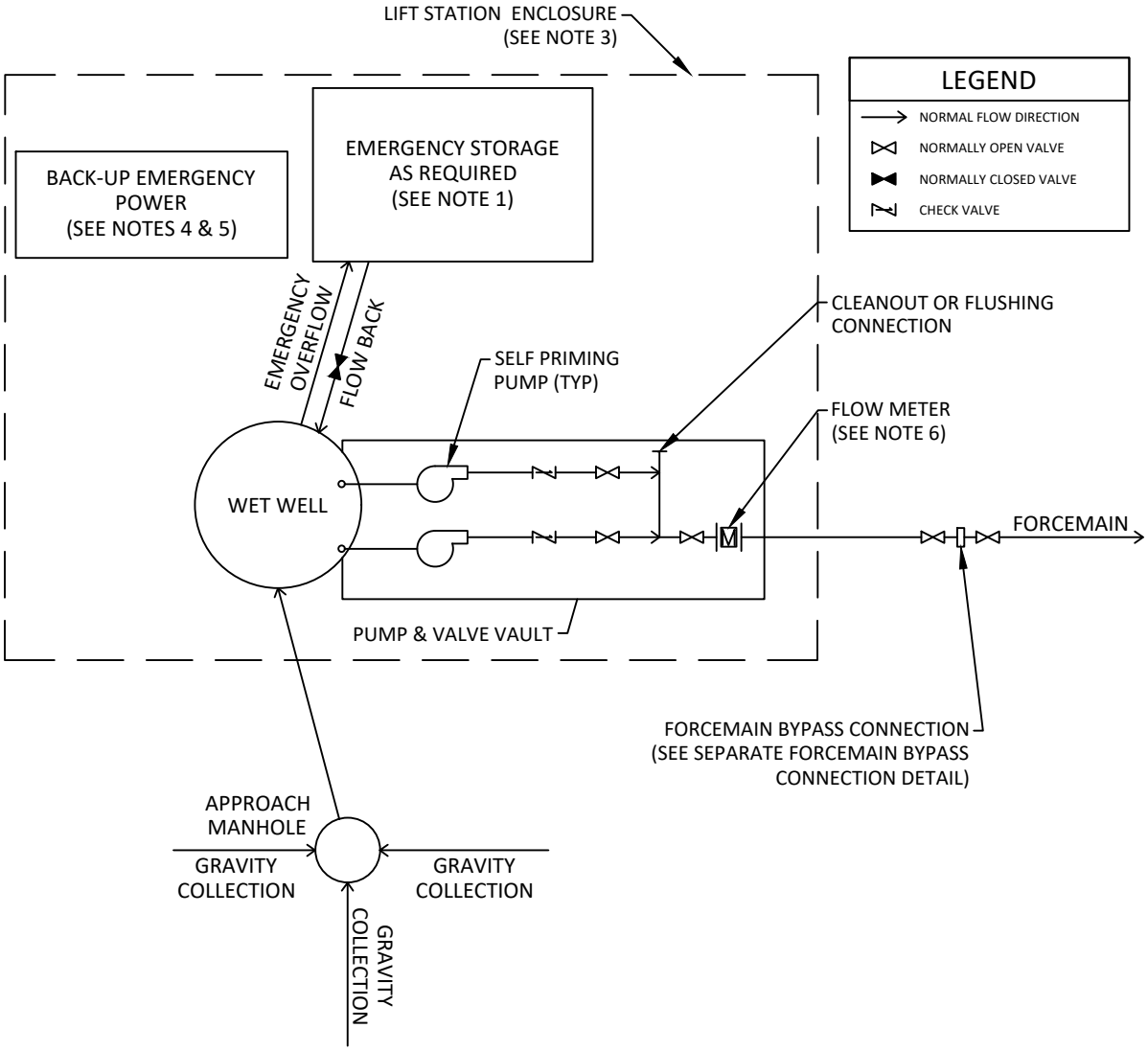
City of Greeley Colorado

SANITARY SEWER SERVICE CONNECTION

DETAIL SS-5

DATE: JANUARY 2023

SCALE: N.T.S.



NOTES:

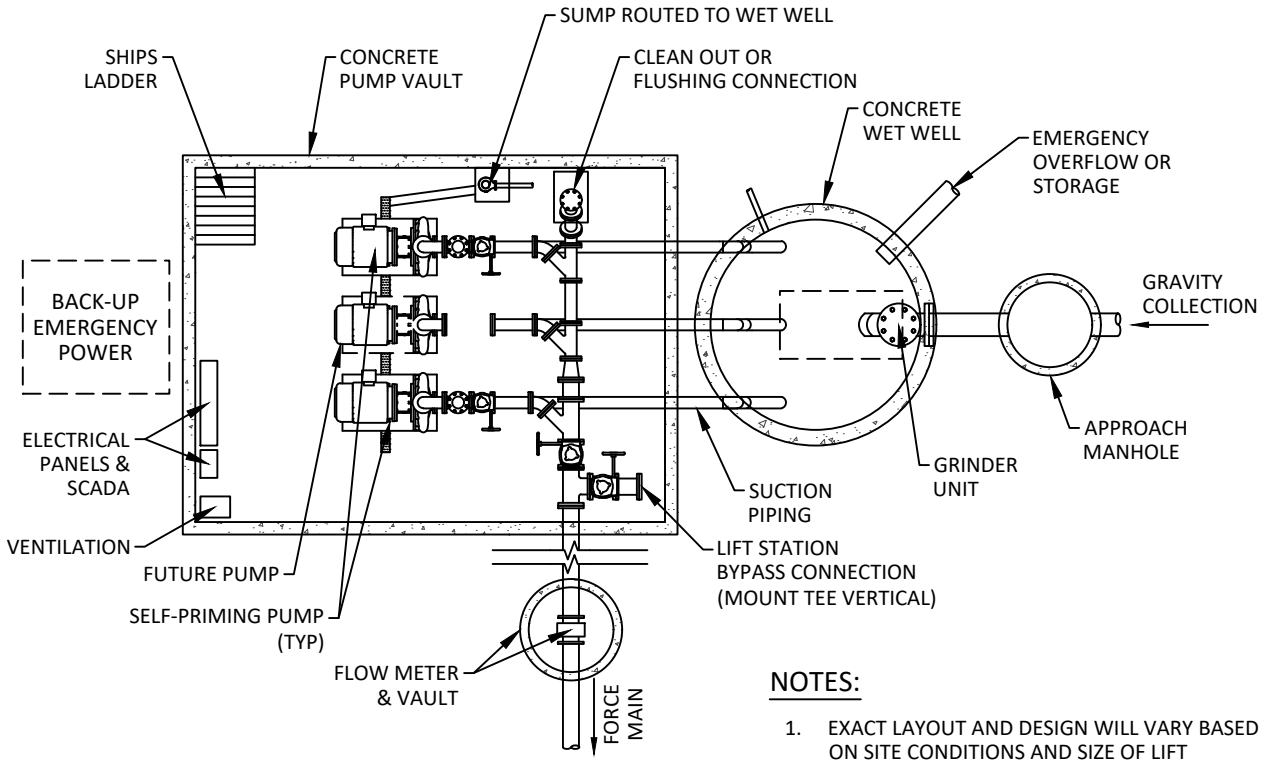
1. EMERGENCY STORAGE VOLUME WILL BE BASED ON PEAK HOURLY FLOW AND RESPONSE TIME. STORAGE VOLUME IS SUBJECT TO REVIEW & ACCEPTANCE BY THE CITY AND COLORADO DEPARTMENT OF PUBLIC HEALTH & ENVIRONMENT (CDPHE).
2. LIFT STATION BYPASS CONNECTION IS REQUIRED FOR ALL LIFT STATIONS.
3. FINAL ORIENTATION AND ARRANGEMENT OF LIFT STATION AND FORCE MAIN SUBJECT TO REVIEW & ACCEPTANCE BY CITY.
4. BACK-UP EMERGENCY POWER SYSTEM SHALL BE INCLUDED IN THE STATION BY PUMP MANUFACTURER OR INDEPENDENT GAS GENERATOR.
5. SKID-MOUNTED NATURAL GAS DRIVEN ENGINES INTEGRAL WITH SKID-MOUNTED LIFT STATION PUMP SYSTEM PREFERRED FOR BACK-UP EMERGENCY POWER SYSTEMS.
6. FLOW METER SHALL BE INSIDE DEDICATED METER VAULT PER WATER METER VAULT DETAILS, LATEST REVISION, OR LIFT STATION ENCLOSURE (PREFERRED).
7. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE PRODUCT AND EQUIPMENT MODELS AND MANUFACTURERS.

City of Greeley Colorado

(TYP) LIFT STATION FLOW SCHEMATIC

DETAIL SS-6

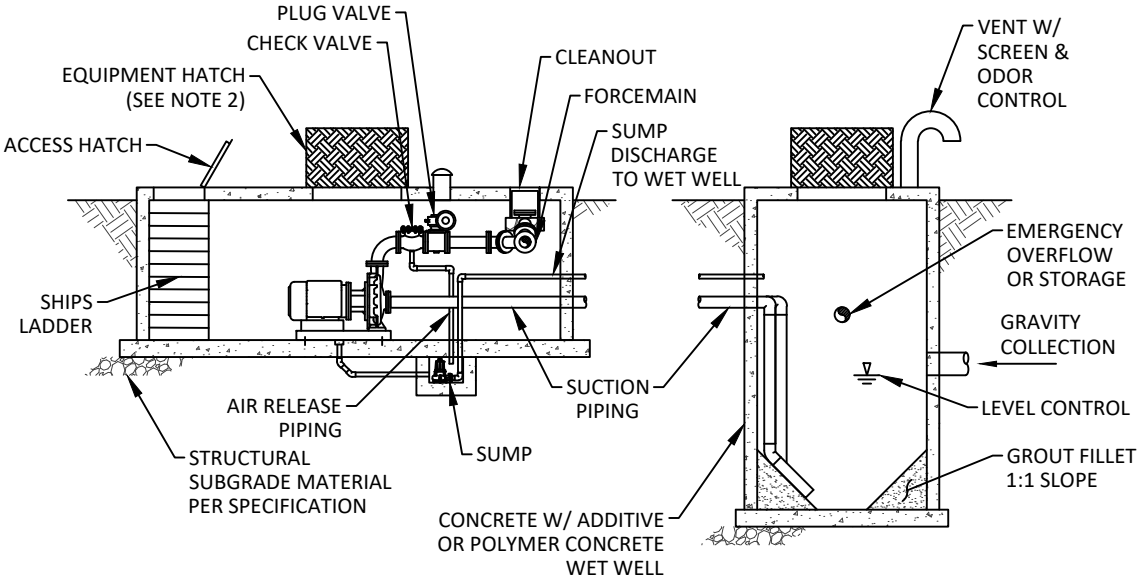
DATE: JANUARY 2023 SCALE: N.T.S.



PLAN VIEW

NOTES:

1. EXACT LAYOUT AND DESIGN WILL VARY BASED ON SITE CONDITIONS AND SIZE OF LIFT STATION.
2. EQUIPMENT HATCH SHALL BE OVER ALL EQUIPMENT THAT WILL REQUIRE REPLACEMENT OR MAINTENANCE.



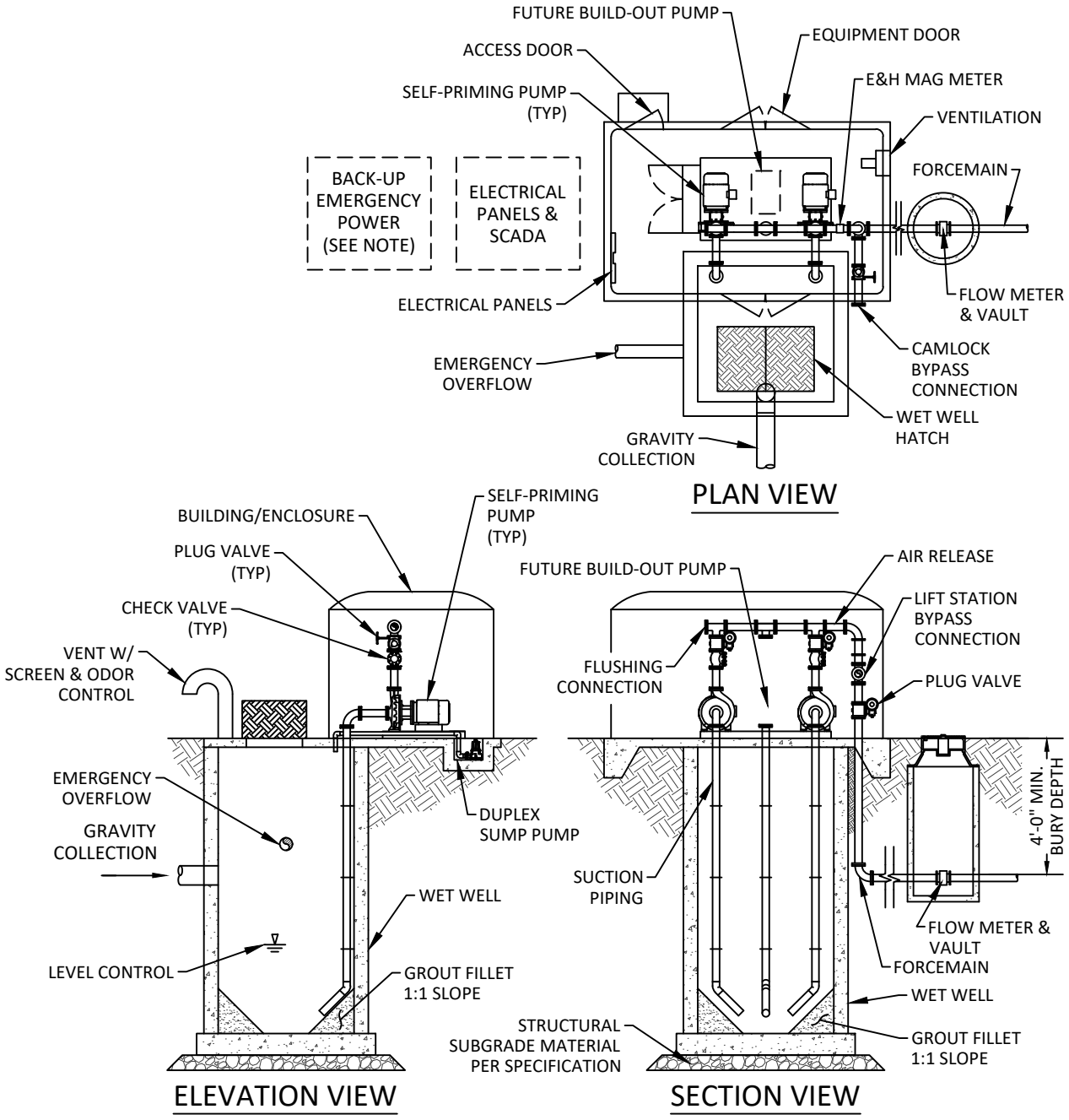
SECTION VIEW

City of Greeley Colorado

(TYP) BELOW GRADE LIFT STATION

DETAIL SS-7

DATE: JANUARY 2023 SCALE: N.T.S.



NOTES:

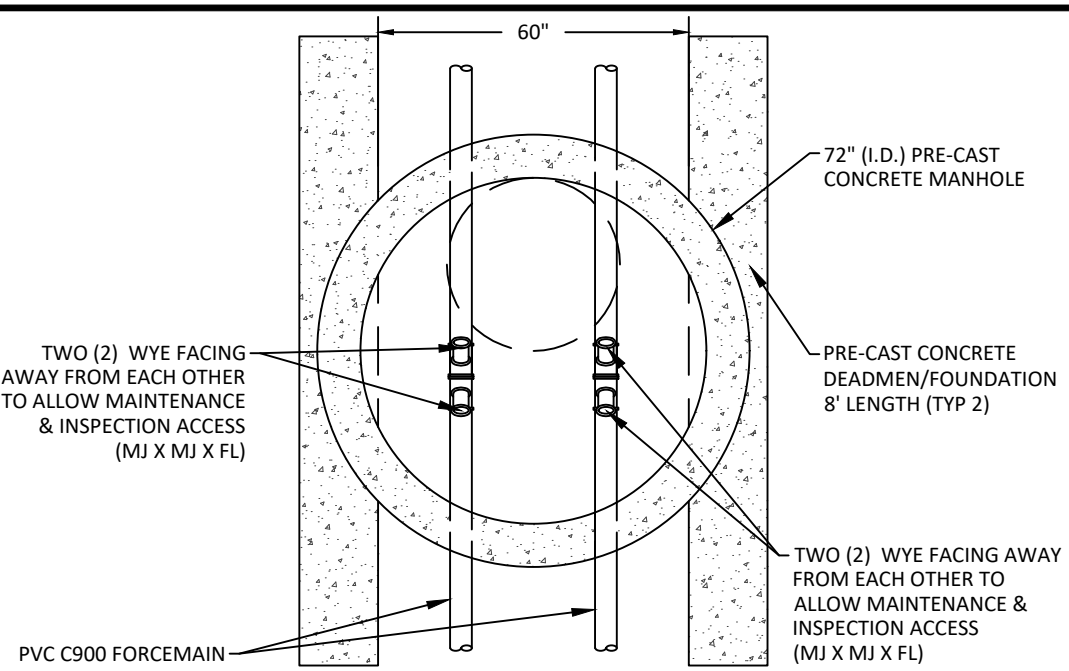
1. BACK-UP POWER SYSTEMS SHALL BE PROVIDED BY PUMP MANUFACTURER.
2. EXACT LAYOUT AND DESIGN WILL VARY BASED ON SITE CONDITIONS AND SIZE OF LIFT STATION.

City of Greeley Colorado

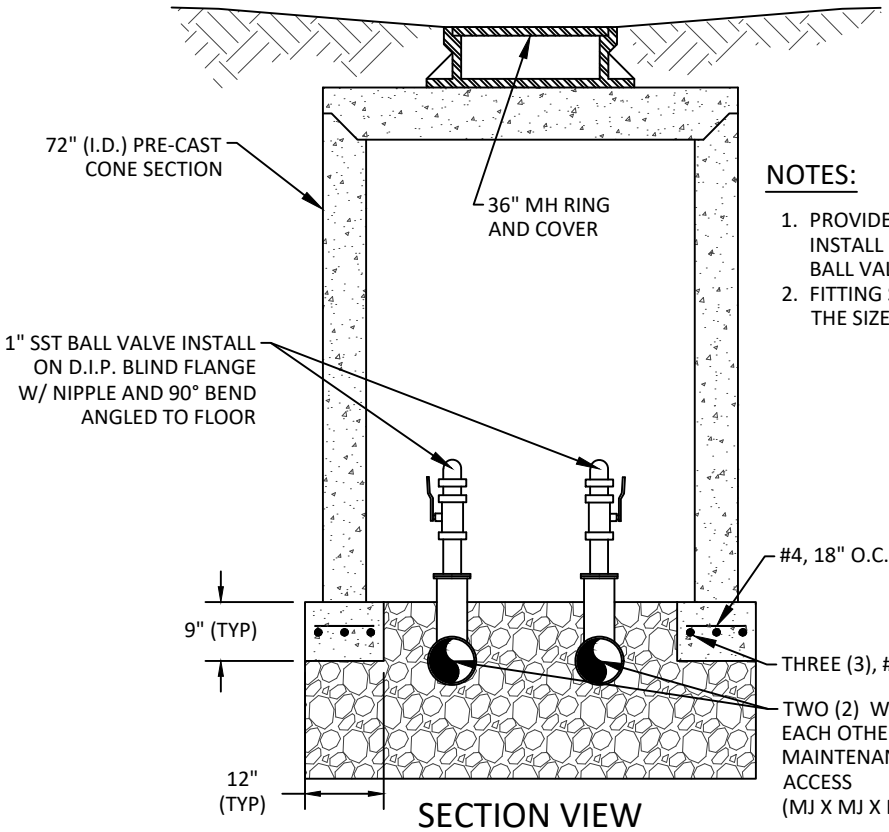
(TYP) ABOVE GRADE LIFT STATION

DETAIL SS-8

DATE: JANUARY 2023 SCALE: N.T.S.



PLAN VIEW



NOTES:

1. PROVIDE 1" BLIND FLANGE, INSTALL 1" STAINLESS STEEL (SST) BALL VALVE.
2. FITTING SIZES WILL DEPEND ON THE SIZE OF THE FORCE MAIN.

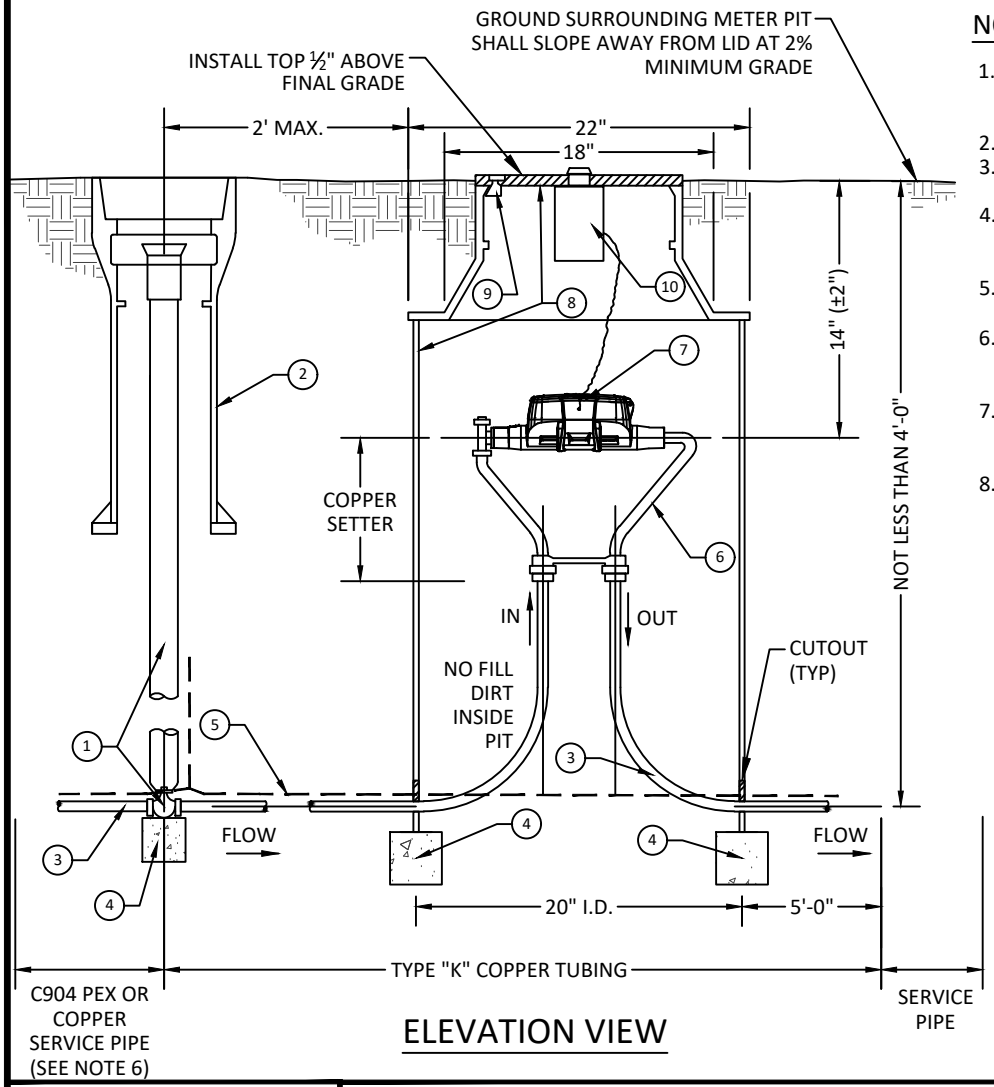
SECTION VIEW

City of Greeley Colorado

(TYP) FORCEMAIN BYPASS & CLEANOUT CONNECTION

DETAIL SS-9

DATE: JANUARY 2023 SCALE: N.T.S.



ELEVATION VIEW

NOTES:

1. METER MUST BE PURCHASED THROUGH THE CITY OF GREELEY METER SHOP. NO EXCEPTIONS. CONTRACTOR TO PROVIDE ADDITIONAL PIPING, COUPLINGS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM.
2. COPPER SHALL NOT SHOW ANY VISIBLE SIGNS OF CRIMPING.
3. METER PIT SHALL NOT BE PLACED IN ROADWAYS, DRIVEWAYS, OR PARKING AREAS.
4. PLACEMENT OF CURB STOP BOX MAY VARY FROM A MAXIMUM OF 1' OUTSIDE THE PROPERTY LINE TO A MAXIMUM OF 1' INSIDE THE PROPERTY LINE. PLACEMENT OF CURB STOP BOX OUTSIDE THE PROPERTY LINE IS PREFERRED.
5. METER PIT AND PIPING MUST BE INSPECTED BEFORE BACKFILLING. FOR INSPECTION CALL (970)-350-9264.
6. REFER TO CITY OF GREELEY WATER & SEWER (W&S) CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER SPECIFICATIONS, REQUIRED MARKINGS, AND COATINGS.
7. FOR ADDITIONAL APPLICABLE METER AND METER PIT INSTALLATION NOTES AND REQUIREMENTS, REFER TO CITY OF GREELEY W&S DETAIL W-15, CONSTRUCTION SPECIFICATIONS, AND DESIGN CRITERIA, LATEST REVISION OF EACH,
8. FOR CURB STOP DETAILS, REFER TO CITY OF GREELEY W&S DETAIL W-9, LATEST REVISION.

LEGEND	
1	CURB STOP VALVE & SERVICE BOX (SEE NOTE 8)
2	UPPER HALF OF STANDARD 6" VALVE BOX (INSTALLED PER SPECIFICATIONS)
3	¾" OR 1" SERVICE PIPE (MATCH SERVICE PIPE I.D.) (SEE NOTE 6)
4	BRICK SUPPORT (PLACE ON UNDISTURBED SOIL)
5	TRACER WIRE (SEE GENERAL NOTES ON RELATED DETAIL NP-2)
6	COPPER METER SETTER (SEE NOTE 6)
7	METER UNIT (SEE NOTE 1)
8	COMPOSITE DOUBLE LID CONE OR APPROVED EQUAL (SEE NOTE 6)
9	STANDARD FORGED BRASS WATERWORKS PENTAGON HEAD WITH LOCKING SCREW
10	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)

City of Greeley Colorado

OUTSIDE SETTING FOR ¾" & 1" IRRIGATION METER

DETAIL NP-1

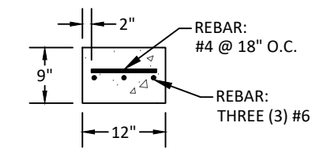
DATE: JANUARY 2023

SCALE: N.T.S.

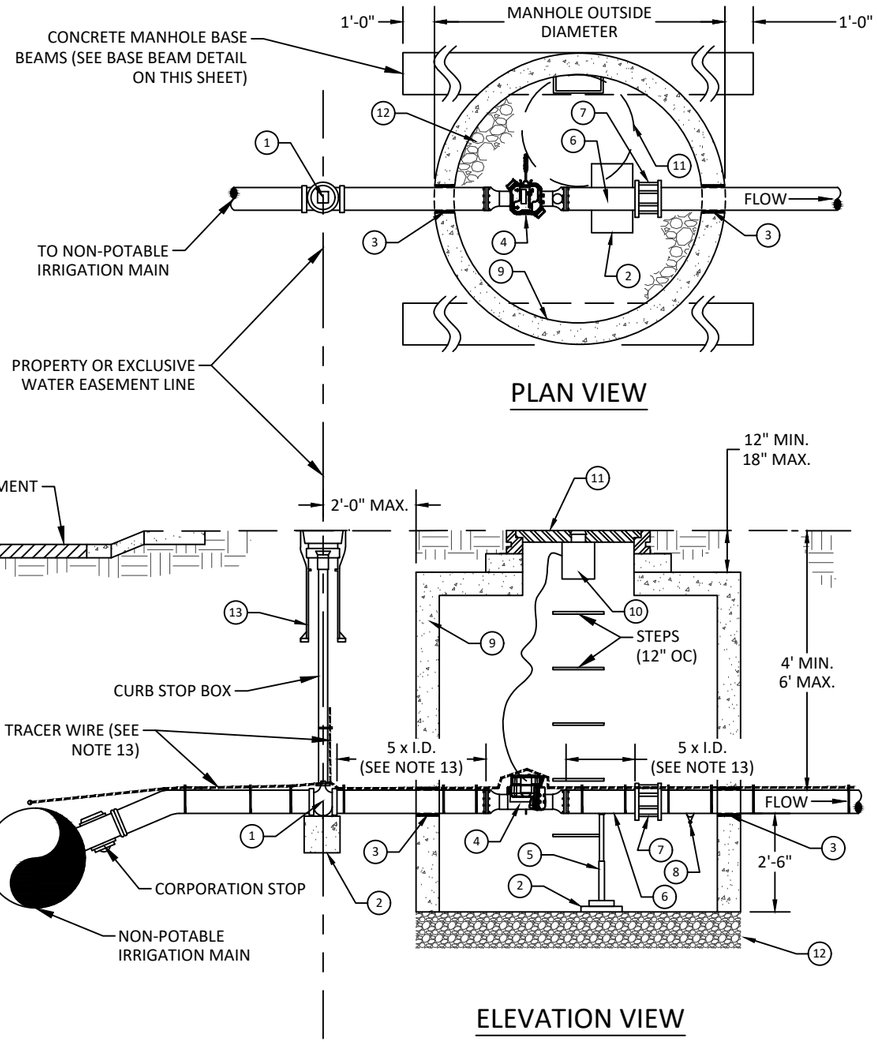
GENERAL NON-POTABLE NOTES:

1. METER MUST BE PURCHASED THROUGH THE CITY OF GREELEY METER SHOP. NO EXCEPTIONS. CONTRACTOR TO PROVIDE PIPING, COUPLINGS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM.
2. LOCATION OF METER VAULT SHALL BE 2 FT DOWNSTREAM OF THE CURB STOP UNLESS OTHERWISE SPECIFIED BY THE WATER & SEWER DEPARTMENT.
3. NO CONCRETE SHALL BE POURED INTO VAULT, UNLESS IN SITUATIONS INVOLVING HIGH GROUND WATER OR OTHERWISE SPECIFIED BY THE CITY. THE WATER & SEWER DEPARTMENT RESERVES THE RIGHT TO REQUIRE A CONCRETE BOTTOM AND BE WATERTIGHT IN AREAS OF HIGH GROUND WATER.
4. ALL EQUIPMENT AND PIPING SHALL BE ADEQUATELY SUPPORTED AND ATTACHED TO VAULT WITH STAINLESS STEEL FASTENERS AND BOLTS.
5. IF SURFACE IS NOT TO FINAL GRADE AT TIME OF METER VAULT INSTALLATION OR GRADE CHANGES AFTER INSTALLATION, OWNER SHALL ADJUST VAULT TO MEET SPECIFICATIONS.
6. VAULT MANHOLE COVER SHALL BE A BOLT DOWN LID. REFER TO WATER & SEWER (W&S) CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION, FOR APPROVED MANHOLE COVER MATERIALS, MANUFACTURERS, MARKINGS, AND OTHER REQUIREMENTS.
7. VAULT MANHOLE COVER SIZE DEPENDS ON METER SIZE:
   - 24" MIN. MANHOLE COVER FOR 1-½" AND 2" METERS
   - 30" MIN. MANHOLE COVER FOR 3" AND LARGER METERS
8. METER SETTING MUST BE INSPECTED BEFORE BACKFILLING. FOR INSPECTION CALL (970)-350-9264.
9. PLACEMENT OF CURB STOP BOX MAY VARY FROM A MAXIMUM OF 1' OUTSIDE THE PROPERTY LINE TO A MAXIMUM OF 1' INSIDE THE PROPERTY LINE. PLACEMENT OF CURB STOP BOX OUTSIDE THE PROPERTY LINE IS PREFERRED.
10. SHUTOFF VALVE SHALL MATCH THE SERVICE PIPE INSIDE DIAMETER. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR ACCEPTABLE MFR AND MODELS.
    - FOR 2" AND SMALLER SERVICE LINES: SHUTOFF VALVE SHALL BE A STANDARD CURB STOP.
    - FOR 3" AND LARGER SERVICE LINES: SHUTOFF VALVE SHALL BE A STANDARD GATE VALVE (SEE DETAIL W-18).
11. INSTALL UPPER HALF OF STANDARD VALVE BOX AROUND CURB STOP BOXACCORDING TO THE W&S SPECIFICATIONS, LATEST REVISION.
12. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.
13. UPSTREAM AND DOWNSTREAM PIPE SPOOL LENGTH 5X PIPE I.D. OR PER MFR REQUIREMENTS (WHICHEVER YIELDS THE LONGER PIPE LENGTH).
14. NO SPRINKLER SYSTEM CONNECTIONS SHALL BE MADE IN THE METER VAULT.
15. NO MAJOR LANDSCAPING OR STRUCTURES SHALL BE LOCATED WITHIN 10 FT OF METER VAULT.
16. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER SPECIFICATIONS.
17. ALL BURIED PIPING SHALL BE RESTRAINED AND INSTALLED IN ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.
18. SEE WATER & SEWER DETAIL W-15, LATEST REVISION, FOR ADDITIONAL METER AND VAULT INSTALLATION REQUIREMENTS.

LEGEND	
1	SHUTOFF VALVE WITH 2" OPERATING NUT (SEE NOTE 11).
2	CONCRETE PAVER OR APPROVED EQUIVALENT
3	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECIFICATION
4	METER UNIT (SEE NOTE 1)
5	ADJUSTABLE STAINLESS STEEL PIPE SUPPORT AND BASE
6	FLG X PE SPOOL PIPE
7	RESTRAINED FLANGED COUPLING ADAPTER OR COUPLING
8	1" BALL VALVE DRAIN
9	CONCRETE MANHOLE (48" MIN. DIAMETER FOR 1-½" AND 2" METERS, 60" MIN. DIAMETER FOR 3" AND 4" METERS, 72" MIN. FOR 6" AND 8" METERS)
10	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)
11	ACCESS FRAME AND APPROVED MANHOLE COVER WITH RECESSED 2" DIAMETER HOLE FOR RT UNIT (SEE NOTES 6, 7, AND 8)
12	6" MIN OF SUBGRADE MATERIAL UNDER GRADE BEAM AND INSIDE VAULT PER SPECIFICATIONS
13	UPPER HALF OF STANDARD 6" VALVE BOX (INSTALLED PER SPECIFICATIONS)



BASE BEAM DETAIL



PLAN VIEW

ELEVATION VIEW

OUTSIDE SETTING FOR 1-½" TO 8" IRRIGATION METER & GENERAL NON-POTABLE NOTES

DETAIL NP-2

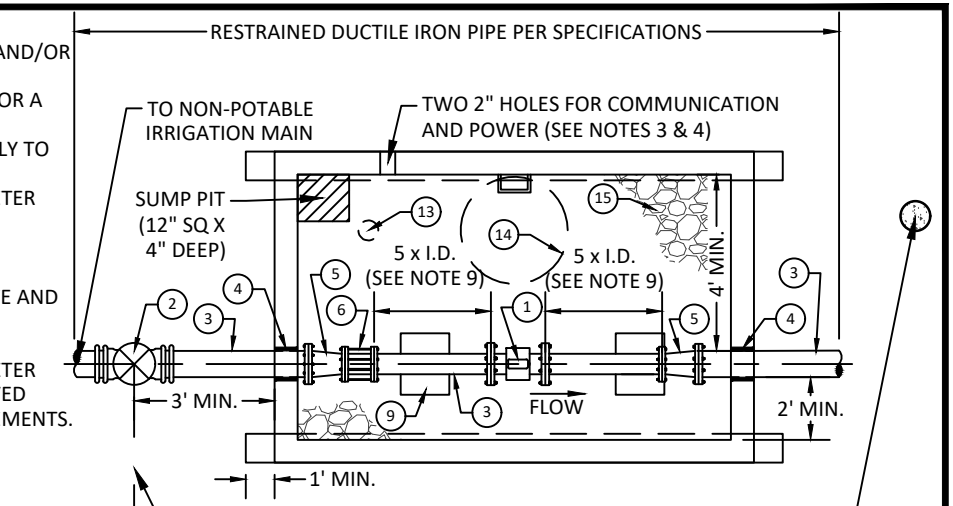
DATE: JANUARY 2023

SCALE: N.T.S.

NOTES:

1. PURCHASED FLOW METER SHALL BE BADGER M2000 MAG METER AND END POINT AND/OR COORDINATED THROUGH THE CITY OF GREELEY METER SHOP. NO EXCEPTIONS. CONTRACTOR TO PROVIDE PIPING, COUPLINGS, AND ACCESSORIES AS NECESSARY FOR A COMPLETE SYSTEM.
2. ALL NOTES ON RELATED CITY OF GREELEY WATER & SEWER (W&S) DETAIL NP-2 APPLY TO THIS DETAIL.
3. CONTRACTOR IS RESPONSIBLE FOR PROVIDING POWER AND TELEMETRY TO THE METER AND VAULT.
4. ELECTRICAL/CONTROL PANEL SHALL BE MOUNTED ABOVE GRADE INSIDE A NEMA 4 ENCLOSURE PER W&S SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION.
5. ALL ELECTRICAL WIRE SHALL BE EQUIPPED WITH WATERTIGHT CONNECTIONS ABOVE AND BELOW GRADE.
6. VAULT & MANHOLE COVER SHALL BE RATED FOR HS-20 TRAFFIC LOADINGS.
7. 36" VAULT COVER SHALL BE A BOLT DOWN LID WITH A RECESSED TWO-INCH DIAMETER HOLE FOR RT UNIT. REFER TO W&S SPECIFICATIONS, LATEST REVISION, FOR APPROVED MANHOLE COVER MATERIALS, MANUFACTURERS, MARKINGS, AND OTHER REQUIREMENTS.
8. SEE W&S DETAIL W-15, LATEST REVISION, FOR ADDITIONAL METER AND VAULT INSTALLATION REQUIREMENTS.
9. UPSTREAM AND DOWNSTREAM PIPE SPOOL LENGTH 5X PIPE I.D. OR PER MFR REQUIREMENTS (WHICHEVER YIELDS THE LONGER PIPE LENGTH).
10. REFER TO CITY OF GREELEY W&S SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER SPECIFICATIONS.
11. INSTALL TRACER WIRE ACCORDING TO CITY OF GREELEY W&S SPECIFICATIONS AND STANDARD DETAILS, LATEST REVISION.
12. PIPE BOLLARD MAY BE OMITTED AT THE CITY OF GREELEY W&S DEPARTMENT'S DISCRETION.

LEGEND	
1	METER (SEE NOTE 1)
2	MJ X MJ GATE VALVE
3	FLG X PE SPOOL PIECE
4	APPROVED RUBBER SEAL ON PIPE BARREL AT WALL PENETRATION PER SPECS
5	CONCENTRIC REDUCER (AS REQUIRED)
6	RESTRAINED FLANGED COUPLING ADAPTER
7	FLG x FLG SPOOL PIECE
8	ADJUSTABLE S.S. PIPE SUPPORT
9	CONCRETE PAVER OR APPROVED EQUAL
10	1" BALL VALVE DRAIN
11	TRACER WIRE (SEE NOTE 11)
12	THRUST BLOCK
13	6" HOLE FOR VENT PIPE
14	36" MANHOLE FRAME AND COVER (SEE NOTES 6 & 7)
15	6" MIN OF SUBGRADE MATERIAL UNDER GRADE BEAM AND INSIDE VAULT PER SPECS
16	METER ENDPOINT RADIO TRANSMITTER (RT UNIT)

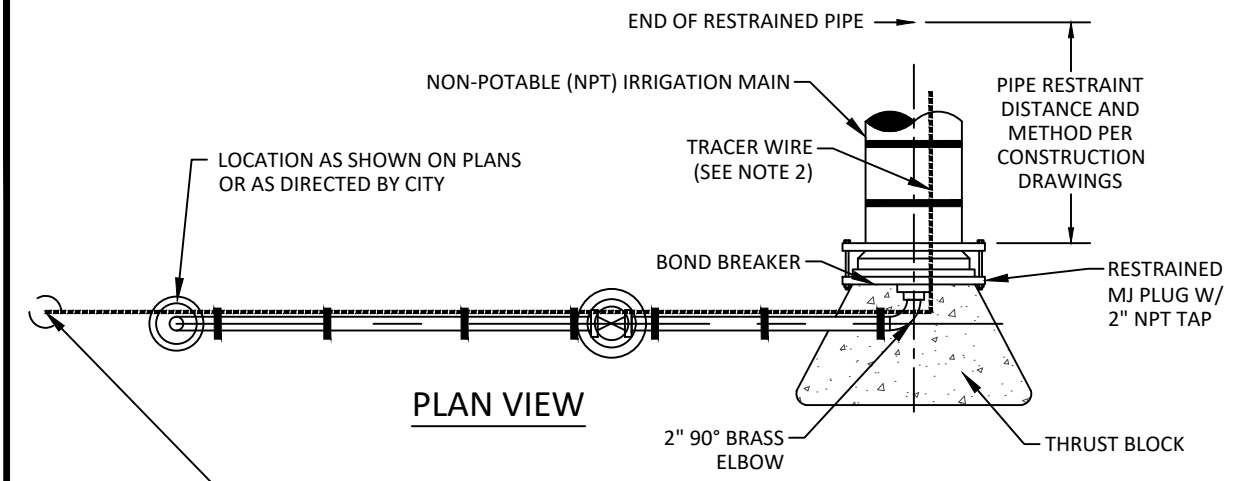


TYPICAL SETTING FOR 10" AND LARGER IRRIGATION METER & VAULT

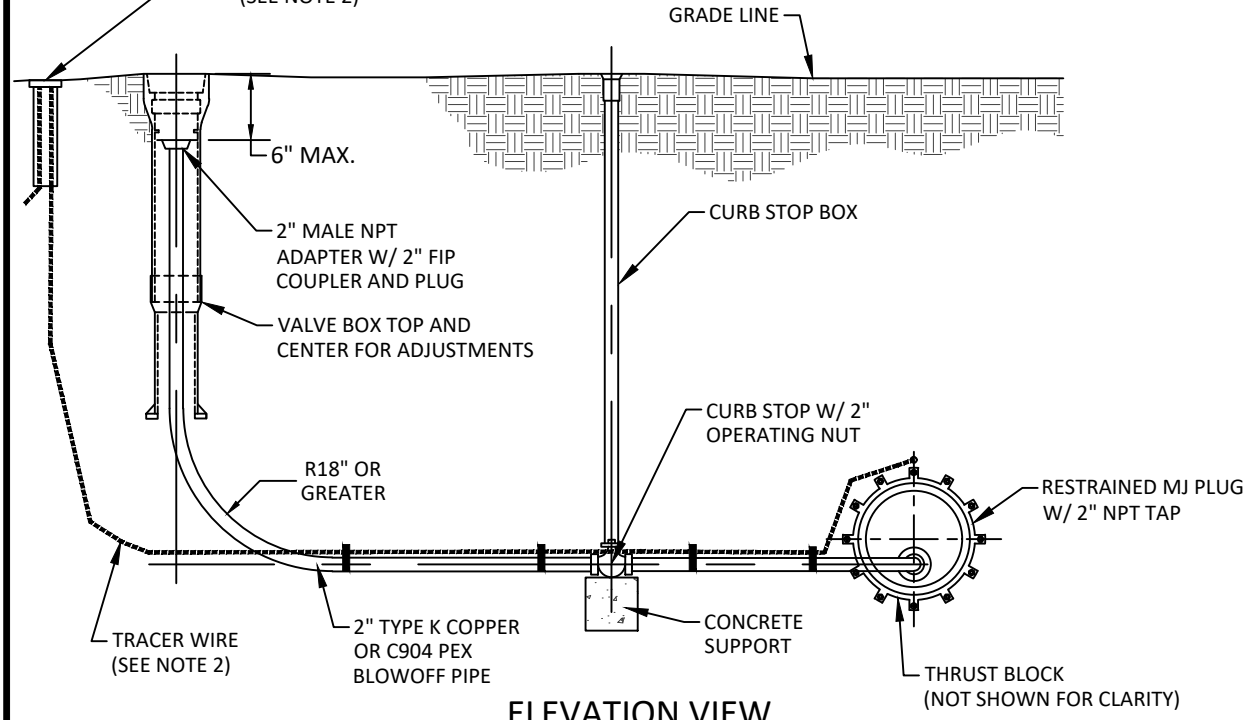
DETAIL NP-3

DATE: JANUARY 2023

SCALE: N.T.S.



PLAN VIEW



ELEVATION VIEW

NOTES:

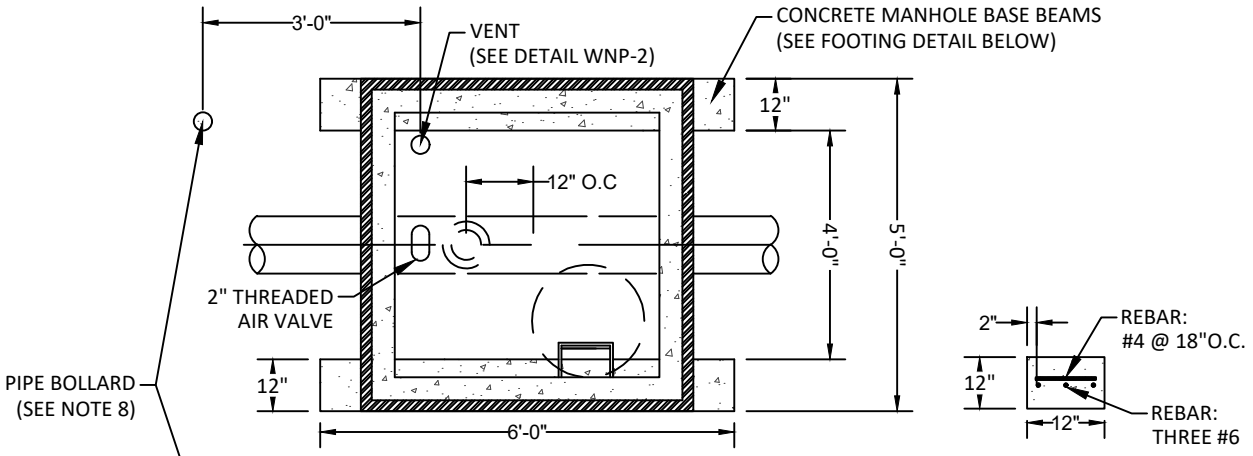
1. REFER TO RELATED NON-POTABLE IRRIGATION DETAIL NP-1 AND WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION OF EACH, FOR ADDITIONAL NON-POTABLE PIPE, CURB STOP, AND MISC. VALVE INSTALLATION REQUIREMENTS.
2. INSTALL TRACER WIRE ACCORDING SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") DETAILS, LATEST REVISION OF EACH.
3. ALL BURIED PIPING SHALL BE RESTRAINED AND INSTALLED ACCORDANCE WITH W&S SPECIFICATIONS, LATEST REVISION.

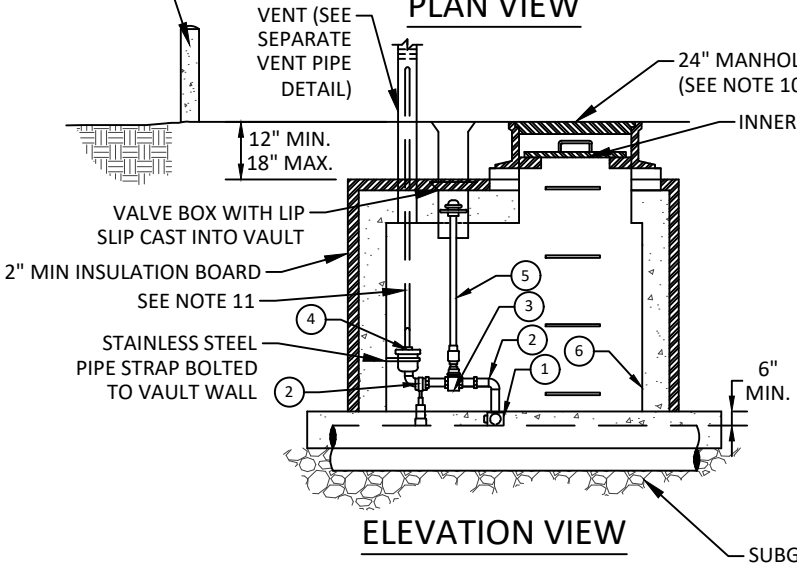
City of Greeley Colorado

NON-POTABLE BLOWOFF

DETAIL NP-4

DATE: JANUARY 2023 SCALE: N.T.S.





LEGEND	
1	PIPE SADDLE AND CORPORATION STOP OR TAPPING SLEEVE
2	ELBOW
3	THREADED GATE VALVE WITH STANDARD OPENING NUT
4	AIR RELEASE, AIR VACUUM, OR COMBINATION AIR VALVE (SEE NOTES 2 & 3)
5	VALVE STEM EXTENSION (AS REQUIRED BY THE CITY)
6	5' CONCRETE MANHOLE

NOTES:

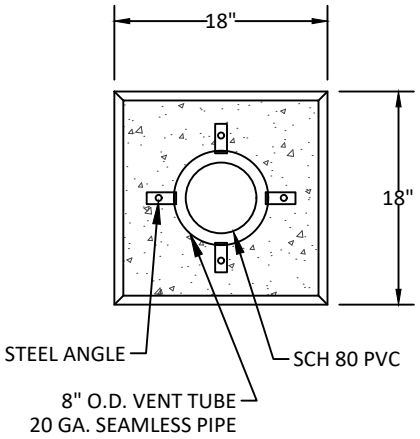
1. PLACE 6" OF SUBGRADE MATERIAL IN THE BOTTOM OF THE MANHOLE TO THE CROWN OF PIPE ONLY. REFER TO WATER & SEWER (W&S) DEPARTMENT CONSTRUCTION SPECIFICATIONS (SPECIFICATIONS), LATEST REVISION, FOR MATERIAL GRADATION.
2. VALVE TYPE AND SIZE SHALL BE SPECIFIED BY THE DESIGN ENGINEER AND APPROVED BY THE CITY.
3. INSTALL AIR RELEASE, AIR/VACUUM, AND COMBINATION AIR VALVES IN ACCORDANCE WITH MFR SPECIFICATIONS.
4. ALL SUPPORT MATERIALS SHALL BE GIVEN TWO (2) COATS OF RUST INHIBITIVE PAINT.
5. VAULT BOTTOM SHALL SIT 6" HIGHER THAN TOP OF PIPE.
6. VAULT AND MANHOLE COVER TO BE RATED FOR HS-20 TRAFFIC LOADINGS.
7. SEE SPECIFICATIONS AND DETAIL W-15, LATEST REVISION, FOR ADDITIONAL RELEVANT TYPICAL VAULT NOTES.
8. PIPE BOLLARD MAY BE OMITTED AT THE CITY OF GREELEY W&S DEPARTMENT'S DISCRETION. BOLLARD SHALL BE INSTALLED IN ACCORDANCE WITH THE WATER & SEWER STANDARD DETAILS AND SPECIFICATIONS, LATEST REVISION OF EACH.
9. INSTALL TRACER WIRE ALONG MAIN ACCORDING TO SPECIFICATIONS AND W&S UTILITY LOCATING ("UL") STANDARD DETAILS, LATEST REVISION OF EACH.
10. 24" MANHOLE COVER SHALL BE A BOLT DOWN LID MARKED WITH THE APPROPRIATE UTILITY. REFER TO CITY OF GREELEY SPECIFICATIONS, LATEST REVISION, FOR SPECIFIC MANHOLE COVER MFR AND PRODUCT INFORMATION.
11. FOR ALL AIR VACUUM VALVE VAULTS, AIR VALVE INTAKE SHALL BE WATER TIGHT AND PIPED TO THE SURFACE INSIDE THE VENT PIPE WITH SCHEDULE 80 PVC THAT MATCHES VALVE OUTLET SIZE.

City of Greeley Colorado

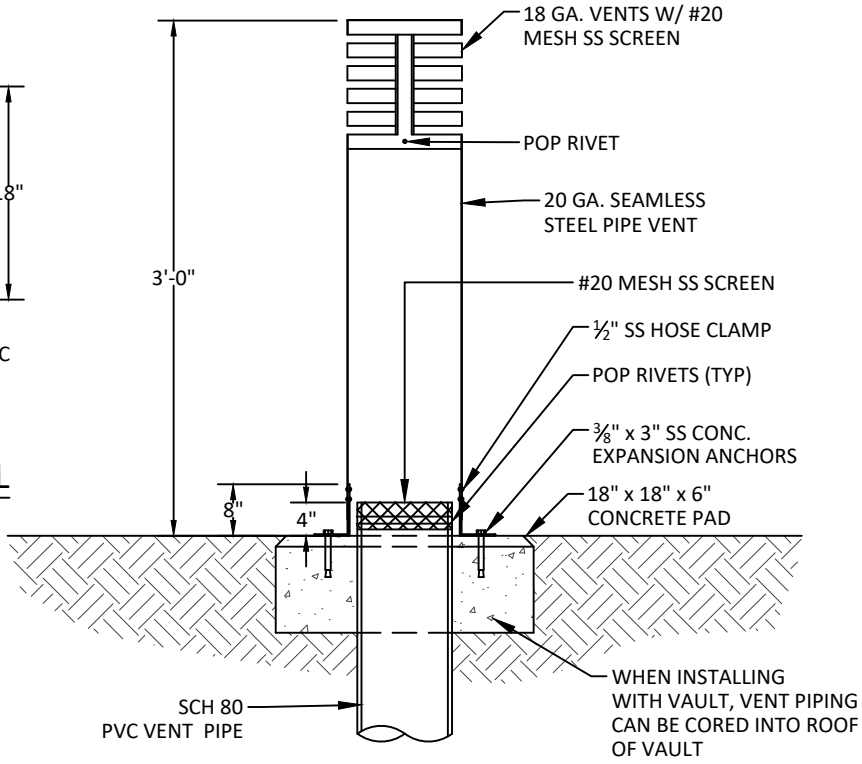
AIR RELEASE/VACUUM & COMBINATION AIR VALVE VAULT

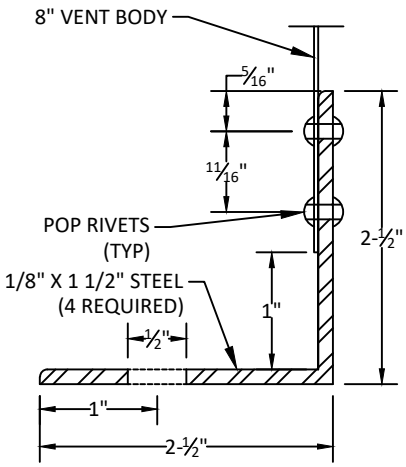
DETAIL WNP-1

DATE: JANUARY 2023 SCALE: N.T.S.



CONCRETE BASE DETAIL





STEEL ANGLE DETAIL

ROUND VENT SCREEN

NOTES:

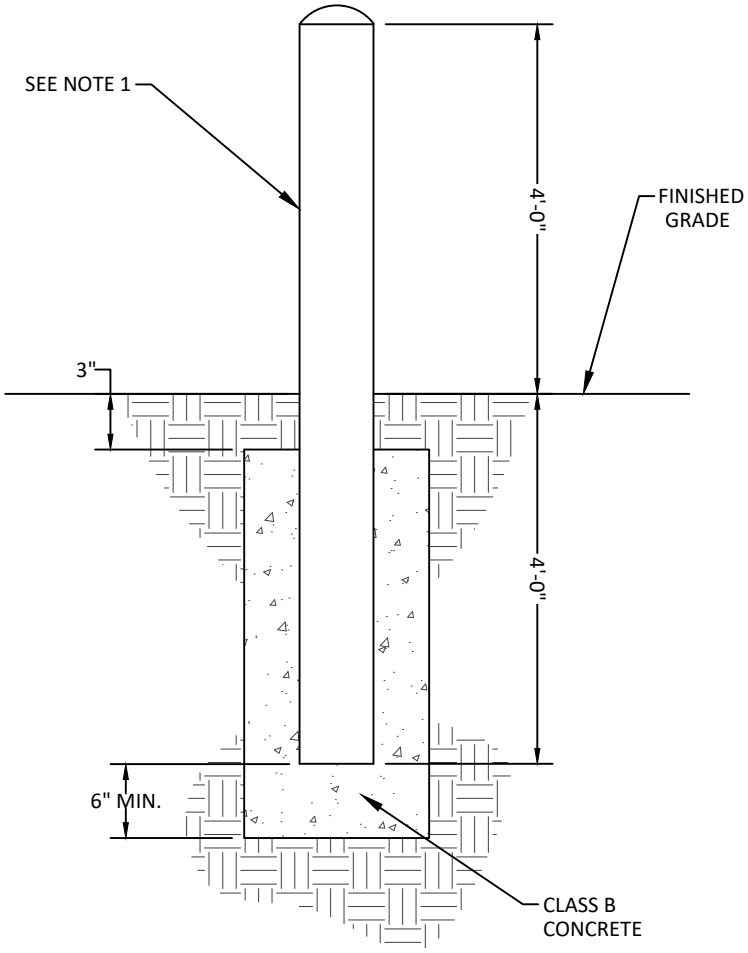
1. REFER TO CONCRETE STANDARD SPECIFICATIONS
2. VENT PIPE SHALL BE MANUFACTURED BY CUSTOM METAL MFG OR APPROVED EQUAL.
3. VENT PIPE SHALL BE PRIMED AND COATED ACCORDING TO THE APWA UNIFORM COLOR CODE FOR FOR THE CORRESPONDING UTILITY:
   - 3.A. POTABLE WATER: SHERWIN-WILLIAMS SAFETY BLUE NO. SW4086 OR APPROVED EQUAL
   - 3.B. NON-POTABLE IRRIGATION: SHERWIN-WILLIAMS SAFETY PURPLE NO. SW 4080 OR APPROVED EQUAL.
4. 3" AIR VENT TO BE PVC SCHEDULE 8O WITH GLUED JOINTS BELOW GRADE AND SIZED TO MATCH TO AIR VALVE OUTLET SIZE.
5. WHEN SITE CONDITIONS PREVENT INSTALLING VENT IN ROOF OF VAULT AND PER WATER & SEWER DEPARTMENT'S DIRECTION, SCH 80 PVC MAY PENETRATE VAULT WALL AND RUN HORIZONTAL BEFORE BENDING VERTICAL AT AN ACCEPTABLE LOCATION FOR THE ROUND VENT SCREEN.

City of Greeley Colorado

VAULT & AIR/VAC VENT PIPE

DETAIL WNP-2

DATE: JANUARY 2023 SCALE: N.T.S.



NOTES:

1. PROVIDE A 6" MIN SCHEDULE 40 STL. PIPE BOLLARD FILLED WITH CONCRETE WITH ROUNDED TOP, PAINT SAFETY YELLOW.
2. BOLLARD SHALL BE PLACED AT MINIMUM 3'-0" FROM VALVE BOXES, VAULTS, AND CONCRETE STRUCTURES.
3. THE CITY OF GREELEY RESERVES THE RIGHT TO DETERMINE WHERE AND WHEN A PIPE BOLLARD MAY BE REQUIRED OR OMITTED.

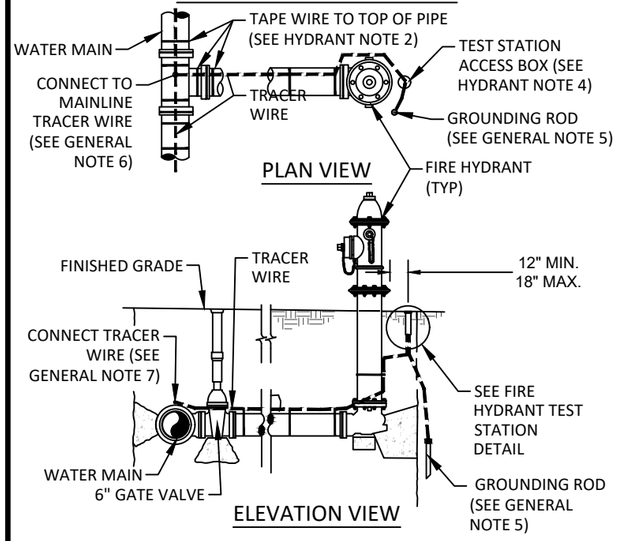
City of Greeley Colorado

(TYP) CONCRETE PIPE BOLLARD

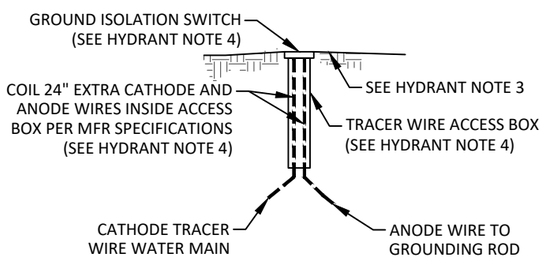
DETAIL WNP-3

DATE: JANUARY 2023 SCALE: N.T.S.

FIRE HYDRANT TRACER WIRE



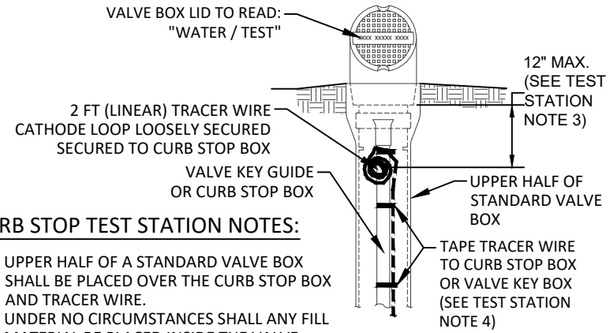
FIRE HYDRANT & STANDARD MFR TEST STATION DETAIL



HYDRANT & STANDARD MFR TEST STATION NOTES:

1. REFER TO RELATED DETAIL FIRE HYDRANT DETAIL, LATEST REVISION, FOR FIRE HYDRANT INSTALLATION STANDARD DRAWING.
2. REFER TO GENERAL NOTES FOR ADDITIONAL TRACER WIRE REQUIREMENTS.
3. GRADE SURROUNDING TRACER WIRE ACCESS BOX SHALL SLOPE AWAY FROM LID AT 2% MINIMUM GRADE.
4. FIRE HYDRANT TEST STATION ACCESS BOX SHALL BE COPPERHEAD SNAKEPIT ACCESS POINT WITH TWO-TERMINAL SWITCHABLE LID OR APPROVED EQUAL.

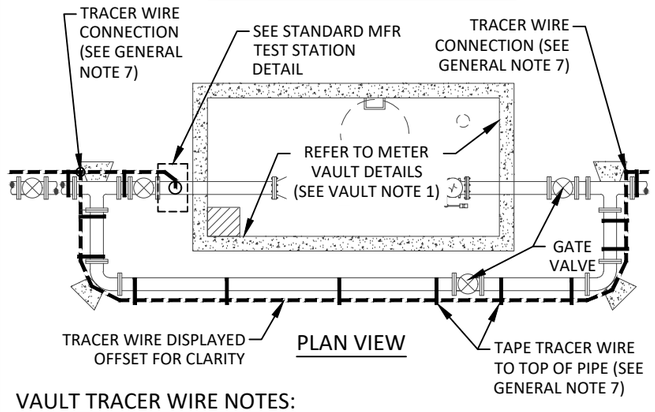
CURB STOP TEST STATION DETAIL



CURB STOP TEST STATION NOTES:

1. UPPER HALF OF A STANDARD VALVE BOX SHALL BE PLACED OVER THE CURB STOP BOX AND TRACER WIRE.
2. UNDER NO CIRCUMSTANCES SHALL ANY FILL MATERIAL BE PLACED INSIDE THE VALVE BOX.
3. SECURE CATHODE LOOP 12" MAX BELOW VALVE BOX COVER INSIDE THE VALVE BOX.
4. FOLLOW SAME TAPING INTERVAL FOR TRACER WIRE ALONG CURB STOP AS TRACER WIRE IS TAPED ALONG PIPE.

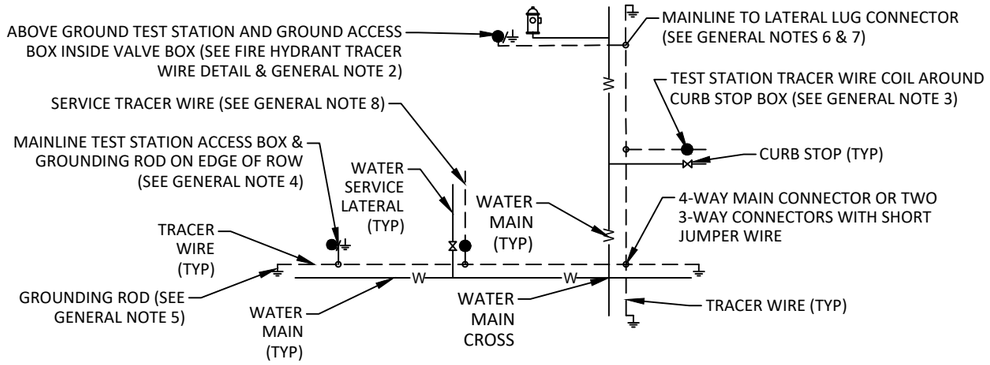
TRACER WIRE AROUND VAULTS



VAULT TRACER WIRE NOTES:

1. REFER TO RELATED DETAILS W-10, W-11, AND W-15 FOR METER VAULT DETAILS AND REQUIREMENTS.
2. REFER TO GENERAL NOTES FOR ADDITIONAL TRACER WIRE REQUIREMENTS.

SAMPLE PLAN OF WATER MAIN TRACER WIRE



LEGEND

- WATER MAIN
- TRACER WIRE
- WATER SERVICE
- DRIVE-IN MAGNESIUM GROUNDING ROD (TYP)
- CURB STOP (TYP)
- FIRE HYDRANT (TYP)
- TRACER WIRE ACCESS BOX (LOOSE COIL AROUND CURB STOP FOR ABOVE GROUND ACCESS)
- TRACER WIRE ACCESS BOX (ABOVE GROUND ACCESS BOX / GROUNDING ROD)

GENERAL NOTES:

1. TRACER WIRE DEPICTED OFFSET FROM PIPE FOR CLARITY. TRACER WIRE SHALL BE INSTALLED ON TOP OF PIPE, IN ACCORDANCE WITH THE WATER & SEWER UTILITY LOCATING DETAIL UL-6, AND WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION OF EACH.
2. TRACER WIRE ACCESS IN THE FORM OF A TEST STATION ACCESS BOX FROM A CITY APPROVED MFR MUST BE PROVIDED AND GROUNDED AT EVERY FIRE HYDRANT. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR PRODUCT AND MANUFACTURER RECOMMENDATIONS AND REQUIREMENTS.
3. TRACER WIRE ACCESS IN THE FORM OF A CATHODE WIRE LOOPED AROUND THE CURB STOP BOX SHALL BE PLACED INSIDE OF A STANDARD VALVE BOX AT EVERY SERVICE LATERAL. REFER TO W&S SERVICE LATERAL UTILITY LOCATING DETAILS UL-3 AND UL-4, LATEST REVISION OF EACH, FOR ADDITIONAL INSTALLATION REQUIREMENTS.
4. FOR LONG RUNS IN EXCESS OF 1,000 FEET WITHOUT SERVICE LATERALS OR HYDRANTS - TRACER WIRE ACCESS MUST BE PROVIDED IN THE FORM OF EITHER AN APPROVED MFR GRADE LEVEL WIRE ACCESS BOX OR A STANDARD VALVE BOX WITH CATHODE WIRE LOOP. EITHER FORM OF ACCESS SHALL BE LOCATED ABOVE THE PIPE OR AT THE EDGE OF RIGHT-OF-WAY AND OUT OF THE ROAD-WAY. TRACER WIRE ACCESS BOX SHALL ALSO BE DELINEATED USING A MINIMUM 48" POLYETHYLENE MARKER POST, COLOR CODED PER APWA STANDARD FOR THE SPECIFIC UTILITY BEING MARKED.
5. TRACER WIRE MUST BE GROUNDED AT EVERY MAINLINE DEAD END/STUB, AND ALONG CONTINUOUS RUNS AT A MAXIMUM OF 1,000 FT INTERVALS WITH A 1.5 LB DRIVE-IN MAGNESIUM GROUNDING ROD PER GROUNDING ROD MFR REQUIREMENTS. PLACEMENT OF GROUNDING ROD SHALL BE INSTALLED IN SUCH A WAY THAT ALLOWS FOR PROPER WIRE LOCATING WITHOUT A LOSS OR DETERIORATION OF LOW FREQUENCY SIGNAL (512 Hz) FOR DISTANCES IN EXCESS OF 1,000 FT. EVERY FIRE HYDRANT TEST STATION SHALL BE GROUNDED PER MFR RECOMMENDATIONS.
6. TRACER WIRE SYSTEMS MUST BE INSTALLED AS A SINGLE CONTINUOUS WIRE, EXCEPT WHERE USING APPROVED CONNECTORS. NO LOOPING OR COILING OF WIRE IS ALLOWED.
7. REFER TO WATER & SEWER SERVICE LATERAL TRACER WIRE DETAIL AND GENERAL TRACER WIRE NOTES ON DETAIL UL-6, LATEST REVISION OF EACH, FOR ADDITIONAL TRACER WIRE INSTALLATION, TAPING, CONNECTION, SPLICING, AND GROUNDING REQUIREMENTS.
8. SERVICE LATERAL TRACER WIRE SHALL EXTEND PAST CURB STOP TEST STATION AND TERMINATE AT STRUCTURE PER SERVICE LATERAL UTILITY LOCATING DETAIL.

City of Greeley Colorado

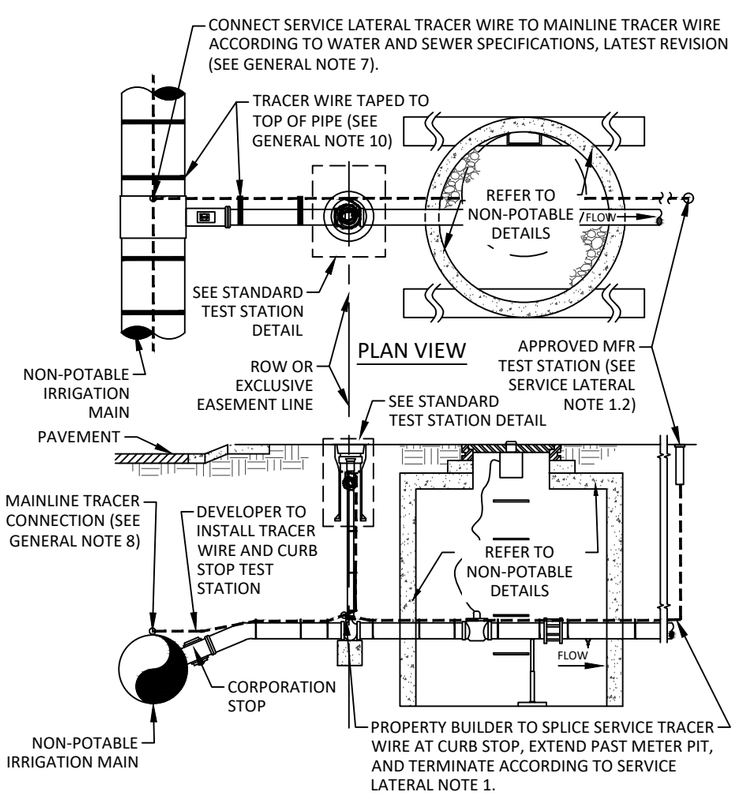
WATER MAIN TRACER WIRE AND UTILITY LOCATING

DETAIL UL-1

DATE: JANUARY 2023

SCALE: N.T.S.

NON-POTABLE IRRIGATION SERVICE LATERAL

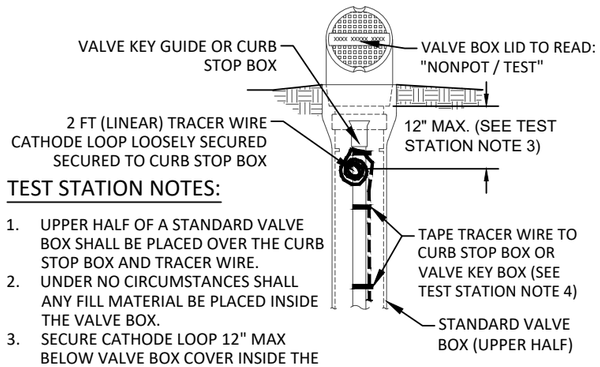


ELEVATION VIEW

NON-POTABLE IRRIGATION SERVICE LATERAL NOTES:

1. TEST STATION AT SERVICE LATERAL FAR END ON OWNER SIDE OF METER:
   - 1.1. SHALL BE A MOUNTABLE OR FLUSH-GRADE ACCESS POINT AND INSTALLED PER MFR SPECIFICATIONS. SEE WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED MFR AND MODELS.
   - 1.2. TEST STATION ACCESS SHALL BE PROVIDED AT TRACER WIRE TERMINATION NEAR THE IRRIGATION CONTROL VALVE BOX OR AS NOTED ON THE DESIGN DRAWINGS.

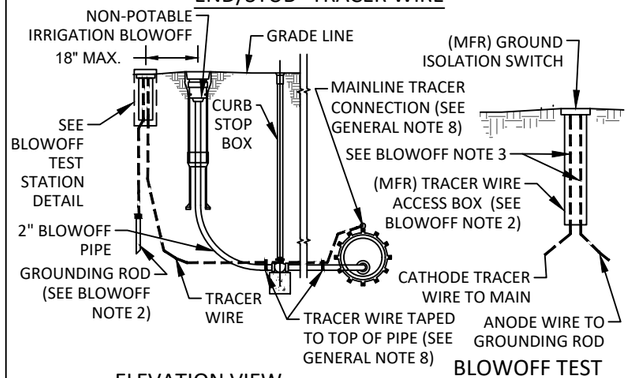
STANDARD TEST STATION DETAIL



TEST STATION NOTES:

1. UPPER HALF OF A STANDARD VALVE BOX SHALL BE PLACED OVER THE CURB STOP BOX AND TRACER WIRE.
2. UNDER NO CIRCUMSTANCES SHALL ANY FILL MATERIAL BE PLACED INSIDE THE VALVE BOX.
3. SECURE CATHODE LOOP 12" MAX BELOW VALVE BOX COVER INSIDE THE VALVE BOX.
4. FOLLOW SAME TAPING INTERVAL FOR TRACER WIRE ALONG CURB STOP BOX AS FOR TAPING TRACER ALONG PIPE.

NON-POTABLE IRRIGATION BLOWOFF AND "DEAD END/STUB" TRACER WIRE



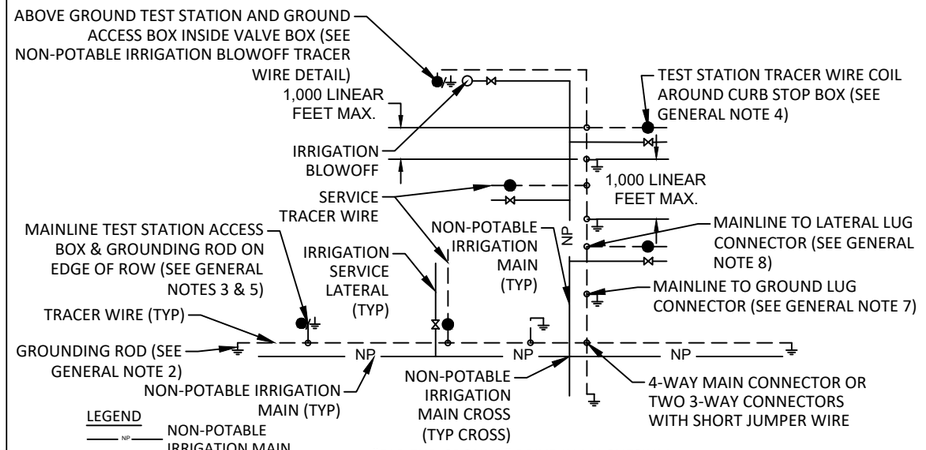
ELEVATION VIEW

BLOWOFF TEST STATION DETAIL

BLOW-OFF TRACER WIRE NOTES:

1. REFER TO RELATED NON-POTABLE BLOWOFF DETAIL, LATEST REVISION, FOR BLOWOFF INSTALLATION STANDARD DRAWING.
2. REFER TO GENERAL NOTES FOR ADDITIONAL TRACER WIRE REQUIREMENTS.
3. BLOWOFF TEST STATION ACCESS BOX SHALL BE COPPERHEAD SNAKEPIT ACCESS POINT WITH TWO-TERMINAL SWITCHABLE LID OR APPROVED EQUAL.
4. COIL 24" EXTRA CATHODE AND ANODE WIRES INSIDE ACCESS BOX PER MFR SPECIFICATIONS.

SAMPLE PLAN OF NON-POTABLE IRRIGATION MAIN TRACER WIRE



GENERAL NOTES:

1. TRACER WIRE DEPICTED OFFSET FROM PIPE FOR CLARITY. TRACER WIRE SHALL BE INSTALLED ON TOP OF PIPE, AND INSTALLED IN ACCORDANCE WITH THE WATER & SEWER UTILITY LOCATING DETAILS, AND WATER & SEWER SPECIFICATIONS, LATEST REVISION OF EACH.
2. TRACER WIRE MUST BE GROUNDED AT EVERY MAINLINE DEAD END/STUB, AND ALONG CONTINUOUS RUNS AT A MAXIMUM OF 1,000 FT INTERVALS WITH A 1.5 LB DRIVE-IN MAGNESIUM ANODE GROUNDING ROD PER GROUNDING ROD MFR REQUIREMENTS. PLACEMENT OF GROUNDING ROD SHALL BE INSTALLED IN SUCH A WAY THAT ALLOWS FOR PROPER WIRE LOCATING WITHOUT A LOSS OR DETERIORATION OF LOW FREQUENCY SIGNAL (512 Hz) FOR DISTANCES IN EXCESS OF 1,000 FT.
3. FOR LONG RUNS IN EXCESS OF 1,000 FEET WITHOUT SERVICE LATERALS - TRACER WIRE ACCESS MUST BE PROVIDED IN THE FORM OF EITHER AN APPROVED MFR GRADE LEVEL / IN-GROUND WIRE ACCESS BOX OR A STANDARD VALVE BOX WITH CATHODE LOOP. EITHER FORM OF ACCESS BOX SHALL BE LOCATED ABOVE THE PIPE OR AT THE EDGE OF RIGHT-OF-WAY AND OUT OF THE ROAD-WAY. TRACER WIRE ACCESS BOX SHALL ALSO BE DELINEATED USING A MINIMUM 48" POLYETHYLENE MARKER POST, COLOR CODED PER APWA STANDARD FOR THE SPECIFIC UTILITY BEING MARKED.
4. SERVICE LATERAL TEST STATIONS SHALL BE IN THE FORM OF A CATHODE WIRE LOOP AT THE CURB STOP AND PLACED INSIDE OF A STANDARD VALVE BOX AT EVERY SERVICE LATERAL. REFER TO W&S SPECIFICATIONS AND GENERAL NOTES ON DETAIL UL-6, LATEST REVISION OF EACH, FOR ADDITIONAL INSTALLATION REQUIREMENTS.
5. TEST STATIONS LOCATED AT THE MAXIMUM DISTANCE FROM THE NEAREST GROUND SHALL BE INSTALLED AS AN APPROVED MFR GRADE-LEVEL/ IN GROUND WIRE ACCESS BOX WITH A GROUNDING ROD.
6. GRADE SURROUNDING TEST STATION ACCESS BOX SHALL SLOPE AWAY FROM LID AT A 2% MINIMUM GRADE.
7. "FAR END" GROUNDING RODS WIRE SHALL BE CONNECTED TO MAINLINE TRACER WIRE USING APPROVED LOCKABLE CONNECTORS WITHOUT CUTTING OR SPLICING THE MAINLINE TRACER WIRE.
8. SERVICE LATERAL TRACER WIRE SHALL BE CONNECTED TO MAINLINE TRACER WIRE USING APPROVED LOCKABLE CONNECTORS WITHOUT CUTTING OR SPLICING THE MAINLINE TRACER WIRE.
9. TRACER WIRE SYSTEMS MUST BE INSTALLED AS A SINGLE CONTINUOUS WIRE, EXCEPT WHERE USING APPROVED CONNECTORS. NO LOOPING OR COILING OF WIRE IS ALLOWED.
10. REFER TO GENERAL TRACER WIRE NOTES ON WATER & SEWER DETAIL UL-6, LATEST REVISION, FOR ADDITIONAL TRACER WIRE INSTALLATION, TAPING, CONNECTION, SPLICING, AND GROUNDING REQUIREMENTS.

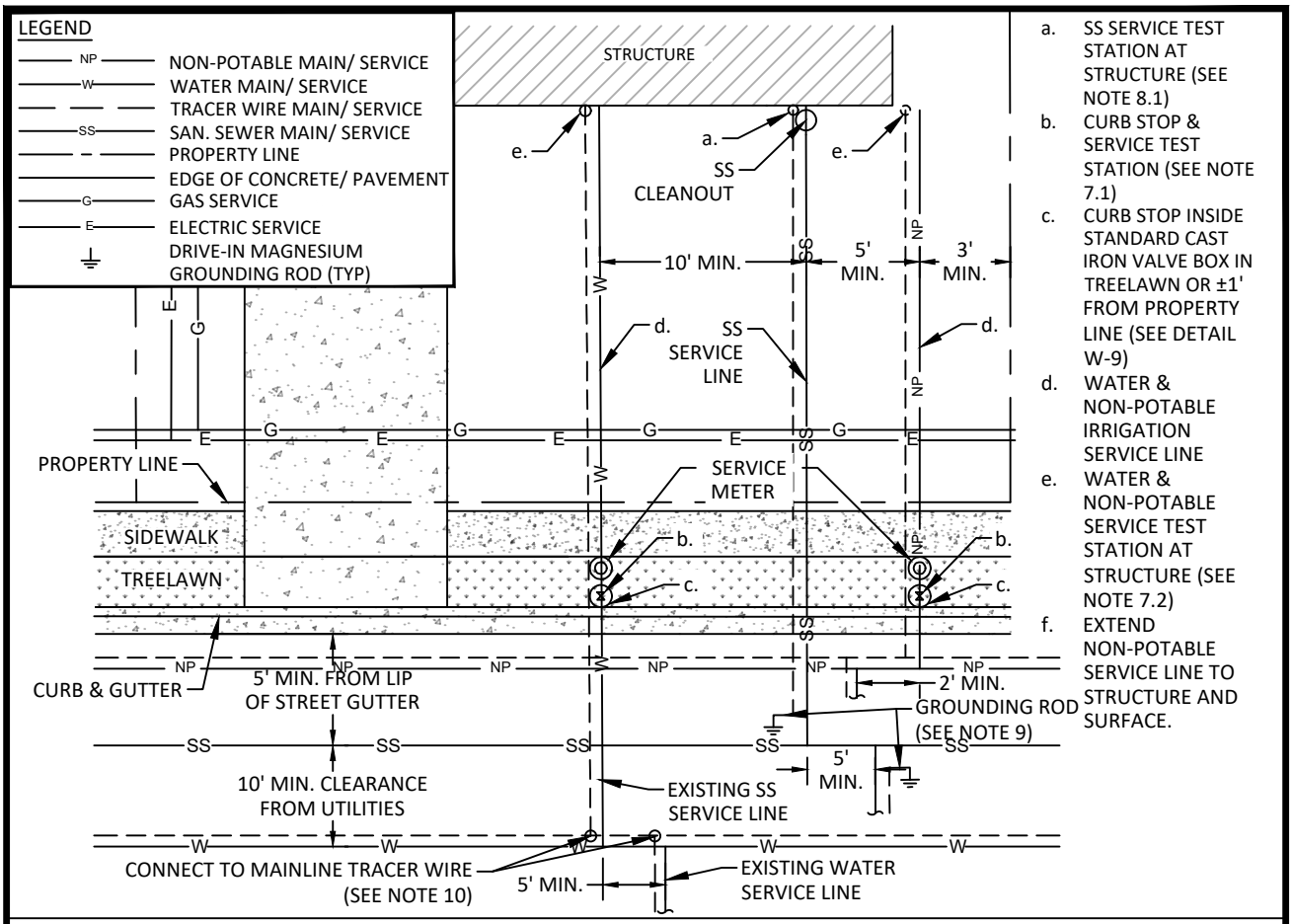
City of Greeley Colorado

NON-POTABLE IRRIGATION TRACER WIRE AND UTILITY LOCATING

DETAIL UL-2

DATE: JANUARY 2023

SCALE: N.T.S.



NOTES:

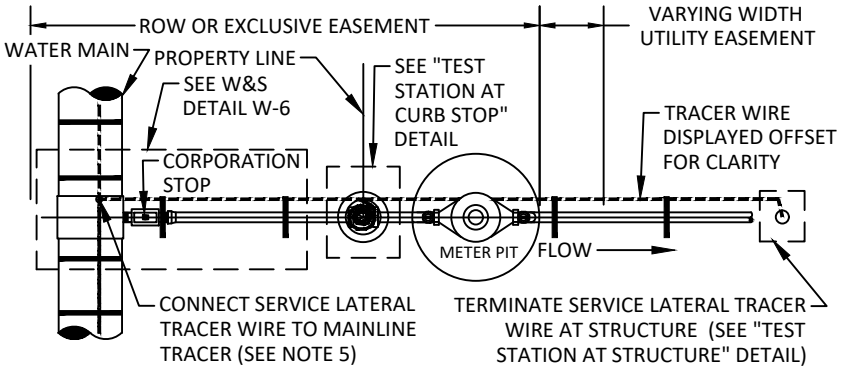
1. ALL BURIED PIPE, VALVES, AND APPURTENANCES SHALL BE INSTALLED ACCORDING TO THE CITY OF GREELEY WATER & SEWER DETAILS AND SPECIFICATIONS LATEST REVISION.
2. TRACER WIRE IS REQUIRED FOR ALL SERVICE PIPES (WATER, SEWER, NON-POTABLE).
3. TRACER WIRE IS ONLY DEPICTED AWAY FROM PIPE IN ABOVE DRAWING FOR CLARITY.
4. REFER TO GENERAL NOTES ON WATER & SEWER DETAIL UL-6, LATEST REVISION, FOR ADDITIONAL TRACER WIRE INSTALLATION, TAPING, CONNECTION, SPLICING, AND GROUNDING REQUIREMENTS.
5. FOR FUTURE CONNECTION SERVICE STUBS, DEVELOPER SHALL PROVIDE A MINIMUM OF 2 FEET OF WIRE WRAPPED AND TAPED TO MARKER POST AT PROPERTY LINE (PROPERTY BUILDER SHALL SPLICE TO THIS TRACER WIRE COIL AT LATER DATE).
6. REFER TO WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR APPROVED TRACER WIRE, GROUNDING ROD, TEST STATION, AND MISC. PRODUCT MFR.
7. WATER & NON-POTABLE SERVICE TEST STATIONS/TRACER ACCESS:
   - 7.1. TEST STATION (AT CURB STOP): TAPE TRACER WIRE TO CURB STOP BOX AND RUN TO SURFACE. SECURE A TWO FOOT (LINEAR) COIL OF TRACER WIRE AT THE TOP OF THE CURB STOP BOX, AND PLACE THE UPPER HALF OF A STANDARD VALVE BOX AROUND THE CURB STOP AND TEST STATION.
   - 7.2. PROPERTY OWNER TEST STATION AT STRUCTURE: TERMINATE TRACER WIRE AT STRUCTURE WITH AN APPROVED TEST STATION ACCESS BOX FROM AN APPROVED MFR, MOUNTED TO STRUCTURE.
   - 7.3. SEE W&S DETAIL UL-4, LATEST REVISION, FOR ADDITIONAL DETAILS.
8. SANITARY SEWER SERVICE TEST STATIONS/TRACER ACCESS:
   - 8.1. PROPERTY OWNER TEST STATION AT STRUCTURE: TERMINATE TRACER WIRE AT STRUCTURE WITH AN APPROVED TEST STATION ACCESS BOX FROM AN APPROVED MFR, MOUNTED TO THE STRUCTURE.
   - 8.2. SEE W&S DETAIL UL-5, LATEST REVISION, FOR ADDITIONAL DETAILS.
9. ALL SANITARY SEWER SERVICE LATERAL TRACER WIRES SHALL TERMINATE WITHIN 2FT OF THE SS MAIN WITH AN APPROVED 1.5 LB DRIVE-IN MAGNESIUM GROUNDING ROD.
10. ALL WATER SERVICE LATERAL TRACER WIRES SHALL BE CONNECTED TO MAINLINE TRACER WITHOUT CUTTING / SPLICING THE MAINLINE TRACER WIRE, ACCORDING TO WATER & SEWER DETAIL UL-6, LATEST REVISION.

City of Greeley Colorado

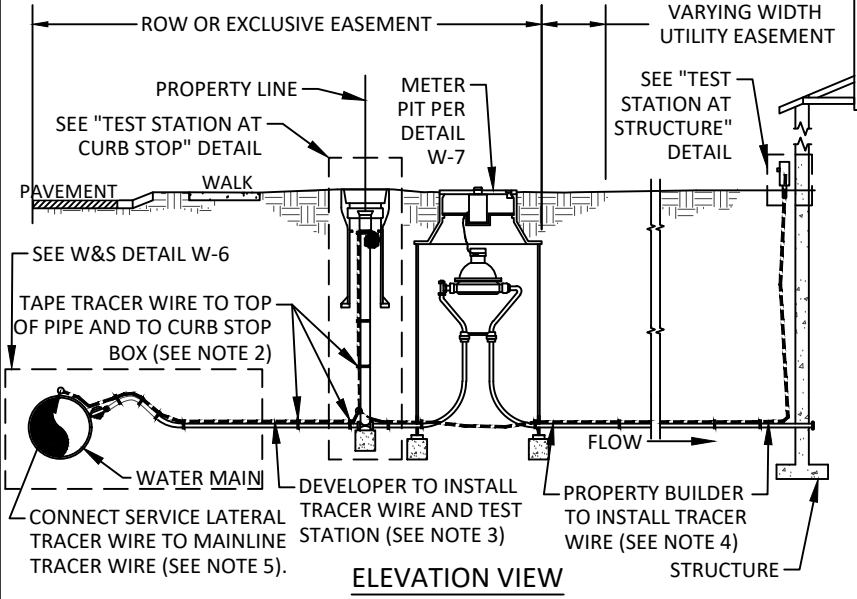
(TYP) SERVICE LATERAL UTILITY LOCATING PLAN

DETAIL UL-3

DATE: JANUARY 2023 SCALE: N.T.S.

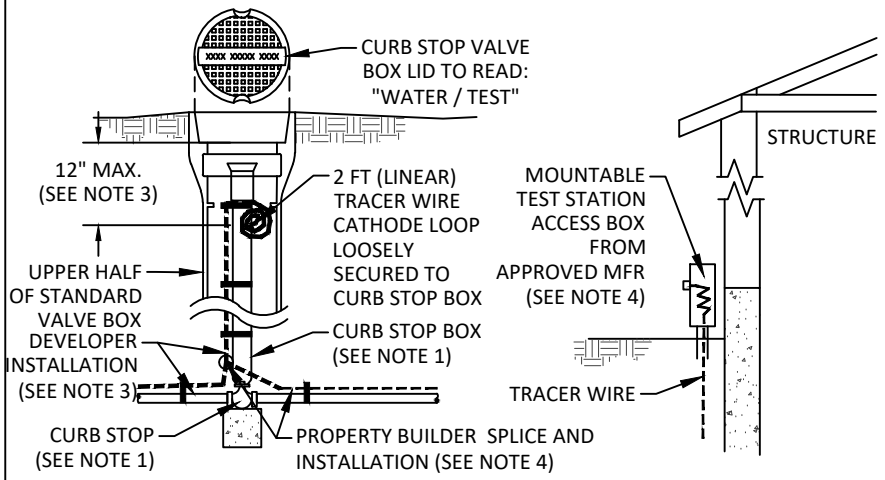


TRACER WIRE INSTALLATION PLAN VIEW



ELEVATION VIEW

WATER SERVICE TEST STATION DETAIL



TEST STATION AT CURB STOP

TEST STATION AT STRUCTURE

NOTES:

1. REFER TO RELATED WATER & SEWER DETAILS W-6 THROUGH W-11, LATEST REVISION OF EACH, FOR WATER SERVICE LATERAL AND METER INSTALLATION DETAILS.
2. REFER TO RELATED SERVICE LATERAL TRACER WIRE DETAIL UL-3, AND GENERAL TRACER WIRE NOTES ON UL-6, LATEST REVISION OF EACH, FOR ADDITIONAL TRACER WIRE TAPING, SPLICING, CONNECTING, AND GROUNDING DETAILS.
3. UTILITY DEVELOPER TO INSTALL TRACER WIRE ON MAIN AND UP TO TEST STATION AT CURB STOP ON THE EDGE OF ROW. PROVIDE 2 FT (LINEAR) OF EXCESS TRACER WIRE, SECURED AT THE TOP OF THE CURB STOP BOX, AND PLACE THE UPPER HALF OF A STANDARD VALVE BOX AROUND THE CURB STOP AND TEST STATION. FOR NEW DEVELOPMENT, UTILITY DEVELOPER SHALL PROVIDE A MINIMUM 2 FT COIL AT MARKER POST IF PRIOR TO CURB STOP INSTALLATION.
4. PROPERTY BUILDER TO SPLICE SERVICE TRACER WIRE TO TEST STATION TRACER WIRE AND INSTALL UP TO STRUCTURE, TERMINATING DIRECTLY ABOVE THE SERVICE LATERAL AT THE STRUCTURE WITH AN APPROVED ACCESS BOX FROM AN APPROVED MFR AND INSTALLED IN ACCORDANCE WITH MFR SPECIFICATIONS. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED MFR.
5. ALL MAINLINE TRACER WIRE CONNECTIONS SHALL BE INSTALLED PER LATEST REVISION OF WATER & SEWER SPECIFICATIONS. MAINLINE TRACER SHALL NOT BE CUT OR SPLICED IN ANY WAY (SEE NOTE 3).

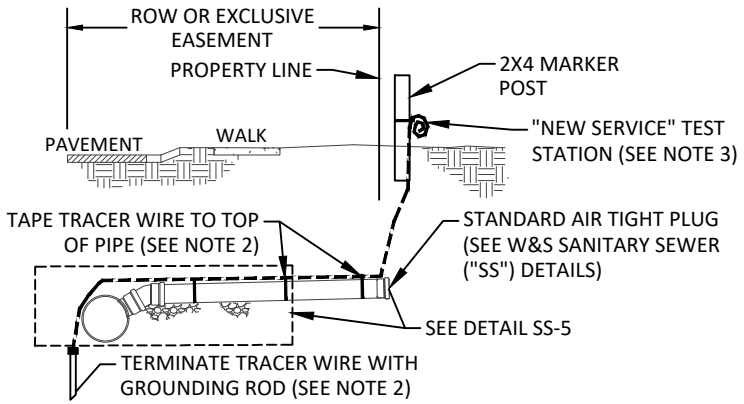
City of Greeley Colorado

(TYP) WATER SERVICE UTILITY LOCATING DETAIL SECTION & TEST STATION

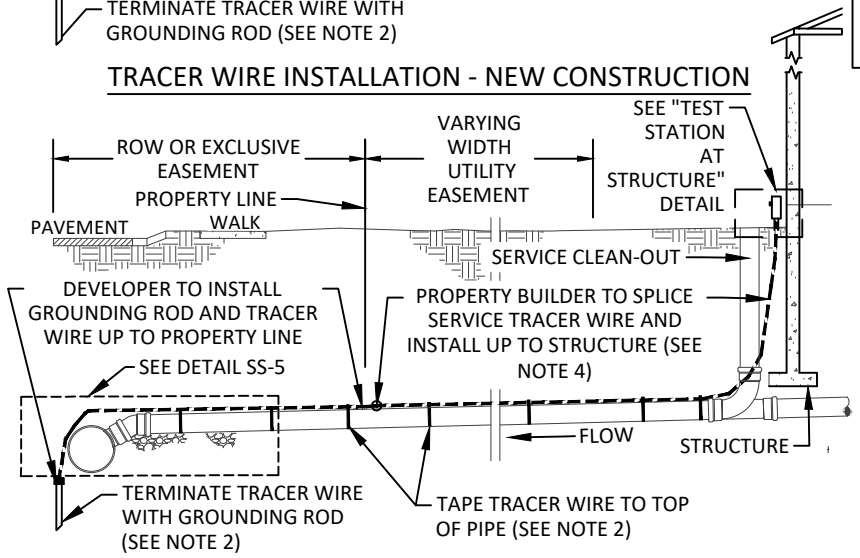
DETAIL UL-4

DATE: JANUARY 2023

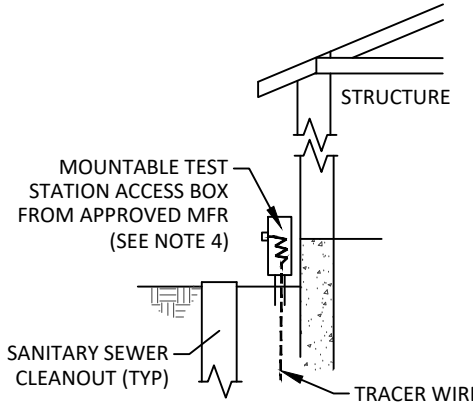
SCALE: N.T.S.



TRACER WIRE INSTALLATION - NEW CONSTRUCTION



TRACER WIRE INSTALLATION ELEVATION VIEW



TEST STATION AT STRUCTURE

NOTES:

1. REFER TO RELATED DETAIL SS-5, LATEST REVISION, FOR SANITARY SEWER SERVICE LATERAL STANDARD DRAWING.
2. REFER TO RELATED SERVICE LATERAL TRACER WIRE DETAIL UL-3, AND GENERAL TRACER WIRE NOTES ON UL-6, LATEST REVISION OF EACH, FOR ADDITIONAL TRACER WIRE TAPING, SPLICING, CONNECTING, GROUNDING, AND MISC. INSTALLATION DETAILS.
3. DEVELOPER TO INSTALL TRACER WIRE FROM SS MAIN TO THE TEST STATION BOX ON THE EDGE OF ROW. TEST STATION FOR NEW DEVELOPMENT SHALL BE A COIL OF 2 FT (LINEAR) TRACER WIRE, SECURED TO THE SERVICE STUB MARKER POST.
4. PROPERTY BUILDER TO SPLICE SANITARY SEWER SERVICE TRACER WIRE PROPERTY LINE AND INSTALL UP TO STRUCTURE, TERMINATING AT THE SS SERVICE CLEANOUT WITH AN APPROVED MFR TEST STATION ACCESS BOX FROM AN APPROVED MFR. TEST STATION ACCESS BOX SHALL BE MOUNTED TO THE STRUCTURE WITHIN 18" OF THE SS SERVICE CLEANOUT AND INSTALLED ACCORDING TO THE TEST STATION MFR SPECIFICATIONS. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR APPROVED MFR.

City of Greeley Colorado

(TYP) SANITARY SEWER SERVICE UTILITY LOCATING DETAIL SECTION & TEST STATION

DETAIL UL-4

DATE: JANUARY 2023

SCALE: N.T.S.

TRACER WIRE NOTES:

1. LOCATING MUST MEET REQUIREMENTS OF SENATE BILL 18-167 OR ANY UPDATE.
2. TRACER WIRE SHALL BE LOCATED ON TOP OF PIPE, TAPED EVERY 3 TO 4 FEET MAX AND EACH SIDE OF EVERY JOINT, FITTING, AND VALVE.
3. TRACER WIRE IS REQUIRED FOR ALL WATER SERVICE LATERALS, NON-POTABLE IRRIGATION SERVICE LATERALS, ALL SANITARY SEWER LATERALS, ALL WATER MAINS, AND ALL NON-POTABLE IRRIGATION MAINS.
4. TWO UNDERGROUND WIRE SPLICES ARE ALLOWED PER SERVICE, SHALL HAVE LOCKABLE CONNECTIONS SPECIFICALLY DESIGNED FOR DIRECT BURIAL, AND DIELECTRIC SILICONE GEL FILLED OR APPROVED EQUAL.
5. REFER TO WATER & SEWER SPECIFICATIONS, LATEST REVISION, FOR TRACER WIRE GAUGE, MATERIAL, AND COATING REQUIREMENTS.
6. TRACER WIRE SYSTEMS MUST BE INSTALLED AS A SINGLE CONTINUOUS WIRE, EXCEPT WHERE USING APPROVED CONNECTORS. NO LOOPING OR COILING OF WIRE AROUND THE PIPE IS ALLOWED.
7. ALL WATER SERVICE LATERAL TRACER WIRES SHALL BE CONNECTED TO MAINLINE TRACER USING AN APPROVED MAINLINE TO LATERAL LUG CONNECTOR WITHOUT CUTTING / SPLICING THE MAINLINE TRACER WIRE.
8. ALL MAINLINE TRACER WIRE BRANCHES SHALL BE MADE WITH AN APPROVED MAINLINE TO MAINLINE LUG CONNECTOR WITHOUT CUTTING / SPLICING EITHER MAINLINE TRACER WIRE.
9. REFER TO WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR APPROVED TRACER WIRE MFR AND ADDITIONAL INSTALLATION REQUIREMENTS.

TEST STATIONS:

1. TRACER WIRE SHALL BE ACCESSIBLE AT LEAST ONCE EVERY 1,000 FT MAX.
2. TEST STATION SHALL NOT BE FURTHER THAN 1,000 FT FROM AN APPROVED "FAR-END" GROUNDING ROD. THIS GROUNDING ROD MUST MEET WATER & SEWER CONSTRUCTION SPECIFICATIONS AND DESIGN CRITERIA STATED IN THE GROUNDING NOTES.
3. TEST STATION MAY EITHER BE IN THE FORM OF A CATHODE WIRE LOOP ACCESSIBLE FROM FINAL GRADE SURFACE OR AN APPROVED TEST STATION ACCESS BOX FROM AN APPROVED MFR. EITHER TEST STATION FORM SHALL BE WITHIN THE FAR-END GROUNDING INTERVAL REQUIREMENT, AND MEET WATER & SEWER TRACER WIRE CONSTRUCTION SPECIFICATIONS AND DETAILS, LATEST REVISION OF EACH.
4. GROUND SURROUNDING TEST STATION ACCESS BOXES SHALL SLOPE AWAY FROM LID AT 2% MINIMUM GRADE.

GROUNDING NOTES:

1. ALL SANITARY SEWER SERVICE LATERAL TRACER WIRES SHALL TERMINATE WITHIN 2 FT OF THE SS MAIN WITH AN APPROVED DRIVE-IN MAGNESIUM GROUNDING ROD. SINGLE GROUNDING ROD MAY BE UTILIZED FOR UP TO 3 SEWER SERVICES MAX.
2. MAINLINE TRACER WIRE MUST BE GROUNDED AT EVERY DEAD END/STUB, AND ALONG CONTINUOUS RUNS AT A MAXIMUM OF 2,000 FT INTERVALS WITH A 1.5 LB DRIVE-IN MAGNESIUM GROUNDING ROD PER MFR REQUIREMENTS. PLACEMENT OF GROUNDING ROD SHALL BE INSTALLED IN SUCH A WAY THAT ALLOWS FOR PROPER WIRE LOCATING WITHOUT A LOSS OR DETERIORATION OF LOW FREQUENCY SIGNAL (512 HZ) FOR DISTANCES IN EXCESS OF 1,000 FT.
3. IF GROUNDING ROD IS TOO CLOSE TO A TEST STATION THAT IT INTERFERES WITH PROPER LOCATING, THE GROUNDING ROD MUST BE SWITCH-ABLE IN ORDER TO TEMPORARILY DEACTIVATE THE INTERFERING GROUND SIGNAL IN THE VICINITY. SUCH A TEST STATION SHALL BE IN THE FORM OF A TEST STATION ACCESS BOX FROM A CITY APPROVED MFR.
4. REFER TO WATER & SEWER CONSTRUCTION SPECIFICATIONS, LATEST REVISION, FOR APPROVED GROUNDING ROD MFR AND ADDITIONAL REQUIREMENTS.

City of Greeley Colorado

TRACER WIRE GENERAL NOTES

DETAIL UL-5

DATE: JANUARY 2023

SCALE: N.T.S.

CONSTRUCTION SPECIFICATIONS
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SECTION 01713

SUBMITTALS

PART 1 – GENERAL

1.1 SCOPE

A. This Section includes provisions for Contractor submittals. Additional provisions may be included in specific Specifications Sections.

B. This Section contains general information pertaining to the processing of submittals. Additional detailed submittal requirements are contained within the individual technical Specifications Sections.

C. Submittals shall be mailed or emailed as follows:

City of Greeley – Civil Inspections
1100 10th Street
Greeley, Colorado 80631

D. This Section specifies the general methods and requirements of submissions applicable to the following work-related submittals: Shop Drawings, Product Data, Manuals, Samples, Certificates of Compliance, Statements of Qualifications, Test Results, Survey Data, Calculation's and Construction or Submittal Schedules. Detailed submittal requirements will be specified in the technical Specifications sections.

E. All submittals shall be clearly identified by reference to Specification Section, Paragraph and Drawing No. or Detail as applicable. Submittals shall be clear and legible and of sufficient size for sufficient presentation of data. The "Submittal Transmittal Form" and the "Certification Statement" to be used with each submittal is included at the end of this Section.

F. Prepare, maintain, and submit submittal logs as specified herein.

1.2 SUBMI SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

A. Shop Drawings

1. Shop drawings include, but are not necessarily limited to, custom-prepared data such as fabrication and erection/installation (working) drawings, design calculations, lists, graphs, operating instructions, scheduled information, setting diagrams, actual shop work manufacturing instructions, custom templates, special wiring diagrams, coordination drawings, individual system or equipment inspection and test reports including performance curves and certifications, as applicable to the work.

2. All details on shop drawings submitted for approval shall show clearly the relation of the various parts of the work and control lines, and where correct fabrication of the work depends upon field measurements such measurements

shall be made and noted on the drawings before being submitted for approval.

B. Product Data

1. Product data as specified in individual Sections include, but are not necessarily limited to, standard prepared data for manufactured products (sometimes referred to as catalog data), such as the manufacturer's product specification and installation instructions, availability of colors and patterns, manufacturer's printed statements of compliance and applicability, roughing-in diagrams and templates, catalog cuts, product photographs, standard wiring diagrams, printed performance curves and operational- range diagrams, production or quality control inspection and test reports and certifications, mill reports, product operating and maintenance instructions and recommended spare-parts listing and printed product warranties, as applicable to the work.

C. Samples

1. Samples specified in individual Sections include, but are not necessarily limited to, physical examples of the work, such as sections of manufactured or fabricated work, small cuts or containers of materials, complete units of repetitively-used products, color/texture/pattern swatches and range sets, specimens for coordination of visual effect, graphic symbols and units of work to be used by the District for independent inspection and testing, as applicable to the work.

1.3 CONTRACTOR'S RESPONSIBILITIES

A. The CONTRACTOR shall prepare, approve, sign and submit to the City or Engineer of Record any and all Shop Drawings, Manufacturers' Project Data, Certificates, Wiring Diagrams, Operation and Maintenance Manuals and Samples required by the Contract Documents.

NOTE: All references in the Technical Sections under "Shop Drawings" or “Submittal” to the words "approval of" shall mean "reviewed by".

B. The CONTRACTOR, by preparing, reviewing, approving and submitting the Shop Drawings, Manufacturers' Product Data, Certifications, Wiring Diagrams, Operation and Maintenance Manuals and Samples, represents that the CONTRACTOR has determined and verified all materials, field measurements and filed construction criteria related thereto, and has checked and coordinated the information contained within such submittals with the requirements of the Work, the Project and the Contract Documents.

C. The CONTRACTOR shall inform the City or Engineer of Record, in writing, of any and all deviations and/or questions regarding the Contract Documents, and shall properly identify these areas of concern in the letter of transmittal of the Shop Drawings, Manufacturers' Product Data, Certification, Wiring Diagram and Samples for proper written disposition respectively by the Engineer of Record. The CONTRACTOR shall provide reproducible Shop Drawings.

D. All Shop Drawings, Manufacturers' Product Data, Wiring Diagrams, Certifications,

Operation and Maintenance Manuals and Samples submitted, shall be accompanied by a preprinted standard transmittal form with submittal number, and shall be addressed to the City or Engineer of Record to be received and filed.

E. The Contractor is not relieved of the responsibility for any deviation from the requirements of the Contract Documents, by virtue of Contractor's approval and submittal of the Shop Drawings, Manufacturers' Product Data, Wiring Diagrams, Operation and Maintenance Manuals and Samples to the City or Engineer of Record. All deviations and/or interpretations of the Contract Documents must be approved in writing by the City or Engineer of Record.

F. The review of the Shop Drawings, Manufacturers' Product Data, Certifications, Wiring Diagrams, Operation and Maintenance Manuals; and Samples by the City or Engineer of Record does not relieve the Contractor of its responsibility from any requirements of the Contract Document, or any errors or omissions in such submittals, or for any failure to perform the requirements and intent of Contract Documents. The Contractor shall be responsible for a fully functional system as intended by the Contract Documents.

G. The Contractor shall review shop drawings, product data and samples, including those by subcontractors, prior to submission to determine and verify the following:

1. Catalog numbers and similar data.

2. Conformance with the Specifications.

E. Each shop drawing, sample and product data submitted by the Contractor shall have affixed to it the following Certification Statement including the Contractor's Company name and signed by the Contractor: "Certification Statement: By this submittal, I hereby represent that I have determined and verified all materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements." The cover sheet shall fully describe the packaged data and include a listing of all items within the package. Provide to the City or Engineer of Record a copy of each submittal transmittal sheet for shop drawings, product data and samples at the time of submittal of said drawings, product data and samples.

F. The Contractor shall utilize a 10-character submittal identification numbering system in the following manner:

1. The first two characters shall represents Shop/Working Drawing and other Product Data (SD), Sample (SL), Operating/Maintenance Manual (OM), Certificate of Compliance (CC), Statement of Qualification (SQ), or Test Results/Report (TR).

2. The next two digits shall be the numbers 01-99 to sequentially number each initial separate item or drawing submitted.

3. The next character shall be a letter, A-Z, indicating the submission, or resubmission of the same Drawing, i.e., A=1st submission, B=2nd submission, C=3rd submission, etc.

4. The next five digits shall be the applicable Specifications Section Number.

A typical submittal number would be as follows: SD-08-B-13122

SD	=	Shop Drawing
08	=	The eighth initial submittal
B	=	The second submission (first resubmission) of that particular shop drawing
13122	=	Specifications Section

G. Notify the City or Engineer of Record in writing, at the time of submittal, of any deviations in the submittals from the requirements of the Contract Documents.

H. The review and approval of shop drawings, samples or product data by the City or Engineer of Record shall not relieve the Contractor from his/her responsibility with regard to the fulfillment of the terms of the Contract. All risks of error and omission are assumed by the Contractor and the City and Engineer of Record will have no responsibility thereof.

I. No portion of the Work requiring a shop drawing, sample, or product data shall be started nor shall any materials be fabricated or installed prior to the approval or qualified approval of such item. Fabrication performed, materials purchased or on- site construction accomplished which does not conform to approved shop drawings and data shall be at the Contractor's risk. The City will not be liable for any expense or delay due to corrections or remedies required to accomplish conformity.

J. Project Work, materials, fabrication, and installation shall conform to approved shop drawings, applicable samples, and product data.

1.4 SUBMISSION REQUIREMENTS

A. Make submittals promptly in accordance with approved schedule, and in such sequence as to cause no delay in the Work or in the work of any other contractor.

B. Each submittal, appropriately coded, will be returned within thirty (30) Calendar Days following receipt of submittal by the City or Engineer of Record.

1. Submittal identification number

2. The date of submission and the dates of any previous submissions.

3. The Project title and number.

4. Contractor identification.

5. The names and telephone numbers of:

   a. Contractor

   b. Supplier

   c. Manufacturer

6. Field dimensions, clearly identified as such.

7. Identification of deviations from Contract Documents.

8. Identification of revisions on resubmittals.

1.5 REVIEW OF SHOP DRAWINGS, PRODUCT DATA, WORKING DRAWINGS AND SAMPLES

A. The review of shop drawings, data, and samples will be for general conformance with the design concept and Contract Documents. They shall not be construed:

   1. as permitting any departure from the Contract requirements;

   2. as relieving the Contractor of responsibility for any errors, including details, dimensions, and materials;

   3. as approving departures from details furnished by the City, except as otherwise provided herein.

B. The Contractor remains responsible for details and accuracy, for coordinating the Work with all other associated work and trades, for selecting fabrication processes, for techniques of assembly, and for performing work in a safe manner.

C. If the shop drawings, data or samples as submitted describe variations and show a departure from the Contract requirements which City or Engineer of Record finds to be in the interest of the City and to be so minor as not to involve a change in Contract Price or time for performance, the City or Engineer of Record may return the reviewed drawings without noting an exception.

D. The City or Engineer of Record will reject incomplete submittals as not complying with the Contract requirements. Contractor shall provide space for 2.5” by 3.5” review stamp for each submittal.

E. After receipt of a complete submittal and within the time limits described below, the City

or Engineer of Record will transmit the submittal back to the Contractor marked with one of the following review status:

"Reviewed, No Exceptions Taken"

"Make Corrections Noted, Do Not

Resubmit" "Revised and Resubmit"

"Rejected"

F. For items marked "Make Corrections Noted, Do Not Resubmit," the revisions will be marked on the submittal or will be described as comments in the response letter. The submittal will be considered approved without formal revision. The CONTRACTOR shall, within 7 calendar days, submit two (2) corrected record copies of the submittal to the City or Engineer of Record for record purposes.

G. If the submittal is returned to the Contractor marked "Revised and Resubmit," the submittal will be transmitted to the Contractor with a statement of the deficiencies. The Contractor shall promptly revise the submittal and resubmit to the City or Engineer of Record.

H. If the submittal is returned to the Contractor marked "Rejected," the Contractor shall revise said submittal and shall resubmit the revised submittal to the City or Engineer of Record.

I. Revisions indicated on submittals shall be considered as changes necessary to meet the requirements of the Contract Documents, Specifications, or Drawings. Submittal revisions shall not be taken as the basis of claims for extra work. The Contractor shall have no claim for damages or extension of time due to any delay resulting from making required revisions to the submittals. The review of submittals by City or Engineer of Record shall in no way relieve the Contractor of responsibility for errors or omissions contained therein nor will such review operate to waive or modify any provisions or requirements contained in the Contract Documents, Specifications, or Drawings.

J. After approval of submittals, the Contractor shall not deviate from the approved submittal without the prior written consent from the City or Engineer of Record. Commencement of production Work performed in advance of the receipt of approval of submittals shall be entirely at the Contractor's risk.

K. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing on the letter of transmittal and on resubmitted shop drawings by use of revision triangles or other similar methods, to revisions other than the corrections requested by the City or Engineer of Record, on previous submissions. Any such revisions which are not clearly identified shall be made at the risk of the Contractor. The Contractor shall make corrections to any work done because of this type revision that is not in accordance to the Contract Documents as may be required by the City or Engineer of Record.

L. Partial submittals may not be reviewed. The City or Engineer of Record will be the only judge as to the completeness of a submittal. Submittals not complete will be returned to the Contractor, and will be considered "Rejected" until resubmitted. The City or Engineer of Record may at his/her option, provide a list or mark the submittal directing the Contractor to the areas that are incomplete.

M. Repetitive Review

4. Shop drawings and other submittals will be reviewed no more than twice at the City or Engineer of Record expense. All subsequent reviews will be performed at times convenient to the City or Engineer of Record and at the Contractor's expense, based on the City or Engineer of Record then prevailing rates. The Contractor shall reimburse the City for all such fees invoiced to the City. Submittals are required until approved.

5. Any need for more than one resubmission, or any other delay in obtaining City or Engineer of Record review of submittals, will not entitle Contractor to extension of the time for completion.

N. If the Contractor considers any correction indicated on the shop drawings to constitute a change to the Contract Documents, the Contractor shall give written notice thereof to the City or Engineer of Record at least seven work days prior to release for manufacture.

O. When the shop drawings have been completed to the satisfaction of the City or Engineer of Record, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the City or Engineer of Record.

1.6 DISTRIBUTION

D. Distribute reproductions of approved shop drawings and copies of approved product data and samples, where required, to the job site file and subcontractors as required or directed by the City.

1.7 SCHEDULES

D. Provide all schedules required by the requirements of these Specifications.

1.8 GENERAL PROCEDURES FOR SUBMITTALS

D. Coordination of Submittal Times: Prepare and transmit each submittal sufficiently in advance of performing the related work or other applicable activities, or within the time specified in the individual sections of the Specifications so that the installation will not be delayed by processing times including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery and similar sequenced activities. No extension of the time for completion will be authorized because of the Contractor's failure to transmit submittals sufficiently in advance of the work.

1.9 QUALITY CONTROL SUBMITTALS

D. Certificates:

1. Manufacturer's Certificate of Compliance:

a. When specified in individual Specification sections or where products are specified to a recognized standard or code, submit prior to shipment of product or material to the Project site.

b. City or Engineer of Record may permit use of certain materials or assemblies prior to sampling and testing if accompanied by accepted certification of compliance.

c. Signed by product manufacturer certifying that materials, manufacture, and product specified conform to or exceed specified requirements and intent for which product will be used. Submit supporting reference data, affidavits, and certifications as appropriate.

d. May reflect recent or previous test results on material or product, but must be acceptable to City or Engineer of Record.

2. Certificates of Successful Testing or Inspection: Submit when testing or inspection is required by Laws and Regulations or governing agency or specified in the individual Specification sections.

E. Operation and Maintenance Manual: Submit Operation and Maintenance Manual in accordance with City requirements.

F. Statements of Qualification: Evidence of qualification, certification, or registration. As required in these Contract Documents to verify qualifications of Engineers, materials testing laboratories, specialty Subcontractors, trades, specialists, consultants, installers, and other professionals.

G. Written Test Reports of Each Test and Inspection: As a minimum, include the following:

1. Date of test and date issued, Project title and number, testing laboratory name, address, and telephone number, and name and signature of laboratory inspector.

2. Date and time of sampling or inspection and record of temperature and weather conditions.

3. Identification of product and Specification section, location of Sample, test or inspection in the Project, type of inspection or test with referenced standard or code, certified results of test.

4. Compliance with Contract Documents, and identifying corrective action necessary to bring materials and equipment into compliance.

5. Provide an interpretation of test results, when requested by City or Engineer of Record.

1.10 SUBMITTAL LOG

D. The Contractor shall prepare and maintain an accurate submittal log for the duration of the project. The Contractor shall submit initial submittal log within 30 Calendar Days after Notice to Proceed. The Contractor shall submit an updated submittal log once a month and upon request of the City or Engineer of Record. The submittal log shall contain a listing of all submittals required by the Contract Documents and shall include the following.

1. Submittal identification number

2. Specification Section Reference

3. Description of submittal item

4. Projected submission date

5. Actual submission date

6. Date returned by the Engineer

7. Notation of the City or Engineer of Record response

8. Notation if re-submittal or record copy is required

PART 2 – PRODUCTS (NOTUSED)

PART 3 – EXECUTION

3.1 SUBMITTAL TRANSMITTAL/CERTIFICATE FORM

Project Name:

To: City of Greeley – Civil Inspections
1100 10th Street
Greeley, Colorado 80631
Attn:

From: _____
_____
_____
_____

Description:
_____

_____

Submittal #:_____-_____-_____- _____
Type Submittal # Submission Section

Date:_____Date of Previous Submission:_____Copies:_____

Supplier:_____Phone No:_____

Manufacturer:_____Phone No:_____

Remarks:
_____

_____

Relationship to Critical Features of Work:

_____

_____

Certification Statement: By this submittal, I hereby represent that I have determined and verified all materials, dimensions, catalog numbers and similar data, and I have checked and coordinated each item with other applicable approved shop drawings and all Contract requirements.

By: _____ _____
Signature Date

SECTION 01713

WATER DISTRIBUTION SYSTEM TESTING

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the hydrostatic testing of potable water distribution and non-potable irrigation lines.

B. The Contractor is responsible for the hydrostatic testing of water lines.

1.2 SUBMITTALS

A. Testing Plan: Submit prior to testing and include the following:

1. Testing dates.

2. Piping systems and section(s) to be tested.

3. Test type.

4. Method of isolation.

5. Calculation of maximum allowable leakage for piping section(s) to be tested.

B. Certifications of Calibration for testing equipment, including pressure gauges, that are no more than 6 months old from date of use.

C. Certified Test Report.

PART 2 – PRODUCTS

2.1 PRESSURE GAUGES

A. Contractor shall supply all pressure gauges used for leakage testing meeting the following requirements:

1. Dial Size: Nominal 2-inch dial size.

2. Accuracy: 2 percent of span.

3. Scale Range: Such that normal operating pressure lays between 50 percent and 80 percent of the scale range.

4. The maximum allowable pressure gauge increment shall be five (5) psi.

PART 3 – EXECUTION

3.1 GENERAL

A. Testing shall be conducted when:

1. Backfill and compaction has been completed, but before street improvements are installed.

2. Main has been flushed.

3. Disinfection may occur after leak testing is completed and accepted or concurrently with the leak testing. Disinfection to follow construction specification *Section 02511, Disinfection of Water Utility Distribution*.

B. Contractor shall ensure that thrust blocking or other types of restraining systems will provide adequate restraint prior to pressurizing the system.

1. At least seven (7) days shall have elapsed since the last concrete thrust restraint was cast.

2. A minimum of seventy-two (72) hours shall elapse if high-early-strength cement is used.

C. The Contractor shall provide all equipment and personnel to perform the hydrostatic test.

1. Test equipment shall be able to maintain a continuous internal pipe pressure required for the test psi and accurately measure leakage from the pipe over a two (2) hour, minimum, test period.

2. A water meter shall be used to measure the amount of water used in pressurizing the system.

D. When existing water mains are used to supply the test water, they shall be protected from backflow pressures by temporarily installing a double check-valve assembly between the test and the supply main.

E. Do <u>not</u> test against the City's existing valves.

1. Provide temporary watertight plugs and temporary thrust restraint until tests pass.

2. After system passes testing, remove plugs and thrust restraint and connect to existing valve with cut-in sleeve or solid sleeve.

F. New Piping Connected to Existing Piping:

1. Isolate new piping with grooved-end pipe caps, spectacle blinds, blind flanges, or as acceptable to the City.

2. Test joint between new piping and existing piping by methods that do not place entire existing system under test load, as approved by the City.

G. The City shall be notified 48 hours in advance of testing. The City shall witness tests and record times, leakage readings, and pressure over the test period.

H. A hydrostatic pressure test shall be performed against all new valves at the point of connection to the existing system. This test shall be performed prior to connecting the new system to the existing one.

I. Only City personnel shall operate existing City owned valves.

J. Filling the Line

1. Potable water shall be used. An alternative water source will require prior approval from the City.

2. When filling the pipeline, it shall be filled at a rate which will not cause surges nor will it exceed the rate at which the air can be released.

3. Where permanent air release vents are not available, the Contractor shall install corporation stops at high points in the water line in order to evacuate trapped air.

4. All corporation stops, which were installed to facilitate evacuation of air from the water main, shall be removed and plugged with a "cc" threaded brass plug after the water main is filled, and prior to pressure testing.

K. Pipe shall remain filled with water for a minimum of twenty-four (24) hours prior to the hydrostatic pressure test.

L. Prior to the tests, inspect valves within the test section to make sure they are fully operational.

M. Operate all valves in the system in the presence of City personnel.

N. Prior to test, remove or suitably isolate appurtenant instruments or devices that could be damaged by pressure testing.

3.2 PRESSURE TEST

A. "Leakage" is the quantity of water that must be added to the pipeline to maintain a pressure within five (5) psi of the specified test pressure after the air has been expelled and the pipe has been filled with water.

B. Test pressure

1. Test pressure shall be 150 psi or 150% of the operating pressure, whichever is greater, at the highest elevation of the test section.

2. A residual pressure, within five (5) psi of the test pressure, shall be maintained for a minimum two (2) hours.

C. The maximum allowable leakage for each test section is determined by the following formula and table:

$$L = \frac{SD\sqrt{P}}{148{,}000}$$

Where: L = maximum allowable leakage, in gallons per hour
S = length of pipe tested, in feet
D = nominal pipe diameter, in inches
P = average test pressure during the leakage test, in psi (gauge)

There will be no additional leakage allowance for valves.

D. If the pipeline under test contains sections of various diameters, the allowable leakage will be the sum of the computed leakage for each size.

3.3 PASSING

A. If the tests disclose leakage greater than that specified, the defective materials and joints shall be located and repaired. The tests shall be repeated until the leakage is less than the maximum allowed.

B. With the exception of obvious leaks, passing of the pressure test shall be on the basis of maximum allowable leakage per section tested. No leakage is allowed through the bonnet of any valve or appurtenance. Any valve or appurtenance that is tested and leaks will be removed and replaced.

C. All visible leaks shall be repaired regardless of maximum allowable leakage.

SECTION 01715

SEWER AND MANHOLE TESTING

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the testing of sanitary sewer collection mains, manholes, and appurtenances.

B. All sanitary sewer pipelines shall be air tested per these specifications.

C. All sanitary sewer manholes shall be vacuum tested per these specifications.

D. All sanitary sewer collection systems shall be video inspected per these specifications.

1.2 REFERENCES

A. ASTM International (ASTM)

1. C1244, Standard Test Method for Concrete Sewer Manholes by Negative Air Pressure (Vacuum) Test Prior to Backfill, latest revision.

2. F1417, Standard Test Method for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air, latest revision.

1.3 SUBMITTALS

A. Video Inspections

1. Flash Drives or USB portable hard drives

a. Submit Flash Drive or USB portable hard drives of completed, narrated, color digital videos identified by Project name, street name, right-of-way property name, and manhole numbers.

b. Flash Drives or USB portable hard drives become property of the City of Greeley Water and Sewer Department

2. Inspection Logs

a. Submit cleaning and television inspection logs of all new installed sewer lines, manholes, structures, and all connections to an existing sewer line.

b. Cleaning and television inspection logs shall be submitted prior to request for progress payment, pay applications, or prior to substantial completion. Failure to provide inspections log may result in delay of substantial completion or progress payments.

c. Include the following minimum information

i. Stationing and location of lateral services, wyes, or tees

ii. Date and clock time references

iii. Pipe joints

iv. Infiltration/Inflow defects

v. Cracks

vi. Leaks

vii. Offset joints

3. Submit specific detailed description of proposed bypass pumping system, including written description of plan addressing schedule, quantity, capacity, and location of pumping equipment.

4. Submit spill plan to address any spills that might occur.

5. Field Quality-Control Submittals: Indicate results of Contractor-Furnished tests and inspections.

6. Qualifications Statement

a. Submit qualifications of applicator.

B. Exfiltration and Infiltration Testing

1. Submit the following items prior to the start of testing

a. Testing procedures

b. List of test equipment

c. Testing sequence schedule

d. Provisions for disposal of flushing and test water

e. Certification of test gage calibration

2. Test and Evaluation Reports: Indicate results of manhole and piping tests

3. Qualifications Statement

a. Submit qualifications for applicator

C. Vacuum Testing

1. Submit the following items prior to start of testing

a. Testing procedures

b. List of test equipment

c. Testing sequence schedule

d. Provisions for disposal of flushing and test water

e. Certification of test gage calibration

2. Test and Evaluation Reports: Indicate results of manhole tests

3. Qualifications Statement

a. Submit qualifications for applicator

D. Air Testing

1. Submit the following items prior to the start of testing

a. Testing procedures

b. List of test equipment

c. Testing sequence schedule

d. Provisions for disposal of flushing and test water

e. Certification of test gage calibration

2. Test and Evaluation Reports: Indicate results of piping tests

3. Qualifications Statement

a. Submit qualifications for applicator

E. Mandrel Testing

1. Submit the following items prior to start of testing

a. Testing procedures

b. List of test equipment

c. Testing sequence schedule

d. Provisions for disposal of flushing and test water

e. Certification of test gage calibration

f. Deflection mandrel drawings and calculations

2. Test and Evaluation Reports: Indicate results of piping tests.

PART 2 – PRODUCTS

2.1 VIDEO INSPECTIONS

A. Flash Drive or USB portable hard drive

1. Description: Digital video formatted files

2. Audio track containing simultaneously recorded narrative commentary and evaluations of videographer, describing in detail condition of pipeline interior.

2.2 EXFILTRATION AND INFILTRATION TESTING

A. Equipment

1. Plugs

2. Pump

3. Measuring device

2.3 VACUUM TESTING

A. Equipment

1. Vacuum pump

2. Vacuum line

3. Vacuum tester base

a. Compression band seal

b. Outlet port

4. Shutoff valve

5. Stopwatch

6. Plugs

7. Vacuum Gage: Calibrated to 0.1 in. Hg

2.4 AIR TESTING

A. Equipment

1. Air compressor

2. Air supply line

3. Shutoff valves

4. Pressure regulator

5. Pressure relief valve

6. Stopwatch

7. Plugs

8. Pressure Gage: Calibrated to 0.1 psi

2.5 MANDREL TESTING

A. Equipment

1. Properly sized rigid ball or “go, no go” mandrel

2. Pull/retrieval ropes

PART 3 – EXECUTION

3.1 GENERAL

A. Testing shall be conducted when:

1. Backfill and compaction has been completed, but before paving and curb gutter improvements are installed.

2. Line and manholes have been thoroughly cleaned of all foreign material.

B. The Contractor shall furnish all equipment, labor, and incidentals necessary to perform tests. The pressure gauge shall be capable of indicating pressure to the nearest 0.1 pounds per square inch (psi) increment.

C. The City shall witness tests and record times, leakage readings, and pressure over the test period. Contractor shall provide the City a minimum forty-eight (48) hours advance notice of any tests.

3.2 ALIGNMENT TEST

A. Lamp testing shall be on an as needed basis at the City’s discretion.

B. Lamp each section of sanitary sewer between manholes to determine whether any displacement of pipe has occurred.

C. Lamping shall be done after pipe trench is compacted and brought to grade or pavement subgrade.

D. “Full moon” shall be visible for vertical grade alignment. No less than “half moon” shall be visible for horizontal alignment.

E. Repair poor alignment, displaced pipe, or other defects discovered at the city’s discretion.

3.3 PIPE DEFLECTION TEST

A. Mandrel testing shall be completed on an as needed basis at the City's discretion.

B. Each section of sanitary sewer shall be tested for deflection by an independent testing firm as hired by the Contactor prior to City acceptance and as deemed necessary within the warranty period by the City.

1. The maximum allowable deflection for City acceptance is 5% of the base internal diameter.

2. The maximum allowable deflection at the end of the warranty period shall be 5% of the base internal diameter.

3. Mandrel outside diameters in inches are as follows:

TABLE 3.3-A: Allowable Pipe Deflection – Mandrel Test

Pipe Size (in)	Base I.D.	5% Deflection Mandrel
8"	7.665	7.282
10"	9.563	9.085
12"	11.361	10.793
15"	13.898	13.203

C. Sections of the pipe which fail the deflection test shall have the defects repaired and the test repeated.

3.4 AIR TESTING SANITARY SEWER MAINS

A. Conduct tests in conformance with ASTM F1417 and these specifications.

B. All pressures in this section assume no groundwater back pressure, if groundwater is present, increase test air pressures to compensate for the back pressure. Each foot of groundwater produces approximately 0.433 psi back pressure. For groundwater in excess of five feet (5') above the pipe crown, an infiltration test shall be used in lieu of air testing.

C. Preparation for tests:

1. Flush and clean the sewer line prior to testing in order to wet the pipe surfaces and produce more consistent results.

2. Provide a relief valve on the pressuring equipment to avoid over-pressurizing and damaging an otherwise acceptable line. Set relief valve at 5.0 psi.

3. Plug and brace all openings in the main sanitary sewer line and the upper connections. Check all pipe plugs with a soap solution to detect any air leakage. If leaks are found, release the air pressure, eliminate the leaks and start the test procedures over again.

D. Test Procedure:

1. Add air until internal pressure of the sewer line is raised to approximately 4.0 psi gage. Maintain the air pressure between 3.5 psig and 4.5 psig until the air temperature in the pipe is stabilized with the pipe/ground temperature.

2. Disconnect the air supply and reduce the air pressure to 3.5 psig before starting the test.

3. If the groundwater is higher than the top of the pipe, the test pressure shall be adjusted to account for the higher groundwater. The test pressure shall be increased by 0.433 psi per foot of ground water up to five (5) feet of groundwater. For groundwater over five (5) feet in depth, an infiltration test shall be conducted in place of the air test.

4. Determine the time required for the air pressure to drop from 3.5 psig to 2.5 psig.

   a. The time elapsed shall not be less than:

$$T = 0.085\frac{DK}{Q}$$

   Where: T = shortest time(s) allowed for the air pressure to drop 1.0 psig.
   K = 0.000419DL but not less than 1.0
   Q = leak rate in cubic feet/minute/square feet of internal surface =
   0.0015 CFM/SF
   D = measured average inside diameter of pipe (in)
   L = length of test section (ft)

   b. Example calculation for an eight-inch (8") diameter sanitary sewer pipe with a test section 400 feet long:

$$T = 0.085\left[\frac{8in(0.000419)(8in)(400\,ft)}{0.0015CFM\,/\,SF}\right]$$

   T= 608 seconds or 10 minutes 08 seconds (10:08)

   c. The following table contains the test durations for pipe diameters between eight-inches (8") and fifteen inches (15"), for pipe lengths up to 500 feet.

TABLE 3.4-D: Specified Test Duration for Length of Pipe Indicated (Duration indicated in min:sec)

Pipe Diameter (in)	Pipe Length (feet)						
	0-	200	250	300	350	400	500
8	7:34	7:34	7:34	7:36	8:52	10:08	12:38

10	9:26	9:26	9:53	11:52	13:51	15:49	19:45
12	11:20	11:24	14:15	17:05	19:56	22:47	28:26
15	14:10	17:48	22:15	26:42	31:09	35:36	44:26

5. If lateral or service lines are included in the test, their length may be ignored for computing required test time if the test time requirements are met. If the test section fails, time shall be recomputed to include all the lateral lengths using the following formula:

$$T = 0.085\left[\frac{D_1^{\,2}L_1 + D_2^{\,2}L_2 + \ldots + D_n^{\,2}L_n}{D_1L_1 + D_2L_2 + \ldots + D_nL_n}\right]\frac{K}{Q}$$

Where:

T = shortest time(s) allowed for the air pressure to drop 1.0 psig.
K = $0.000419(D_1L_1 + D_2L_2 + \ldots + D_nL_n)$ but not less than 1.0
Q = leak rate in cubic feet/minute/square feet of internal surface = 0.0015 CFM/SF
D_1, D_2, etc. = measured average inside diameter of pipe (in)
L_1, L_2, etc. = length of test section (ft)

If the recomputed test time is short enough to allow the section tested to pass, then the test section meets the requirements of this specification.

E. Sections of the pipe which fail the air test shall have the defects repaired and the test repeated.

3.5 EXFILTRATION TEST

A. Exfiltration testing may only be completed upon approval from the City.

B. Contractor shall provide a pre-approved device capable of measuring flow in the pipe in fifteen (15) minute intervals and providing a total flow at the end of the testing period.

C. Flow measurement shall be twenty-four (24) hours minimum and shall be conducted before backfill and trench/area dewatering operations are complete.

D. The maximum allowable exfiltration for sanitary sewers shall not exceed 50 gallons per day/inch nominal diameter pipe/mile (0.95 gpd/inch/100ft).

3.6 INFILTRATION TEST

A. If groundwater exists in excess of five feet (5') above the pipe crown an infiltration test for leakage shall be used.

B. Contractor shall provide a pre-approved device capable of measuring flow in the pipe in fifteen (15) minute intervals and providing a total flow at the end of the testing period.

C. Flow measurement shall be twenty-four (24) hours minimum and shall be conducted only after backfill and trench/area dewatering operations are complete, and groundwater has

returned to normal elevations.

D. The maximum allowable infiltration for sanitary sewers shall not exceed 50 gallons per day/inch nominal diameter pipe/mile (0.95 gpd/inch/100ft).

3.7 VACUUM TESTING MANHOLES

A. Manholes shall be tested before the ring and cover and grade adjustment rings are installed, and after backfill and compaction is complete.

B. Conduct tests in conformance with ASTM C1244 and these specifications.

C. Preparation for tests:

1. All lift holes, joints, and other imperfections shall be filled with an approved non-shrink grout, to provide a smooth finish appearance.

2. All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manholes.

D. Test Procedure:

1. The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendation.

2. A vacuum of ten-inches (10") mercury shall be drawn in the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off.

3. The time shall be measured for the vacuum to drop to nine-inches (9") mercury.

4. The manhole shall pass if the time for the vacuum reading to drop from ten-inches (10") mercury to nine-inches (9") mercury meets or exceeds the values indicated in the following table:

TABLE 3.6-D: Manhole Vacuum Testing Durations

Depth* (ft)	Diameter (in)		
	48	60	72
	Time (seconds)		
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97
26	64	85	105
28	69	91	113
30	74	98	121
* Round actual depth of manhole to next depth up (ex. 11 foot deep manhole, use depth of 12 feet)			

E. If the manhole fails any test, necessary repairs shall be made by an approved method and the manhole shall be retested until a satisfactory test is obtained.

3.8 TELEVISING SANITARY SEWER MAIN

A. All sanitary sewer lines shall be televised prior to final acceptance and three (3) months prior to the end of the warranty period or as deemed necessary within the warranty/construction period by the City. The televising shall be made by the Contractor or a Sub-consultant to the contractor and the recording shall be submitted to the City for review and acceptance. The individual completing the video recording shall be NASSCO trained and certified.

1. The recording shall be made using a color camera, self-propelled or other, having sufficient light to show detail of problem areas and joints.

2. Camera shall have a swivel head capable of looking up each service connection.

3. Camera speed shall not exceed three (3) ft/s.

4. If problem area or concerns are seen by the operator, then the camera shall be backed up and an extended look at the area will be recorded.

5. All recordings will have location (i.e., manhole # to manhole #), time, date, and footage displayed.

6. All recordings will include an evaluation of the manholes.

B. The warranty period for the sanitary sewer collection system WILL continue to be in

effect for the time specified in these specifications or until the Water and Sewer Department has received and approved the video recordings, which ever is longer.

SECTION 01785

PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the requirements for Project Record Documents.

B. Reference *Section 2* of these Criteria for supplementary information to this specification.

1.2 RECORD DOCUMENTS

A. Quality Assurance:

1. Furnish qualified and experienced person, whose duty and responsibility shall be to maintain record documents.

2. Accuracy of Records:

a. Coordinate changes within Project Record Documents, making legible and accurate entries on each sheet of Drawings and other documents where such entry is required to show change. Project Record Documents may be kept digitally but must be backed-up daily.

b. Purpose of Project Record Documents is to document factual information regarding aspects of the Work, both concealed and visible, to enable future modification of the Work to proceed without lengthy and expensive Site measurement, investigation, and examination.

c. Field verify all as-built dimensions and materials.

3. Make entries within 48 hours after receipt of information that a change in the Work has occurred.

4. Prior to each request for progress payment, pay application, or when a field change is requested or made, the Engineer of Record, Project manager, Chief Construction, or City may request review and approval of current Redline Drawings. Failure to properly maintain, update, and submit Redline Drawings may result in a deferral of the whole or any part of Contractor's Application for Payment, either partial or final, and substantial completion may be delayed. The City reserves the right to review Redline Drawings throughout the project.

PART 2 – PRODUCTS

SECTION NOT USED

PART 3 - EXECUTION

3.1 MAINTENANCE OF DOCUMENTS AND SAMPLES

A. Do not use Project Record Documents for construction purposes.

B. Store documents in Contractor's field office apart from documents used for construction. Protect Project Record Documents from deterioration and store in a secure location. Updated Project Record Documents shall be scanned and saved as a PDF monthly.

C. File documents and samples in accordance with the specification's section numbers.

D. Maintain documents and samples in a clean, dry, legible condition and in good order.

E. Documents shall be made available for inspection by the City upon request. Additionally, most recent PDFs must be provided upon City request.

3.2 RECORDING DURING CONSTRUCTION

A. Label each drawing "REDLINE DRAWING" in neat large-printed letters.

B. Mark whichever drawing is most capable of showing "field" condition fully and accurately, however, where shop drawings are used for mark-up, record a cross reference at corresponding locations on the Redline Drawings.

C. Mark drawings legibly with a pen or pencil. Ink shall not be water based or subject to easy smearing. Use other colors to distinguish between variations in separate categories of work as follows:

1. Red – Incorporated items (added)

2. Green – Deleted items

3. Blue – Comments for information only, not to be added to drawings (black shall not be used since it does not show well on black and white drawings)

4. Yellow – Items marked as "correct"

5. Orange – Items addressed by drafting (pickups) to check your own work

D. Date entries.

E. Call attention to entry by "cloud" drawn around area or areas affected.

F. Record information concurrently with construction progress.

G. Record new information that was not shown on the Construction Drawings or shop drawings. Give particular attention to concealed work which would be difficult to measure and record later.

H. Record all field dimensions, elevations, details, deviations in sizes, locations, materials, or other features of the Work. It shall be possible, using these Redline Drawings to correctly and easily locate, identify, and establish dimensions of work features which will be concealed in finished work or underground.

I. Establish locations of concealed and underground work, utilities and appurtenances, with

accurate horizontal and vertical dimensions. Horizontal locations shall be referenced to a minimum of two (2) permanent surface improvements. Vertical element locations shall be in relation to the project vertical datum.

J. Do not backfill, cover, place or proceed with any work until necessary Redline Drawings information is obtained.

3.3 REDLINE DRAWINGS AND SUBMISSION

A. Contractor shall submit Redline Drawing information to the Engineer of Record and City on a monthly basis or prior to each request for progress payment, pay application, or when a field change is requested or made for review and approval.

1. The Engineer of Record and City shall review the submitted Redline Drawing information and any corrections, additions, or omissions identified shall be incorporated into the Redline Drawings by the Contractor prior to approval.

B. Accompany the submittal to the Engineer of Record and City with a transmittal letter containing:

1. Date

2. Project title and number

3. Contractor's name, address, and telephone number

4. Index containing title and number of each Record Document

5. Signature of Contractor or his authorized representative

C. Redline Drawings shall be submitted and approved by the Engineer of Record and City prior to issuance of Substantial Completion.

3.4 FINAL AS-CONSTRUCTED RECORD DRAWINGS AND SUBMISSION

A. Engineer of Record shall incorporate changes from approved Redline Drawings to produce final As-Constructed Record Drawings. As-Constructed Record Drawings shall be submitted to the City for review and approval within 2 months of the Engineer of Record receiving the approved Redline Drawings.

1. The City shall review the submitted As-Constructed Drawing information and any corrections, additions, or omissions identified from the comparison to the approved Redline Drawings shall be incorporated into the As-Constructed Record Drawings by the Engineer of Record prior to approval.

B. Engineer of Record shall submit approved As-Constructed Record Drawings to the City as noted below within 1 month of City approval of As-Constructed Record Drawings:

1. 22” x 34” blueline or blackline form.

2. Electronic PDF format

3. AutoCAD per the most current version of “Electronic Data Submittal Standards (EDSS)”

4. GIS shape files per the most current version of “Electronic Data Submittal Standards (EDSS)”

SECTION 02240

DEWATERING

PART 1 - GENERAL

1.1 DESCRIPTION OF WORK

A. Provide all material, equipment, and labor to install and maintain all pumps, piping, drains, well points, and other facilities required to effectively control, collect, and dispose of groundwater or surface water to permit safe and proper completion of the Work. Use appropriate equipment and methods for dewatering based on existing site conditions.

B. Maintain the foundations and other portions of the Work free from water as required for constructing each part of the Work.

C. Comply with all applicable environmental protection laws and requirements in operation of the dewatering system.

D. Must obtain all permits as required by State and Local regulations.

1. Colorado Department of Public Health and Environment (CDPHE) requires permits for dewatering operations.

2. Discharge of water from dewatering operations may need additional approvals based on water quality and location of discharge.

E. Remove all components of the dewatering system after it is no longer required.

1.2 SUBMITTALS

A. Submit in accordance with Section 01330: Submittals.

B. Dewatering Plan: Submit a Dewatering Plan prepared by a qualified dewatering specialist, with experience in design, installation, and operation of dewatering installations. The Dewatering Plan shall be prepared by a Licensed Professional Engineer in the State of Colorado and include the following:

1. Details regarding the anticipated types and locations of various dewatering facilities and design calculations required substantiating the Dewatering Plan.

2. Superintendence plan and schedule, indicating who will be responsible for observing the dewatering system and the proposed schedule describing when personnel will be on site to observe and maintain the system.

3. Coordination with other work including schedule, dewatering and diversion methods as well as operations, erosion and sediment control measures, equipment, and location and elevation of pumps, pipes, and any other features planned for use in the dewatering plan.

4. Provide type and sizes of filters, if used.

5. Identify proposed alignment, support, and protection for discharge pipe. Identify location of discharge and provide details for that location. For pipes discharging into manholes, provide details of pipe entry at manhole.

6. Final recommendations for dewatering.

7. If the Contractor purchases, rents, installs, or mobilizes to the site any elements of the dewatering system before approval of the dewatering submittal, the Contractor does so at its own risk, and will not be due any additional compensation from the Owner if such elements are not subsequently used for the work.

8. Approval of the dewatering system proposed by the Contractor will only be with respect to the basic principles of the methods the Contractor intends to employ. Approval does not relieve the Contractor of full responsibility for adequacy of the dewatering system.

C. Well construction logs. Include:

1. Descriptions of actual materials encountered.

2. Construction details.

3. Well development procedures and results.

4. Deviations from original design.

D. Qualifications:

1. Dewatering contractor.

2. Dewatering design engineer.

3. Testing laboratory.

E. Permit for permanent groundwater monitoring wells.

1.3 DEFINITIONS

A. Definitions

1. Dewatering: Removing water by single or multiple stage wellpoints, deep wells, ejector wells or sumps, as approved based on the Contractor's submittals.

2. Hydrostatic Groundwater Level: The groundwater level at any location during construction and before dewatering.

3. Sump: A depression excavated or constructed, from which water is pumped as part of dewatering.

1.4 AVAILABLE DATA

A. Logs of test borings and groundwater observations at the time of drilling may be included on the Drawings or Baseline Report.

B. If available, the Contractor may refer to the boring and test pit logs on the Drawings, but shall draw their own conclusions as to the applicability of the information contained therein. The Contractor may choose to perform additional investigations to develop their dewatering plan. It is the Contractor's responsibility to evaluate site subsurface conditions with respect to required dewatering facilities.

C. The subsurface conditions and groundwater observations from the test pits and borings apply only to the locations of the test pits and borings and at the time of the explorations and measurements. The subsurface conditions at the site may be different at the time of construction as compared to when observations were made and recorded, and the groundwater level can be expected to fluctuate. These factors should be appropriately considered in developing the Contractor's Dewatering Plan.

1.5 QUALITY ASSURANCE AND QUALITY CONTROL

A. Dewatering operations shall be adequate to assure the integrity of the finished project and shall be the responsibility of the Contractor.

B. Regulatory requirements:

1. Obtain required water discharge permits.

2. Obtain permanent groundwater monitoring well permits.

PART 2 - PRODUCTS

2.1 DEWATERING SYSTEM

A. The dewatering system may be single- or multiple-stage wellpoints, deep wells, ejector wells, sumps, or approved alternatives used for dewatering and which fulfill the dewatering requirements specified in this Section. The materials and construction of the dewatering wells will be selected by the Contractor and the Contractors' dewatering specialist.

PART 3 - EXECUTION

3.1 GENERAL

A. Design, furnish, install, maintain, and operate a dewatering system that prevents loss of fines, boiling, quick conditions, or softening of foundation strata and maintain stability of bottom of excavations so that every phase of the work can be performed in a dry, safe, and stable environment. Operate dewatering systems such that excavation bottoms are firm, suitably dry, and free from standing water at all times.

B. Locate elements of the dewatering system such that interference with excavation and construction activity is minimized. Locations are subject to approval by the Engineer.

C. The responsibility for conducting the dewatering operation in a manner which will protect adjacent structures and facilities rests solely with Contractor.

D. At all times during construction, provide ample means and devices to remove promptly, and dispose of properly, all water entering excavations and keep the bottoms of excavations firm and free of standing water until structures to be built thereon are completed and/or backfill to be placed therein is placed. Conduct pumping and dewatering operations such that no

disturbance to foundation subgrade materials or to fill materials supporting any other work will result. Discharged water shall be piped to an approved area.

E. Install silt barriers or other discharge control measures at dewatering discharge locations, to control and prevent siltation. Provide suitable discharge controls in accordance with applicable federal, state, and local permit regulations, and Section 01570: Sediment and Erosion Control. Do not allow dewatering discharge to cause siltation or other negative environmental impact on natural waterways or other property.

3.2 INSTALLATION AND OPERATION

A. Operate the dewatering system to lower water levels as required and then operate continuously 24 hours per day, 7 days per week until all facilities and structures affected by the dewatering have been satisfactorily constructed, including placement of fill materials.

B. Maintain groundwater levels low enough to fulfill the requirements of this Section and do not allow the water level to rise until constructed facilities are complete, so that the water can be allowed to rise without damaging facilities, their foundations, or surrounding areas and structures.

C. Provide superintendence in accordance with the approved plan during all periods of dewatering. Superintendence means providing qualified Contractor personnel knowledgeable in operation and maintenance of dewatering system(s). The Contractor is responsible for any damage resulting from failure to maintain the dewatering system.

D. Provide complete standby equipment and power sources available for immediate operation as may be required, to adequately maintain the dewatering on a continuous basis in the event that all or any part of the dewatering system becomes inadequate or fails. Provide an automatic switchover system to the standby power source to ensure uninterrupted power supply to pumps in an emergency. Spare pumps shall be automatically engaged if primary pumps fail for any reason.

E. When the dewatering system does not meet the specified requirements, and as a consequence, loosening or disturbance of the foundations strata, instability of the slopes, or damage to the foundations or structures occurs, the Contractor is responsible for supplying all materials and labor and performing all work for restoring foundation soils, slopes, foundations, and structures, to the satisfaction of the Engineer, and at no additional cost to the Owner.

F. When failure to provide adequate dewatering and drainage causes disturbance of the soils below design foundation or excavation grade, provide adequate dewatering and excavate and re-fill the disturbed areas with approved, properly compacted fill material. Such work shall be at the Contractor's expense and at no additional cost to the Owner.

G. Properly dispose of discharge water in accordance with Federal, State, and local requirements and permits. For discharge of water into holding tanks or infiltration ponds, include a means of overflow protection that is acceptable to the Engineer.

H. Control release of groundwater to its static level to prevent disturbance of natural foundation soils, or compacted backfills and fills and to prevent flotation or movement of structures, pipelines, or other facilities.

3.3 REMOVAL

A. Obtain written approval from the Engineer before discontinuing operation of any portion of the dewatering system(s).

B. Remove all elements of the dewatering system(s) from the site at the completion of dewatering work.

SECTION 02275

RIPRAP AND RIPRAP BEDDING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnish all labor, equipment, and materials necessary for placing boulders, riprap, riprap bedding, and grouting in conformance with the Construction Drawings and Specifications.

1.2 RELATED SECTIONS

A. Section 02240—Dewatering.

1.3 REFERENCES

A. Where reference is made to any standard, the version in affect at the time of bid opening shall apply.

B. Colorado Department of Transportation

1. Standard Specifications for Road and Bridge Construction.

1.4 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Certification: Submit certification stating both source of stone and that materials for all types of riprap will meet requirements of this Section.

C. Product Data: Descriptions of all materials to be provided under this Section. In addition, provide sample of angular stone.

D. Riprap Bedding

1. Gradation test results for each type of riprap bedding shall be submitted.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Riprap Bedding

1. Imported bed course material for slope protection, or riprap filter blanket, shallbe a porous free draining material consisting of sand, gravel, crushed stone or other approved free draining material. This material shall meet the following gradation requirements:

GRADATION FOR GRANULAR BEDDING

Sieve Size	% by Weight Passing
	Type I
3/8”	100
#4	95-100
#16	45-80
#50	10-30
#100	2-10
#200	0-2

B. Riprap

1. Imported riprap stone shall be rough, fractured to sub angular, and have a specific gravity of at least 2.65. Riprap shall consist of individual angular rock fragments which shall be unweathered, dense, hard, sound, and resistant to abrasion; shall be free from cracks, seams, and other defects that would tend to unduly increase their destruction by water and frost action. Boulder and riprap stones shall be nearly cubical as possible, with neither breadth nor thickness of a single stone less than one-third of its length. Thus, slab type stones, flaking rock, rounded stones, asphalt, broken concrete, concrete slabs, or other materials not classified as rock will not be allowed for use as boulders or riprap material. Riprap shall be clean, free of fines, and shall meet the following requirements:

CLASSIFICATION AND GRADATION OF RIPRAP

Riprap Designation	% Smaller Than Given Size by Weight	Intermediate Rock Dimension (inches)	D50* (inches)
Type VL	70 – 100 50 – 70 35 – 50 2 – 10	12 9 6 2	6
Type L	70 – 100 50 – 70 35 – 50 2 – 10	15 12 9 3	9
Type M	70 – 100 50 – 70 35 – 50 2 – 10	21 18 12 4	12
Type VH	100 50 – 70 35 – 50 2 – 10	42 33 24 9	24

** D50 = Median Particle size.*

C. Grout

1. Concrete for the grout shall be an approved batch meeting the following requirements:

    i. All concrete shall develop 4,000 psi compressive strength within 28 days.

    ii. The cement shall be Type V.

    iii. The stone aggregate shall have a maximum diameter of ½ inch.

    iv. The slump shall be within a range of 3 inches to 6 inches.

b. Use of a stiffer mix or other measures as approved by the City for steeper slopes or for vertical joints.

c. The water/cement ratio shall not exceed 0.48.

d. Add 1.5 pounds per cubic yard of synthetic fiber reinforcement per manufacturer's instructions.

e. The grout shall contain both an air entraining admixture and water reducing agent. The job site air content be 6.5% +/- 1.5% by volume. A water reducing agent shall be used.

f. The Contractor shall submit a mix design in writing to the City for approval prior to the placement of any grout.

PART 3 - EXECUTION

3.1 GENERAL

A. No riprap bedding or riprap shall be placed until the subgrade has been prepared, dewatered and properly compacted, or otherwise prepared in accordance with the provisions of the Specifications and as specified on the Drawings. No material shall be placed until the subgrade has been checked and approved by the Engineer in writing.

3.2 PLACEMENT OF RIPRAP BEDDING

A. All riprap bedding shall be placed uniformly under all placed riprap material, including replenished riprap materials, to a minimum thickness of 6 inches, and shall not account for the minimum thickness of riprap as shown on the Drawings. Uniform spreading of all riprap bedding shall be done using approved devices and machinery. Excessive rutting of the finished bedding surface shall be avoided. Riprap bedding shall be kept clean and free of other soils. If the riprap bedding is contaminated with other soils or deleterious material, it shall be removed and replaced by the Contractor immediately. Where compaction is required, the bedding shall be compacted to 65% relative density (ASTM D4253).

3.3 RIPRAP PLACEMENT

A. Riprap shall be placed with a maximum drop height of 3 feet to reduce segregation of particle sizes. Placing in layers or by dumping into chutes or similar methods which may cause segregation are specifically prohibited. The riprap shall be placed, in one preparation,

to the line, grade, and thickness as shown on the drawings, without undue displacement of the granular filter bedding underneath.

B. Riprap shall be placed to grade in a manner to ensure that the larger rock fragments are uniformly distributed and the smaller rock fragments serve to fill the spaces between the larger rock fragments in such a manner as will result in a well-keyed, densely placed, uniform layer of riprap of the specified thickness. Consolidation of the riprap by backhoe or other means will be necessary to ensure interlocking of rock fragments. Placed riprap shall be uniform and free from bulges, humps, or cavities. Hand placing will be required only to the extent necessary to secure the results specified above.

3.4 GROUTED RIPRAP

A. The subgrade shall be excavated and any unstable material shall be removed. Approved material shall be placed and compacted in a maximum of 4-inch lifts to 95” of Maximum Standard Proctor Density (ASTM D698) to re-establish the subgrade.

B. The top of the riprap shall be as indicated on the Drawings.

C. The riprap shall be placed as described in Section 3.3. Placement shall be approved by the City prior to grouting.

D. Prior to placing the grout, any type of debris, fines, smaller rock, or silt shall be removed from around the riprap.

E. Dewatering shall be implemented to guarantee that the grout will not be placed in water and for a period of 24 hours the grout has been placed.

F. Keep riprap receiving grout wet at all times prior to receiving grout.

G. The concrete grout shall be placed by injection methods by pumping under low pressure, through a 2-inch maximum diameter hose to ensure complete penetration of the grout into the void area as detailed on the Drawings.

H. Grout will be placed up to 6 inches from the top of the riprap, or as directed by the Engineer. The operator shall be able to stop the flow and will place grout in the voids and not on the surface of the rocks.

I. Grout should be troweled out and finished to minimize visibility.

J. Clean and wash any spillage before the grout sets. The visual surfaces of the riprap will be free of grout. If washing does not clean off grout residue, the Contractor shall wash off any grout residue with muratic acid and water using a brush to scrub off the residue.

K. A pencil vibrator shall be used to make sure all voids are filled between the riprap. The intent is to fill all voids from the subgrade level around the riprap to a depth as shown on the Drawings. The pencil vibrator may be used to smooth the appearance of the surface but the Contractor shall use a wood float to smooth and grade the grout around the boulders.

3.5 TOLERANCES

A. Thickness: Minus 10 percent to plus 20 percent as shown on Drawings.

SECTION 02315

EXCAVATION AND FILL

PART 1 – GENERAL

1.1 SCOPE

A. This section covers excavation and trenching, including but not limited to dewatering, preparation of subgrades, pipe bedding, backfilling, compacting, groundwater barriers, materials testing, and finish grading for underground pipelines and appurtenances.

1.2 REFERENCES

A. American Association of State Highway and Transportation Officials (AASHTO)

1. T26, Standard method of Test for Quality of Water to be Used in Concrete, latest revision.

2. T99, Moisture–Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop (Method A), latest revision.

B. American Concrete Institute (ACI)

1. 305, *Hot Weather Concreting*, latest revision.

C. ASTM International (ASTM)

1. C33, *Standard Specification for Concrete Aggregates*, latest revision.

2. C94, *Standard Specification for Ready-Mixed Concrete*, latest revision.

3. C150, *Standard Specification for Portland Cement*, latest revision.

4. D422, *Standard Test Method for Particle-Size Analysis of Soils*, latest revision.

5. D448 (AASHTO M43), *Standard Classification for Sizes of Aggregate for Road and Bridge Construction*, latest revision.

6. C618, *Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete*, latest revision.

7. D698, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft^3 (600 kN-m/m^3))*, latest revision.

8. C1012/C1012M, *Standard Test Method for Length Change of Hydraulic-Cement Mortars Exposed to a Sulfate Solution*, latest revision.

9. D1556, *Standard Test Method for Density and Unit Weight of Soil in Place by Sand-Cone Method*, latest revision.

10. D1557, *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft^3 (2,700 kn-m/m^3))*, latest revision.

11. D2487, *Standard Test Method for Classification of Soils for Engineering Purposes*, latest revision.

12. D4318, *Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils*, latest revision.

13. D4254, Standard Test Methods for Minimum Index Density and Unit Weight of Soils and Calculation of Relative Density, latest revision

14. D4832, *Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders*, latest revision.

15. D6023, *Standard Test Method for Unit Weight, Yield, Cement Content, and Air Content (Gravimetric) of Controlled Low Strength Material (CLSM)*, latest revision.

16. D6024, *Standard Test Method for Ball Drop on Controlled Low Strength Material (CLSM) to Determine Suitability for Load Application*, latest revision.

17. D6938, *Standard Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate by Nuclear Methods (Shallow Depth)*, latest revision.

D. Colorado Department of Transportation (CDOT)

1. (CDOT) Specifications for Road and Bridge Construction

E. (National Electrical Manufacturers Association (NEMA)

1. Z535.1, *Safety Color Code*, latest revision.

F. Occupational Safety and Health Administration (OSHA)

1. 29 CFR Part 1926, *Safety and Health Regulations for Construction*, latest revision.

G. City of Greeley Design Criteria and Construction Specifications Streets Volume I (SDC)

1.3 SUBMITTALS

A. Dewatering

1. Water Control Plan: Submit for review by the City prior to start of any field work. At a minimum, the Water Control Plan shall include the following:

a. Descriptions of proposed groundwater and surface water control facilities including, but not limited to, equipment; methods; standby equipment and power supply, discharge locations to be utilized, and dewatering pollution control BMPs.

b. Drawings showing locations, dimensions, and relationships of elements of each system.

c. Design calculations demonstrating adequacy of proposed dewatering systems and components.

d. Surface water control and drainage installations and related pollution control BMPs.

e. Locations and types of monitoring systems.

f. Proposed methods and locations for disposing of the removed water.

g. Any treatment system in place to meet discharge quality criteria if applicable.

h. If the system is modified during installation or the operation, revise or amend and resubmit the Water Control Plan.

2. Statement of Qualifications for Dewatering Specialist: Provide a summary of project experience and references for designer of dewatering systems.

3. Well Permits: Submit to City before start of field work.

4. Discharge Permits: Submit to City before start of field work and keep onsite for the duration of the work.

B. Fill and Backfill

1. Results of particle size testing of proposed offsite source material in accordance with ASTM D422.

2. Results of Atterberg limit testing of proposed offsite source material in accordance with ASTM D4318 (fine-grained material only).

3. Results of Standard proctor testing (ASTM D698) or Modified proctor testing (ASTM D1557) of proposed offsite source material as appropriate based on compaction requirements stated herein.

4. Certified test results from independent testing agency.

C. Trench Backfill

1. Shop Drawings: Manufacturer's descriptive literature for marking tapes.

2. Samples: Submit samples of materials proposed to be used in the Work to demonstrate material conformance with these Specifications.

a. Samples to be provided include:

i. Trench stabilization material.

ii. Bedding and pipe zone material.

iii. Granular drain.

iv. Granular backfill.

v. Earth backfill.

vi. CLSM.

vii. Geotextile.

3. CLSM: Certified mix designs, certified laboratory performance of mix designs, and strength test results provided by a certified laboratory.

   a. Include material types, weight per cubic yard, and 2 and 28-day unconfirmed compressive strengths for each component of CLSM mix.

      i. Form a minimum of six test cylinders with proposed materials to confirm design strength and mix design in accordance with ASTM D4832. Break four of the cylinders at 7 days in conformance with applicable concrete cylinder specifications and provide test results to City for review. Break the remaining two cylinders at the discretion of City. Complete mix design and cylinder breaks at least 21 days prior to use of the material in the Work. Final mix approval and use of the material will not occur prior to confirmation for strength by the cylinder breaks.

      ii. Determine the materials and proportions used to meet the requirements of these Specifications. Continuously monitor soil composition. Perform sieve analysis and adjust CLSM mix if general composition changes or as directed by City. Modify CLSM mix as necessary to meet the strength, flowability, pumpability, and set time requirements for each individual pour.

      iii. Do not place CLSM until City has approved the mix design. City's approval of the mix design indicates conditional acceptance. Final acceptance will be based on tests conducted on field samples and conformance with these Specifications.

4. Catalog and manufacturer's data sheets for compaction equipment.

5. Certified Gradation Analysis: Submit not less than 30 days prior to delivery for imported materials or anticipated use for excavated materials, except for trench stabilization material that will be submitted prior to material delivery to Site.

6. Credentials of certified labs.

7. Description and location of proposed sources of imported material. Include documentation that imported materials are free of hazardous substances.

8. Test for conformance and submit certification and test records of materials showing that they meet the applicable requirements prior to commencing permanent placement of the materials for the Work. Tests, certification, and test records of materials will be performed within 6 months of submittal.

9. Submit a description of material testing work plan and program including as minimum onsite and offsite soils/materials laboratory testing facility location, facility details, testing certifications, experience of testing personnel, frequency of testing regarding material quality and material placement.

1.4 CONSTRUCTION STAKING

A. Construction staking shall be performed under the direct supervision of a Professional Land Surveyor licensed in the State of Colorado.

B. Adequate staking shall be provided to establish acceptable horizontal and vertical control.

C. Offsets shall be staked so that the City Inspector may check vertical and horizontal alignment.

D. All survey notes and construction staking notes shall be entered into bound, hard cover field books, kept at the construction site for the duration of the project, and shall be made available to the City upon request.

E. All survey data, which is developed by the Contractor or the Engineer in performing surveys required by the work, shall be available to the City for examination and reproduction throughout the construction and warranty periods.

F. The City Inspector shall be informed of all field changes to the City accepted Construction Drawings. Approval for the changes shall be required from the City prior to the changes being made in the field.

1.5 FIELD CONDITIONS

A. Drainage and groundwater.

1. Keep excavations and trenches free of water during construction. Divert surface runoff and utilize sumps, gravel blankets, well points, drain lines or other means of dewatering, as necessary.

   a. Dewater the excavation or trench until the structure, pipe, or other, to be installed therein, is completed to the extent that no damage from hydrostatic pressure, floatation, or other cause will result.

   b. Water shall be removed from the trench to the extent necessary in order to provide a firm subgrade and dry conditions for pipeline installation.

2. The pipeline being constructed shall not be used for dewatering.

3. The piping used to dewater the trench shall not be left in the trench when backfilled.

4. For trenched installations, groundwater barriers shall be installed if groundwater is encountered or expected. Groundwater barriers shall be installed as shown on the drawings and, as necessary, every 400'. Refer to the City of Greeley Standard Drawing for additional installation requirements.

5. Prior to beginning dewatering operations, the Contractor shall obtain all necessary permits and appropriate authorization to start dewatering. If groundwater will be discharged or drained into an irrigation ditch, pond, stream or waterway, a CDPHE Dewatering Permit will be required.

   a. The Contractor is required to complete and process the Discharge Monitoring Report (DMR) that is typically a part of the Dewatering Permit.

   b. Upon completion of the work, the Contractor shall be responsible for completing a CDPHE Discharge Termination Notice.

B. Blasting is not permitted within the jurisdiction of the City unless otherwise authorized by the City. If authorized, permitting and requirements associated with blasting are the responsibility of the Contractor.

C. Sequencing

1. Backfill shall be completed, at the end of each day, to the extent that no damage from hydrostatic pressure, flotation, or other causes will result.

2. Where excavation is a hazard to automotive or pedestrian traffic, the amount of open trench and the time duration of that opening shall be minimized. The City shall direct the amount of open trench that is acceptable for the condition encountered.

3. During construction, maintain access to private residence and businesses.

D. Underground Obstructions

1. It is the Contractor/City's responsibility to call for utility locates. Call UNCC at 1-800-922-1987 or dial 811 for locates.

2. Depending on the required subsurface utility engineering (SUE) quality level, the Contractor shall be prepared to expose and verify the size, location, and elevation of underground utilities and other obstructions, sufficiently in advance of construction to permit changes to be made to the Construction Drawings in the event there is a conflict with the proposed and existing utilities. In the event there is a conflict, the Contractor shall notify the City, and affected utility company immediately.

3. Protect and support utilities, appurtenances, structures, etc., by shoring, bracing or other means necessary.

E. Weather

1. Do not install pipe or place pipe bedding on frozen soil in the trench bottom.

2. Do not place frozen materials, snow or ice in backfill, fill, or embankments.

3. Do not deposit, tamp, roll or otherwise mechanically compact backfill in water.

1.6 Quality Assurance

A. Preparation of Subgrade

1. Notify City when subgrade is ready for compaction or proof-rolling or whenever compaction or proof-rolling is resumed after a period of extended inactivity.

B. Excavation

1. Provide adequate survey control to avoid unauthorized overexcavation.

C. Fill and Backfill

1. Notify City when:

a. Structure or pipeline is ready for backfilling, and whenever backfilling operations are resumed after a period of inactivity.

b. Soft or loose subgrade materials are encountered wherever embankment or site fill is to be placed.

c. Fill material appears to be deviating from Specifications.

1.7 Soil and Bedrock Conditions

A. A geotechnical investigation may have been performed for the project in order to obtain relative data concerning the character of material in and upon which the project is to be built. If an investigation has been performed, the information will be available to the Contractor for information purposes only, and is not to be considered a part of the Contract Documents. The Contractor shall satisfy himself as to the kind and type of soil and/or rock to be encountered and any water conditions that might affect the construction of the project.

PART 2 – PRODUCTS AND EQUIPMENT

2.1 GENERAL

A. All material shall be free from frozen matter, stumps, roots, brush, other organic matter, cinders, corrosive material, debris, broken asphalt and concrete, and any other objectionable material that is not suitable in the opinion of the City.

B. If job excavated material is not sufficient or suitable, suitable material shall be imported. Reference *SDC* construction specifications for import fill requirements.

2.2 DEWATERING

A. Refer to construction specification *Section 02240, Dewatering*, for dewatering products & requirements.

2.3 MARKING TAPE

A. Non-detectable:

1. Material: Solid colored non-detectable polyethylene.

2. Thickness: Minimum 4 mils.

3. Width: 3 inches.

4. Identifying Lettering: Minimum 1-inch high, permanent black lettering imprinted continuously over entire length.

   a. Potable water lines: “CAUTION: BURIED WATER LINE BELOW”

   b. Non-potable water lines: “CAUTION – BURIED NON-POTABLE WATER LINE BELOW” or “CAUTION – BURIED RECLAIMED WATER LINE BELOW”

   c. Sanitary and Storm Sewers: “CAUTION: BURIED SEWER LINE BELOW”

5. Manufacturers and Products:

   a. Emedco

   b. Presco

   c. Approved equivalent.

B. Color: In accordance with APWA Uniform Color Code for Temporary Marking of Underground Facilities.

Color*	Facility
Red	Electric power lines, cables, conduit, and lightning cables
Orange	Communication alarm or signal lines, cables, or conduit
Yellow	Gas, oil, steam, petroleum, or gaseous materials
Green	Sewer and drain lines
Blue	Potable water

Purple	Reclaimed water, irrigation, and slurry lines

* As specified in NEMA Z535.1, Safety Color Code.

2.4 SUBGRADE MATERIAL BELOW STRUCTURES

A. At minimum, the top six-inches (6") of in-situ soil below structures shall be removed and replaced with an approved structural fill material. If deemed necessary by the City, more than six-inches (6") of material from the trench bottom may require removal and replacement with a stabilization material.

B. Subgrade material below structures shall be crusher-run angular rock per ASTM 4253 and ASTM 4254, compacted 65-70% or 95% standard proctor dry density, and conforming to CDOT #357 (ASTM D448, AASHTO M43) in table below or approved equivalent.

TABLE 2.4-B.1: Subgrade Material Below Structures – CDOT #357

Size (inch)	Percent (%) Passing
2 ½"	100
2"	95-100
1"	35-70
½"	10-30
#4	0-5

C. Structures consist of but not limited to vaults, sewer manholes, equipment pads, etc.

2.5 STABILIZATION MATERIAL

A. In the case of poor soil conditions, subgrade stabilization may be required to adequately support structural foundations and utility pipelines. If deemed necessary by the City, more than six-inches (6") of material from the trench bottom may require removal and replacement with a stabilization material.

B. Stabilization material shall be crushed concrete and natural aggregate with at least two fractured faces, conforming to CDOT Vehicle Tracking Pad (VTP) (ASTM D448, AASHTO M43)

TABLE 2.5-A.1: STABILIZATION MATERIAL – CDOT VTP

Size (inch)	Percent (%) Passing
3"	100
2"	0-25
3/4"	0-15

C. Geotextile fabric shall be used in conjunction with stabilization material unless approved otherwise by the City. Geotextile fabric shall conform to Colorado Department of Transportation, Division of Highways, State of Colorado "*Standard Specifications for Road and Bridge Construction", Section 712.08, Class A Table 712-2*, latest edition.

1. Acceptable geotextile fabric manufacturers are:

a. TenCate – Mirafi 500X

b. Webtec, Inc. Geosythetics – TerraTex GS

c. Or approved equivalent.

2.6 CONTROLLED LOW STRENGTH MATERIAL (CLSM)

A. The CLSM facility shall be certified by the National Ready Mixed Concrete Association. Mixing times shall conform to the requirements of ASTM C94, Specification for Ready-Mixed Concrete. Hand mixing is not allowed. The production facility shall supply a load ticket with the actual batch weights of the component materials.

B. Thoroughly mix all water added at the project site in accordance with the recommendations stated in ACI 305, Hot Weather Concreting. Measure all water added to the mix. The water cement ratio as stated in the CLSM mix design approved by the City is not to be exceeded. Do not add water after discharge of the CLSM from the mixer begins.

C. Place CLSM within the 90 minutes after the addition of cement or fly ash to the mix. The City reserves the right to reduce the allowable time for placement to account for adverse weather conditions or other factors that may accelerate the stiffening of the mix.

D. Select and proportion the ingredients to obtain an unconfined compressive strength at 2 days to be a minimum of 50 psi, an unconfined compressive strength at 28 days a maximum of 125 psi, and an air content between 7 and 13 percent. Determine compressive strength in accordance with ASTM D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders. Determine air content in accordance with ASTM D6023, Standard Test Method for Unit Weight, Yield, Cement Content, and Air Content (Gravimetric) of Controlled Low Strength Material (CLSM).

E. Materials:

1. Portland Cement: Cement Type I or Cement Type II as defined by ASTM C150, Specification for Portland Cement including Table 1, 2, and 4.

2. Aggregate: Conform to all requirements for fine aggregate as defined by ASTM C33, Specification for Concrete. Keep the aggregate materials moist for 24 hours before use in the mixture.

3. Fly Ash (if used): Conform to requirements of Class F fly ash as defined by ASTM C618, Specification for Coal Fly Ash and Raw or Calcined Natural Pollolan for Use as a Mineral Admixture in Concrete, except as modified herein:

a. Test in accordance with ASTM C1012/C1012M to verify that thesulfate resistance is acceptable.

4. Water: All water used in the CLSM mixture shall meet the requirements of AASHTO T26, Quality of Water to be used in Concrete. Obtain such water from a source approved by the City.

2.7 BEDDING ZONE MATERIALS

A. The bedding zone shall extend six-inches (6") below the invert of the pipe to six-inches (6") above top of pipe.

B. Bedding material for sanitary sewer pipe shall be 57/67 rock or City approved equal

TABLE 2.8-B.1: Bedding Material – 57/67 rock

Size (inch)	Percent (%) Passing
1 ½"	100
1"	95-100
¾"	90-100
½"	25-60
3/8"	20-55
#4	0-10
#8	0-5
#200	1 max

C. Bedding material for potable and non-potable water pipe shall be either ASTM C33 Sand or Squeegee Fine Sand.

TABLE 2.8-C.1: Bedding Material – ASTM C33 Sand

Size (inch)	Percent (%) Passing
3/8"	100
#4	95-100
#8	80-100
#16	50-85
#30	25-60
#50	5-30
#100	0-10
#200	0-3

TABLE 2.8-C.2: Bedding Material – Squeegee

Size (inch)	Percent (%) Passing
3/8"	100

#4	85-100
#8	30-70
#16	5-40
#30	0-15
#50	0-10
#100	0-5
#200	<1

D. Or approved equal.

E. Groundwater Barrier shall meet the following soil classification:

1. Soil Classifications

a. Minimum thirty-percent (30%) fines.

b. Minimum plasticity index of 10.

c. Material shall not be lumpy or hard but shall be finely divided, suitable, and free from stones.

2. Or CLSM in conformance with *SDC* construction specifications.

2.8 INSULATION BOARD

A. Insulation board shall be installed above the bedding zone when the depth of cover over the water line is less than five (5) feet.

B. Insulation board shall be high density and rated for high compressibility of a minimum of 100 psi.

C. Insulation board shall be a minimum two-inches (2") thick. Acceptable insulation board manufacturers are:

1. Dow Chemical Company - Styrofoam™

2. Owens-Corning

3. Or approved equivalent.

2.9 TRENCH BACKFILL MATERIAL

A. Trench backfill material shall be placed from a point six-inches (6") above the top of pipe exterior to six-inches (6") below the ground surface, or bottom of topsoil layer, or bottom of the pavement subgrade, whichever is applicable. Trench backfill shall conform to *SDC* construction specifications.

PART 3 – EXECUTION

3.1 PREPARATION

A. Topsoil shall be stripped from areas which are to be disturbed by construction and stockpiled.

B. Topsoil shall be segregated from non-organic trench material and debris.

3.2 SUBGRADE PREPARATION

A. General

1. Keep subgrade free of water, debris, and foreign matter during compaction or proof-rolling.

2. Bring subgrade to proper grade and cross-section and uniformly compact surface.

3. Do not use sections of prepared ground surface as haul roads. Protect prepared subgrade from traffic.

4. Maintain prepared ground surface in finished condition until next course is placed.

B. Compaction

1. Under Earthfill and Exposed Cut Surfaces: Compact upper 8 inches to minimum of 90 percent relative compaction as determined in accordance with ASTM D1557 or 93 percent relative compaction as determined in accordance with ASTM D698.

2. Under Structures Including Slabs, Tanks and Other Miscellaneous Structures: Areas shall be overexcavated to such an extent so as to provide a minimum of 6 inches of granular fill on prepared subgrade. Scarify and compact the upper 8 inches of subgrade to minimum of 95 percent of standard proctor compaction as determined in accordance with ASTM D698.

C. Moisture Conditioning

1. Dry Subgrade: Add water, then mix to make moisture content uniform throughout.

2. Wet Subgrade: Aerate material by blading, discing, harrowing, or other methods, to hasten drying process.

D. Testing

1. Proof-roll subgrade with a fully loaded tandem-axle dump truck or similar vehicle to detect soft or loose subgrade or unsuitable material. Proof-roll shall be conducted prior to scarifying/recompaction to identify soft or loose subgrade or unsuitable material. City shall be notified 2 days in advance of proof-rolling

activities and will be present to examine and approve subgrade before backfilling begins. City shall approve proof-roll prior to backfill.

2. Contractor shall provide an independent testing laboratory to conduct in-place density tests in accordance with ASTM D6938 at a minimum rate of one test per every 5,000 square feet of prepared subgrade.

E. Correction

1. Soft or Loose Subgrade:

a. Adjust moisture content and recompact, or

b. Over excavate as specified in Section 3.3 of this specification, and replace with suitable material from the excavation. If unsuitable soil is encountered at a depth of 3 feet below planned subgrade, excavation shall be halted and the City notified immediately.

c. In the event the unacceptable material is encountered at the 3-foot overexcavation, a geogrid shall be provided and placed, and overlain with a geotextile. The overexcavation shall be filled to plan grade with stabilization material. Stabilization material shall be placed in lifts not more than 10 inches thick and shall be compacted to the satisfaction of the City.

2. Unsuitable Material: Over excavate as specified in Section 3.3 of this specification and replace with suitable material from the excavation.

3.3 EXCAVATION

A. General

1. Excavate to lines, grades, and dimensions shown in the drawings and as necessary to accomplish work. Excavate to within tolerance of plus or minus 0.1 foot, except where dimensions or grades are shown or specified as maximum or minimum. Allow for forms, working space, granular base, topsoil, and similar items, wherever applicable. Trim to neat lines where concrete is to be deposited against earth.

2. Do not over excavate without written authorization of City.

3. Remove or protect obstructions as shown in the drawings.

B. Unclassified Excavation

1. Excavation is unclassified. Complete all excavation regardless of the type, nature, or condition of the materials encountered.

C. Trench Width

1. Minimum Width of Trenches: As specified in Section 3.6 of this specification.

2. Maximum Trench Width: Unlimited, unless otherwise shown or specified, or unless excess width will cause damage to existing facilities, adjacent property, or completed Work.

D. Pipe Bedding Grooves for Nonperforated Drain Lines

1. Semicircular, trapezoidal, or 90-degree-V.

2. Excavated or plowed into trench bottom. Forming groove by compaction will not be acceptable.

E. Embankment and Cut Slopes

1. Shape, trim, and finish cut slopes to conform with lines, grades, and cross-sections shown in the drawings, with proper allowance for topsoil or slope protection, where shown.

2. Remove stones and rock that exceed 3-inch diameter and that are loose and may roll down slope. Remove exposed roots from cut slopes.

3. Round tops of cut slopes in soil to not less than a 6-foot radius, provided such rounding does not extend offsite or outside easements and rights-of-way, or adversely impacts existing facilities, adjacent property, or completed work.

4. Temporary earthen slopes or benching shall meet current OSHA requirements or be designed by a Professional Engineer in the State of Colorado.

F. Stockpiling Excavated Material

1. Stockpile excavated material that is suitable for use as fill or backfill until material is needed.

2. Post signs indicating proposed use of material stockpiled. Post signs that are readable from all directions of approach to each stockpile. Signs should be clearly worded and readable by equipment operators from their normal seated position.

3. Confine stockpiles to within easements, rights-of-way, and approved work areas. Do not obstruct roads or streets.

4. Do not stockpile excavated material adjacent to trenches and other excavations, unless excavation side slopes and excavation support systems are designed, constructed, and maintained for stockpile loads.

5. Do not stockpile excavated materials near or over existing facilities, adjacent property, or completed Work, if weight of stockpiled material could induce excessive settlement.

G. Disposal of Spoil

1. Dispose of excavated materials, which are unsuitable or exceed quantity needed for fill or backfill, offsite.

2. Dispose of debris resulting from removal of underground materials, organic matter, trash, refuse, junk, and other materials in accordance with local and federal governmental regulations.

3.4 DEWATERING

A. Refer to construction specification *Section 02240, Dewatering*, for dewatering requirements.

3.5 FILL AND BACKFILL

A. General

1. Keep placement surfaces free of water, debris, and foreign material during placement and compaction of fill and backfill materials.

2. Place and spread fill and backfill materials in horizontal lifts of uniform thickness, in a manner that avoids segregation, and compact each lift to the specified densities prior to placing succeeding lifts. Slope lifts only where necessary to conform to final grades or as necessary to keep placement surfaces drained of water.

3. During filling and backfilling, keep level of fill and backfill around each structure and pipeline even.

4. Do not place fill or backfill if fil1 or backfill material is frozen, or if surface upon which fill or backfill is to be placed is frozen.

5. If pipe, conduit, duct bank, or cable is to be laid within fill or backfill:

   a. Fill or backfill to an elevation 2 feet above top of item to be laid.

   b. Excavate trench for installation of item.

   c. Install bedding, if applicable, as specified in Section 3.6 of this specification.

   d. Install item.

   e. Backfill envelope zone and remaining trench, as specified in Section 3.6 of this specification, before resuming filling or backfilling specified in this section.

6. Tolerances:

   a. Final Lines and Grades: Within a tolerance of 0.1 foot unless dimensions or grades are shown or specified otherwise.

   b. Grade to establish and maintain slopes and drainage as shown. Reverse slopes are not permitted.

7. Settlement: Correct and repair any subsequent damage to structures, pavements, curbs, slabs, piping, and other facilities, caused by settlement of fill or backfill material.

B. Backfill Under and Around Structures

1. Under Structures:

a. Overexcavate and prepare subgrade as specified in Section 3.2 of this specificaiton, or fill on prepared subgrade with earthfill to within 6 inches of bottom of structure.

b. Earthfill shall be placed in 8-inch maximum lifts and compacted at moisture content of optimum plus or minus 2 percent. Each lift of moisture conditioned earthfill shall be compacted to a minimum 95 percent of standard proctor compaction as determined in accordance with ASTM D1698

c. Place a minimum 6 inches of stabilization material below structures and slabs. Stabilization material shall be compacted and tested in accordance with ASTM D4254 to a minimum relative density of 65 percent.

d. Backfill with cohesive material to lines and grades shown, with proper allowance for topsoil thickness where shown. Place in lifts of 8-inch maximum thickness and compact each lift to minimum 90 percent relative compaction as determined in accordance with ASTM D1557 or 93 percent relative compaction as determined in accordance with ASTM D698.

2. Other Areas: Backfill with earthfill to lines and grades shown, with proper allowance for topsoil thickness where shown. Place in lifts of 8-inch maximum thickness and compact each lift to minimum 90 percent relative compaction as determined in accordance with ASTM D1557 or 93 percent relative compaction as determined in accordance with ASTM D698.

C. Fill

1. Outside Influence Areas beneath Structures, Tanks, Pavements, Curbs, Slabs, Piping, and Other Facilities: Unless otherwise shown, place earthfill as follows:

a. Allow for 6-inch thickness of topsoil where required.

b. Maximum 8-inch thick lifts.

c. Place and compact fill across full width of embankment.

d. Compact to minimum 90 percent relative compaction as determined in accordance with ASTM D1557 or 93 percent relative compaction as determined in accordance with ASTM D698.

e. Dress completed embankment with allowance for topsoil, crest surfacing, and slope protection, where applicable.

D. Site Testing

1. Gradation:

a. One sample from each 1,500 tons of finished product or more often as determined by City, if variation in gradation is occurring, or if material appears to depart from Specifications.

b. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.

c. Remove material placed in Work that does not meet Specification requirements.

2. Atterberg Limits:

a. One sample from each 1,500 tons of finished product or more often as determined by City, if variation in gradation is occurring, or if material appears to depart from Specifications.

b. If test results indicate material does not meet Specification requirements, terminate material placement until corrective measures are taken.

c. Remove material placed in Work that does not meet Specification requirements.

3. Contractor shall provide an independent testing laboratory to conduct in-place Density Tests: In accordance with ASTM D1556 or D6938. During placement of materials, test every 500 cubic yards, but no less than two tests per day for each day material is being placed, and no less than two tests per lift.

E. Replacing Over Excavated Material

1. Replace excavation carried below grade lines shown or established by City as follows:

a. Beneath Structures: Granular fill.

b. Beneath Fill or Backfill: Same material as specified for overlying fill or backfill.

c. Trenches:

i. Unauthorized Over excavation: Either trench stabilization material or granular pipe base material, as specified in Section 3.6 of this specification.

ii. Authorized Over excavation: Trench stabilization material, as specified in Section 3.6 of this specification.

d. Permanent Cut Slopes (Where Overlying Area is Not to Receive Fill or Backfill):

i. Flat to Moderate Steep Slopes (3:1, Horizontal Run: Vertical Rise or Flatter): Earthfill.

ii. Steep Slopes (Steeper than 3:1):

ii-a. Correct over excavation by transitioning between overcut areas and the designed slope adjoining areas, provided such cutting does not extend offsite or outside easements and right-of-ways, or adversely impacts existing facilities, adjacent property, or completed work.

ii-b. Backfilling over excavated areas is prohibited, unless in City's opinion, backfill will remain stable, and over excavated material is replaced as compacted earthfill.

F. Placing Fill Over Geosynthetics

1. General:

a. Place fill with sufficient care so as not to damage the geosynthetic.

b. Place fill only by back dumping and spreading only.

c. Dump fill only on previously placed fill.

d. While operating equipment, avoid sharp turns, sudden starts or stops that could damage geosynthetics.

2. Hauling: Operate hauling equipment on minimum of 3 feet of covering.

3. Spreading:

a. Spreading equipment shall be track mounted D 6 or lighter.

b. Operate spreading equipment on minimum of 12 inches of fill over geosynthetics.

c. Spread fill in same direction as unseamed overlaps to avoid separation of seams and joints.

d. Never push fill downslope. Spread fill over sideslopes by pushing up from slope bottom.

e. Correct wrinkles in geomembranes as required by manufacturer.

f. Maintain proper overlap of unseamed geosynthetics as required by manufacturer.

g. Avoid overstressing geosynthetics and seams.

4. Compaction: Compact fill only after uniformly spread to full thickness shown.

5. Geosynthetic Damage:

   a. Mark punctures, tears, or other damage to geosynthetics, so repairs may be made.

   b. Clear overlying fill as necessary to repair damage.

   c. Repairs to geosynthetics shall be made by respective installers as specified in respective specification section for each geosynthetic.

3.6 TRENCHING

A. Do not drop backfill directly upon any structure or pipe. Do not place backfill around or upon any structure until the concrete or CLSM has attained sufficient strength to withstand the loads imposed.

B. Place backfill after water is removed from the excavation as specified in Section 3.4 of this specification, and the excavation bottom or surface upon which backfill is to be placed is firm and has been dried to a moisture content suitable for scarifying and recompaction. Remove water in a manner that minimizes soil erosion from trench sides and bottom. Provide continuous water control until trench backfill is complete.

C. Excavate trenches by open cut methods, except where a boring is indicated on the Construction Drawings, required by jurisdictional agencies, or desired by the Contractor and approved by the City.

D. Do not use mechanical equipment in locations where its operation would cause damage to trees, buildings, culverts, utilities, structures or other property above or below ground. In all such locations, hand-excavating methods shall be used.

E. Use mechanical equipment designed and operated so the rough excavated trench bottom elevation can be controlled with uniform trench width and vertical sidewalls from an elevation one (1) foot above the top of installed pipe to the bottom of the trench. The trench alignment shall be sufficiently accurate to permit pipe to be aligned properly between the pipe and sidewalls of the trench. Do not undercut the trench sidewall to obtain clearance.

F. Contractor shall follow the most current regulations concerning excavations set forth by OSHA: 29 CFR Part 1926.

G. Excavation in Rock

   1. When rock is present, over-excavate a minimum of six-inches (6”) below the bottom of the required trench bottom.

   2. Backfill to required trench bottom with compacted bedding material.

H. Preparation of Trench Bottom

1. Grade trench bottom uniformly to provide clearance for each section of pipe and bedding material.

2. Remove loose materials, water and foreign objects.

3. Provide firm subgrade suitable for placement of bedding material.

4. Wherever unstable material is encountered in the bottom of the trench, over-excavate such material to a depth suitable for constructing a stable subgrade or as determined by the City. Backfill over-excavation with stabilization material and compact. A geotextile fabric layer shall be placed between the stabilization material and the bedding material.

I. Stockpiling Excavated Materials

1. Pile suitable material for backfilling in an orderly manner a sufficient distance from trench banks to avoid overloading and to prevent slide or cave-ins.

2. Do not stockpile excavated material against existing structures or appurtenances.

3. The Contractor shall follow the most current OSHA regulations concerning excavations.

J. Trench Widths

1. Trench width shall be maintained to within three-inches (3") of that specified on the City of Greeley Standard Drawings unless otherwise specified by the City.

3.7 PIPE BEDDING

A. Placement and Compaction

1. Distribute, grade, and compact bedding material to provide uniform and continuous support beneath the pipe at all points between bells and pipe joints.

2. Bell holes shall be dug deep enough to provide a minimum two-inches (2") of clearance between the bell and bedding material. The pipe shall not be supported by the pipe bell.

3. Deposit bedding material and compact uniformly and simultaneously on each side of the pipe to prevent lateral displacement.

4. Compact granular bedding material by vibrating, slicing with a shovel, or bent tee-bar. Care shall be taken to not damage the pipe during compaction. Hand-held equipment shall be used to compact material immediately adjacent to the pipe.

5. All utility trenches within the street right-of-way (including service lines) must be mechanically compacted to not less than 95% of maximum density within ± two percent (2%) of optimum moisture content as determined by AASHTO T99. Alternatively, utility trenches can also be backfilled with CLSM to the bottom of the new pavement.

6. Trench backfill in utility easements within 20 feet of right-of-way shall be mechanically compacted to 95% maximum density or backfilled with CLSM to within one foot of finish grade.

7. Trench backfill in utility easements beyond 20 feet from right-of-way shall be compacted to 90% maximum density.

8. Place pipe bedding in accordance with the City of Greeley Standard Drawings.

3.8 MARKING TAPE INSTALLATION

A. Marking tape to be installed in accordance with City of Greeley Standard Drawings. Marking tape shall meet APWA Uniform Color Code specifications. Continuously install marking tape along centerline of all buried piping, at eighteen-inches (18") above pipe. Coordinate with piping installation drawings.

3.9 TRACER WIRE AND TEST STATIONS

A. Refer to the proper construction specification and the standard drawings ("UL" section) for the utility specific tracer wire and test station requirements.

1. For water distribution tracer wire, refer to construction specification *Section 02510, Water Utility Distribution Piping*.

2. For water distribution test stations at fire hydrants, refer to construction specification *Section 02516, Water Utility Distribution Fire Hydrants.*

3. For sanitary sewer service tracer wire and test stations, refer to construction specification *Section 02534, Sanitary Sewer Service Lines.*

4. For non-potable irrigation tracer wire and test stations, refer to construction specification *Section 15140, Non-Potable Irrigation System.*

3.10 GROUND WATER BARRIERS

A. Ground water barriers shall be constructed in such a manner to impede the passage of water through the bedding material and shall be installed when high groundwater conditions exist or as directed by the City.

B. Ground water barriers shall be keyed at least one (1) foot into the trench wall and bottom, and spaced ten (10) feet upstream of each manhole for gravity sanitary sewers or every 400 feet on water lines and sanitary sewer force mains.

C. At a minimum, ground water barriers shall extend one (1) foot above the bedding material.

D. Refer to City of Greeley Standard Drawings for additional installation requirements.

3.11 INSULATION BOARD

A. Insulation board, if preapproved by the City, shall be installed above the bedding zone wherever the depth of cover over the water main is less than four (4) feet.

1. Insulation board installation shall consist of two (2) overlapping boards, one-inch (1") minimum thickness per board, with off-set joints.

2. Insulation board shall be placed across the full trench width.

B. Refer to City of Greeley Standard Drawings for additional installation requirements.

3.12 BACKFILLING AND COMPACTION

A. Backfill trench promptly after completion of pipe bedding, but only after the City has inspected the work.

B. Backfilling and compaction operations and requirements shall be in accordance with the *SDC*.

C. Use backfilling and compaction methods and equipment appropriate for the backfill material. Do not use equipment or methods that will transmit damaging shocks to the pipe.

D. Do not perform compaction by jetting or water settling.

E. Rock and bedrock encountered in the excavation shall not be used in backfill.

F. For areas not receiving surface improvements after construction, return the final grading to the depth of stripping over all areas disturbed by construction operations and replace topsoil.

G. All surface cuts shall be, as a minimum, restored to a condition equal to, or better than, that prior to construction. All gravel or paved streets shall be restored in accordance with the regulation and requirements of the agency having control or jurisdiction over the street, roadway or right-of-way.

H. Controlled Low Strength Material:

1. Maintain stability of pipe and conduit throughout CLSM placement and curing. Anchor pipe as needed to prevent movement of the pipe caused by flotation or lateral displacement. If any movement occurs, remove the CLSM material and place the pipe back on line and grade. Remove sloughed material or other debris from top of previously placed CLSM.

2. Place in lifts as necessary to prevent uplift (flotation) of new and existing facilities.

3. Fill entire trench section to pavement finish grade for a temporary driving surface in traveled areas, and screed off excess and finish with a float.

4. In other areas fill the trench section to top of trench backfill zone.

5. Allow CLSM to set before placing backfill. Prior to placing backfill over CLSM, achieve an indentation diameter less than or equal to 3 inches as determined by ASTM D6024.

3.13 MATERIALS AND QUALITY CONTROL TESTING

A. The Contractor is responsible for quality control testing and the testing shall be performed by an independent testing agency employed by the Contractor.

B. For backfill compaction and moisture requirements and the required materials testing, frequency of tests, and standard testing methods, reference the *SDC*.

C. The following requirements shall also apply:

1. Groundwater Barriers

   a. Compaction – 95% (ASTM D698)

   b. Moisture – ±2%

2. Bedding Material

   a. Compaction – 65% of relative density (ASTM D4254)

3. CLSM:

   a. Provide adequate facilities for safe storage and proper curing of CLSM test cylinders onsite for first 24 hours, and for additional time as may be required before transporting to test lab.

   b. Provide CLSM testing of air content and for making cylinders from the point of discharge into forms. When CLSM is pumped, Samples used shall be taken from discharge end of pump hose.

   c. Specimens shall be made, cured, and tested in accordance with ASTM D4832, Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders.

   d. One set of test cylinders shall be tested per each 100 cubic yard of CLSM placed, but no less than one set per day. Frequency of testing may be changed at discretion of City.

   e. Reject CLSM represented by cylinders failing to meet strength and air content specified.

D. Services

1. Water services shall have a minimum of one (1) moisture/density test per service.

2. Sanitary sewer services shall have a minimum of two (2) moisture/density tests per service or at the City Inspector's discretion.

3. Moisture/density tests in the vicinity of vaults, valve boxes and manholes shall be performed at a minimum of one (1) foot away from the edge of vault/manhole sections or valve boxes.

a. Tests shall be performed in random directions from the vault, manhole, or valve box, on separate lifts.

b. A minimum of one (1) test shall be performed, on opposite sides of the vault, manhole or valve box, for every two (2) feet of backfill material.

4. The Contractor shall keep copies of all quality control test results in a notebook at the job site for the duration of the project. Test results shall be made available to the City at all times.

3.14 COMPACTION TEST FAILURE

A. If the required compaction and moisture is not obtained, it shall be the responsibility of the Contractor to recompact or rework the material to the required state of compaction and moisture.

B. In cases where there is a failure to achieve the required compaction or moisture, the City may require that the backfill be removed and recompacted or replaced entirely with suitable materials.

C. Water line and sanitary sewer line/manhole testing may be required after recompaction if the testing had been performed prior to recompaction.

1. Water line testing shall be performed between valves on both sides of the recompacted area.

2. Sanitary sewer line testing shall be performed between manholes on both sides of the recompacted area.

3. Sanitary sewer manhole testing shall be performed if recompaction occurs in the vicinity of the manhole.

SECTION 02445

CASING PIPE – BORINGS AND ENCASEMENTS

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the installation of a casing pipe by boring (or jacking) or as an open trench encasement and includes the acceptable products, materials, and construction practices.

B. The specifications provided in this section are the minimum City requirements for casing pipe borings and encasements.

C. The Design Engineer may be required by the City to provide additional design and installation considerations depending on the situation.

D. The requirements included in this Section shall be superseded by other regulators if the other regulators requirements are more stringent. Other regulations could include CDOT, railroad, county, etc.

1.2 REFERENCES

A. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C206, *Field Welding of Steel Water Pipe*, latest revision.

2. C150/A21.50, *Thickness Design of Ductile-Iron Pipe*, latest revision.

3. C151/A21.51, *Ductile-Iron Pipe, Centrifugally Cast, For Water*, latest revision.

4. C900, *Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In., For Water Distribution*, latest revision. (Both slip joint and fusible)

B. ASTM International (ASTM)

1. A139, Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over), latest revision.

2. D3350, Polyethylene Plastic Pipe and Fittings Materials, lastest revision.

3. F714, Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Outside Diameter, lastest revision.

C. American Water Works Association (AWWA)

1. C901, *Polyethylene (PE) Pressure Pipe and Tubing ½ inch through 3 inch*, latest revision.

2. C906, *Polyethylene (PE) Pressure Pipe and Fittings, 4 inch through 63 inch*, latest revision.

3. M23, *PVC Pipe – Design and Installation*, latest revision.

4. M41, Ductile-Iron Pipe and Fittings, latest revision.

1.3 DESIGN CONSIDERATIONS

A. The Design shall specifically design each casing pipe boring (or jacking) installation.

1. Casing pipe thicknesses specified in this section are based upon superimposed loads and not upon the loads which may be placed on the casing pipe as a result of jacking operations.

2. Provide increased casing pipe strength as necessary to withstand jacking loads.

B. The Design shall size the casing pipe such that the inside clearance is at least one-inch (1") greater than the maximum outside diameter of the casing spacer runners.

C. The design and construct all Shafts in accordance with the Contract Documents and promote construction using Contractor's proposed tunneling means and methods.

D. Shafts shall be of sufficient size to install the Casing Pipes in accordance with the Contract Documents.

E. The disign shall determine the Shaft footprint size, methods of excavation, ground control, ground support type, and allowable excavation slopes needed to perform the work and provide safe access for tunnel construction subject to the limitations specified herein and elsewhere in the Contract Documents.

F. Ground support for Shafts and excavations shall stay within established easements.

a. Abide by the requirements of existing permits obtained by others, and obtain additional permits or approvals as needed.

G. Where excavations are undertaken near any structure or facility including but not limited to buildings, railroads, highways, streets, or utilities, the construction shall not alter, damage, impair, or interfere with the operation of the structure or facility.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

A. The type of casing pipe material and its properties will normally be specified by the agency granting permission to cross. Such crossings shall be subject to approval by the City to avoid conflicts in requirements or standards between the City and the agency granting permission to cross.

B. The Contractor shall provide a letter, permit, or an approved crossing application to the City from the agency granting the crossing approval. Copies of all documents required to be sent to the regulating agency shall be provided to the City.

C. The Contractor shall obtain the necessary bonds, insurance or indemnity required by the crossing permit for protection against damage, interference with traffic, or service that may be caused by the construction activities.

PART 2 – PRODUCTS

2.1 CARRIER PIPE

A. The carrier pipe shall be the same nominal diameter as the system main on either side of the casing pipe.

B. In situations where one (1) pipe joint falls within the casing pipe, the carrier pipe material shall be consistent with the pipe material being used for the rest of the project.

C. For situations where more than one (1) pipe joint falls within the casing pipe, the carrier pipe shall be restrained through the casing and the carrier pipe material shall be:

1. Potable Water Distribution System and Non-Potable Irrigation System – Restrained ductile iron pipe (DIP) in accordance with construction specification *Section 02512, Ductile-Iron Pipe*.

2. Sanitary Sewer System – Restrained gravity sewer C-900 PVC (green in color) in accordance with construction specification *Section 02533, Polyvinyl Chloride (PVC) Non-Pressure Pipe*. Restrained gravity sewer PVC shall extend from manhole to manhole on either side of the casing pipe.

3. Or other approved equivalent.

2.2 CASING PIPE

A. Material

1. AWWA C900 Polyvinyl Chloride (PVC) Pipe

2. Steel Pipe

a. The casing pipe shall be new, smooth steel conforming to ASTM A139, Grade B (no hydro.)

b. Minimum Yield Strength – 35,000 psi

c. Exterior Coating – Not required.

3. AWWA C901 Polyethylene (PE) Pressure Pipe and Tubing

4. AWWA C906 Polyethylene (PE) Pressure Pipe and Fittings

B. The following table indicates what casing pipe diameter and material to use in relation to the carrier pipe diameter. It also provides steel casing pipe minimum wall thicknesses and specifies when to use casing spacers and end seals.

TABLE 2.2-B: Casing Pipe Specifications

Carrier Pipe Diameter (in)	Casing Pipe Diameter (in)	Borings and Encasements Casing Pipe Materials	Steel Casing Pipe Thickness (in)	Encasements Only Casing Pipe Materials
2” or less Water Services	4”	Welded Steel, Fusible C900 PVC	0.250	C900 PVC
4”	8”	Welded Steel, Fusible C900 PVC or HDPE	0.322	C151 DIP, C900 PVC, HDPE, Welded Steel
6”	12”	Welded Steel, Fusible C900 PVC or HDPE	0.375	C151 DIP, C900 PVC, HDPE, Welded Steel
8”	16”	Welded Steel, Fusible C900 PVC or HDPE	0.375	C151 DIP, C900 PVC, HDPE, Welded Steel
10”	20”	Welded Steel	0.375	Welded Steel
12”	24”	Welded Steel	0.375	Welded Steel
15”	30”	Welded Steel	0.500	Welded Steel
16”	30”	Welded Steel	0.500	Welded Steel
- End seals are required on all casing pipe installations. - Casing spacers are required on all carrier pipes except for 2” diameter or less water services. - Plastic Casing Pipe thickness by design				

Or approved equivalent.

2.3 ACCESSORIES

A. Casing Spacers

1. Casing spacers shall be in a “centered-restrained” configuration in the casing pipe.

2. Casing spacers shall be sized such that the height of the risers and runners have no less than one-inch (1”) clearance from the inside wall of the casing pipe.

3. Band

   a. Casing spacers shall be constructed of circular stainless steel bands that bolt together to form a shell around the carrier pipe.

   b. Material – T-304 stainless steel

   c. Minimum Thickness – 14 gauge

   d. Use an eight-inch (8”) band width for carrier pipes twelve-inches (12”) in diameter and smaller, unless otherwise recommended by the manufacturer.

   e. Use a twelve-inch (12”) band width for carrier pipes larger than twelve-inches (12”) in diameter, unless otherwise recommended by the manufacturer.

4. Liner

   a. Material – Polyvinyl Chloride (PVC)

b. Minimum Thickness – 0.090-inches

c. Hardness-Durometer – 85-90

d. Electrical Properties – 1,380 V/min

5. Risers (Support Structures)

a. Material – T-304 stainless steel

b. Maximum Thickness – 10 gauge

c. Reinforced over six-inches (6") in height

d. MIG welded to band

6. Assembly Hardware

a. Bolts – 5/16" - 18 x 2 ½" T-304 stainless steel or plated

b. Nuts – Hex, 5/16"

c. Washers – 5/16" SAE 2330

7. Runners

a. Material - Glass Filled Polymer or Ultra High Molecular Weight (UHMW) Polyethylene

b. Minimum Width – Two-inches (2")

c. Runners shall be mechanically bolted to the risers.

8. Manufacturers

a. Cascade Waterworks Mfg.

b. PSI Pipeline Seal & Insulator, Inc.

c. CCI Pipeline Systems

d. Or approved equivalent.

B. Casing Pipe End Seals

1. Material - Seamless neoprene rubber

2. Minimum Thickness – 1/8"

3. Type – Pull on

4. Bands and clamps – T-304 stainless steel

5. Size shall be specific to the casing-carrier pipe combination.

6. Manufacturers

a. Cascade Waterworks Mfg. – Model CCES

b. PSI Pipeline Seal & Insulator, Inc. – Model C

c. CCI Pipeline Systems – Model ESC

d. Or approved equivalent.

C. Grout

1. Grout shall consist of one (1) part Portland Cement and three (3) parts sand.

D. Anode Bags

1. 17-pound high potential magnesium anode bags.

E. Connections

1. Connections shall be made with Perma-lock.

PART 3 - EXECUTION

3.1 CARRIER PIPE INSTALLATION

A. Carrier pipe shall be installed at the elevations and grades shown on the Construction Drawings.

B. Install the carrier pipe in accordance with the pipe material's specification.

C. Restrain the carrier pipe within the casing pipe, as required in accordance with this specification.

D. Install casing spacers one (1) to two (2) feet on either side of the bell joint and one (1) every six (6) to eight (8) feet apart thereafter, for a total of three (3) casing spacers per pipe length unless otherwise specified by the manufacturer or City. Casing spacers are required on all carrier pipes except for two-inch (2") diameter or less water services.

E. Seal the ends of the casing pipe with casing pipe end seals. End seals are required on all casing pipe installations.

3.2 CASING PIPE INSTALLATION

A. General

1. All excavations shall meet the requirements set forth in the construction specification *Section 02315, Excavation and Fill.*

2. Vertical and horizontal offset staking shall be provided at both ends of the casing pipe.

3. Casing pipe shall be installed to the grade and alignment shown on the approved Construction Drawings. Grade and alignment shall not deviate more than 0.3 feet horizontally and 0.1 foot vertically from that shown on the Construction Drawings.

4. Open trench excavation shall not be permitted where boring or jacking is specified.

B. Polyvinyl Chloride (PVC) Casing Pipe

1. AWWA C900 Polyvinyl Chloride (PVC) casing pipe shall be installed in accordance with construction specification *Section 02513, Polyvinyl Chloride (PVC) Pressure Pipe*.

C. Smooth Steel Pipe

1. Provide adequate equipment to ensure a smooth, continuous, and uniform casing with no exterior voids.

2. Joints shall be butt welded in accordance with AWWA C206. Weld each section of pipe around the entire circumference of the joint to form a continuous conduit capable of resisting all applied stresses, including jacking stresses.

3. A seventeen (17) pound high potential magnesium anode shall be installed at each end of steel casing pipes with a cathodic testing station as shown in the Standard Drawings.

D. High Density Polyethylene (HDPE)

1. Installed per manufacturers standards.

2. Minimum SDR-17

E. Grouting (As required)

1. Fill all spaces between the casing pipe and the earth with grout.

2. Plug each hole after pumping through the casing has stopped to prevent backflow of grout.

SECTION 02510

WATER UTILITY DISTRIBUTION PIPING

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the installation of potable and non-potable water distribution mains from four-inch (4") to twenty-four inch (24") diameter and includes the acceptable products, materials, and construction practices that may be used in installation.

1.2 REFERENCES

A. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C104/A21.4, *Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water*, latest revision.

2. C111/A21.11, *Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings*, latest revision.

3. C151/A21.51, *Ductile-Iron Pipe, Centrifugally Cast, for Water*, latest revision.

4. C153/A21.53, *Ductile-Iron Compact Fittings for Water Service*, latest revision.

B. ASTM International (ASTM)

1. A536, *Standard Specification for Ductile Iron Castings*, latest revision.

2. B170, *Standard Specification for Oxygen-Free Electrolytic Copper—Refinery Shapes*, latest revision.

3. B227, *Standard Specification for Hard-Drawn Copper-Clad Steel Wire*, latest revision.

4. B910, *Standard Specification for Annealed Copper-Clad Steel Wire*, latest revision.

5. B1010, *Standard Specification for Copper-Clad Steel Electrical Conductor for Tracer Wire Applications*, latest revision.

6. D1248, *Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable,* latest revision.

7. F3125/F3125M*, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPA Minimum Tensile Strength*, latest revision.

1.3 SUBMITTALS

A. Shop Fabricated Piping:

1. Detailed pipe fabrication or spool drawings showing special fittings and bends, dimensions, coatings, color, and other pertinent information.

2. Layout drawing showing location of each pipe section and each special length; number or otherwise designate laying sequence on each piece.

B. Hydraulic Thrust Restraint for Restrained Joints: Details including materials, sizes, assembly ratings, and pipe attachment methods.

C. Dissimilar Buried Pipe Joints: Joint types and assembly drawings.

D. Pipe Corrosion Protection: Product data.

1.4 JOB CONDITIONS

A. Pipe delivered for construction shall be strung so as to minimize entrance of foreign material.

B. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of the day's work or pipe laying is not in progress.

C. Do not allow debris, tools, clothing, rags, or other materials to enter the pipe. Precautions shall be taken to protect the interiors of pipes, fittings, and valves against contamination.

D. Use effective measures to prevent uplifting or floating of the pipeline prior to completion of backfilling operations.

E. Protect pipe and appurtenances against dropping and damage. Damaged pipe and appurtenances that are rejected shall be marked and removed from the site.

F. Do not install pipe when the trench contains water or when the trench bottom is unstable as determined by the City. Water that is encountered in the trench shall be removed to the extent necessary to provide a firm subgrade, permit connection to be made in dry conditions, and to prevent the entrance of water into the pipeline.

1. Surface runoff shall be diverted as necessary to keep excavations and trenches free from water during construction.

2. The excavation or trench shall be kept free from water until the structure, or pipe, to be installed is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

3. The pipe shall not be used to dewater the trench.

1.5 LOCATION AND LOOPING

1. All mains shall be located in dedicated street right-of-way or within a dedicated exclusive easement of appropriate width. City approval is required for all other proposed main locations.

2. The centerline of mains shall not be placed closer than three (3) feet to the lip of street gutter without prior acceptance by the City.

3. A main serving one (1) lot shall extend all the way across the frontage for that lot.

4. Mains shall extend to the extremities of the property or the subdivision served. Extensions shall be in appropriate locations to provide adequate connections.

5. The City shall determine on a case by case basis if system looping is required for a development.

PART 2 – PRODUCTS

2.1 PIPE

A. The same type of pipe material shall be used for each size pipe. Pipe material shall not be interchanged, except where another type of pipe material is specifically indicated.

B. Reference construction specifications *Section 02512, Ductile-Iron Pipe* and *Section 02513, Polyvinyl Chloride (PVC) Pressure Pipe*.

2.2 VALVES

Reference construction specification *Section 02515, Water Utility Distribution Valves*.

2.3 FIRE HYDRANTS

Reference construction specification *Section 02516, Water Utility Distribution Fire Hydrants*.

2.4 BLOW-OFFS

Reference City of Greeley Standard Drawings.

2.5 SERVICE LINES, METERS, AND APPURTENANCES

Reference construction specification *Section 02514, Water Service Lines, Meters, and Appurtenances*.

2.6 TAPPING SLEEVES AND TAPPING VALVES

A. Tapping sleeves and valves are required for connections to existing distribution mains unless otherwise indicated on the approved Construction Drawings.

B. Tapping sleeves for PVC and ductile iron pipe shall have a cast iron or ductile iron body. Tapping sleeves for steel pipe shall be a weld-on type or fabricated steel.

C. Accepted manufacturers are:

1. ROMAC
2. Ford
3. Smith Blair
4. JCM Industries, Inc.
5. Or approved equivalent

D. Tapping sleeves shall be rated at 200 psi, minimum, working pressure.

E. Tapping sleeves shall provide a 100% leak-tight seal.

F. Prior to ordering tapping sleeve, manufacturer's shop drawings and specifications shall be submitted to the City for review and acceptance.

G. For tapping valves, reference construction specification *Section 02515, Water Utility Distribution Valves*.

2.7 TRACER WIRE AND TEST STATIONS

A. General

1. All system components, including tracer wire, connectors, ground rods and access points, must be compatible. The component parts of the Copperhead® Complete Utility Locating System™ have been designed and engineered for compatibility to ensure end-to-end conductivity for the purpose of detecting and protecting underground utility assets.
2. All tracer wire and tracer wire components shall be manufactured in the USA.
3. All tracer wire shall have HDPE (High Density Polyethylene) insulation for direct bury, color coded per APWA standard for the specific utility being marked.

B. Tracer wire and insulation

1. Tracer wire shall conform to the following ASTM standards as applicable:
   a. B1010/B1010M – Standard Specification for Copper-Clad Steel Electrical Conductor for Tracer Wire Applications
   b. B910/B910M – Standard Specification for Annealed Copper-Clad Steel Wire
   c. B227 – Standard Specification for Hard-Drawn Copper-Clad Steel Wire
   d. B170 – Standard Specification for Oxygen-Free Electrolytic Copper-Refinery Shapes

e. D1248 – Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable

2. Documentation verifying that tracer wire is 100% made in the USA.

3. If tracer wire manufacturer has not completed a 5-year corrosion test, a 5-year warranty must be provided.

4. Open Trench / Open Cut - Tracer wire shall be Copperhead® copper-clad steel 12-AWG High Strength, high carbon with minimum 450 lb. break load, minimum 30 mil HDPE insulation (1230*-HS-**).

5. Directional Drilling/Boring - Tracer wire shall be Copperhead copper-clad steel 12-AWG Extra High Strength with minimum 1,150 lb. break load, minimum 45 mil HDPE insulation (1245*-EHS-**).

6. Pipe Bursting - Tracer wire shall be Copperhead 7x7 stranded copper-clad steel SoloShot™ Xtreme Strength with 4,700 lb. break load, minimum 50 mil HDPE insulation (PBX-50*-**).

7. Acceptable Manufacturers:

a. Copperhead Industries, Inc.

b. Approved equivalent.

* denotes color

** spool size (500', 1000', 2500')

C. Connectors

1. All mainline tracer wires shall be interconnected at intersections, at mainline tees and mainline crosses. At tees, the three wires shall be joined using a single, three-way SnakeBite™ Locking Connector (LSC1230C). At crosses, the four wires shall be joined using two, three-way Copperhead SnakeBite™ Locking Connectors (LSC1230C) with a short jumper wire between them.

2. Direct bury wire connectors shall include three-way lockable Copperhead SnakeBite™ Locking Connectors (LSC1230C) and Copperhead Mainline-to-Service Connectors (3WB-01) specifically manufactured for use in underground tracer wire installation. Connectors shall be dielectric silicone filled to seal out moisture and corrosion and shall be installed in a manner as to prevent any uninsulated wire exposure.

3. Non-locking, friction fit or taped connectors are prohibited.

D. Grounding

1. Tracer wire must be properly grounded at all dead-ends/stubs.

2. Grounding of tracer wire shall be achieved by using a Copperhead 1.5-lb, drive-in, magnesium Ground Rod (ANO-12) with a minimum 20-feet, #12 red HDPE insulated copper-clad steel wire connected to the rod specifically manufactured for this purpose.

E. Termination/Access

1. All tracer wire termination points must provide a direct connection point to the tracer wire by a utility locate transmitter (above ground or at grade) specifically manufactured for lite duty, concrete/driveway, or roadway applications.

2. All at-grade access points shall be appropriately identified with "water" on the cap and be color coded per American Public Works (APWA) standards.

3. All two-terminal tracer wire access points must include a manually interruptible conductive/connective link between the terminal for the tracer wire connection and the terminal for the ground rod wire connection.

4. All two-terminal tracer wire access points must have external direct connection points to both the tracer wire and ground rod wire from top of lid.

5. All at-grade access points shall include an encapsulated magnet molded into the top portion of the tube, to allow for detection by a ferrous metal detector.

6. All at-grade access points shall be supplied with anti-corrosion wax/gel to protect wires.

7. Service laterals on public property – Tracer wire shall terminate at an approved at-grade access point located at the edge of the road right-of-way, and out of the roadway. Approved at-grade access points shall be a two (2) foot linear cathode-wire loop within the specified grounding interval or a grounded two-terminal externally switchable lid, where there is a direct connection point for a locate transmitter and an external switch to turn "ground" on and off from the top of the lid. Acceptable access points with two-terminal, externally switchable lids include Copperhead's SnakePit® Lite Duty (LD14*2T-SW), Lite Duty Adjustable (LD14*2T-ADJ-SW), Lite Duty XL (LDXL36*2T-SW), or Concrete/Driveway (CD14*2TP-SW).

8. Service laterals on *private* property – Tracer wire shall terminate at an approved Copperhead® single-terminal access point (when grounding isn't required) affixed to or near the building exterior directly above where the utility enters the building, or at a two-terminal access point (when grounding is required) located within two linear feet of the building being served by the utility.

   a. Single-terminal access points may include:

      i. Above-grade, Cobra™ Access Point (T1-*)

      ii. Above-grade, SnakeSkin™ Access Point (SNSK-*-01)

iii. At-grade, SnakePit® Lite Duty (LD14*TP), Lite Duty Adjustable (LD14*TP-ADJ), Lite Duty XL (LDXL36*TP), or Concrete/Driveway (CD14*TP) Access Point

iv. Equivalent single-terminal access point from an approved manufacturer.

b. Two-terminal access points may include:

i. Above-grade, Cobra™ Access Point (T2-*)

ii. At-grade Two-terminal Switchable SnakePit® Lite Duty (LD14*2T-SW), Lite Duty Adjustable (LD14*2T-ADJ-SW), Lite Duty XL (LDXL36*2T-SW), or Concrete/Driveway (CD14*2T-SW) Access Point

iii. Equivalent two-terminal access point from an approved manufacturer.

9. Hydrants – Tracer wire shall terminate at an approved above-grade

a. Copperhead Cobra™ Access Point properly affixed to the hydrant-grade flange (T2-*-FLPKG). Affixing with tape or plastic ties shall not be acceptable. Tracer wire may also terminate at an approved at-grade Copperhead SnakePit® Lite Duty (LD14*2T-SW), Lite Duty Adjustable (LD14*2T-ADJ-SW), Lite Duty XL (LDXL36*2T-SW), or Concrete/Driveway (CD14*2TP-SW) Access Point.

10. Long-runs, more than 1,000 linear feet, without service laterals, hydrants, or any other access points – Tracer wire access must be provided utilizing an approved at-grade Copperhead SnakePit® Access Point or approved equal. All dead-ends shall be grounded utilizing a 1.5-lb., drive-in, magnesium Copperhead Ground Rod (ANO-12).

* denotes color

F. Prohibited Products

1. The following products shall NOT be allowed or acceptable:

a. Non-American-made products

b. Uninsulated tracer wire

c. Stainless steel tracer wire

d. Tracer wire insulations other than HDPE

e. Tracer wire not domestically manufactured

f. Brass or copper ground rods

g. Brass fittings with tracer wire connection lugs

h. Wire connections utilizing taping or spray-on waterproofing

2.8 MECHANICAL COUPLINGS

A. All mechanical couplings shall be of a gasketed, sleeve-type, with diameter to properly fit the pipe. Tolerance on pipe and coupling, together with proper bolt and gasket arrangements, shall be sufficient to ensure permanent watertight joints under all conditions.

B. Materials used in the manufacture of these couplings shall be new and shall conform to AWWA C219.

C. Couplings shall be sufficiently wide, so that each type of pipe joined will have as much pipe end inserted in the coupling as is provided by the standard push-on mechanical joint for the pipe size and type involved.

D. Acceptable manufacturers and styles of couplings are:

TABLE 2.10-D: Couplings

Straight Couplings		
Romac	Style XR501	4” through 12”
Romac	Style ALPHA	4” through 16”
Romac	Style 400	16” and larger
Smith-Blair	Style 441	all sizes
Insulating Couplings		
Romac	Style IC501	4” through 12”
Romac	Style IC400	16” and larger
Smith-Blair	Style 416	all sizes
Reducing Couplings		
Dresser	Style 62	all sizes
Romac	Style RC501	4” through 24”
Romac	Style RC400	16” through 60”
Smith-Blair	Style 415	all sizes
Transition Coupling		
Dresser	Style 162	all sizes
Flange Coupling Adapters and Restrained Couplings		
Smith-Blair	Style 913	all sizes
Smith-Blair	Style 923	all sizes

Romac	Restrained Flanged Coupling Adapter (RFCA)	all sizes

Or approved equivalent.

2.9 FITTINGS

A. All fittings shall be manufactured in accordance with AWWA C104, C110, and C111.

B. All fittings shall have either mechanical joint or flanged joint connections.

C. All fittings shall be made of either gray-iron or ductile-iron, and have a minimum working pressure rating of 350 psi for four-inch (4") through twenty-four inch (24") diameter and 250 psi for larger than twenty-four inch (24") diameter.

D. All sizes of ductile and gray iron fittings shall be furnished with a cement –mortar lining of standard thickness or fusion-bonded epoxy coating in accordance with AWWA C116.

E. Iron used in the manufacture of fittings for these specifications shall have:

1. Minimum tensile strength – 60,000 psi

2. Minimum yield strength – 42,000 psi

3. Minimum elongation – 10%

PART 3 **– EXECUTION**

3.1 GENERAL

A. All materials used in the construction of potable water distribution shall be new.

B. Construction Staking

1. Reference construction specification *Section 02315, Excavation and Fill.*

2. Tolerances:

a. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.

b. Horizontal alignment shall not deviate from the City accepted Construction Drawings by more than 0.3 feet.

c. Vertical alignment shall not deviate from the City accepted Construction Drawings by more than 0.3 feet as measured from the top of pipe.

C. The minimum effective area of thrust blocks shall be as specified in City of Greeley Standard Drawings, latest revision.

3.2 INSPECTION

A. Pipe barrel and fittings shall be free of dirt or other foreign objects prior to installation.

B. Pipe and fittings shall be inspected for cracks, dents, abrasions, or other flaws prior to installation.

C. Damaged or flawed pipe or fittings shall be rejected, marked, and removed from the site.

D. Operational Inspection: At the completion of the project and in the presence of the City, the Contractor shall operate all valves to ascertain that the entire facility is in good working order, all valve boxes are centered and valves are open, all hydrants operate and drain properly, all curb boxes are plumb centered and water is available at all curb stops. Any valves or hydrants that do not meet these requirements shall be satisfactorily repaired as directed by the City or removed and replaced with working and properly installed valves or hydrants at no expense to the City.

3.3 PREPARATION

A. Trenching, Backfilling, and Compaction

1. Reference construction specification *Section 02315, Excavation and Fill.*

B. Existing Utilities

1. The horizontal and vertical location of existing utilities shall be field verified prior to start of construction.

2. Any deviation from what is shown on the approved Construction Drawings shall be reported to the City immediately and documented on the As-Constructed Record Drawings.

3.4 CONNECTIONS TO EXISTING SYSTEM

A. When connecting to the existing potable and non-potable water distribution system, ONLY City Water and Sewer Department personnel shall operate existing system valves. The Contractor shall provide at least forty-eight (48) hours notification prior to needing any valve operated, except in the case of emergencies.

B. At locations where connections to existing mains are to be made, the Contractor shall locate the existing mains both vertically and horizontally and verify their exact size and material in advance of the time scheduled for making the connections.

1. Prior to connecting to existing mains, the Contractor shall have all labor, materials, and equipment ready to connect the fitting to the existing main, so as to keep the shutoff time to a minimum.

2. The Contractor shall notify the City of Greeley 48 hours in advance to examine the existing pipe or appurtenance and specify any necessary adjustments in line, grade, or connection requirements to accomplish the connection. Contractor to make corrections as directed by the City.

3. Use effective measures to prevent contamination to existing potable water lines.

4. Refer to construction specification *Section 02511, Disinfection of Water Utility Distribution* for more information on disinfection prior to connecting to existing waterlines.

C. The City shall not be responsible for valve water tightness on existing facilities. If existing valves leak, the City Water and Sewer Department may assist in reducing the influx of water, but the Contractor must use methods at his own disposal to dewater the trench and complete any required testing and disinfection of the potable water line.

D. All connections shall have valves installed to separate new construction from the existing system. New construction shall not be connected to the existing system until the new system has been tested, disinfected, and accepted by the City.

3.5 PIPE INSTALLATION

A. Pipe Laying

1. Exercise care when lowering pipe into trench to prevent twisting or damage to pipe.

2. Measure for grade at top of pipe.

3. Excavate trench bottom and sides of ample dimensions to permit visual inspection and testing of entire flange, valve, or connection.

4. Lay pipe with the bells pointing in the direction the work is progressing.

5. Deflect pipe at joints for pipelines laid on a curve using unsymmetrical closure of spigot into bell. If joint deflection of standard pipe lengths will not accommodate horizontal or vertical curves in alignment, provide:

   a. Shorter pipe lengths.

   b. Special mitered joints.

   c. Standard or special fabricated bends.

6. After joint has been made, check pipe alignment and grade.

7. Place sufficient pipe zone material to secure pipe from movement before next joint is installed.

8. Take effective measures to prevent opening of joints during bedding and backfilling operations.

9. Complete the joint in accordance with the applicable pipe material specification and adjust the pipe to the correct line and grade as each length of pipe is placed in the trench. Make adjustments in line and grade by scraping away or filling pipe bedding under the entire length of the pipe, except at bells, and not by wedging, blocking, or mounding up the pipe or bells.

10. Secure the pipe in place with the specified bedding tamped under and around the pipe except at the joints. Do not disturb the pipe after the jointing has been completed.

11. Install the pipeline so that a positive or negative grade is maintained between high and low points.

12. The minimum depth of cover for potable water and non-potable water mains shall be five (5) feet and four (4) feet respectively, .

13. When constructability constraints are present, deeper or shallower main installation may be permitted only with acceptance from the City. Additional design and installation considerations may be required by the City depending on the situation.

14. No water pipe may be covered or backfilled until inspection of pipe and bedding has been made or City Inspector has given approval.

15. Tracing wire shall be installed with PVC pipe and ductile iron pipe (DIP) according to the Standard Drawings, latest revision.

16. Install underground marking tape in accordance with City of Greeley Standard Drawings. Tape installation shall be continuous along the pipe

B. Underground Marking Tape and Identification Signs

1. Reference construction specification *Section 02315, Excavation and Fill for Marking Tape Requirements*.

2. Approved signs shall be posted bearing warning of buried pipelines.

a. Potable water lines: “CAUTION – BURIED WATER LINE BELOW”

b. Non-potable water lines: “CAUTION – BURIED NON-POTABLE WATER LINE BELOW” or “CAUTION – BURIED RECLAIMED WATER LINE BELOW”.

c. See the City of Greeley Standard Details an example of an approved sign. Coordinate signage requirements with the City of Greeley during design process.

C. Separation of Water Mains and Services in Relation to Other Utilities

1. Potable water services and distribution mains shall have a minimum ten (10) feet horizontal and eighteen-inches (18”) vertical separation from all utilities measured from outside diameter.

2. Where sanitary sewer lines cross beneath potable water lines with less than eighteen-inches (18”) clearance, sanitary sewer lines cross above potable water lines, or the ten (10) feet horizontal clearance between potable water lines and sanitary sewer lines cannot be maintained, pipe encasement shall be provided in

accordance with construction specification *Section 02445, Casing Pipe – Borings and Encasements.*

3. Where storm water lines cross above potable water mains, storm water pipe joints shall be grouted a minimum ten (10) feet on either side of the crossed potable water main, measured from the outside diameter of the pipe.

4. Potable and non-potable irrigation main crossings under any open irrigation ditch shall have a minimum five (5) feet of cover and shall be encased.

5. Dry utility crossings shall be encased in high density polyethylene pipe (HDPE), Standard Dimension Ratio (SDR) 11 from edge to edge of the easement or right-of-way, or ten (10) feet on either side of the potable water main, whichever is greater.

6. Right angle only utility crossings are permitted above and below the potable water main. Parallel installation of other utilities in exclusive water easements is not permitted.

7. Bored utility crossings shall have a minimum twenty-four inches (24") of vertical clearance from the outside diameter of the utility casing to the outside diameter of the potable water line if the bored utility crosses above the potable water line and a minimum thirty-six inches (36") of vertical clearance from the outside diameter of the utility casing to the outside diameter of the potable water line if the bored utility crosses below the water line.

8. If there are horizontal or vertical clearance conflicts between the potable water line and a utility, the City may require that the potable water main be lowered, raised, or realigned in order to maintain the required clearances.

9. For a potable water line crossing situation not specifically mentioned in this section, the crossing requirements provided in these Criteria shall be applied to that particular situation to the best extent possible.

3.6 TRACER WIRE & TEST STATION INSTALLATION

A. Non-Potable Water System

1. Refer to Water & Sewer Standard Drawings for installation and grounding requirements specific to Non-Potable.

B. General

1. Tracer wire locating system must meet requirements of Senate Bill 18-167 or any update.

2. Tracer wire installation shall be performed in such a manner that allows proper access for connection of line tracing equipment, proper locating of wire without loss or deterioration of low frequency (512 Hz) signal, and without distortion of signal caused by more than one wire being installed in close proximity to one another.

3. Tracer wire systems must be installed as a single continuous wire, except where using approved connectors. No looping or coiling of wire is allowed.

4. Any damage occurring during installation of the tracer wire must be immediately repaired by removing the damaged wire and installing a new section of wire with approved connectors. Taping and/or spray coating shall not be allowed.

5. Mainline tracer wire shall not be connected to existing conductive pipes. Treat as a mainline dead-end ground using an approved waterproof connector to a Ground Rod driven into virgin soil beneath and in line with the utility.

6. Tape to top centerline of pipe every three (3') to four (4') feet with adhesive tape or plastic tie straps such that wire remains in place during embedding of pipe.

7. Tracer wire shall be installed and grounded per City of Greeley Standard Drawings, latest revision.

8. All service lateral tracer wire shall be a single wire, connected to the mainline tracer wire using a three-way mainline-to-service connector, installed without cutting/splicing the mainline tracer wire.

9. In occurrences where an existing tracer wire is encountered on an existing utility that is being extended or tied into, the new tracer wire and existing tracer wire shall be connected using approved connectors.

10. Tracer wire on all service laterals/stubs must terminate at an approved tracer wire access point located directly above the utility, at the edge of the road right-of-way, but out of the roadway.

11. One foot of excess/slack wire is required in all tracer wire access points after meeting final elevation.

12. Tracer wire must be properly grounded as specified.

13. At all mainline dead-ends, tracer wire shall go to ground using an approved connection to a 1.5-lb., drive-in, magnesium ground rod.

14. When grounding the tracer wire at dead-ends/stubs, the Ground Rod shall be driven into virgin soil directly beneath and in line with the utility.

15. Ground rod wire shall be connected to the ground rod terminal on the two-terminal SnakePit® Access Point Lid or to the bottom terminal on the two-terminal Cobra™ Access Point.

16. Where the Ground Rod wire will be connected to a tracer wire access point, one foot of excess/slack wire is required after meeting final elevation.

17. Test Station

a. Tracing wire shall be brought to the surface in a two (2) foot cathode loop at every service curb stop. Place upper half of standard valve box over curb stop and cathode loop per City of Greeley Standard Drawings.

b. Fire hydrant test station access boxes shall be installed according to manufacturer specifications.

C. Water System

1. A mainline tracer wire must be installed, with all service lateral tracer wires properly connected to the mainline tracer wire, to promote tracing/locating capabilities from a single connection point.

2. Lay mainline tracer wire continuously, by-passing around the outside of valves and fittings on the north or east side.

3. A single tracer wire only shall be installed on all water service laterals and must terminate at an approved tracer wire access point, color coded blue and located directly above the service lateral at the edge of road right-of-way.

4. Tracer wire access points will be installed at all fire hydrants.

5. All conductive and non-conductive service lines shall include tracer wire.

D. Prohibited Installation Methods

1. The following methods shall NOT be allowed or acceptable:

a. Looped wire or continuous wire installations that have more than one wire laid side-by-side or in close proximity to one another

b. Tracer wire wrapped around the corresponding utility

c. Wire terminations within the roadway in valve boxes, cleanouts, manholes, etc.

d. Connecting tracer wire to existing conductive utilities

E. Testing

1. All new tracer wire installations shall be located using typical low frequency (512 Hz) line tracing equipment, witnessed by the contractor, engineer and facility owner as applicable, prior to acceptance of ownership.

2. This verification shall be performed upon completion of rough grading and again prior to final acceptance of the project.

3. Continuity testing in lieu of actual line tracing shall not be accepted.

3.7 THRUST RESTRAINT

A. Anchorage and Blocking

1. Reference City of Greeley Standard Drawings.

2. Concrete thrust blocks and anchors for preventing movement shall be provided at all mechanical joint plugs, tees, crosses, reducers, valves, bends, and changes in direction of 11-¼° or more.

3. The minimum size of thrust blocks and thrust anchors shall be determined from the table provided on the City of Greeley Standard Drawings.

4. The concrete thrust block-bearing surface shall be excavated into undisturbed soil.

   a. All loose soil shall be disposed of, and the location where the thrust block is to be poured shall be carefully shaped to provide a uniform bearing surface of the required size.

   b. The concrete thrust block bottom shall be flat, and sides shall be vertical.

   c. If soil is to be disturbed, making a concrete thrust block or thrust anchor unusable, alternate restraining systems must be approved for use by the Water and Sewer Department prior to pipeline installation.

5. The concrete thrust block shall be formed to provide access to fittings, valves, and hydrants. Care shall be taken not to block outlets or to cover bolts, nuts, clamps, or other fittings to make them inaccessible.

6. The concrete thrust block shall be extended from the fitting or valve to be blocked to undisturbed earth. Concrete thrust blocks shall be constructed so that joints and drain holes are clear and accessible.

7. Concrete shall be separated from fittings, valves, and hydrants by eight (8) mil polyethylene film.

8. The City shall be notified a minimum twenty-four (24) hours prior to concrete being placed.

B. Restraining Devices

1. If concrete thrust blocks cannot be used for any reason, or if otherwise required, push-on and mechanical joints may be restrained with mechanical restraint systems.

2. The City shall determine the length of pipe to be restrained for each situation where mechanical restraint systems are to be installed. Refer to Construction Drawings or coordinate with City as necessary for location.

3. Reference construction specifications *Section 02512, Ductile-Iron Pipe* and *Section 01513, Polyvinyl Chloride (PVC) Pressure Pip*e.

3.8 INSTALLATION OF PIPELINE APPURTENANCES

A. Install valves, hydrants, blow-offs, and other pipeline appurtenances at the locations shown on the Construction Drawings or as designated by the City to accommodate field conditions.

B. Horizontal and vertical record measurements of the actual location of fittings, valves, and appurtenant equipment prior to backfill and record for the As-Constructed Record Drawings.

C. All dead-end potable water lines will have a hydrant blow-off at the end of the. Dead-end potable water lines that will be extended in the future shall have a valve which controls that section of potable water line left in the off position. The valve shall be positioned so no service will be left without water when the line is extended in the future.

D. Non-potable appurtenances not available from the manufacturer in the purple color (ie. valves, fittings) shall be identified in the field by securing marking tape to the surface of the item. Reference construction specification *Section 02315, Excavation and Fill for Marking Tape Requirements*.

3.9 PROTECTION OF METAL SURFACES

A. Protect supplied material including coatings that have been damaged.

B. For polyethylene encasement, reference construction specification *Section 02512, Ductile-Iron Pipe.*

C. Apply two (2) coats of coal tar paint to ferrous metal rods, rebar, clamps, bolts, nuts and other accessories which are subject to submergence or contact with earth or fill material. Apply first coat of coal tar paint to a dry, clean surface. Allow first coat of coal tar paint to dry before the second coat is applied.

3.10 DISSIMILAR METALS AND INSULATOR KITS

A. Whenever it is necessary to join dissimilar metals, a City approved insulated joint shall be installed.

3.11 FIELD QUALITY CONTROL

A. Pipe Leakage Tests.

1. Reference construction specification *Section 01713, Water Distribution System Testing*.

B. Tracer Wire Testing.

1. Pass current through wire and demonstrate that wire is capable of locating the pipe.

2. If wire will not pass current, locate break in circuit and test until tracer wire works in accordance with its intended use.

C. Soil Compaction.

1. Reference construction specification *Section 02315, Excavation and Fill.*

3.12 PIPELINE DISINFECTION

A. Reference construction specification *Section 02511, Disinfection of Water Utility Distribution*.

SECTION 02511

DISINFECTING OF WATER UTILITY DISTRIBUTION

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the filling and disinfection of potable water distribution lines.

B. The Contractor is responsible for the disinfection and testing of water lines.

1.2 REFERENCES

A. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. B300, *Hypochlorites*, latest revision

2. C651, *Disinfecting Water Mains*, latest revision.

1.3 SUBMITTALS

A. Procedure and plan for cleaning, disinfection, and testing of system. Plan shall include:

1. Plan describing and illustrating conformance to appropriate AWWA standards and this Specification.

2. Proposed locations within system where Samples will be taken.

3. Type of disinfecting solution and method of preparation.

4. Method of disposal for highly chlorinated disinfecting water.

B. Certification that employees working with concentrated chlorine solutions have received appropriate safety training.

C. Certification that independent testing agency is qualified to perform bacteriological testing in accordance with AWWA standards, agency requirements, and this Specification.

D. Certified Bacteriological Test Results confirming area tested is free from coliform bacteria contamination. Forward results directly to City.

1.4 QUALITY ASSURANCE

A. Independent Testing Agency: Certified in the State of Colorado with 10 years of experience in the field of water sampling and testing. Agency shall use calibrated testing instruments and equipment and documented standard procedures for performing specified testing. The City may choose to self-perform the testing.

PART 2 – PRODUCTS

2.1 WATER FOR DISINFECTION AND TESTING

A. Clean, uncontaminated, and potable.

2.2 DISINFECTANT

A. Hypochlorite - Reference AWWA B300. Hypochlorite for use in swimming pools is not allowed.

PART 3 – EXECUTION

3.1 GENERAL

A. Perform disinfection after completion of leakage testing and acceptance of results. If pre-approved by the City, leakage test and disinfection can be completed at the same time.

B. The Contractor shall disinfect all pipe and fittings which will be installed between the new main and the existing mains, which will not be subjected to the standard chlorination procedure. The Contractor shall notify City of Greeley a minimum of 48 hours prior to the disinfection so the City can be onsite to observe.

C. The Contractor shall flush and satisfactorily disinfect new water lines prior to acceptance of the lines by the City and placing them in service.

D. New water lines shall not be connected to existing lines until the new lines have been flushed, tested, disinfected, and accepted by the City.

E. Under NO circumstances shall a non-disinfected potable water main be connected to an existing disinfected potable water main without prior acceptance by the City.

F. As soon as possible after making the connections, the Contractor shall flush the connection so as to prevent contamination of the existing facilities. The Contractor shall take every precaution necessary to prevent dirt or debris from entering the main.

G. Complete flushing and disinfection in accordance with AWWA C651, except as modified in these Specifications.

H. Contractor to furnish chemicals and equipment, such as pumps and hoses, to accomplish disinfection.

I. Water used to fill pipeline may be supplied using a temporary connection to existing distribution system. Provide protection against cross-connections and appropriate backflow preventer assembly as required by AWWA C651.

J. Disinfect items installed or modified under this Project, intended to hold, transport, or otherwise contact potable water.

3.2 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Reference the Forwards to AWWA B300 and AWWA C651.

B. Exercise extreme care in handling hypochlorites, as they may be dangerous to health.

3.3 GROUNDWATER OR SURFACE RUNOFF CONTAMINATION

A. If it is not possible to keep the pipe and fittings dry during installation, every effort shall be made to assure that any of the water that may enter the pipe joint spaces contains an available chlorine concentration of approximately 25 mg/L. This may be accomplished by adding calcium hypochlorite granules to each length of pipe before it is lowered into a wet trench.

B. If the main is flooded during construction, it shall be cleared of the flood water by draining and by flushing with potable water until clean. The section exposed to the flood water shall then be filled with chlorinated potable water which at the end of a twenty-four (24) hour holding period shall have a free chlorine residual of not less than 25 mg/L. The chlorinated water may then be drained or flushed from the main. After construction is completed, the main shall be disinfected using the continuous feed or slug method.

C. If dirt and debris enters the pipe that, in the opinion of the City, will not be removed by the flushing operation, the interior of the pipe shall be cleaned by mechanical means and then shall be swabbed with a 1% hypochlorite disinfection solution. Cleaning with the use of a pig, swab, or "go-devil" should be undertaken only when such operations will not force mud or debris into pipe joint spaces.

3.4 FILLING PIPE

A. Only City personnel shall operate existing City owned valves to prevent disinfecting solution from flowing back into the line supplying the water.

B. Where permanent air release vents are not available, the Contractor shall install corporation stops at high points in the water line in order to evacuate trapped air.

1. All corporation stops shall be installed using an approved tapping saddle. No direct taps will be allowed.

2. All locations for corporation stops shall either be shown on the City accepted Construction Drawings or as directed in the field by the City.

3. All corporation stops, which were installed to facilitate evacuation of air from the water main shall be removed and plugged with a brass "cc" threaded plug after the water main is filled, and prior to pressure testing. All tap locations shall be shown on the As-Constructed Record Drawings.

C. Refer to specific method of disinfection in this Specification for maximum filling velocity.

D. Water supplied from a temporary, backflow protected connection to the existing distribution system or other approved supply source, shall flow at a constant measured rate into the newly installed water main.

E. Prior to application of disinfectants, clean all pipelines of loose and suspended material. If continuous feed method or slug method of disinfection, as described in AWWA C651,

are used flush pipelines with potable water until clear of suspended solids and color. Provide hoses, temporary pipes, ditches, and other conduits as needed to dispose of flushing water without damage to adjacent properties.

F. Flush service connections and hydrants. Flush distribution lines prior to flushing hydrants and service connections. Operate valves during flushing process at least twice during each flush.

G. Allow freshwater and disinfectant solution to flow into pipe or vessel at a measured rate so chlorine-water solution is at specified strength. Do not place concentrated liquid commercial disinfectant in pipeline or other facilities to be disinfected before it is filled with water.

3.5 METHODS

A. General

1. The City, in accordance with AWWA C651, shall approve the chlorinating agent and method of application. The City has the authority to restrict the method of disinfection on a case by case basis.

2. The City shall sample and test water from the pipe system extremities until clear, potable water is obtained.

3. The Contractor shall properly and legally dispose of flushing and heavily chlorinated water. Do not allow flow into a waterway without neutralizing disinfectant residual. See appendix of AWWA C651 for acceptable neutralization methods.

4. Operate new valves and other appurtenances while the lines are filled with heavily chlorinated water.

B. Tablet Method

1. The tablet method consists of placing calcium hypochlorite tablets in the water main as it is being installed and then filling the main with potable water when installation is complete. This method may be used only if the pipes and appurtenances are kept clean and dry during construction.

2. Placing Calcium Hypochlorite Tablets

a. During construction, 5-gram calcium hypochlorite tablets shall be placed in each section of pipe. Also, one tablet shall be placed in each hydrant, hydrant branch, and other appurtenance.

b. The number of 5 gram tablets required for each pipe section shall be

$$0.0012d^2L$$

rounded to the next higher integer, where d is the inside pipe diameter, in inches, and L is the length of the pipe section, in feet. Reference Table

2, AWWA C651 for commonly used sizes of pipes.

c. Tablets shall be attached to the top of the pipe by a food-grade adhesive.

d. The adhesive shall be only on the broadside of the tablet attached to the surface of the pipe.

e. If the tablets are attached before the pipe section is placed in the trench, their position shall be marked on the section to indicate that the pipe has been installed with the tablets at the top.

3. Filling and contact

a. Introduce water into the pipes at a velocity no greater than one (1) foot per second (fps).

b. The chlorinated water shall be retained in the lines for a minimum of twenty-four (24) hours. If the water temperature is less than 41° F, the water shall remain in the pipe at least forty-eight (48) hours.

c. Detectable chlorine residual of not less than 10 mg/L shall be found at each sampling point after the twenty-four (24) hour or forty-eight (48) hour period.

C. Continuous-Feed Method

1. The continuous-feed method of disinfecting water mains consists of completely filling the main to remove all air pockets, flushing the completed main to remove the particulates, and filling the main with potable water.

2. Chlorinated water shall be introduced into the water lines at a point not more than ten (10) feet downstream from the beginning of the new main. Water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 25 mg/L free chlorine.

a. The entire main shall be filled with the chlorine solution.

b. Reference Table 4, AWWA C651 for required chlorine amounts.

c. Prior to and during the disinfection process, valves shall be positioned so that the chlorine solution in the newly constructed main will not flow into water mains in active service.

3. The chlorinated water shall be retained in the main for a minimum of twenty-four (24) hours, at which time the treated water in all portions of the main shall have a free chlorine residual of not less than 10 mg/L.

D. Slug Method

1. The slug method consists of placing calcium hypochlorite granules in the main during construction, completely filling the main to eliminate all air pockets, flushing the main to remove particulates, and slowly flowing through the main a

slug of water dosed with chlorine to a concentration of 100 mg/L.

2. Placing Calcium Hypochlorite Granules

   a. Calcium hypochlorite granules may only be used with prior written approval by the City.

   b. During construction, calcium hypochlorite granules shall be placed at the upstream end of each section of pipe and at the upstream end of each branch main.

   c. The quantity of granules used shall be as shown in Table 1, AWWA C651.

3. At a point not more than ten (10) feet downstream from the beginning of the new main, water entering the new main shall receive a dose of chlorine fed at a constant rate such that the water will not have less than 100 mg/L free chlorine.

4. The chlorine shall be applied continuously and for a sufficient period to develop a solid column, or "slug" of chlorinated water that will, as it moves through the main, expose all interior surfaces to a concentration of approximately 100 mg/L.

5. The free chlorine residual shall be measured in the slug as it moves through the main. If the free chlorine drops below 50 mg/L, the flow shall be stopped, chlorination equipment moved to the head of the slug, and as flow resumes, chlorine shall be applied to restore the free chlorine in the slug to not less than 100 mg/L.

6. Flow rate shall be set so that all interior surfaces are exposed to a chlorine concentration of approximately 100 mg/L for a minimum of three (3) hours.

3.6 PIPE AND FITTING INSTALLED AFTER CHLORINATION

A. All pipes and fittings which will be installed after the pipe has been chlorinated or installed at connections to existing mains, which will not be subject to chlorination, shall be disinfected:

1. The ends of the existing pipe shall be thoroughly cleaned both inside and outside before any new parts are installed.

2. The ends of the existing pipe shall be sprayed with a concentrated chlorine solution (min. of 100 parts per million chlorine), both inside and outside. The inside of the pipe shall be sprayed as far back into the main as possible.

3. All inside surfaces of any new material that will have contact with potable water shall be cleaned and sprayed with a concentrated chlorine solution (minimum of 100 parts per million chlorine). This includes middle rings and gaskets for mechanical couplings, punch joints, mechanical joints, and split sleeves.

3.7 FINAL FLUSHING

A. After the applicable retention period, the heavily chlorinated water shall be flushed from the water lines until chlorine measurement show that the concentration in the water leaving the main is no higher than that generally prevailing in the system, or less than 1 mg/L.

B. The Contractor shall be responsible for all necessary permits and to ensure that no environmental damage occurs from the flushed water line. Reference Appendix B of AWWA C651 for a list of neutralizing chemicals.

3.8 BACTERIOLOGICAL TESTS

A. The Testing Agency shall collect water samples to test for bacteriological quality to show the absence of coliform and heterotrophic organisms in the pipeline. Testing shall be done after final flushing and disinfection procedures. Under no circumstances shall the main be put in service prior to bacteriological testing.

B. The Contractor shall schedule with the Testing Agency for sample collection and bacteriological testing. The Contractor shall notify City of Greeley a minimum of 48 hours prior to the testing so the City can be onsite to observe.

C. The Testing Agency, based upon AWWA C651, shall determine the number and frequency of samples.

D. All test results shall be sent to the City for review and approval.

E. Water mains shall not be placed in service until written release is obtained from the City.

3.9 REPETITION OF PROCEDURE

A. If the initial disinfection, or subsequent disinfections, fails to produce satisfactory samples, the main shall be reflushed and resampled. If the samples are still not satisfactory, the continuous-feed or the slug method of chlorination shall be used to rechlorinate the main until satisfactory results are obtained.

SECTION 02512

DUCTILE IRON PIPE

PART 1 – GENERAL

1.1 SCOPE

A. This section is a minimum guideline for furnishing and the installation of ductile-iron pipe (DIP) and fittings for water lines.

B. Pipe shall be furnished complete with all fittings, flanges, specials, and other accessories.

C. Refer to *Section 02510, Water Utility Distribution Piping*, for additional requirements.

1.2 REFERENCES

A. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C104/A21.4*, Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water*, latest revision.

2. C105/A21.5, *Polyethylene Encasement for Ductile-Iron Pipe Systems*, latest revision.

3. C110/A21.10, *Ductile-Iron and Gray-Iron Fittings*, latest revision.

4. C111/A21.11, *Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings*, latest revision.

5. C115/A21.15, F*langed Ductile-Iron Pipe with Ductile-Iron or Gray-Iron Threaded Flanges*, latest revision.

6. C116/A21.16-03, *Protective Fusion-Bonded Epoxy Coatings for the Interior and Exterior Surfaces of Ductile-Iron and Gray-Iron Fittings for Water Supply Service*, latest edition.

7. C150/A21.50, *Thickness Design of Ductile-Iron Pipe*, latest revision.

8. C151/A21.51, *Ductile-Iron Pipe, Centrifugally Cast, for Water*, latest revision.

9. C153/A21.53, *Ductile-Iron Compact Fittings for Water Service*, latest revision.

10. C219, Bolted, *Sleeve-Type Couplings for Plain-End Pipe*, latest revision.

11. C600, *Installation of Ductile-Iron Water Mains and Their Appurtenances*, latest revision.

B. American Society of Mechanical Engineers/American National Standards Institute (ASME/ANSI)

1. B16.1*, Cast Iron Pipe Flanges and Flanged Fittings*, latest revision.

C. ASTM International (ASTM)

1. A153/A153M, S*tandard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware*, latest revision.

2. A536, *Standard Specification for Ductile Iron Castings*, latest revision.

3. F3125/F3125M*, Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPA Minimum Tensile Strength*, latest revision.

D. American Water Works Association (AWWA)

1. M41, Manual of Water Supply Practices, Ductile-Iron Pipe and Fittings, latest revision.

1.3 SUBMITTALS

A. See *Section 02510, Water Utility Distribution Piping* for Submittal Requirements.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. All DIP shall be supplied by one manufacturer.

B. Handling

1. Use slings, pipe tongs or skids.

2. Do not drop pipe or fittings including dropping on cushions.

3. Do not skid or roll pipe into pipe already on the ground.

4. Do not damage pipe coating or lining.

5. Do not use hooks.

6. Care must be taken to prevent damage to the pipe and fittings by impact, bending, compression, or abrasion.

C. Storage

1. Store and use pipe lubricants in a manner which will avoid contamination.

2. Pipe, gaskets, and all other installation materials shall be stored in accordance with the manufacturer's specifications.

3. Pipe shall be stored on a surface that provides even support for the pipe barrel. Pipe shall not be stored in such a way as to be supported by the bell.

4. Do not exceed maximum stacking heights listed in AWWA C600, Tables 6.

PART 2 – PRODUCTS

2.1 GENERAL

A. Materials in contact with potable water shall conform to NSF 61 acceptance.

B. Pipe manufacturer shall submit certification that source manufacturing facility has been producing ductile iron pipe of the specified diameters, dimensions, and standards for a period of not less than 10 years. Testing of pipe required by AWWA A2l.51 shall be conducted in testing and laboratory facilities located in the USA and operating under USA laws and regulations. Pipe shall be handled during manufacture and shipped without nesting (without insertion of one pipe inside another.

2.2 DUCTILE-IRON PIPE – SLIP JOINT

A. General

1. This specification shall cover slip joint DIP in four-inch (4”) through twenty-four inch (24”) nominal diameters.

2. DIP shall be manufactured in accordance with AWWA C151.

B. If corrosion level is Medium-High or High, all DIP shall be zinc coated in accordance with ASTM A153/153M.

C. Pipe joints shall be “push-on single gasket” type conforming to applicable requirements of AWWA C111.

D. DIP shall have normal laying lengths of either eighteen (18) feet or twenty (20) feet. Random pipe lengths are not acceptable.

E. Iron used in the manufacture of DIP for these specifications shall have:

1. Minimum tensile strength – 60,000 psi

2. Minimum yield strength – 42,000 psi

3. Minimum elongation – 10%

F. DIP shall have standard thickness cement mortar lining in accordance with AWWA C104.

G. DIP shall have a bituminous coating, minimum one (1) mil thick, on the pipe exterior, unless otherwise specified.

H. As shown in AWWA C151, slip joint DIP shall conform, at a minimum, to the following pressure classes:

TABLE 2.1-G: Pressure Class and Wall Thickness – Slip Joint DIP

Diameter (inch)	Pressure Class (psi)	Nominal Wall Thickness (inch)
4	350	0.25
6	350	0.25
8	350	0.25
12	350	0.28
16	350	0.34
20	300	0.36
24	300	0.40
Higher pressure class pipe will be required when the W&S Dept determines that excessive dead loads, pressures, or other conditions warrant increased wall thickness.		

2.3 DUCTILE-IRON PIPE – MECHANICAL JOINT

A. General

1. This specification shall cover mechanical joint DIP in four-inch (4") through twenty-four inch (24") nominal diameters.

2. All DIP shall be manufactured in accordance with AWWA C151.

B. If corrosion level is Medium-High or High, all DIP shall be zinc coated in accordance with ASTM A153/153M.

C. Pipe joint shall be "mechanical single gasket" type conforming to applicable requirements of AWWA C111.

D. DIP shall have normal laying lengths of either eighteen (18) feet or twenty (20) feet.

E. All mechanical joint glands shall be sized and drilled in accordance with AWWA C111.

F. Iron used in the manufacture of DIP for these specifications shall have:

1. Minimum tensile strength – 60,000 psi

2. Minimum yield strength – 42,000 psi

3. Minimum elongation – 10%

G. DIP shall have standard thickness cement mortar linings in accordance with AWWA C104.

H. DIP shall have a bituminous coating, minimum one (1) mil thick, on the pipe exterior, unless otherwise specified.

I. As shown in AWWA C151, mechanical joint DIP shall conform, at a minimum, to the

following pressure classes:

TABLE 2.2-H: Pressure Class and Wall Thickness – Mechanical Joint Pipe

Diameter (inch)	Pressure Class (psi)	Nominal Wall Thickness (inch)
4	350	0.25
6	350	0.25
8	350	0.25
12	350	0.28
16	250	0.30
20	250	0.33
24	250	0.33
Higher pressure class pipe will be required when the W&S Dept determines that excessive dead loads, pressures, or other conditions warrant increased wall thickness.		

A. Bolts and nuts for all fitting, mechanical joints, and appurtenances

1. All other applications shall be corrosion resistant, high strength, low-alloy steel (blue bolts) in accordance with ASTM A242 and ANSI/AWWA C111/A21.11 (latest version). Bolts shall meet or exceed ASTM A588, Grade A and nut shall meet or exceed ASTM A563 Grade, C3. Coating shall be Xylan 1424 top coat colored coded blue and zinc plating base coat. Acceptable bolts and nuts are:

2. Romac Industries, Inc

3. Or approved equivalent.

2.4 MECHANICAL JOINT RESTRAINTS

A. General

1. Mechanical joint restraints shall be used for restraining fittings, valves, hydrants, and fire sprinkler lines.

2. All mechanical joint pipe restraints shall be incorporated in a follower gland and shall include a restraining mechanism which, when actuated, imparts multiple wedging action against the pipe, increasing its resistance as the pressure increases. Twist-off nuts, sized same as tee-head bolts, shall be used to ensure proper actuating of restraining devices.

B. Glands shall be manufactured of ductile-iron conforming to ASTM A536, grade 60-42-10. Restraining devices shall be of ductile-iron heated to a minimum hardness of 370 BHN. Dimensions of the gland shall be such that it can be used with the standardized mechanical joint bell and tee-head bolts conforming to AWWA C153.

C. Mechanical joint restraint devices shall have the following minimum working pressures

and shall not be less than piping working pressure ratings:

1. 350 psi with a minimum safety factor of 2:1, for four-inch (4") through twenty-four inch (24") diameter.

2. 250 psi with a minimum safety factor of 2:1, for larger than twenty-four inch (24") diameter.

D. Acceptable manufacturers and styles are:

1. Mechanical Joint Restraint

a. EBAA Iron, Inc. – MEGALUG, SERIES 1100

b. Uni-Flange Corp. – SERIES 1400

c. Romac Industries, Inc.

2. Slip Joint Restraint

a. EBAA Iron, Inc. – MEGALUG, SERIES 1700

b. Uni-Flange Corp. – SERIES 1450

3. Romac Industries, Inc.

2.5 DUCTILE-IRON PIPE – FLANGED JOINT

A. General

1. This specification shall cover flanged joint DIP in four-inch (4") through twenty-four inch (24") nominal diameters.

2. DIP shall be manufactured in accordance with AWWA C151.

B. Pipe joints shall be "flanged single gasket" type conforming to applicable requirements of AWWA C111.

C. All pipe flanges shall be sized and drilled in accordance with ASME B16.1, Class 125.

D. Iron used in the manufacture of DIP for these specifications shall have:

1. Minimum tensile strength – 60,000 psi

2. Minimum yield strength – 42,000 psi

3. Minimum elongation – 10%

E. DIP shall have standard thickness cement mortar linings in accordance with AWWA C104.

F. DIP shall have a bituminous coating, minimum one (1) mil thick, on the pipe exterior,

unless otherwise specified.

G. As shown in AWWA C115, flanged DIP shall conform, at a minimum, to pressure class 250:

TABLE 2.3-G: Pressure Class and Wall Thickness – Flanged Joint DIP

Diameter (inch)	Pressure Class (psi)	Nominal Wall Thickness (inch)
4	250	0.32
6	250	0.34
8	250	0.36
12	250	0.40
16	250	0.43
20	250	0.45
24	250	0.47
Higher pressure class pipe will be required when the W&S Dept determines that excessive dead loads, pressures, or other conditions warrant increased wall thickness.		

H. Bolts and nuts for all fitting and appurtenances

1. All buried applications shall be corrosion resistant, high strength, low-alloy steel (blue bolts) in accordance with ASTM A242 and ANSI/AWWA C111/A21.11 (latest version). Bolts shall meet or exceed ASTM A588, Grade A and nut shall meet or exceed ASTM A563 Grade, C3. Coating shall be Xylan 1424 top coat colored coded blue and zinc plating base coat. Acceptable bolts and nuts are:

2. In all other applications shall be manufactured to the dimensional specification of ASME B18.2.1 and B18.2.2 and conform to ASTM F593 and F594 Type 316 stainless steel with minimum tensile strength of 75,000 PSI in accordance with ANSI/AWWA C111/A21.11 (latest version).

   a. Romac Industries, Inc

   b. Or approved equivalent.

2.6 DUCTILE-IRON PIPE – RESTRAINED JOINT

A. General

1. This specification shall cover restrained joint DIP in four-inch (4”) through twenty-four inch (24”) nominal diameters.

2. DIP shall be manufactured in accordance with AWWA C151.

B. Pipe joints shall be “restrained push-on single gasket” type conforming to applicable requirements of AWWA C111.

C. Restrained ductile-iron pipe shall have normal laying lengths of either eighteen (18) feet or twenty (20) feet. Random pipe lengths are not acceptable.

D. Iron used in manufacture of DIP for these specifications shall have:

1. Minimum tensile strength – 60,000 psi

2. Minimum yield strength – 42,000 psi

3. Minimum elongation – 10%

E. DIP shall have standard thickness cement mortar linings in accordance with AWWA C104.

F. DIP shall have a bituminous coating, minimum one (1) mil thick, on the pipe exterior, unless otherwise specified.

G. As shown in AWWA C151, restrained joint DIP shall conform, at a minimum to the following pressure classes:

TABLE 2.4-G: Pressure Class and Wall Thickness – Restrained Joint DIP

Diameter (inch)	Pressure Class (psi)	Nominal Wall Thickness (inch)
4	350	0.25
6	350	0.25
8	350	0.25
12	350	0.28
16	350	0.34
20	300	0.36
24	300	0.40
Higher pressure class pipe will be required when the W&S Dept determines that excessive dead loads, pressures, or other conditions warrant increased wall thickness.		

H. Acceptable manufacturers for boltless, restrained joint pipe are:

1. U. S. Pipe - TR FLEX

2. Pacific States Pipe - TYTON AND FASTITE RESTRAINED JOINT

3. American D.I.P - FLEX-RING or Lok-Ring

4. Clow Corp. – Super-Lock

5. Or approved equivalent.

I. Bell type restrained joint pipe shall incorporate a mechanical joint type socket with a mechanical joint restraint.

2.7 MECHANICAL JOINT RESTRAINTS

A. Reference construction specification *Section 02510, Water Utility Distribution Piping* for additional requirements for mechanical joint restraints.

2.8 TRACER WIRE AND TEST STATIONS

A. Reference construction specification *Section 02510, Water Utility Distribution Piping* for additional requirements for tracer wire and test stations.

2.9 MECHANICAL COUPLINGS

A. Reference construction specification *Section 02510, Utility Distribution Piping* for additional requirements for couplings.

2.10 FITTINGS

A. Reference construction specification *Section 02510, Utility Distribution Piping* for additional requirements for fittings.

2.11 GASKETS

A. Gaskets in contact with potable water shall be NSF 61 certified.

B. Gasket pressure rating to equal or exceed the system hydrostatic test pressure.

2.12 POLYETHYLENE ENCASEMENT

A. All buried ductile-iron pipe and fittings shall be encased in V-Bio polyethylene in accordance with AWWA C105, Method A.

B. Polyethylene encasement shall be eight (8) mil minimum thickness.

PART 3 – EXECUTION

3.1 INSPECTION

A. Examine pipe and fittings for cracks, flaws, broken or loose lining, dents, abrasions, and other defects. Damaged or flawed pipe shall be rejected, marked, and removed from the site.

B. Verify size, material, joint types, elevation, horizontal location, and pipe service of existing pipelines to be connected to new pipelines.

3.2 PREPARATION

A. Trenching, backfilling, and compaction.

1. Reference construction specification *Section 02315, Excavation and Fill*.

B. Inspect pipe and fittings before installation, clean ends thoroughly, and remove foreign matter and dirt from inside.

C. Cutting the pipe.

1. Cut pipe smooth, straight and at right angles to the pipe axis.

2. Do not damage the pipe or cement lining.

3. Cut pipe with milling type cutter, rolling pipe cutter, or abrasive blade cutter. Do not flame cut.

4. Grind cut ends and rough edges smooth.

5. Dress cut ends as required for the type of joint to be made, as recommended by pipe manufacturer. Bevel the cut end for push-on joints.

3.3 INSTALLATION

A. Install buried pipe in accordance with these specifications, City of Greeley accepted Construction Drawings, and AWWA M41.

B. Join pipe and fittings in accordance with manufacturer's instructions, unless otherwise shown or specified.

C. Pipe Laying:

1. See *Section 02510, Water Utility Distribution Piping* for information on pipe laying.

D. Tolerances:

1. See *Section 02510, Water Utility Distribution Piping* for allowable tolerances.

E. Field Joints

1. Use push-on joints for buried pipe except where indicated otherwise on the Construction Drawings.

2. Use flanged joints at unburied locations unless indicated otherwise on the Construction Drawings.

3. All joints shall be watertight and free from leaks.

4. Use Mega-Lug, or approved equivalent, retainer gland on all exposed mechanical joints for restraint.

5. Block, anchor, or harness all mechanical couplings, push-on or mechanical joints.

6. Install concrete blocking against undisturbed earth in a manner to allow access to joints.

F. Polyethylene Encasement

1. Repair rips, punctures or other damage with adhesive tape or with a short length of polyethylene encasement wrapped around pipe and secured in place.

2. Maintain a sealed encasement on pipe with the polyethylene. Tape to existing lines and the ends of encasement sections.

3. Use loose polyethylene encasement at all buried locations including fittings with flanged or mechanical joints.

4. Polyethylene encasement shall be installed per City of Greeley Standard Drawings.

G. Curves in Trench Alignments

1. See *Section 02510, Water Utility Distribution Piping* for allowable joint deflection.

3.4 JOINT INSTALLATION

A. Push-On Joints

1. Remove all dirt, oil, grit, excess coating and other foreign matter from the inside of the bell and the outside of the spigot.

2. Insert the gasket.

3. Apply a thin film of pipe lubricant to either the inside surface of the gasket, the spigot end of the pipe or both.

4. Do not permit the joint surfaces to come in contact with the ground.

5. Make sure the pipe is marked with a depth mark before assembly to ensure that the spigot is inserted to the depth mark according to manufacturer's recommendations.

6. Do not stab pipe.

B. Mechanical Joints

1. Remove all dirt, oil, grit, excess coating and other foreign matter from the inside of the bell and the outside of the spigot.

2. Insert the gasket.

3. Apply a thin film of pipe lubricant to either the inside surface of the gasket, the spigot end of the pipe or both.

4. Do not permit the joint surfaces to come in contact with the ground.

5. Make sure the pipe is marked with a depth mark before assembly to ensure that

the spigot is inserted to the depth mark according to manufacturer's recommendations.

6. Do not stab pipe.

7. Tighten nuts alternately on opposite sides of the pipe to produce equal pressure on all parts of the gland.

8. Use a torque limiting wrench with the following ranges:

TABLE 3.4-B: Torque Wrench Ranges

Pipe Diameter (in.)	Bolt Diameter (in.)	Torque (ft-lb)
4"-24"	¾"	75-90

9. Holes in mechanical joint bells shall straddle the top (or side for vertical piping) centerline.

C. Flanged Joints

1. Extend pipe completely through screwed-on flanges.

2. Machine finish the pipe end and flange face in a single operation.

3. Eliminate any restraints on pipe that would prevent uniform gasket compression or cause unnecessary stress in the flanges.

4. Do not assemble mechanical connections until all flanged joints have been tightened.

5. Alternately tighten bolts spaced on opposite sides of the pipe to assure uniform gasket compression.

6. Holes in flanges shall straddle the top (or side for vertical piping) centerline.

3.5 FIELD QUALITY CONTROL

A. Reference *Section 02510, Water Utility Distribution Piping*.

3.6 PIPELINE DISINFECTION

A. Reference *Section 02511, Disinfection of Water Utility Distribution*.

SECTION 02513

POLYVINYL CHLORIDE (PVC) PRESSURE PIPE

PART 1 – GENERAL

1.1 SCOPE

A. This section includes materials and installation procedures for polyvinyl chloride (PVC) pressure pipe for potable and non-potable water distribution.

B. Pipe shall be furnished complete with all fittings, specials, and other accessories.

C. Refer to specification section 02510 Water Utility Distribution Piping, for additional requirements.

1.2 REFERENCES

A. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C900, *Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In., For Water Distribution*, latest revision.

B. ASTM International (ASTM)

1. D1784, *Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds*, latest revision.

2. F477, *Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe*, latest revision.

C. American Water Works Association (AWWA)

1. M23, *Manual of Water Supply Practices, PVC Pipe: Design and Installation*, latest revision.

D. National Sanitation Foundation (NSF)

1. Standard No. 61 – *Drinking Water System Components – Health Effects*, latest revision.

E. Plastic Pipe Institute (PPI)

1. TR-3 – *Policies and Procedures for Developing Hydrostatic Design Basis (HDB), Pressure Design Basis (PDB), Strength Design Basis (SDB), and Minimum Required Strength (MRS) Ratings for Thermoplastic Piping Materials or Pipe*, latest revision.

1.3 SUBMITTAL REQUIREMENTS

A. See *Section 02510, Water Utility Distribution Piping* for general submittal requirements.

B. Additional submittal requirements for PVC include:

1. Pipe Manufacturer
2. Pipe Class / Pressure Rating
3. Color
4. Recommended Minimum bending Radius
5. Recommended Maximum Safe Pull Force (For Fusible PVC)
6. Fusion Technician qualifications indicting conformance with this specification. (For Fusible PVC)

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. All PVC pipe shall be supplied by one manufacturer.

B. Handling.

1. Use wide fabric choker slings.
2. Do not drop pipe or fittings including dropping on cushions.
3. Do not use hooks.
4. Polyvinyl chloride (PVC) pipe has reduced flexibility and impact resistance as temperatures approach and drop below freezing. Extra care should be used in handling and installing PVC pipe during cold weather.
5. Care must be taken to prevent damage to the pipe and fittings by impact, bending, compression, or abrasion.

C. Storage.

1. Store and use pipe lubricants in a manner that will avoid contamination.
2. Pipe shall be stored in accordance with the manufacturer's specifications.
3. Pipe, gaskets, and all other installation materials shall be stored in accordance with the manufacturer's specifications.
    a. Pipe shall be stored on a surface that provides even support for the pipe barrel. Pipe shall not be stored in such a way as to be supported by the bell.

b. No pipe stored outside and exposed to sunlight shall exceed the manufacturer's recommended exposure time. This time shall begin from the date of manufacture.

c. If the exposure time will be greater than the manufacturer's recommended time, the pipe shall be covered with an opaque material. Air circulation shall be provided under the covering.

d. Pipe that exhibits excessive ultraviolet deterioration and cracking, which in the opinion of the City degrades the pipe quality, shall not be used.

PART 2 – PRODUCTS

2.1 GENERAL

A. Materials in contact with potable water shall conform to NSF 61 acceptance.

B. Pipe manufacturer shall submit certification that source manufacturing facility has been producing PVC pipe of the specified diameters, dimensions, and standards for a period of not less than 10 years. Testing of pipe required by AWWA C900 shall be conducted in testing and laboratory facilities located in the USA and operating under USA laws and regulations. Pipe shall be handled during manufacture and shipped without nesting (without insertion of one pipe inside another).

2.2 POLYVINYL CHLORIDE (PVC) PIPE – SLIP JOINT

A. General.

1. This specification shall cover slip joint PVC pipes in 6-inch (6") through 24-inch (24") nominal diameters with cast iron equivalent outside diameters.

2. All PVC pipe shall be manufactured in accordance with AWWA C900-16.

3. Pipe shall be blue in color for potable water mains and purple for non-potable water mains.

a. Purple PVC pipe markings shall include the designation "CAUTION NON-POTABLE WATER" OR "CAUTION RECLAIMED WATER" in addition to the standard factory labeling required by AWWA.

B. Pipe joints shall be made using an integral bell with elastomeric gasket push-on type joint or using machined couplings of a sleeve type with rubber ring gaskets and machined pipe ends to form a push-on type joint.

C. All sizes of pipe under these specifications shall be pressure class as shown on the City accepted Constructed Drawings. Pressure Class 235 (DR-18) shall be the minimum pipe class accepted.

D. Each length of pipe shall be a standard laying length of twenty (20) feet. Random lengths are not acceptable.

E. Polyvinyl chlorine (PVC) pipe materials shall be made from Class 12454A of 12454B virgin compounds as defined in ASTM D1784. All compounds shall qualify for a rating of 4000 psi for water at 73.4ºF (23ºC) per the requirements of Plastic Pipe Institute (PPI), *TR-3*, and complies with the National Sanitation Foundation Standard, *No. 61*, for water service.

F. Elastomeric gaskets shall conform to ASTM F477.

2.3 POLYVINYL CHLORIDE PIPE (PVC) – RESTRAINED JOINT

A. General.

1. This specification shall cover restrained joint PVC pipe in 6-inch (6") through 24-inch (24") nominal diameters with cast iron equivalent outside diameters.

2. All PVC pipe shall be manufactured in accordance with AWWA C900.

3. Pipe shall be blue in color for potable water mains and purple for non-potable water mains.

a. Purple PVC pipe markings shall include the designation "CAUTION NON-POTABLE WATER" OR "CAUTION RECLAIMED WATER" in addition to the standard factory labeling required by AWWA..

B. Pipe joints shall be non-metallic restrained joint design by utilizing precision-machined grooves on the pipe and in the coupling. When aligned, a nylon spline is inserted, resulting in a fully circumferential restrained joint that locks the pipe and coupling together. A flexible elastomeric seal (o-ring) in the coupling provides a hydraulic pressure seal.

C. All sizes of pipe under these specifications shall be pressure class as shown on the City accepted Constructed Drawings. Pressure Class 235 (DR-18) shall be the minimum pipe class accepted.

D. Each length of pipe shall be a standard laying length of twenty (20) feet. Random lengths are not acceptable.

E. Polyvinyl chlorine pipe materials shall be made from Class 12454A of 12454B virgin compounds as defined in ASTM D1784. All compounds shall quality for a rating of 4000 psi for water at 73.4ºF (23ºC) per the requirements of Plastic Pipe Institute (PPI), *TR-3*, and complies with the National Sanitation Foundation Standard, *No. 61*, for water service.

F. Elastomeric gaskets shall conform to ASTM F477.

G. Acceptable restrained joint PVC manufacturers are:

1. Certain Teed – CERTA-LOK C900/RJ

2. Or approved equivalent.

H. Acceptable high deflection restrained joint PVC manufacturers are:

1. Certain Teed – HD (High Deflection)

2. Or approved equivalent.

2.4 POLYVINYL CHLORIDE (PVC) PIPE – FUSED

A. General.

1. This specification shall cover slip joint PVC pipes in 6-inch (6") through 24-inch (24") nominal diameters with cast iron equivalent outside diameters.

2. All PVC pipe shall be manufactured in accordance with AWWA C900.

3. Pipe shall be blue in color for potable water mains and purple for non-potable water mains.

a. Purple PVC pipe markings shall include the designation "CAUTION NON-POTABLE WATER" OR "CAUTION RECLAIMED WATER" in addition to the standard factory labeling required by AWWA.

B. All sizes of pipe under these specifications shall be pressure class as shown on the City accepted Constructed Drawings. Pressure Class 235 (DR-18) shall be the minimum pipe class accepted.

C. Each length of pipe shall be a standard laying length of twenty (20) feet or more. Random lengths are not acceptable

D. Polyvinyl chlorine (PVC) pipe materials shall be made from Class 12454A of 12454B virgin compounds as defined in ASTM D1784. All compounds shall qualify for a rating of 4000 psi for water at 73.4ºF (23ºC) per the requirements of Plastic Pipe Institute (PPI), *TR-3*, and complies with the National Sanitation Foundation Standard, *No. 61*, for water service.

E. Fusion Technician

1. Fusion Technician shall be fully qualified by the pipe supplier to install Fusible PVC of the type(s) and size(s) being used. Qualifications shall be current as of the actual date of fusion performance on the project.

F. Fusion Joints

1. Unless otherwise specified, fusible PVC pipe lengths shall be assembled in the field with butt-fused joints. Contractor shall follow the pipe suppliers written guidelines for this procedure. All Fusion joints shall be completed as descripted in these specifications.

2.5 MECHANICAL JOINT PIPE RESTRAINTS

A. Refer to construction specification *Section 02510, Water Utility Distribution Piping* for additional requirements for mechanical joint pipe restraint.

B. Acceptable manufacturers for PVC pipe are:

1. Mechanical joint Restraint:

    a. EBAA Iron, Inc. – MEGALUG, SERIES 2000 PV

    b. Uni-Flange Corp. – SERIES 1500 Slip joint restraint:

    c. EBAA Iron, Inc. – MEGALUG, SERIES 1500

    d. Uni-Flange Corp. – SERIES 1390

    e. ROMAC Industries, Inc

2.6 TRACER WIRE AND TEST STATIONS

A. Reference construction specification *Section 02510, Utility Distribution Piping* for additional requirements for tracer wire and test stations.

2.7 FITTINGS AND COUPLINGS

A. Reference construction specification *Section 02510, Utility Distribution Piping* for additional requirements for fittings and couplings.

PART 3 – EXECUTION

3.1 INSPECTION

A. In addition to any deficiencies covered by AWWA M23, PVC pipe which has any of the following visual defects will be rejected:

1. Pipe which is sufficiently out-of-round to prohibit proper joining or be able to pass a mandrel test.

2. Improperly formed bell and spigot ends.

3. Fractured, cracked, chipped, dented, abrasions, or otherwise damaged pipe.

4. Pipe that has been damaged during shipment or handling. Acceptance of the pipe at point of delivery will not relieve the Contractor of full responsibility for any defects in material of the completed pipeline.

B. Damaged or flawed pipe shall be rejected, marked, and removed from the site.

3.2 PREPARATION

A. Trenching, backfilling, and compaction.

1. Reference construction specification *Section 02315, Excavation and Fill.*

3.3 FUSION PROCESS

A. General

1. Fusible PVC pipe to handled in a safe and non-destructive manner before, during and after the fusion process and in accordance with this specification and the pipe's supplier's guidelines

2. Fusible PVC pipe will be fused by a qualified fusion technician, as documented by the pipe supplier

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe manufacture shall be used in the fusion process. Fusion machines must incorporate the following elements:

    a. Heat Plate – Heat plates shall be good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

    b. Carriage – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

    c. General Machine – Overview of machine body shall yield to obvious defects, missing parts, or potential safety issues during fusion.

    d. Data Logging Device – An approved data logging device with current version of pipe suppliers recommendation and compatible software shall be used. Datalogging device operation and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110 V power source shall be available to extend battery life.

5. Other equipment specifically required for the fusion process shall include the following:

    a. Pipe rollers shall be used for support of the pipe to either side of the machine

    b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and / or windy weather, per the pipe suppliers recommendations

    c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

    d. Fusing machine operations and maintenance manual shall be kept with the fusion machine at all times.

e. Face blades specifically designed for cutting fusible PVC pipe shall be used.

B. Joint Recording

1. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of fusible polyvinyl chloride pipe. The software shall register and / or record the parameters required by the supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

3.4 FUSION PIPE INSTALLATION

A. General Installation

1. Installation guidelines from the pipe supplier shall be followed for all installations.

2. The fusible PVC pipe will be installed in a manner so as not to exceed the recommended bending radius.

3. Where fusible PVC pipe is installed by pulling in tension, the recommended Safe Pulling Forces established by the pipe supplier shall not be exceeded.

B. Connections to Existing and New Piping Systems

1. Approximate locations for existing piping syste3ms are shown in the construction documents. Prior to making connection into existing piping systems, the contractor shall:

a. Field verify locations, size, piping material, and piping system of the existing pipe.

b. Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or other as shown in the construction documents.

c. Allow all piping that has been installed to relax for a period of 24 hours or longer before making final connections.

d. Have installed all temporary pumps and / or pipes in accordance with the established connection plans.

2. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

C. Cutting the pipe.

1. Cut pipe smooth, straight and at right angles to the pipe axis with saws or pipe cutters designed specifically for the material.

2. Remove burrs and wipe off all dust from the jointing surfaces.

3. Bevel the cut end in accordance with manufacturer's recommendation.

4. Do not disturb previously installed joints during cutting operations.

D. Field joints.

1. Use push-on joints for buried pipe except where indicated otherwise on the Construction Drawings.

2. Dirt, oil, grit, and other foreign matter shall be removed from the inside of the bell and the outside of the spigot.

3. A thin film of lubricant shall be applied to the inside surface of the gasket and the spigot end of the pipe, per the manufacturer's recommendation.

4. The lubricated joint surface shall be kept clean until joined.

E. Bending

1. Bending of pipe can be up to 75% of manufacturers recommendation.

3.5 INSTALLATION

A. Reference construction specification *Section 02510, Water Utility Distribution Piping* for additional requirements for installation of pipe.

B. Install buried pipe in accordance with these specifications, City of Greeley accepted Construction Drawings, and AWWA M23.

C. Joints.

1. The pipe shall be joined to the tolerances recommended by the manufacturer (i.e. home line).

2. Stabbing of the pipe shall not be allowed.

3. Previously completed joints shall not be disturbed during the jointing operation.

4. All joints shall be watertight and free from leaks.

5. Test all pipe under concrete and asphalt construction prior to placing concrete to asphalt.

6. Install concrete blocking against undisturbed earth in a manner to allow access to joints.

D. Curves in Trench Alignment.

1. PVC pressure pipe may be curved to change alignment or grade or to avoid obstructions. The allowable joint offset for PVC pressure pipe is provided in the table below:

TABLE 3.3-D: Maximum PVC Pipe Joint Deflection (or per manufacturer's limits which ever is more restrictive)

Pipe Diameter (in)	Maximum Joint Deflection (°)
8"	1°
12"	1°
16"	1°
HD Couplings	5.0°

2. In making the pipe conform to the curve, the pipe lengths should first be assembled in a straight line and then curved as they are lowered into the trench.

3.6 FIELD QUALITY CONTROL

A. Reference construction specification *Section 02510, Water Utility Distribution Piping* for additional requirements for field quality control.

3.7 PIPELINE DISINFECTION

A. Reference construction specification *Section 02511 Disinfection of Water Utility Distribution* for additional requirements for pipeline disinfection.

SECTION 02514

WATER SERVICE LINES, METERS, AND APPURTENANCES

PART 1 – GENERAL

1.1 SCOPE

A. This section is a minimum guideline for furnishing and installation of corporation stops, service lines, meters, meter setters, and meter pits.

B. Service lines are from the water main to the meter box.

C. All services shall be metered with the exception of fire sprinkler lines.

1.2 REFERENCES

A. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C800, Underground Service Line Valves and Fittings, latest revision.

2. C904, Cross-Linked Polyethylene (PEX) Pressure Tubing, latest revision.

B. ASTM International (ASTM)

1. F876, *Standard Specification for Crosslinked Polyethylene (PEX) Tubing*, latest revision.

2. F2080, *Standard Specification for Cold-Expansion Fittings with Metal Compression-Sleeves for Crosslinked Polyethylene (PEX) Pipe and SDR 9 Polyethylene of Raised Temperature (PE-RT) Pipe.*

3. B88, Standard Specification for Seamless Copper Water Tube, latest revision.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. The products shall be handled, stored and protected in a manner that will prevent damage to materials, coatings, and finishes.

B. All material shall be kept free from dirt, oil, and grease.

C. All material shall be new.

1.4 INSTALLATION OF SERVICES

A. All water services 1 ½-inch (1 ½”) and 2-inch (2”) shall be fitted with an approved backflow prevention device.

1. Any case where a cross-connection potential exists, all taps must be fitted with a backflow prevention device.

2. Backflow prevention devices shall be installed according to the Colorado Department of Public Health and Environment (CDPHE), Water Quality Control Division's Cross-Connection Control Manual, latest edition, and tested upon installation and every year thereafter by a certified cross-connection control technician.

   a. Product information sheets for proposed backflow prevention devices shall be submitted to the Water and Sewer Department for acceptance during the building review process and prior to requesting building permits.

   b. Test reports shall be forwarded to the Water and Sewer Department.

   c. The Water and Sewer Department reserves the right to enhance the requirements of the CDPHE based on City requirements.

B. There shall be no physical connection between any potable water service line, inside or outside of any property or building, and any pipes, pumps, hydrants, or tanks, whereby any unsafe or contaminated water (including steam condensation or cooling water) could be discharged or drawn into the potable water system.

C. Pressure reducing valves may be required according to the plumbing regulations.

D. No pressure booster shall be allowed unless adequate backflow protection is used.

PART 2 – PRODUCTS

2.1 TAPPING SADDLES

A. 1-inch (1") inclusive through 2-inch (2") tapping saddles shall be constructed of materials in accordance with one of the following descriptions.

1. Bronze body.

2. Nuts, bolts, and accessories shall be in accordance with the manufacturer's specifications.

3. Acceptable manufacturers and models of 1-inch (1") inclusive through 2-inch (2") tapping saddles are:

TABLE 2.1-A: 1" – 2" Tapping Saddles

Manufacturer	Model	Pipe Material
Mueller	BR 2 B CC	DIP, CIP
Mueller	H-13000 CC	C900 PVC
Ford	Style 202B CC	DIP, CIP
Ford	Style S90 CC Hinged	C900 PVC

Or approved equivalent.

B. 4-inch (4") and larger taps on new construction shall use tees.

C. 4-inch (4") and larger taps on existing water mains may be tapped with approval from the City.

1. Tapping saddles shall be a cast-iron or ductile iron mechanical joint tapping sleeve with totally confined end gaskets.

2. Reference the City of Greeley Standard Drawings for tapping sleeve requirements.

3. Acceptable manufacturers and models of 4-inch (4") and larger tapping saddles are:

TABLE 2.1-C: 4" and Larger Tapping Saddles

Manufacturer	Model
Mueller	H-615 for centrifugal CI, DI, PVC
Mueller	H-616 for pit cast CI pipe

Or approved equivalent.

2.2 CORPORATION STOPS

A. All corporation stops shall conform to AWWA C800 and be capable of operating at a working pressure of 150 psi.

1. All corporation stops shall be full opening plug type and constructed of no-lead brass.

2. Corporation stop inlet threads for tapping saddles shall be "cc" type only.

3. All corporation stop outlets shall use a compression connection.

B. Corporation stops shall be used for all taps which are 2-inch (2") and smaller.

C. Tap sizes shall match line sizes, i.e., 1-inch (1") corporation tap with a 1-inch (1") line.

D. Acceptable manufacturers and models of corporation stops are:

TABLE 2.2-C: Corporation Stops

Manufacturer	Model
Mueller	H-15013
Ford	F1000

No substitutions allowed.

2.3 SERVICE LINES

A. 2-inch (2") and smaller service lines shall be cross-linked polyethylene (PEX) pressure tubing that conforms to AWWA C904 or Type K Copper conforming to AWWA C800. From water main to the curb stop shall be cross-linked PEX (service line shall be one size larger than the tap side or matching ID) or Type K copper. From curb stop to meter-setter shall be Type K copper. From meter-setter to 3 feet (3') past the meter pit, Type K copper shall be installed with a copper setter. No PEX shall be allowed in the meter pit. Ensure service lines are the same types of materials noted or they may require an appropriate insulator to be installed at the junctions of any dissimilar metals.

B. Acceptable manufacturers for service lines include:

1. Municipex®

   a. The pipe shall be Municipex® SDR 9 Pipe only, conforming to ASTM F2080

   b. All connections shall be Municipex® compression only.

2. Uponor

   a. The pipe shall be Uponor AquaPEX® conforming to ASTM F876

   b. All connections shall be Uponor ProPEX® compression only.

3. Copper Water Tube

   a. Type K standard Copper tube produced in accordance with, ASTM B88, NSF 61 approved, and UNS C12200.

   b. Copper tubing shall be made in the United States.

C. 4-inch (4") and larger service lines shall be C900 PVC pipe or ductile iron pipe and conform to construction specification *Section 02513 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE or Section 02512, Ductile-Iron Pipe*. 3-inch (3") service lines shall use a 4-inch (4") tap/tee and reduce to 3-inches (3") immediately after the tap/tee.

D. Fire service lines shall be a minimum of 4-inch (4") diameter and shall be restrained C900 PVC pipe or ductile iron pipe and conform to construction specification *Section 02513 POLYVINYL CHLORIDE (PVC) PRESSURE PIPE or Section 02512, Ductile-Iron Pipe*.

2.4 COUPLINGS

A. All couplings shall be compression x compression only.

B. Acceptable manufacturers and models of couplings are:

TABLE 2.4-B: Couplings

Manufacturer	Model
Mueller	H-15433
Ford	C44

No substitutions allowed.

2.5 CURB STOPS

A. Curb stops 1-inch by ¾-inch (1" x ¾") inclusive to 2-inches (2") shall conform to AWWA C800.

1. All curb stops shall have compression connections at both ends.

2. Curb stops shall be plug type, full opening, Minneapolis pattern.

3. Acceptable manufacturers and models of 1-inch (1") curb stops are:

TABLE 2.5-A.3: 1" Curb Stops

Manufacturer	Model
Mueller	H-10228
Ford	Z11-333 or Z11-444

No substitutions allowed.

4. Acceptable manufacturers and models of 1 ½-inch (1 ½") and 2-inch (2") curb stops are:

TABLE 2.5-A.4: 1 ½" and 2" Curb Stops

Manufacturer	Model
Mueller	H-10228

No substitutions allowed.

B. Curb stops 3-inches (3") and larger shall be gate valves and conform to construction specification *Section 02515, Water Utility Distribution Valves*.

2.6 CURB STOP BOXES

A. Curb stop boxes are required with all curb stops.

B. Curb stop boxes at tracer wire test stations shall be in street valve box and conform to construction specification *Section 02515, Water Utility Distribution Valves*.

C. Acceptable manufacturers and models of 1-inch (1") curb stop boxes are:

TABLE 2.6-B: ¾" and 1" Curb Stop Boxes

Manufacturer	Model
Mueller (1")	H-10300-99002 (6 ft)
Ford	EM2-50-47-42R or EM2-55-46-48R (6 ft)

Or approved equivalent.

D. Acceptable manufacturers and models of 1 ½-inch (1 ½") and 2-inch (2") curb stop boxes are:

TABLE 2.6-C: 1 ½" and 2" Curb Stop Boxes

Manufacturer	Model
Mueller	H-10300-99002 (6 ft)
Ford	EM2-50-57 (6 ft)

Or approved equivalent.

E. Curb stop boxes for 3-inches (3") and larger shall be in street valve box and conform to construction specification *Section 02515, Water Utility Distribution Valves*.

2.7 METERS

A. All water meters, sizes ¾-inch (3/4") through 8-inch (8") shall be Badger E-Series and purchased from the Water and Sewer Department. No exceptions.

2.8 METER SETTERS

A. Meter setters to be installed as shown in the City of Greeley Standard Drawings.

B. All ¾-inch (¾") and 1-inch (1") meter setters shall have a meter stop inlet valve with a lockwing. Note that the lay lengths listed do not account for gasket thickness. The acceptable manufacturers and models of meter setters are:

TABLE 2.8-A: ¾" and 1" Meter Setters

Meter Size	Setter Manufacturer	Setter Model	Total Lay Length (in)
¾" x ¾" Meter	Ford	VV-83W-22-33-NL	9 3/8"
¾" x ¾" Meter	Mueller	H-1489N	9 3/8"
1" Meter	Ford	V84-10W-22-44-NL	11 1/8"
1" Meter	Mueller	H-1489N	11 1/8"

No substitutions allowed.

C. All 1 ½”-inch (1 ½”) and 2-inch (2”) meter setters shall have a meter stop inlet valve with a lockwing, and a built-in locking by-pass. Note that the lay lengths listed do not account for gasket thickness. The acceptable manufacturers and models of meter setters are:

TABLE 2.8-B: 1 ½” and 2” Meter Setters

Meter Size	Setter Manufacturer	Setter Model	Total Lay Length (in)
1 ½” Meter	Ford Meter	VBB76-12B-44-66-NL	13 3/8”
1 ½” Meter	Mueller	H-1423N	13 1/4”
2" Meter	Ford Meter	VBB77-12B-44-77-NL	17 3/8”
2" Meter	Mueller	H-1423N	17 1/4”

No substitutions allowed.

2.9 METER PITS AND VAULTS

A. ¾-inch (¾”) meters and 1-inch (1”) meters:

1. Meter pits shall be 20-inches (20”) in diameter and shall be constructed of rigid High-Density Polyethylene (HDPE).

2. Meter pit covers shall be constructed of rigid HDPE with cap type top lid with a 3-inch (3”) deep plastic inner frost lid, or fiberglass lid with a 3-inch (3”) deep plastic inner frost lid. All lids shall be traffic rated.

   a. The minimum allowable opening for meter pit covers shall be 11-inches (11”) diameter.

   b. All meter pit covers shall have a 27/32-inch worm-lock with a Standard Waterworks pentagon head.

   c. Meter pit covers shall be capable of withstanding minus 40 °F to 190 °F and shall be resistant to ultraviolet light degradation.

   d. Meter pit covers shall have a pre-installed, recessed, 2-inch (2”) hole for the meter endpoint radio transmitter (RT Unit). Fiberglass lids do not need a hole.

3. Reference City of Greeley Standard Drawings.

B. 1 ½ -inch (1 ½”) and 2-inch (2”) meters:

1. Meter vaults shall be 48-inches (48”) diameter.

2. Meter vaults shall be a pre-cast concrete manhole in accordance with construction specification *Section 03400, Precast Concrete*. All vault openings shall have modular sealing units and be grouted with non-shrink grout between

the modular sealing unit and the vault inside and outside wall.

3. Meter vault rings may be an aluminum or Fiberglass manhole ring, and cover with a 24-inch (24") diameter opening unless approved otherwise, in writing, by the City Water and Sewer Department. Aluminum lids shall have a 2-inch (2") recessed hole for endpoint. Fiberglass lids do not need a hole. Frost lid not required. All potable meter vault covers shall have the word "WATER" cast in the lid.

4. Reference City of Greeley Standard Drawings.

C. 3-inch (3") and larger meters:

1. Meter vaults shall be a pre-cast concrete in accordance with construction specification *Section 03400, Precast Concrete.*

2. All vault openings shall be link-sealed.

3. All joints shall be watertight.

4. Meter vault covers shall be aluminum ring and lid, or fiberglass ring and lid. 3-inch (3") through 8-inch (8") meter vault lids shall be 24-inch (24") diameter. 10-inch (10") and larger meter vault lids shall be 36-inch (36") diameter opening, unless approved otherwise by the City. All potable water meter vault covers shall have the word "WATER" cast in the lid. Aluminum lid shall have a 2-inch (2") recessed hole in lid for endpoint. Fiberglass lid does not need hole. Frost lid not required.

5. Include gravel sump

6. Reference City of Greeley Standard Drawings for vault size and layout.

2.10 TRACER WIRE AND TEST STATIONS

A. Reference construction specification *Section 02510, Water Utility Distribution Piping* for tracer wire products, manufacturers, and requirements.

PART 3 – EXECUTION

3.1 GENERAL

A. Only those Contractors licensed and bonded with the City of Greeley will be permitted to install water service connections.

B. The Contractor shall make all taps on new lines, with approved equipment, and install the service line to the curb stop prior to disinfection and pressure testing of the water main.

C. The Contractor shall adjust meter pits to the horizontal location and to the final grade as determined by grade stakes.

1. Grade stakes shall be placed a minimum five feet (5') from the location of the meter pit.

2. The grade shall be determined from the top of sidewalk elevation to top of building finished floor.

3. Grade stakes shall not be disturbed prior to service inspection by the City.

D. The Contractor shall mark the location of water services and fire sprinkler lines with a stamped “W” and “F”, respectively, 4-inches (4”) high, 3-inches (3”) wide into the face of the curb and gutter.

3.2 TRENCHING, BACKFILLING, AND COMPACTION

A. Reference construction specification *Section 02315, Excavation and Fill*.

3.3 TAPS

A. Unless prior approval is given by the City, only City personnel shall make service taps on mains which have been accepted by the City. Contractor to bolt everything prior to the City personnel making the service taps.

B. The Contractor shall not make any taps without permission from the City.

C. All taps shall be made with a tapping saddle in accordance with these specifications and the manufacturer’s recommendations.

D. Connections to the existing potable water distribution system shall be made by wet tap or cut in tee. All wet taps and all cut-in tees on mains smaller than 16” diameter shall be made by the Contractor under the direct supervision of the City. It is the Contractor’s responsibility to provide all approved tapping materials (tapping sleeves, tapping valves, insulator kit, etc.).

E. Taps for new 8” and 12” main connections to existing 16” or larger mains shall be performed by the City unless otherwise directed.

F. Connections to the existing transmission mains or distribution mains larger than sixteen-inch (16”) shall be limited and must be approved by City.

G. For wet taps on existing transmission mains or sixteen-inch (16”) and larger distribution mains, manufacturer’s shop drawings and specifications for the proposed tapping sleeve shall be submitted to the City for review and acceptance prior to installation of the tapping sleeve by the Contractor.

H. Taps on existing transmission mains or sixteen-inch (16”) and larger distribution mains shall require the installation of an insulator kit between the tapping sleeve and tapping valve.

I. Connection to cast iron mains constructed prior to 1950 may require replacement or non-standard fittings which must be reviewed and approved by City of Greeley Water & Sewer department.

J. Construction documents shall include a note for all wet taps: "Contractor to reference specifications for approved tapping materials and prior to installation shall contact Distribution for direct supervision of installation by the City."

K. Service taps on mains will be made only under the direct supervision of the City. The Contractor shall give seventy-two (72) hours advance notice to the City before any taps are made.

L. The City reserves the right to make taps in lieu of the Contractor and the right to deny permission for any main to be tapped.

M. Tapping equipment shall be of good quality, used for the purpose intended, and used in accordance with the manufacturer's instructions.

N. Taps shall not be made within two feet (2') of any joint, fitting, or valve.

O. Taps shall be separated by at least two feet (2'), measured along the pipe length, even when taps are made on opposite sides of the pipe.

P. Taps shall be made at the 2:00 or 10:00 location on the pipe circumference. Taps that are made on the same side of the pipe and within ten feet (10') of each other, measured along the pipe length shall be staggered by fifteen degrees (15º).

3.4 SERVICE LINES

A. All water service lines, and fire sprinkler lines shall be a minimum five feet (5') and a maximum six feet (6') below the final grade unless otherwise approved by the City.

1. Water Service

a. There will be a maximum of one (1) coupling per service, between the main and the curb stop. The coupling shall be used only for repair situations and not for utilizing short pieces of tubing during construction. Couplings shall be compression x compression for services 2-inches (2") and smaller.

b. Service lines shall be uniform in size from the corporation stop to five feet (5') past the meter pit.

c. The expansion loop shall not be installed higher than the top of the main being tapped. When backfilling the service trench, bedding shall be used under and 6-inches (6") above the expansion loop at the service connection to the main.

2. Fire Service

a. Fire sprinkler services shall be uniform in size from the main to the structure being serviced.

b. Fire Sprinkler lines shall be a minimum of 4-inches (4") in diameter.

c. A resilient seat gate valve the same diameter as the fire sprinkler service

pipe shall be installed at the main and restrained back to the mainline tee by use of restrained joint pipe or mechanical joint restraint.

d. Fires sprinkler lines are not metered.

B. A 2-inch by 4-inch (2" x 4") wooden post, pressure treated and exterior grade, shall be placed at the end of the future service line.

1. All wooden posts shall extend from the end of the service to a point two feet (2') minimum, above the ground surface and shall be painted blue.

2. Locator balls/rings or adequate steel to be located by a ferrous metal detector should be placed at the end of the service at an adequate depth so it will not be disturbed by grading and construction operations.

3. Maintenance of the marker posts shall be the responsibility of the Contractor until the City accepts the project. After acceptance by the City the maintenance of the marker posts shall be the responsibility of the property owner.

C. Service trenches shall be subject to compaction specifications. Reference construction specification *Section 02315, Excavation and Fill*.

D. Where a water service or fire service line crosses another utility or any underground structure, the service shall preferably pass above the other utility or structure.

a. In no instance shall there be less than 18-inches (18") clearance between the water service or fire service line and any other utility or structure.

b. The space between the water or fire service line and the other utility or structure shall be backfilled with compacted bedding material or flow-fill concrete.

3.5 CURB STOPS

A. Reference City of Greeley Standard Drawings for curb stop location.

B. The Contractor shall adjust the curb stop box to ½-inch (1/2") above final grade prior to final inspections.

C. Curb stop boxes shall not be placed in driveways or sidewalks.

D. Curb stop boxes shall be plumb.

E. Curb stop boxes at tracer wire test stations shall be installed inside a standard valve box and installed in accordance with the City of Greeley Standard Drawings, latest revision.

F. Contractor shall demonstrate to the City that curb stops are operable prior to City acceptance.

3.6 LANDSCAPE SPRINKLER SYSTEMS

A. Underground sprinkler systems shall be designed in strict conformance with the City of

Greeley Building Inspection guidelines for the installation of underground sprinkling systems and shall receive approval by permit prior to start of construction. The sprinkler system installer shall be responsible for the submittal of a permit application and the scheduling of inspections prior to installation and operation. A copy of the guidelines is available at the City of Greeley Building Inspection Department.

B. Each irrigation system shall have appropriate backflow protection.

C. With the exception of single family houses, all sprinkler irrigation systems shall have their own separate irrigation services and meters.

3.7 METER PITS AND VAULTS

A. Meter pits or vaults shall not be installed in any street, parking area, driveway, or sidewalk unless prior written permission is obtained from the Water and Sewer Department. If a meter pit or vault is permitted to be located in any traffic area, the pit/vault shall be required to be designed to withstand HS-20 traffic loading.

B. There shall be no major landscaping (trees, boulder, shrubs over three feet (3') in mature height, etc.) or structure (retaining wall, etc.) within ten feet (10') of the meter pit or vault. All shrubs less than three feet (3') in mature height shall be located no closer than five feet (5') to a meter pit or vault.

C. The finished ground around the meter pit or vault shall slope away from the lid at a minimum grade of two percent (2%).

D. There shall be no plumbing connections inside the meter pit or vault.

E. All tees, connections, and couplings shall be a minimum of five feet (5') from the meter pit or vault wall and be on the outlet side.

1. There shall be no tees, connections, or couplings installed between the curb stop and the meter setter or meter horn.

2. All pipes coming into any meter vault or pit 3-inches (3") or larger shall be flanged pipe only.

F. The meter pit or vault shall be adjusted to ½-inch (1/2") above final grade if the surrounding grade is changed.

G. Reference Greeley Standard Drawings, latest revision, for additional meter pit/vault installation requirements.

3.8 TRACER WIRE AND TEST STATIONS

A. Reference construction specification *Section 02510, Water Utility Distribution Piping,* and City of Greeley Standard Drawings, latest revision of each, for tracer wire and test station installation along water service lines.

3.9 INSPECTION

A. The Contractor shall ensure that the curb stop, corporation stop, and any couplings

remain exposed until after inspection and the City gives the approval for backfill.

B. All tap and service inspections shall be scheduled with the City a minimum forty-eight hours (48) prior to desired time of inspection.

C. The water shall be turned on at the curb stop by the Water and Sewer Department, only after the service line, curb stop, stop box, and meter setter are installed.

D. Contact the City of Greeley Meter Shop a minimum forty-eight hours (48) prior to requesting final meter pit inspection. Refer to City of Greeley Standard Drawings.

E. Meter pits and stop boxes shall be at finished grade at time of acceptance of subdivision improvements. If the stop box or meter pit is damaged, bent, or otherwise unacceptable to the City, the builder will be responsible for replacing the damaged stop box or meter pit prior to issuance of a Certificate of Occupancy.

SECTION 02515

WATER UTILITY DISTRIBUTION VALVES

PART 1 – GENERAL

1.1 SCOPE

A. This section covers water system valves, valve operators, valve boxes, and other valve appurtenances.

1.2 REFERENCES

A. American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)

1. B16.1, Grey Iron Pipe Flanges and Flanged Fittings, latest revision.

B. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C207, Steel Pipe Flanges for Waterworks Service – Size 4 in. through 144 in., latest revision.

2. C500, Metal-Seated Gate Valves for Water Supply Service, latest revision.

3. C508, Swing-Check Valves for Waterworks Service, 2-in. Through 24-in., latest revision.

4. C509, Resilient-Seated Gate Valves for Water Supply Service, latest revision.

5. C512, Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service, latest revision.

6. C550, Protective Interior Coatings for Valves and Hydrants, latest revision.

C. ASTM International (ASTM)

1. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings, latest revision.

2. B62, Standard Specification for Composition Bronze or Ounce Metal Castings, latest revision.

1.3 SUBMITTAL REQUIREMENTS

A. Information to be provided should include:

1. Valve Manufacture

2. Valve Pressure Rating

3. Valve Construction Materials

B. Two (2) sets of Shop Drawings for each valve size and type shall be furnished to the City for acceptance prior to start of construction.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Take precautions so as not to damage materials during delivery or storage.

B. Store valves off the ground and away from materials that could contaminate water systems.

C. Take precautions to keep joints and internal parts clean.

PART 2 – PRODUCTS

2.1 GENERAL

A. All water distribution valves shall open clockwise (right). (Valves on water transmission lines open counter-clockwise (left)).

B. All valves shall be the same size as the main unless approved otherwise by the City.

C. Valves shall be either mechanical or flanged joint as required.

1. Exposed locations shall use flanged joints.

2. Buried locations shall use mechanical joints.

D. The interior and exterior of all buried valves shall be epoxy coated in accordance with AWWA C550.

E. All buried valves shall have a two-inch (2") square-operating nut. The manufacturer shall paint all open right operating nuts red.

F. The operating nut on buried valves shall be between four (4) feet and six (6) feet below the finished grade. If, in order to achieve the operating nut depth, it is necessary to use a riser stem, the riser shall be double pinned. The riser stem shall be a solid stem coated to prevent corrosion.

G. All exposed valves that are not equipped with motorized or pneumatic actuators shall be equipped with a handwheel.

2.2 GATE VALVES

A. General

1. Four-inch (4") through twelve-inch (12") diameter gate valves shall be designed for a minimum working pressure of 200 psi and a test pressure of 400 psi. Sixteen-inch (16") diameter gate valves shall be designed for a minimum working pressure of 150 psi and a 300 psi test pressure.

2. Sixteen-inch (16") bonnets shall be set vertically.

3. Water distribution line gate valves shall be resilient seat gate valves.

B. Resilient Seat Gate Valves

1. Resilient seat gate valves shall be manufactured in accordance with AWWA C509.

2. Valve stems shall be non-rising.

3. Stem seals shall be provided with two (2) o-ring type stem seals in accordance with AWWA C509.

4. Valves shall be facility tested in compliance with ANSI/AWWA C509.

5. Proof-of-design test certification shall be submitted in compliance with ANSI/AWWA C509.

6. Acceptable manufacturers of resilient seat gate valves are:

a. Mueller

b. Kennedy

c. American AVK Company

d. Clow

2.3 VALVE BOXES

A. Valve boxes for potable water applications shall be cast-iron or ductile iron, buffalo type, two (2) piece boxes with round bases.

1. Valve boxes shall have a five and ¼-inch (5-¼") screw type shaft suitable for depth of cover as required.

2. Valve boxes shall be capable of future adjustment for street overlays.

3. Model 6850 series with drop lid

4. The word "WATER" shall be cast into the box lid for potable water and "WATER/TEST" into box lids for potable water valves with test stations.

5. Acceptable manufacturers of valve boxes are:

a. Castings, Inc

b. Tyler

c. Or approved equivalent.

B. Valve boxes for non-potable irrigation water applications shall be cast-iron or ductile iron, triangular top and cover, two (2) piece boxes with round bases.

1. Valve boxes shall have a five and ¼-inch (5-¼") screw type shaft suitable for depth of cover as required.

2. Valve boxes shall be capable of future adjustment for street overlays.

3. Model 4TCI and compatible with 6850 series bottoms

4. The word "IRRIGATION" shall be cast into the box lid for non-potable irrigation water and "IRR/TEST" into box lids for non-potable irrigation water valves with test stations.

5. Acceptable manufacturers of valve boxes are:

a. Castings, Inc

b. Or approved equivalent.

2.4 AIR RELEASE, AIR/VACUUM, AND COMBINATION AIR VALVES

A. Air Release (AR) valves, Air/Vacuum (A/V) valves, and combination air valves shall be manufactured in accordance with AWWA C512.

B. Air Release and Air/Vacuum Valves

1. All AR and A/V valves shall be rated a minimum working pressure of 150 psi and a hydrostatic test pressure equal to 150% of the actual rated working pressure of the valve.

2. The working parts and seat of the AR and A/V valves shall be brass, stainless steel, or other non-corroding material unless otherwise approved by the City.

C. Combination air valves shall have features of both the AR and A/V valve.

D. The size of the AR valve, A/V valve, or combination air valve shall be as noted on the approved Construction Drawings.

E. Acceptable manufacturers of Air Release, Air/Vacuum, and Combination Air Valves are:

1. ¾-inch (¾"), one-inch (1"), and two-inch (2") Combination Air Valve – A.R.I. D-040

2. Two-inch (2") to ten-inch (10") Combination Air Valve – A.R.I. D060-C HF

3. Or approved equivalent.

2.5 SWING CHECK VALVES

A. All swing check valves shall be manufactured in accordance with AWWA C508.

B. Swing check valves shall have an epoxy coated interior in accordance with AWWA C550.

C. Swing check valves shall be ductile-iron, of the resilient-to-coated seat construction, have a resilient hinge arm, and be of the clear waterway design.

D. The closure assembly shall assume the closed position by gravity under no-flow conditions.

E. Swing check valves shall be designed for a minimum working pressure of 200 psi and 400 psi test pressure for check valves with diameters of four-inch (4") through twelve-inch (12"). Sixteen-inch (16") diameter check valves shall be designed for a minimum working pressure of 150 psi and 300 psi test pressure.

F. Acceptable manufacturers of swing check valves are:

1. Mueller
2. American Flow Control
3. M & H
4. Clow
5. Kennedy
6. Or approved equivalent.

2.6 PRESSURE REDUCING VALVES

A. The function of the Pressure Reducing Valve (PRV) is to reduce an existing high pressure to a pre-adjusted lower downstream pressure for varying rates of flow without causing shock of water hammer on the system.

B. The PRV shall be hydraulically operated with a free-floating guided piston having a seat diameter equal to the size of the valve.

C. Materials and Construction

1. Flanges and covers shall conform to ASTM A126, Class B.
2. The PRV shall be fully bronze-mounted with bronze castings or parts conforming to ASTM B62.
3. All PRVs shall be furnished with flanged ends sized and drilled in accordance with ANSI/ASME B16.1, Class 125 specifications.
    a. Flanges shall be machined to a flat face with a finish of 250 micro inches, or machined to a flat surface with a serrated finish in accordance with AWWA C207.
4. The PRV shall be purchased from the manufacturer as an assembly and shall

include a main valve, electronic actuated pressure sustaining pilot control system which controls operation of the main valve, and other operational components.

a. The pilot valve shall be a single seated, diaphragm operated, spring loaded type.

b. The pilot valve shall be attached to the main valve with piping and isolation valves arranged for easy access to make adjustments and for its removal from the main valve while the main valve is under pressure.

5. PRV shall include an intergraded flow meter and fully functional with City SCADA system to monitor and control the PRV valve.,

6. All PRVs shall be rated a minimum working pressure of 150 psi and a hydrostatic test pressure equal to 150% of the actual rated working pressure of the valve.

7. Allow sufficient room around the PRV for assembly and to make adjustments and for servicing.

8. The standard PRV size to match pipe size unless otherwise approved by the City.

D. Refer to PRV Standard Drawing for acceptable manufacturers of pressure reducing valve manufacturers and various appurtenances.

E. Acceptable manufacturers of pressure reducing valves are:

1. Cla-Val

2. Or approved equivalent.

PART 3 – EXECUTION

3.1 INSPECTION

A. Valves and valve boxes shall be examined for cracks, dents, abrasions, and other flaws prior to installation.

B. Damaged or flawed valves shall be rejected. marked, and removed from the site.

C. Proof-of-design test certification shall be submitted to owner in compliance with ANSI/AWWA C509.

3.2 INSTALLATION

A. Valves

1. With the exception of tapping valves, flanged valves shall not be buried.

2. Valves shall be installed in such a manner that the operating nut is perpendicular to the pipe.

3. Operating nut shall be accessible between 4 FT and 6 FT below finished grade. Extensions may be required for any operating nut that is deeper than 6 FT.

4. Buried valves shall be supported on concrete as shown in the City of Greeley Standard Drawings.

B. Tapping Valves

1. Tapping valves shall be installed per the manufacturer's recommendation.

2. Tapping valves and sleeves are to be hydraulically pressure tested to 150 psi for twenty (20) minutes, with no leakage, prior to proceeding with a wet tap.

3. Tapping valves and sleeves shall be equipped with a threaded test hole.

C. Valve Boxes

1. All buried valves shall be provided with a valve box, including fire hydrant valves, unless indicated otherwise on the approved Construction Drawings.

2. Install the valve box so that no stress is transmitted to the valve.

3. Set the valve box plumb and directly over the valve's operating nut. Valve operators that are mounted to one (1) side of the valve shall be located to the south or west of the valve.

4. The soil around the valve box shall be carefully compacted around the barrel, with hand equipment, to minimize misalignment and settling of the backfill.

D. Air Release, Air/Vacuum, and Combination Air Valves

1. AR, A/V, and combination air valves shall be installed at the locations shown on the Construction Drawings.

2. Air relief and vacuum relief valves shall be installed in accordance with City of Greeley Standard Drawings.

E. Swing Check Valves

1. Swing check valves shall only be used in four-inch (4") or larger service meter settings and shall be installed downstream of the meter.

2. Swing check valves shall be installed in a horizontal, level setting.

3. Swing check valves shall be installed in accordance with City of Greeley Standard Drawings.

F. Pressure Reducing Valves

1. PRVs shall be installed as shown on the Construction Drawings, per the manufacturer's recommendations, and in accordance with City of Greeley Standard Drawings.

3.3 OPERATION

A. Prior to requesting water system acceptance, the Contractor shall operate all valves in the presence of City personnel.

B. Only City personnel shall operate valves that have been accepted by the City.

SECTION 02516

WATER UTILITY DISTRIBUTION FIRE HYDRANTS

PART 1 – GENERAL

1.1 SCOPE

A. This section is a minimum guideline for furnishing and installation of dry-barrel fire hydrants.

1.2 REFERENCES

A. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C502, *Dry-Barrel Fire Hydrants*, latest revision.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Fire hydrants shall be handled, stored, and protected in such a manner as to prevent damage to materials, coatings, and finishes.

B. All fittings and joints shall be kept free from dirt, oil, and grease.

PART 2 – PRODUCTS

2.1 FIRE HYDRANTS

A. Fire hydrants shall be of the following, approved manufacturer:

1. Kennedy Valve, Guardian K-81D

2. American AVK, 2780 Nostalgic

3. City approved equal

B. Specifications for fire hydrants are as follows:

1. Type and Size of Hydrant

a. Dry-barrel type manufactured in accordance with AWWA C502.

b. Main valve opening size – 5 ¼-inch (5 ¼”)

c. Three-way type with one (1) pumper nozzle and two (2) hose nozzles all located on the same horizontal plan.

2. Design and Testing

a. Minimum rated working pressure – 150 psi.

b. Minimum factory test pressure for assembled hydrants – 300 psi in both the open and closed positions.

c. Under test conditions, leakage through drain valve not to exceed five (5) fluid ounces (fl. oz.) per minute. No leakage allowed through the castings, main valve, joints, or stem packing.

3. Pumper Nozzle

a. Size – 4 ½-inch (4 ½") in diameter.

b. Threads – left handed, six (6) threads per inch (1"), National Standard threads.

4. Hose Nozzle

a. Size – 2 ½-inch (2 ½") in diameter.

b. Threads – left-handed, National Standard threads.

5. Nozzle Cap

a. Contains a synthetic rubber gasket installed in a retaining groove.

b. Dimensions and shape of the nozzle cap nut are the same as the operating shaft nut.

c. Attached to the hydrant with non-kinking type steel chains.

6. Operating Nut and Shaft

a. Nut material – bronze.

b. Nut shape – pentagon and tapered.

c. Nut size – 1 5/16-inch (1 5/16") from point to flat base of the nut; 1 ¼-inch (1 ¼") at the top.

d. Nut height – not less than 1-inch (1").

e. Nut operation – Right turn (clockwise direction). An arrow on top of hydrant bonnet designates the direction of opening.

f. Hydrants contain an oil reservoir that provides permanent lubrication of the operating nut threads.

g. "O" rings protect operating mechanism from the waterway.

7. Barrel

a. Component connections – bolted flange type

b. Ground line connection – manufactured to allow positioning of the top section at increments not greater than fifteen degrees (15°).

8. Hydrant Base (Shoe)

a. Four (4) mil minimum, epoxy lined, including lower valve (plant) and retainer.

b. Inlet provided with a mechanical joint to accommodate six-inch (6") diameter DIP.

9. Drain Valve/Openings – One (1) or more provided.

10. Traffic Features – breakaway traffic flange.

11. Color – Orange

12. Certification – An affidavit of compliance shall be provided to the City of Greeley Water and Sewer Department from the hydrant manufacturer stating that all fire hydrant standard and supplemental specifications have been met.

2.2 EXTENSIONS

A. No more than one (1) six-inch (6") or one (1) twelve-inch (12") hydrant extension section may be used.

B. The extension manufacturer shall be the same as the fire hydrant manufacturer.

1. Kennedy Hydrant, K-8150

2. American AVK Hydrant, 2780 Nostalgic

C. For extensions greater than twelve-inches (12"), a grade adjustment fitting shall be used. Acceptable manufacturers are:

1. Assured Flow Sales, Inc. – GRADELOK®

2. Or approved equivalent.

D. Extension sections must be available to allow the fire hydrant to be raised to a new grade without shutting off the water.

2.3 FIRE HYDRANT LATERAL – PIPE AND MAIN CONNNECTION

A. Fire hydrant lateral piping shall be restrained DIP or PVC. Pipe shall be restrained by either restrained joint pipe or mechanical joint restraints.

B. The hydrant tee on the potable water main line shall be a swivel tee. Tapping sleeves are acceptable when connecting to an existing potable water distribution main.

C. Reference construction specification *Section 02512, Ductile-Iron Pipe* and *Section 02513 Potable Polyvinyl Chloride (PVC) Pressure Pipe* .

2.4 FIRE HYDRANT LATERAL – MAIN VALVE

A. The main valve on the fire hydrant lateral shall be a six-inch (6”), resilient seat gate valve located at the main.

B. The valve shall be provided with a H-20 traffic rated valve box.

C. Reference construction specification *Section 02515, Water Utility Distribution Valves* for valve installation.

2.5 DRAIN GRAVEL

A. Fire hydrant drain gravel shall be 1 ½-inch (1 ½”) washed rock.

2.6 TRACER WIRE AND TEST STATIONS

A. Test Station:

1. Test station section to be four-inch (4”) inside diameter with an eighteen-inch (18”) long flared plastic shaft to prevent removal from an approved manufacturer.

2. Test station lid shall be a lockable two-terminal lid and include a ground switch.

3. Cover shall be lockable, cast iron, with “WATER / TEST” cast in the cover

4. Approved Test Station:

   a. Copperhead Industries Snakepit® Access Point

   b. Approved equal.

B. Grounding Rod: 1.5-lb magnesium anode grounding rod from Copperhead Industries, or approved equal.

C. Tracer Wire and Connectors: Reference construction specification *Section 02510, Water Utility Distribution Piping* for product information and installation.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine fire hydrants and all appurtenances, including valves and piping, for cracks, dents, abrasions, and other flaws.

B. Mark defective pipe and fittings and store on site at a separate location from work until after City acceptance at which time it shall be removed from the site.

3.2 PREPARATION

A. For trenching, backfilling, and compaction, reference construction specification *Section 02315, Excavation and Fill,* and Trench Cross Section Standard Drawing.

B. Reference construction specifications *Section 02512, Ductile-Iron Pipe,* and *Section 02513, Potable Polyvinyl Chloride (PVC) Pressure Pipe,* for pipe installation preparation.

3.3 INSTALLATION

A. All fire hydrants shall stand plumb and be installed in accordance with City of Greeley Standard Drawings.

B. The minimum depth of bury shall be five feet six-inches (5'-6") and the maximum depth of bury shall be six (6) feet for restrained DIP fire hydrant laterals.

C. All fire hydrants shall be connected to the potable water distribution main by a six-inch (6") restrained DIP lateral line. A six-inch (6") main valve shall be installed in the lateral line and be restrained back to the main line tee by use of restrained joint pipe or mechanical joint restraints.

D. All fire hydrants shall be supported on a minimum of one (1) cubic yard of compacted drain gravel with a concrete thrust block.

1. The concrete thrust block, with a minimum bearing area of 4.5 square feet (sq. ft.), shall be placed behind the hydrant base (shoe) against undisturbed soil.

2. A sheet of eight (8) mil polyethylene film shall be placed between the hydrant base (shoe) and concrete thrust block, and the barrel shall be polywrapped up to final ground line.

3. After the concrete thrust block is poured and has ample time to cure, drain gravel shall be placed a minimum six-inches (6") above the lower buried flange per City of Greeley Standard Drawings. The concrete thrust block shall cure enough so that the drain gravel will not penetrate the concrete.

4. Cover the gravel drain pit with polyethylene film or a City approved felt material.

E. Keep hydrant drain holes free of obstructions.

F. Fire hydrants that are placed in pavement areas, shall maintain twelve-inches (12") of horizontal clearance between the concrete and the hydrant barrel. The twelve-inch (12") space between the concrete and the barrel shall be filled with drain gravel.

G. After fire hydrant installation is complete, the oil reservoir shall be checked to ensure that it is full. If it is necessary to fill the reservoir, it shall be filled with the oil that is specified by the hydrant manufacturer.

H. Tracer wire and test station box shall be installed per City of Greeley Standard Drawings, latest revision.

3.4 LOCATION

A. All hydrants shall be field staked for both vertical and horizontal location.

B. Vertical

1. The vertical distance from any finished surface to the centerline of the pumper nozzle shall not be less than eighteen-inches (18") or greater than twenty-one-inches (21")

2. If a hydrant is raised, no more than one (1) six-inch (6") or one (1) twelve-inch (12") extension section may be used. If the extension is greater than twelve-inches (12"), a grade adjustment extension fitting shall be used.

3. Extensions shall be installed per manufacturer's recommendations.

C. Horizontal

1. Fire hydrants shall be located at least one (1) foot outside of the property line and shall conform to one of the following conditions:

2. When placed behind the curb when no sidewalk is to be installed, the hydrant barrel shall be set so that no portion of the pumper or hose nozzle cap will be less than twenty-four inches (24") or more that thirty-inches (30") horizontal distance from the gutter face of the curb.

3. When placed in a landscaped area between the curb and the sidewalk or between the sidewalk and the property line, no portion if the hydrant or nozzle cap shall be within six-inches (6") of the sidewalk or greater than eighteen-inches (18") from the sidewalk.

4. A three (3) foot radius in all directions of the hydrant shall be clear of obstructions, which shall include, but is not limited to, posts, fencing, vehicles, trash, storage, shrubs, trees, or other plants with mature growth greater than one (1) foot in height.

3.5 OPERATION

A. Only City personnel shall operate fire hydrants and associated valves that have been accepted by the City unless written permission from the Water and Sewer Department is obtained. If written permission is received, an approved backflow prevention device and water meter shall be installed on the hydrant per City of Greeley Water and Sewer Department requirements.

SECTION 02517

WATER PRESSURE REDUCING VALVES

PART 1 – GENERAL

1.1 SCOPE

A. This specification covers the design, manufacture, and testing of 1 in. through 16 in. Pressure Reducing Valves (PRV). The Pressure Reducing Valve shall maintain a constant downstream pressure regardless of changing flow rate and/or inlet pressure.

1. Standard products - use the same manufacturer for multiple units of same type.

1.2 REFERENCES

A. American National Standards Institute/American Society of Mechanical Engineers (ANSI/ASME)

1. B16.1, Grey Iron Pipe Flanges and Flanged Fittings, latest revision.

B. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C207, Steel Pipe Flanges for Waterworks Service – Size 1/2 in. through 48 in., latest revision.

2. C512, Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service, latest revision.

3. C550, Protective Interior Coatings for Valves and Hydrants, latest revision.

C. ASTM International (ASTM)

1. A126, Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings, latest revision.

2. B62, Standard Specification for Composition Bronze or Ounce Metal Castings, latest revision.

1.3 SUBMITTAL REQUIREMENTS

A. Information to be provided should include:

1. Valve Manufacture

2. Valve Pressure Rating

3. Valve Construction Materials

4. Pilot Control and Trim Materials

B. Two (2) sets of Shop Drawings for each valve size and type shall be furnished to the City for acceptance prior to start of construction.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Take precautions so as not to damage materials during delivery or storage.

B. Store valves off the ground and away from materials that could contaminate water systems.

C. Take precautions to keep joints and internal parts clean.

PART 2 – PRODUCTS

2.1 GENERAL

A. The Pressure Reducing Valve shall automatically throttle to reduce a higher incoming pressure and maintain an accurate and constant lower downstream pressure without causing shock of water hammer on the system regardless of changing flow rate and/or inlet pressure. If downstream pressure increases above the pilot spring setting, the valve shall close.

B. The primary PRV size to match pipe size unless otherwise approved by the City.

C. The PRV shall be hydraulically operated with a free-floating guided piston having a seat diameter equal to the size of the valve.

D. All PRVs shall be rated for a minimum working pressure of 150 psi and a hydrostatic test pressure equal to 150% of the actual rated working pressure of the valve.

E. Allowable PRV size combinations of primary and secondary valves are as follows.

Primary PRV Size	Secondary PRV Size
8”	2”
12”	6”
16”	8”

2.2 MATERIALS

A. Material Specification for the Pressure Reducing Control Valves Main Valve as follows:

Component	Material
Body & Cover	Ductile Iron-ASTM A536
Main Valve Trim	Stainless Steel
Seat	Stainless Steel
Stem, Nut and Spring	Stainless Steel
Seal Disc	Buna-N® Rubber
Diaphragm	Nylon Reinforced Buna-N® Rubber
Internal Trim Parts	Stainless Steel
End Detail	Flanged (2” – 16”)
Pressure Rating	Class 150 lb. (250psi Max.)
Temperature Range	Water to 180°F
Any other wetted metallic parts	Stainless Steel

Coating	Fusion Bonded Epoxy Coating (Interior and Exterior); ANSI / NSF 61 Approved / AWWA coating specifications C116-03.
Additional Components	Valve Position Indicator, Limit Switch, Opening & Closing Speed Controls, E-Flowmeter, Pressure Gauges, Restriction Fitting, Isolation Valve, Opening and Closing Flow Controls, Check Valves Isolation Valve,

Commented [AP1]: What are the costs of these options, do we need and could prevent water hammer?

2.3 MANUFACTURE

A. Main Valve:

1. The main valve shall be hydraulically operated, single diaphragm actuated, globe pattern. The valve shall consist of three major components; the body with seat installed, the cover with bearing installed and the diaphragm assembly. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating the operating pressure from line pressure. Packing glands, stuffing boxes and/or rolling diaphragm technology will not be permitted and there shall be no pistons operating the main valve or pilot controls. No fabrication or welding shall be used in the manufacturing process. Y-pattern valves shall not be permitted. Main valve shall comply with NSF/ANSI 61 and certified lead free to NSF/ANSI 372 as a safe drinking water system component.

B. End Connections:

1. End Connections for control valve shall be flanged per ASME/ANSI B16.42, Class 150 (2" thru 16").

C. Main Valve Body:

1. No separate chamber(s) below the diaphragm shall be allowed between the main valve cover and body. No fabrication or welding shall be used in the manufacturing process.

2. The valve shall contain a resilient, synthetic rubber disc with a rectangular cross-section contained on three- and one-half sides by a disc retainer and forming a tight seal against a single removable seat insert. No O-ring type discs (circular, square, or quad type) shall be permitted as the seating surface. The disc guide shall be of the contoured type to permit smooth transition of flow and shall hold the discs firmly in place. The disc retainer shall be of a sturdy one-piece design capable of withstanding opening and closing shocks. It must have straight edge sides and a radius at the top edge to prevent excessive diaphragm wear as the diaphragm flexes across this surface. No hours-glass shaped disc retainers shall be permitted, and no V-type or slotted-type disc guides shall be used.

3. The diaphragm assembly containing a non-magnetic stainless-steel stem; of sufficient diameter to withstand high hydraulic pressures and shall be fully guided at both ends by a bearing in the main valve cover and an integral bearing in the valve seat. The valve seat shall be a solid, one-piece design and shall have

a minimum five-degree taper on the seating surface for a positive, drip-tight shut off. No center guides shall be permitted. The stem shall be drilled and tapped in the cover end to receive and affix such accessories as may be deemed necessary. The diaphragm assembly shall be the only moving part and shall form a sealed chamber in the upper portion of the valve, separating the operating pressure from the line pressure. No bolts or cap screws shall be permitted for use in the construction of the diaphragm assembly.

4. The flexible, non-wicking, FDA approved diaphragm shall consist of nylon fabric bonded with synthetic rubber compatible with the operating fluid. The diaphragm's center hole for the main valve stem must be sealed by the vulcanized process or a rubber grommet sealing the center stem hole from the operating pressure. The diaphragm must withstand a Mullins Burst Test of a minimum of 600 X per layer of nylon fabric and shall be cycled tested 100,000 times to insure longevity. The diaphragm shall not be used as the seating surface. The diaphragm shall be fully supported in the valve body and cover by machined surfaces which support no less than one-half of the total surface area of the diaphragm in either the fully opened or fully closed position. Bellofram type rolling diaphragms shall not be permitted.

5. The main valve seat and stem bearing in the valve cover shall be removable. The cover bearing and seat in the 6" and smaller size valve shall be threaded into the cover and body. The valve seat in the 8" and larger size valves shall be retained by flat head machine screws for ease of maintenance. The lower bearing of the valve stem shall be contained concentrically within the seat and shall be exposed to the flow on all sides to avoid deposits. To ensure proper alignment of the valve stem, the valve body and cover shall be machined with a locating lip. No "pinned" covers to the valve body shall be permitted. Cover bearing, disc guide and seat shall be made of the same material. All necessary repairs and/or modifications other than replacement of the main valve body shall be possible without removing the valve from the pipeline. The valve shall be designed such that both the cover assembly and internal diaphragm assembly can be disassembled and lifted vertically straight up from the top of a narrow opening/vault. Y-pattern valves shall not be permitted. The seat shall be of the solid one-piece design. Two-piece seats or seat inserts shall not be permitted. Packing glands and/or stuffing boxes shall not be permitted.

D. Pilot Control System:

1. The pressure reducing pilot control shall be a direct-acting, adjustable, spring-loaded, normally open, diaphragm valve designed to permit flow when controlled pressure is less than the spring setting. The pilot control is held open by the force of the compression on the spring above the diaphragm and it closes when the delivery pressure acting on the underside of the diaphragm exceeds the spring setting. The pilot control system shall include a strainer and a fixed orifice closing speed. No variable orifices shall be permitted. The pilot system shall include an opening speed control on all valves sizes 3" and smaller as standard equipment. The pilot control shall have a second downstream sensing port which can be utilized to install a pressure gauge. A full range of spring settings shall be available in ranges of 0 to 150 psi. Pilot to be manufactured by control valve

manufacture. Pilot shall comply with NSF/ANSI 61 and certified lead free to NSF/ANSI 372 as a safe drinking water system component.

E. Material Specification for Pilot Control

Component	Material
Body & Cover	Stainless Steel
Pilot Trim	Stainless Steel 303
Rubber	Buna-N®
Connections	FNPT
Pressure Rating	150 psi Max.
Temperature Range	Water to 180°F Max.
Control Tubing	Flexible Braided Stainless Steel
Control Fittings	Stainless Steel

F. Factory Assembly:

1. Each control valve shall be factory assembled.

2. The Quality Management System of the factory shall be certified in accordance with ISO 9001: 2008.

3. For all control valves, the factory assembly shall include the complete main valve, pilot valve(s), and all associated accessories and control equipment.

4. During factory assembly the control valve manufacture shall make all necessary adjustments and correct any defects.

G. Nameplates:

1. Each Control Valve and associated pilot(s) shall be provided with an identifying nameplate.

2. Nameplates, depending on type and size of control valve, shall be mounted in the most practical position possible, typically on the inlet side of the valve body.

3. Nameplates shall be brass and a minimum of 3/32" thick, ¾" high and 2-3/4" long.

4. Pertinent control valve data shall be etched or stamped into the nameplate. Data shall include control valve Catalog number, function, size, material, pressure rating, end-connection details, type of pilot controls used and control adjustment range.

H. Factory Testing:

1. Each control valve shall be factory tested.

2. The Quality Management System of the factory shall be certified in accordance with ISO 9001: 2008

3. Tests shall conform to approved test procedures.

4. Shell Test: Control valves and pilot valves in the partially open position with both ends closed off with blind flanges (valves) and pipe plugs (pilots) shall be subject to an air pressure test. The applied pressure shall be 200 psi minimum. The pressure shall be applied for a minimum of 15 minutes. No visible leakage is permitted through the pressure boundary walls of the valve or pilot body or valve cover or the body-cover joint.

5. Seat Test: Control valves and pilot valves shall be subjected to an air pressure seat test and held for a minimum of 15 minutes.

2.4 PRODUCT DATA

A. The following information shall be provided:

1. Control Valve manufacturer's technical product data.

2. Control Valve manufacturer's Installation, Operation and Maintenance manual (IOM).

3. Control Valve manufacturers certified Shell and Seat test results.

B. Provide specific information on all optional features specified above and confirm that these items are provided.

C. The valve manufacturer shall be able to supply a complete line of equipment from 1" through 16" sizes and a complete selection of complementary accessories and equipment.

D. The control valve manufacture shall provide a computerized cavitation analysis report which shows flow rate, differential pressure, and percentage of valve opening. Cv factor, system velocity, and if there will be cavitation damage.

Commented [AP2]: ?????

2.5 CONSTRUCTION

A. Flanges and covers shall conform to ASTM A126, Class B.

B. All PRVs shall be furnished with flanged ends sized and drilled in accordance with ANSI/ASME B16.1, Class 125 specifications.

1. Flanges shall be machined to a flat face with a finish of 250 micro inches or machined to a flat surface with a serrated finish in accordance with AWWA C207.

C. The PRV shall be purchased from the manufacturer as an assembly and shall include a main valve, electronic actuated pressure sustaining pilot control system which controls operation of the main valve, and other operational components.

1. The pilot valve shall be a single seated, diaphragm operated, spring loaded type.

2. The pilot valve shall be attached to the main valve with piping and isolation valves arranged for easy access to make adjustments and for its removal from the main valve while the main valve is under pressure.

D. PRV shall include an intergraded flow meter and fully functional with City SCADA system to monitor and control the PRV control valve.

E. Allow sufficient room around the PRV for assembly, and to make adjustments and for servicing.

F. Refer to PRV Standard Drawing for acceptable manufacturers of pressure reducing valve manufacturers and various appurtenances.

G. Acceptable manufacturers of pressure reducing valves are:

1. Cla-Val

2. Or approved equivalent.

PART 3 – EXECUTION

3.1 INSPECTION

A. Valves and valve boxes shall be examined for cracks, dents, abrasions, and other flaws prior to installation.

B. Damaged or flawed valves shall be rejected. marked, and removed from the site.

C. Proof-of-design test certification shall be submitted to owner in compliance with ANSI/AWWA C509.

3.2 INSTALLATION

A. PRVs shall be installed as shown on the Construction Drawings, per the manufacturer's recommendations, and in accordance with City of Greeley Standard Drawings.

B. Final location of vault and control panel shall be determined by Water & Sewer Department.

3.3 FIELD TESTING

A. A direct factory representative shall be made available by the equipment supplier for start-up service, inspection, and necessary adjustments.

3.4 WARRANTY

A. The Control Valve manufacturer shall warrant the valve to be free of defects in material and workmanship for a period of two-years from date of shipment provided the valve is installed and used in accordance with all applicable instructions. Electrical components shall have a two-year warranty.

3.5 OPERATION

A. Prior to requesting water system acceptance, the Contractor shall operate all valves in the presence of City personnel.

B. Only City personnel shall operate valves that have been accepted by the City.

SECTION 02530

SANITARY UTILITY SEWERAGE PIPING

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the installation of sanitary sewer collection mains and includes the acceptable products, materials, and construction practices that may be used in the installation of sanitary sewer collection systems.

1.2 SUBMITTALS

A. Shop Fabricated Piping:

1. Pipe Manufacturer.
2. Pipe Size.
3. Pipe Dimensions.
4. Pipe Class / Pressure Rating.
5. Color (For PVC).
6. Manufacturer's Recommended Joint Deflection.
7. Recommended Maximum Safe Pull Force (For Fusible PVC).
8. Fusion Technician qualifications indicting conformance with specification *Section 02533, Polyvinyl Chloride (PVC) Non-Pressure Pipe* (For Fusible PVC).
9. Detailed pipe fabrication or spool drawings showing special fittings and bends, dimensions, coatings, and other pertinent information.
10. Layout drawing showing location of each pipe section and each special length; number or otherwise designate laying sequence on each piece.

B. Dissimilar Buried Pipe Joints: Joint types and assembly drawings.

C. Pipe Corrosion Protection: Product data.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Pipe shall be handled and stored per manufacturer's recommendations.

B. Handling

1. Use wide fabric choker slings when lifting pipe.

2. Do not drop pipe or fittings including dropping on cushions.

3. Do not use hooks or bare cable.

4. Polyvinyl chloride pipe has reduced flexibility and impact resistance as temperatures approach and drop below freezing. Extra care should be used in handling and installing PVC pipe during cold weather. Do not install pipe when temperature is below 40 degrees F.

5. Care must be taken to prevent damage to the pipe and fittings and coating and lining (when applicable) by impact, bending, compression, or abrasion. If damage does occur due to manufacturers handling recommendations not being followed, Contractor is to replace the damaged piece(s) at no cost to the City.

C. Storage

1. Store and use pipe lubricants in a manner which will avoid contamination.

2. Pipe, gaskets, and all other installation materials shall be stored in accordance with the manufacturer's specifications.

3. Pipe shall be stored on a surface that provides even support for the pipe barrel. Pipe shall not be stored in such a way as to be supported by the bell.

4. Cold Weather Storage: Locate products to prevent coating from freezing to ground.

D. Pipe delivered for construction shall be strung to minimize entrance of foreign material.

E. All openings in the pipeline shall be closed with watertight plugs when pipe laying is stopped at the close of a day's work or for extended periods at inspectors' discretion.

F. Do not allow debris, tools, clothing, or other materials to enter the pipe. Precautions shall be taken to protect the interior of pipes against contamination.

G. Use effective measures to prevent uplifting or floating of the pipeline prior to completion of backfilling operations.

H. Protect pipe and appurtenances against dropping and damage. Damaged pipe and appurtenances that are rejected shall be marked and removed from the site.

I. Do not install pipe when the trench contains water. Water that is encountered in the trench shall be removed to the extent necessary to provide a firm subgrade and to prevent the entrance of water into the pipeline.

1. Surface runoff shall be diverted as necessary to keep excavations and trenches free from water during construction.

2. The excavation or trench shall be kept free from water until the structure and/or pipe to be installed is completed to the extent that no damage from hydrostatic pressure, flotation, or other cause will result.

3. The installed pipe shall not be used to dewater the trench.

PART 2 – PRODUCTS

2.1 MANHOLES

A. Reference construction specification *Section 02535, Sanitary Utility Sewerage Manholes, Frames, and Covers*.

2.2 PIPE

A. Reference construction specification *Section 02533, Polyvinyl Chloride (PVC) Non-Pressure Pipe*.

2.3 SANITARY SEWER SERVICE LINES

A. Reference construction specification Section 02534, Sanitary Sewer Service Lines.

PART 3 – EXECUTION

3.1 GENERAL

A. All piping shall be supplied by one manufacturer.

B. All materials used in the construction of gravity sanitary sewer collection systems shall be new.

C. Construction Staking

1. Reference construction specification *Section 02315, Excavation and Fill*.

2. Horizontal alignment shall remain uniform between consecutive manholes and shall not deviate from the City accepted Construction Drawings by more than 2-inches.

3. Vertical alignment shall remain uniform between consecutive manholes and shall not deviate from the City accepted Construction Drawings by more than ¼-inch, as measured from the pipe invert.

4. Joint Deflection: Maximum of 75 percent of manufacturer's recommendation.

3.2 INSPECTION

A. Pipe barrel and manholes shall be free of dirt or other foreign objects prior to installation.

B. Pipe and manholes shall be inspected for cracks, dents, abrasions, or other flaws prior to installation.

C. Damaged or flawed pipe or manholes shall be rejected, marked, and removed from the site.

D. Operational Inspection: At the completion of the project, in the presence of the City, and

as required by the City, the Contractor shall open all manholes and lamp all lines to ensure that no debris is left in the lines/manholes and the lines are not plugged.

3.3 PREPARATION

A. Trenching, Backfilling, and Compaction.

Reference construction specification *Section 02315, Excavation and Fill*.

B. Existing Utilities

1. The horizontal and vertical location of existing utilities shall be field verified prior to start of construction.

2. Contractor to protect all existing utilities and all damaged items shall be repaired or replaced to the satisfaction of the City at the Contractor's expense.

3. Any deviation from what is shown on the approved Construction Drawings shall be reported to the City immediately for approval and documented on the As-Constructed Record Drawings.

3.4 CONNECTIONS TO EXISTING SYSTEM

A. Main connections to the City's existing sanitary sewer collection system shall be made at an existing manhole or by setting a new manhole on the existing line. A watertight plug shall be installed in the new line and secured to the manhole to prevent any material or the plug from entering the existing system until the City accepts the new system.

B. At locations where a connection to an existing sanitary sewer collection main is to be made, the Contractor shall locate the existing main both vertically and horizontally and verify its exact size and material prior to start of construction. Report any difference from the design to the City and engineer to verify suitability of design.

C. The Water and Sewer Department personnel will examine the existing pipe or manhole. Any necessary adjustments in line, grade, or connection requirements to accomplish the connection shall be reviewed and accepted by the City prior to making the connection.

3.5 PIPE INSTALLATION

A. The only acceptable methods for laying sanitary sewer lines shall be with a laser.

B. Pipe Laying

1. Pipe shall be installed per manufacturer's recommendations.

2. Pipe installation shall begin at the lowest elevation and proceed upstream to the highest unless prior written approval is obtained from the Water and Sewer Department.

a. Pipe shall be installed so that the bells are pointing uphill.

b. Lay pipe true to line and grade.

3. Take effective measures to prevent opening of joints during bedding and backfilling operations.

4. Complete the joint in accordance with the applicable pipe material specification and adjust the pipe to the correct line and grade as each length of pipe is placed in the trench. Make adjustments in line and grade by scraping away or filling pipe bedding under the entire length of the pipe, except at bells, and not by wedging, blocking, or mounding up the pipe or bells.

5. Secure the pipe in place with the specified bedding tamped under and around the pipe except at the joints.

a. Do not disturb the pipe after the jointing has been completed.

b. Do not use mechanical compacting equipment in the zone above the horizontal centerline of the pipe and below a plane one (1) foot above the top of the pipe.

6. Do not walk on pipe or otherwise disturb pipe after the jointing has been completed.

7. PVC piping placement:

a. Do not lay pipe when temperature is below 40 degrees F, or above 90 degrees F when exposed to direct sunlight.

b. Shield ends to be joined from direct sunlight prior to and during the laying operation.

C. Sewer Crossing

1. Where sanitary sewer lines cross beneath potable water lines with less than eighteen-inches (18") clearance, sanitary sewer lines cross above potable water lines, or the ten (10) feet horizontal clearance between potable water lines and sanitary sewer lines cannot be maintained, pipe encasement shall be provided in accordance with construction specification *Section 02445, Casing Pipe – Borings and Encasements.*

3.6 MANHOLE INSTALLATION

A. Reference construction specification *Section 02535, Sanitary Utility Sewerage Manholes, Frames, and Covers*.

B. Manholes shall be installed at the location and to the elevation shown on the approved Construction Drawings or as approved by the Water and Sewer Department to accommodate field conditions.

C. Measurements of the actual location and elevation of sanitary sewer inverts and rim shall be made for the As-Constructed Record Drawings.

3.7 SANITARY SEWER SERVICE CONNECTIONS

A. Reference construction specification *Section 02534, Sanitary Sewer Service Lines*.

3.8 FIELD QUALITY CONTROL

A. Pipe Deflection Tests

1. Refer to construction specification *Section 01715, Sewer and Manhole Testing*.

B. Pipe Leakage Tests

1. Refer to construction specification *Section 01715, Sewer and Manhole Testing.*

C. Soil Compaction

2. Reference construction specification *Section 02315, Excavation and Fill.*

SECTION 02533

POLYVINYL CHLORIDE (PVC) NON-PRESSURE PIPE

PART 1 – GENERAL

1.1 SCOPE

A. This section is a minimum guideline for furnishing and the installation of polyvinyl chloride (PVC) pipe and fittings for lines without hydraulic pressure.

B. Pipe shall be furnished complete with all fittings, specials, and other accessories.

C. Refer to specification *Section 02530 Sanitary Utility Sewerage Piping*, for additional requirements.

1.2 REFERENCES

A. American National Standards Institute/American Water Works Association (ANSI/AWWA)

1. C900, *Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 In. Through 60 In (100 mm Through 1,500 mm),* latest revision.

B. ASTM International (ASTM)

1. D1784, *Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds*, latest revision.

2. D3034, *Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings*, latest revision.

3. D3139, *Standard Specification for Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals*, latest revision.

4. D3212, *Standard Specification for Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals*, latest revision.

5. F477, *Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe*, latest revision.

PART 2 – PRODUCTS

2.1 POLYVINYL CHLORIDE (PVC) PIPE - GASKETED

A. All PVC pipe shall be manufactured from components which conform to ASTM D1784.

B. All four-inch (4”) through fifteen-inch (15”) PVC non-pressure sewer pipe and all fittings shall be manufactured in accordance with ASTM D3034.

C. The standard dimension ratio (SDR) of PVC non-pressure sewer pipe shall not exceed 35.

D. The maximum pipe length shall be twenty (20) feet and no shorter than twelve feet, six inches (12'-6"), except at service tees and closure pieces.

2.2 POLYVINYL CHLORIDE (PVC) PIPE – SLIP JOINT

A. General.

1. This specification shall cover slip joint PVC pipes in 6-inch (6") through 24-inch (24") nominal diameters with cast iron equivalent outside diameters.

2. All PVC pipe shall be manufactured in accordance with AWWA C900.

3. Pipe shall be green in color.

B. Pipe joints shall be made using an integral bell with elastomeric gasket push-on type joint or using machined couplings of a sleeve type with rubber ring gaskets and machined pipe ends to form a push-on type joint.

C. All sizes of pipe under these specifications shall be pressure class as shown on the City accepted Constructed Drawings. Pressure Class 235 (DR-18) shall be the minimum pipe class accepted.

D. Each length of pipe shall be a standard laying length of twenty (20) feet. Random lengths are not acceptable.

E. Polyvinyl chlorine (PVC) pipe materials shall be made from Class 12454A of 12454B virgin compounds as defined in ASTM D1784. All compounds shall qualify for a rating of 4000 psi for water at 73.4ºF (23ºC) per the requirements of Plastic Pipe Institute (PPI), *TR-3*, and complies with the National Sanitation Foundation Standard, *No. 61*, for water service.

F. Elastomeric gaskets shall conform to ASTM F477.

G. If bury depth is shallower than four (4) feet, pipe shall be manufactured in accordance with AWWA C900 or city approved equal.

1. Bedding design is to be submitted per manufacturers requirements.

2.3 POLYVINYL CHLORIDE (PVC) PIPE – FUSED

A. General.

1. This specification shall cover slip joint PVC pipes in 6-inch (6") through 24-inch (24") nominal diameters with cast iron equivalent outside diameters.

2. All PVC pipe shall be manufactured in accordance with AWWA C900.

3. Pipe shall be green in color.

B. All sizes of pipe under these specifications shall be pressure class as shown on the City

accepted Constructed Drawings. Pressure Class 235 (DR-18) shall be the minimum pipe class accepted.

C. Each length of pipe shall be a standard laying length of twenty (20) feet or more. Random lengths are not acceptable

D. Polyvinyl chlorine (PVC) pipe materials shall be made from Class 12454A of 12454B virgin compounds as defined in ASTM D1784. All compounds shall qualify for a rating of 4000 psi for water at 73.4ºF (23ºC) per the requirements of Plastic Pipe Institute (PPI), *TR-3*, and complies with the National Sanitation Foundation Standard, *No. 61*, for water service.

E. Fusion Technician

1. Fusion Technician shall be fully qualified by the pipe supplier to install Fusible PVC of the type(s) and size(s) being used. Qualifications shall be current as of the actual date of fusion performance on the project.

F. Fusion Joints

1. Unless otherwise specified, fusible PVC pipe lengths shall be assembled in the field with butt-fused joints. Contractor shall follow the pipe suppliers written guidelines for this procedure. All Fusion joints shall be completed as descripted in these specifications.

2.4 JOINTS

A. For pipe manufactured in accordance with ASTM D3034 joints shall be of the push-on bell and spigot type and shall be manufactured in accordance with ASTM D3212.

B. For pipe manufactured in accordance with AWWA C900 joints shall be of the push-on bell and spigot type and shall be manufactured in accordance with ASTM D3139.

C. All gaskets shall be of an o-ring type in accordance with ASTM F477.

D. All bells shall be formed integrally with the pipe and shall contain a factory installed elastomeric gasket, which is positively retained.

E. Only lubricant that is specified by the pipe manufacturer shall be used.

F. Solvent cement joints are strictly prohibited.

PART 3 - EXECUTION

3.1 INSPECTION

A. In addition to any deficiencies covered by ASTM D3034 and AWWA C900, PVC pipe which has any of the following visual defects will not be accepted:

1. Straight pipe, measured from the concave side, shall not deviate from straight greater than 1/16-inch per foot of pipe length.

2. Pipe which is sufficiently out-of-round to prohibit proper joining or be able to pass a mandrel test.

3. Improperly formed bell and spigot ends.

4. Fractured, cracked, chipped, dented, abrasions, or otherwise damaged pipe.

5. Pipe that has been damaged during shipment or handling. Acceptance of the pipe at point of delivery will not relieve the Contractor of full responsibility for any defects in material of the completed pipeline.

B. Damaged or flawed pipe shall be rejected, marked, and removed from the site.

3.2 PREPARATION

A. Reference construction specifications *Section 02315, Excavation and Fill.*

B. Cutting Pipe

1. Cut pipe smooth, straight and at right angles to the pipe axis with saws or pipe cutters designed specifically for the material.

2. Remove burrs and wipe off all dust from the jointing surfaces.

3. Bevel the cut end in accordance with manufacturer's recommendation.

4. Do not disturb previously installed joints during cutting operations.

C. Joints

1. Dirt, oil, grit, and other foreign matter shall be removed from the inside of the bell and the outside of the spigot.

2. A thin film of pipe lubricant shall be applied to the inside surface of the gasket and the spigot end of the pipe, per the manufacturer's recommendation.

3. The lubricated joint surface shall be kept clean until joined.

3.3 INSTALLATION

A. Sanitary sewer pipe construction shall be done in accordance with these specification section, City of Greeley accepted Construction Drawings and construction specifications *Section 02530, Sanitary Utility Sewerage Piping* and *Section 02315, Excavation and Fill.*

B. No sanitary sewer pipe may be covered or backfilled until inspection of pipe and bedding has been made or City Inspector has given approval.

C. Joints

1. The pipe shall be joined to the tolerances recommended by the manufacturer (i.e., home line).

2. Stabbing of the pipe is not allowed.

3. Previously completed joints shall not be disturbed during the jointing operation.

4. All joints shall be watertight and free from leaks.

5. Test all pipe under concrete and asphalt construction prior to placing concrete or asphalt.

6. Support and block pipe as necessary to prevent flotation in high groundwater.

3.4 FUSION PROCESS

A. General

1. Fusible PVC pipe to be handled in a safe and non-destructive manner before, during and after the fusion process and in accordance with this specification and the pipe's supplier's guidelines

2. Fusible PVC pipe will be fused by a qualified fusion technician, as documented by the pipe supplier

3. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine

4. Only appropriately sized and outfitted fusion machines that have been approved by the pipe manufacture shall be used in the fusion process. Fusion machines must incorporate the following elements:

a. Heat Plate – Heat plates shall be good condition with no deep gouges or scratches. Plates shall be clean and free of any debris or contamination. Heater controls shall function properly; cord and plug shall be in good condition. The appropriately sized heat plate shall be capable of maintaining a uniform and consistent heat profile and temperature for the size of pipe being fused, per the pipe supplier's guidelines.

b. Carriage – Carriage shall travel smoothly with no binding at less than 50 psi. Jaws shall be in good condition with proper inserts for the pipe size being fused. Insert pins shall be installed with no interference to carriage travel.

c. General Machine – Overview of machine body shall yield to obvious defects, missing parts, or potential safety issues during fusion.

d. Data Logging Device – An approved data logging device with current version of pipe suppliers recommendation and compatible software shall be used. Datalogging device operation and maintenance manual shall be with the unit at all times. If fusing for extended periods of time, an independent 110 V power source shall be available to extend battery life.

5. Other equipment specifically required for the fusion process shall include the following:

    a. Pipe rollers shall be used for support of the pipe to either side of the machine

    b. A weather protection canopy that allows full machine motion of the heat plate, fusion assembly and carriage shall be provided for fusion in inclement, extreme temperatures, and / or windy weather, per the pipe suppliers recommendations

    c. An infrared (IR) pyrometer for checking pipe and heat plate temperatures.

    d. Fusing machine operations and maintenance manual shall be kept with the fusion machine at all times.

    e. Face blades specifically designed for cutting fusible PVC pipe shall be used.

B. Joint Recording

1. Each fusion joint shall be recorded and logged by an electronic monitoring device (data logger) connected to the fusion machine. The fusion data logging and joint report shall be generated by software developed specifically for the butt-fusion of fusible polyvinyl chloride pipe. The software shall register and / or record the parameters required by the supplier and these specifications. Data not logged by the data logger shall be logged manually and be included in the Fusion Technician's joint report.

3.5 FUSION PIPE INSTALLATION

A. General Installation

1. Installation guidelines from the pipe supplier shall be followed for all installations.

2. The fusible PVC pipe will be installed in a manner so as not to exceed the recommended bending radius.

3. Where fusible PVC pipe is installed by pulling in tension, the recommended Safe Pulling Forces established by the pipe supplier shall not be exceeded.

B. Connections to Existing and New Piping Systems

1. Approximate locations for existing piping syste3ms are shown in the construction documents. Prior to making connection into existing piping systems, the contractor shall:

    a. Field verify locations, size, piping material, and piping system of the existing pipe.

b. Obtain all required fittings, which may include saddles, sleeve type couplings, flanges, tees, or other as shown in the construction documents.

c. Allow all piping that has been installed to relax for a period of 24 hours or longer before making final connections.

d. Have installed all temporary pumps and / or pipes in accordance with the established connection plans.

2. Unless otherwise approved, new piping systems shall be completely assembled and successfully tested prior to making connections into existing pipe systems.

C. Cutting the pipe.

1. Cut pipe smooth, straight and at right angles to the pipe axis with saws or pipe cutters designed specifically for the material.

2. Remove burrs and wipe off all dust from the jointing surfaces.

3. Bevel the cut end in accordance with manufacturer's recommendation.

4. Do not disturb previously installed joints during cutting operations.

D. Field joints.

1. Use push-on joints for buried pipe except where indicated otherwise on the Construction Drawings.

2. Dirt, oil, grit, and other foreign matter shall be removed from the inside of the bell and the outside of the spigot.

3. A thin film of lubricant shall be applied to the inside surface of the gasket and the spigot end of the pipe, per the manufacturer's recommendation.

4. The lubricated joint surface shall be kept clean until joined.

E. Bending

1. Bending of pipe can be up to 75% of manufacturers recommendation.

3.6 FIELD QUALITY CONTROL

A. Refer to construction specification *Section 02530, Sanitary Utility Sewerage Piping*.

SECTION 02534

SANITARY SEWER SERVICE LINES

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the furnishing and installation of sanitary sewer service lines, clean-outs, and other appurtenances.

B. Reference construction specification *Section 02530, Sanitary Utility Sewerage Piping*.

PART 2 – PRODUCTS

2.1 PIPE

A. Reference construction specification *Section 02533, Polyvinyl Chloride (PVC) Non-Pressure Pipe*.

B. Piping shall be a minimum of 4” diameter. Pre-approval from the City required for 3” diameter.

2.2 SANITARY SERVICE SADDLE

A. City to supply service saddle for connection to existing sewer mains.

B. Contractor to supply service saddle for connection to new sewer mains.

C. Acceptable manufacturer is:

1. Geneco Sealtite

2.3 FLEXIBLE COUPLINGS

A. Flexible coupling may be used when bell and spigot pipe joints cannot be made.

B. Acceptable flexible coupling manufacturers are:

1. Fernco – Strong Back

2. Or approved equivalent.

2.4 TRACER WIRE AND TEST STATIONS

A. Reference construction specification *Section 02510, Water Utility Distribution Piping* for tracer wire products, manufacturers, and requirements.

PART 3 – EXECUTION

3.1 GENERAL

A. Only those Contractors licensed and bonded with the City of Greeley will be permitted to install sanitary sewer service connections.

B. Sanitary sewer service connections shall be installed at locations designated on the City accepted

Construction Drawings.

3.2 The Contractor shall mark the location of the sanitary sewer service with a stamped "S", four-inches (4") high, three-inches (3") wide into the face of the curb and gutter.

3.3 TRENCHING, BACKFILLING, AND COMPACTION

A. Reference construction specification *Section 02315, Excavation and Fill*.

3.4 TAPS

A. Unless the City gives prior approval, only City personnel shall make service taps on existing mains that have been final accepted by the City. Tapping of existing sewer line to be scheduled with City at least 72 hours prior to construction at (970) 350-9322.

B. The Contractor shall not make any taps without permission from the City.

C. Wyes and bends shall not be permitted for service connections unless previously approved in writing by the City.

D. Taps shall not be made within five (5) feet of a manhole.

E. The spring line of the service connection shall be a minimum one-inch (1") above the spring line of the sanitary sewer collection main and no closer than three (3) feet to the bell or spigot of the pipe.

F. Reference City of Greeley Standard Drawings.

3.5 SERVICE LINES

A. All sanitary sewer services shall be extended at a constant grade from the tap on the collection main to the building.

B. Sanitary sewer service lines shall be uniform in size from the tap to the building.

C. Sanitary sewer service trenches shall be subject to compaction specifications. Reference construction specification, *Section 02315, Excavation and Fill*.

D. The end of all sanitary sewer services will be plugged with an airtight cap or plug.

E. The end of all sanitary sewer services shall be marked with a 2-inch by 4-inch (2" x 4") exterior grade, pressure treated, lumber wood post.

1. All wooden posts shall extend from the end of the service to a point two (2) feet, minimum, above the ground surface and shall be painted green.

2. Adequate steel that can be located by a ferrous metal detector should be placed at the end of the service. The steel shall be installed at an adequate depth so it will not be disturbed by grading and construction operations.

3. Maintenance of the marker posts shall be the responsibility of the Contractor until the sanitary sewer system has been accepted by the City. After the system has been accepted by the City, the Owner or Developer shall be responsible for maintaining the marker posts until the service line is completed to a structure.

F. Tracer Wire

1. Reference construction specification *Section 02510, Water Utility Distribution Piping* for tracer wire product and installation specifications as applicable.

2. Tracer wire shall be installed per Water & Sewer Standard Drawings.

G. Test Station

1. Test stations shall be installed per Water & Sewer Standard Drawings, latest revision.

2. Test stations to be installed by builder at service cleanout near structure.

SECTION 02535

SANITARY UTILITY SEWERAGE MANHOLES, FRAMES, AND COVERS

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses sanitary sewer manholes and includes the acceptable products, materials, and construction practices to be used in the construction and installation of manholes.

B. Manholes shall be furnished with all accessories, including base, cone section, gaskets, and ring and cover.

1.2 REFERENCES

A. American Concrete Institute (ACI)

1. 350-06, *Code Requirements for Environmental Engineering Concrete Structures & Commentary*, latest revision.

2. 440.1R-15, *Guide for the Design and Construction of Structural Concrete Reinforced with Fiber-Reinforced Polymer (FRP) Bars*, latest revision.

3. 548.6R-96, *Polymer Concrete-Structural Applications State-of-the-Art Report*, latest revision

B. ASTM International (ASTM)

1. A48, *Standard Specification for Gray Iron Castings*, latest revision.

2. A615, Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement, latest revision.

3. A996, Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement, latest revision.

4. A1064, *Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete*, latest revision.

5. B108, *Standard Specification for Aluminum-Alloy Permanent Mold Castings*, latest revision.

6. B179, *Standard Specification for Aluminum Alloys in Ingot and Molten Forms for Castings from All Castings Processes*, latest revision.

7. C33, *Standard Specification for Concrete Aggregates*, latest revision.

8. C144, *Standard Specification for Aggregate for Masonry Mortar*, latest revision.

9. C150, *Standard Specification for Portland Cement*, latest revision.

10. C207, *Standard Specification for Hydrated Lime for Masonry Purposes*, latest revision.

11. C443, *Standard Specification for Joints for Concrete Pipe and Manholes Using Rubber Gaskets*, latest revision.

12. C478, *Standard Specification for Circular Precast Reinforcement Concrete Manhole Sections*, latest revision.

13. C497, *Standard Test Method for Concrete Pipe, Manhole Sections, or Tile*, latest revision.

14. C579, *Standard Test Methods for Compressive Strength of Chemical-Resistant Mortars, Grouts, Monolithic, Surfacing, and Polymer Concretes*, latest revision.

15. C580, *Standard Test Method for Flexural Strength and Modulus of Elasticity of Chemical-Resistant Mortars, Grouts, Monolithihc Surfacings, and Polymer Concretes*, latest revision.

16. C857, *Standard Practice for Minimum Structural Design Loading for Underground Utility Structures*, latest revision.

17. C923, *Standard Specifications for Resilient Connectors between Concrete Manholes Structures and Pipe*, latest revision.

18. C990, *Standard Specification for Joints for Concrete Pipe, Manholes, and Precast Box Sections Using Preformed Flexible Joint Sealants*, latest revision.

19. D648, *Test Method for Deflection Temperature of Plastics Under Flexural Load in Edgewise Position*, latest revision.

20. D1248, *Standard Specification for Polyethylene Plastics Extrusion Materials for Wire and Cable*, latest revision.

21. D 2584, *Test Method for Ignition Loss of Cured Reinforced Resins*, latest revision.

22. D4101, *Standard Specification for Polypropylene Injection and Extrusion Materials*, latest revision.

23. D4976, *Standard Specification for Polyethylene Plastics Molding and Extrusion Materials*, latest revision.

24. D6783, *Standard Specification for Polymer Concrete Pipe*, latest revision.

1.3 SUBMITTAL REQUIREMENTS

A. Conform to bid document requirements

B. Submit manufacturer’s data and details of following items for approval:

1. Shop drawings of manhole sections, base units and construction details, jointing methods, materials, and dimensions

2. Summary of criteria used in manhole design including, as minimum, material properties, loading criteria, and dimensions assumed. Include certification from manufacturer that polymer concrete manhole design meets or exceeds the load and strength requirements of ASTM C478 and ASTM C857, reinforced in accordance with ACI 440.1R-15.

3. Frames, grates, rings, and covers

4. Materials to be used in fabricating pipe drop connections

5. Materials to be used for pipe connections

6. Materials to be used for stubs and stub plugs, if required

C. Submitted sealed drawings by a registered Professional Engineer in the State of Colorado

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Manholes shall be delivered, handled, stored, and protected in such a manner as to prevent damage to materials. Rubber gaskets shall be stored in a clean area away from grease, oil, ozone producing electric motors, heat and direct rays of the sun.

B. All joint surfaces shall be free from dirt, oil, and grease at the time of installation.

PART 2 – PRODUCTS

2.1 GENERAL

A. AASHTO HS-20 design, or as required loading applied to manhole cover and transition and base slabs

2.2 PRECAST CONCRETE MANHOLES

A. Precast manhole bases, barrels, and cone sections shall be manufactured in accordance with ASTM C478 and shall be made with Type I/II cement. All cone sections shall be the eccentric type with the exception of shallow (flat top) manholes

B. Concrete and Reinforcing Materials

1. All reinforcing materials shall conform to ASTM A1064, ASTM A615, and ASTM A996.

2. Reference construction specifications *Section 03400, Precast Concrete*.

2.3 MICROBIAL INDUCED CORRSION PROTECTION FOR NEW MANHOLES

A. POLYMER CONCRETE

1. Polymer Concrete Manholes

a. Provide polymer concrete manhole sections, monolithic base sections and related components referencing to ASTM C 478. ASTM C 478 material and manufacturing is allowed compositional and dimensional differences required by a polymer concrete product

b. Provide base riser section with monolithic floors, unless shown otherwise

c. Provide riser sections joined with bell and spigot / ship-lap design seamed with butyl mastic and or rubber gaskets (ASTM C990) so that on assembly, manhole base, riser and top section make a continuous and uniform manhole structure

d. Construct riser sections for polymer concrete manholes from standard polymer concrete manhole sections of the diameter indicated on drawings. Use various lengths of polymer concrete manhole sections in combination to provide correct height with the fewest joints

e. Design wall sections for depth and loading conditions with wall thickness as designed by polymer concrete manufacturer

f. Provide tops to support AASHTO HS-20 loading or loads as required and receiving cast iron frame covers or hatches, as indicated on drawings

g. Acceptable manufactures:

i. Armorock LLC

ii. Or approved equivalent.

2. Polymer Manhole Design Criteria

a. Polymer Concrete Manhole risers, cones, flat lids, grade rings and manhole base sections shall be designed by manufacturer to meet the intent of ASTM C 478 with allowable compositional and sizing differences as designed by the polymer concrete manufacturer.

i. AASHTO HS-20 design or as required loading applied to manhole cover and transition and base slabs

ii. Polymer manholes will be designed based upon live and dead load criteria in ASTM C 857 and ACI 350-06

iii. Unit soil weight of 120 pcf located above portions of manhole, including base slab projections

iv. Internal liquid pressure based on unit weight of 63 pcf

v. Dead load of manhole sections fully supported by polymer concrete manhole base

3. Polymer Manhole Design

i. Polymer Concrete Manhole risers, cones, flat lids, grade rings and manhole base sections shall be designed by manufacturer to meet loading requirements of ASTM C 478, ASTM C 857 and ACI 350-06 as modified for polymer concrete manhole design as follows:

ii. Polymer Concrete Mix Design shall consist of thermosetting resin, sand, and aggregate. No Portland cement shall be allowed as part of the mix design matrix. All sand and aggregate shall be inert in an acidic environment

iii. Reinforcement – Shall use acid resistant reinforcement (FRP Bar) in accordance with ACI 440.1R-06 as applicable for polymer concrete design

iv. The wall thickness of polymer concrete structures shall not be less than that prescribed by the manufacturer's design by less than 95% of stated design thickness

v. Thermosetting Resin - The resin shall have a minimum deflection temperature of 158° F when tested at 264 psi (1.820 mPa) following Test Method D 648. The resin content shall not be less than 7% of the weight of the sample as determined by test method D 2584. Resin selection shall be suitable for applications in the corrosive conditions to which the polymer concrete manhole structures will be exposed

vi. Each polymer concrete manhole component shall be free of all defects, including indentations, cracks, foreign inclusions and resin starved areas that, due to their nature and degree or extent, detrimentally affect the strength and serviceability of the component part. Cosmetic defect shall not be cause for rejection. The nominal internal diameter of manhole components shall not vary more than 2%. Variations in height of two opposite sides of risers and cones shall not be more the 5/8 inch. The under run in height of a riser or cone shall not be more than ¼ in/ft of height with a maximum of ½ inch in any one section

vii. Marking and Identification - Each manhole shall be marked with the following information - Manufacturer's name or trademark, Manufacturer's location and Production Date

viii. Manhole joints shall be assembled with a bell/spigot or shiplap butyl mastic and/or gasketed joint so that on assembly, manhole base, riser and top section make a continuous and uniform manhole. Joint sealing surfaces shall be free of dents, gouges and other surface irregularities that would affect joint integrity

ix. Minimum clearance between wall penetrations and joints shall be per manufacturer's design

x. Construct invert channels to provide smooth flow transition with minimal disruption of flow at pipe-manhole connections. Invert slope through manhole is as indicated on drawings. All precast base sections to be cast monolithically. Polymer bench and channel are to be constructed with all polymer concrete material. Extended ballast slab requirements for buoyancy concerns can be addressed with cementitious concrete material

xi. Provide resilient connectors conforming to requirements of ASTM C 923 or other options as available. All connectors are to be watertight. Install approved resilient connectors at each pipe entering and exiting manholes in accordance with manufacturer's instructions

B. ANTIMICROBIAL CYSTALLINE WATERPROOFING ADMIXTURE

1. Acceptable manufactures:

a. Xypex Bio-San C500

b. Or approved equal

2. System Performance Requirements

a. Testing Requirements: Antimicrobial crystalline waterproofing system shall have been tested in accordance with the following standards and conditions and as per the manufacturer's dosage range, and the testing results shall meet or exceed the performance requirements as specified herein.

b. Independent Laboratory: Testing shall have been performed by an accredited independent laboratory meeting the requirements of ASTM E329 or other applicable international standard for certification of testing laboratories.

c. Indicator: The Admixture shall include an indicator that visually identifies concrete that includes Xypex Bio-San C500.

d. Antimicrobial Effect: Independent testing shall be performed according to ISO 22196 (Mod.) "Measurement of Antibacterial Activity on Plastics and other Non-Porous Surfaces". Treated and non-treated control concrete samples shall be tested, and a definite anti-microbial effect shall be evidenced by a significant reduction in formation of Thiobacillus Novellus / Starkeya Novella bacteria on the treated samples versus the non-treated samples.

e. Concrete Corrosion Rate: Treated and non-treated control concrete samples shall be tested in a live wastewater environment with high concentrations of H2S. Treated samples shall show at least 9 times less mass loss after 10 years as compared to control samples.

f. Long-term Antimicrobial Action and Efficacy: The antimicrobial admixture must show long-term antimicrobial action and efficacy as demonstrated by minimal bacterial concentration on the treated concrete after 10 years exposure to an elevated H2S live wastewater environment.

g. Crystalline Formation: Crystallizing capability of waterproofing system shall be evidenced by independent SEM (Scanning Electron Microscope) photographs showing crystalline formations within the concrete matrix.

h. Permeability 1: Independent testing shall be performed according to a U.S. Army Corps of Engineers CRD-C48 (Mod.) "Permeability of Concrete". Concrete samples shall be pressure tested to 150 psi (350-foot head of water) or 1.05 MPa (106 m head of water). After 5 days the untreated samples shall leak, and the treated samples shall exhibit no measurable leakage.

i. Permeability 2: Independent testing shall be performed according to EN 12390-8. Treated samples shall be exposed to water with a pressure of 0.5 MPa for 72 hours. Treated samples must exhibit a reduction in permeability coefficient of at least 80% when compared to control concrete. Control samples must have a depth of penetration of at least 50 mm.

j. Sulfuric Acid Resistance: Independent testing shall be performed to determine "Sulfuric Acid Resistance of Concrete Specimens". Treated concrete samples dosed at 3% shall be tested against untreated control samples. All samples shall be immersed in 7% sulfuric acid and weighed daily until a control sample reaches a mass loss of 50%. On final weighing the percentage mass loss of the treated samples shall be significantly lower than the control samples.

k. Sulfate Resistance: Independent testing shall be performed to determine "Sulfate Resistance of Concrete Specimens" treated with integral crystalline admixture. Treated and untreated samples shall be immersed in a concentrated sulfate solution for at least 4 months. On final weighing the percentage mass loss of the treated samples shall be significantly lower than the control samples.

l. Compressive Strength: Concrete samples containing the antimicrobial crystalline waterproofing additive shall be tested against an untreated control sample of the same mix. At 28 days, the treated samples shall exhibit equal or increased compressive strength over the control sample.

3. Xypex Bio-San C500 must be added to concrete mix at batch plant.

4. The antimicrobial crystalline powder shall be added to the concrete mix at 1% by weight of the cementitious material content

C. PERFECT LINED MANHOLE SYSTEM

1. Perfect Lined Manhole System

a. Provide Perfect Lined Manhole System components which include monolithic base, risers, conical tops or flat lids and grade rings designed and manufactured in accordance with ASTM C478.

b. Monolithic concrete base section shall be lined with prefabricated one-piece homogeneous fiber reinforced polymer (FRP) compound with a minimum thickness of 0.197-in (5mm).

c. The sanitary sewer baseliner shall include:

i. Full flow channels with side walls to the crown of the pipe(s).

ii. A non-skid pattern on inner bench surfaces.

iii. Pipe connections with specified invert elevations and slopes for incoming pipes.

iv. The standard vertical side wall (skirt) height above the bench shall be 2-in minimum.

v. Other skirt heights, as agreed upon between the purchaser and the manufacturer.

d. Riser sections to be lined with HDPE Perfect Liner sheets with a minimum thickness of 0.065-in (1.65mm).

e. Manhole flat lids and cones to be lined with FRP.

f. Manhole joints shall be assembled with a bell and spigot with SDV seal gaskets per ASTM C443. Joint sealing surfaces shall be free of dents, gouges, and other surface irregularities. The joints and complete assembly shall pass vacuum test per ASTM C1244.

g. The minimum clear distance between two wall penetrations shall be 6 inches. Minimum clear distance between penetrations and joint seams shall be 3 inches.

2. Basis of Design

a. Concrete sewer manholes shall be manufactured from self-consolidating concrete (SCC) with a minimum compressive strength of 4,000 PSI conforming to material and performance standards of ASTM C-478.

b. Cement for the manholes shall conform to ASTM C-150, Type II-V. All sand and aggregate shall be nonreactive in an acid environment.

c. Perfect Manhole system to support AASHTO HL-93 or HS-20 loads.

3. Joints

a. Elastomeric gasket material shall be produced from EPDM 5055 rubber and

b. manufactured by D+S SDV Seal.

c. B. Installed joints shall be capable of holding constant internal pressure of 30 PSI.

4. HDPE Lining

a. The interior of the manhole risers shall be lined with a High-Density Polyethylene (HDPE) concrete protective liner (CPL) with a minimum thickness of 1.65 mm. The CPL shall have a minimum of (94 qty) anchors per square foot extruded as one homogeneous piece.

b. All edges of the HDPE CPL shall be covered with a EPDM liner clip manufactured by D+S Sealants.

c. HDPE CPL shall be capable of resisting groundwater pressure up to 30 PSI.

5. FRP Lining

a. The interior of the manhole base section and flow channels shall be coated prior to casting with a FRP factory spray coating a minimum of 0.197-in (5 mm) thickness.

b. FRP coating shall have spray bonded embeds on the back side of the base liner section.

c. When monolithically cast into the base shell the structure the FRP liner shall be capable of resisting groundwater pressure up to 30 PSI.

d. At the discretion of the manufacturer the FRP coating may be used in all or part of the liner fabrication for the cone.

6. Acceptable manufactures:

a. Geneva Pipe and Precast

b. Or approved equal

7.

2.4 CAST-IN-PLACE MANHOLES

A. All fine and coarse aggregate shall conform to ASTM C33. Fine aggregate shall be clean, sharp, natural sand. Coarse aggregate shall be clean, strong crushed gravel or stone.

B. All deformed reinforcing bars shall conform to ASTM A615 or ASTM A996. All bars shall be Grade 60.

C. All welded steel wire fabric shall conform to ASTM A1064.

D. Concrete used in cast-in-place manholes shall develop a minimum compressive strength of 3,500 psi after 28 days. Concrete shall have a maximum allowable water/cement ratio of 0.50, by weight.

E. Reference construction specification *Section 03300, Cast-in-Place Concrete*.

2.5 GRADE ADJUSTMENT RINGS

A. Precast grade adjustment rings shall be manufactured in accordance with ASTM C478 and shall be made with Type I/II cement.

B. Grade adjustment rings shall be a maximum of 8-inch (8").

C. High Density Polyethylene (HDPE) grade adjustment rings shall be manufactured in accordance with ASTM D4976. Acceptable manufacturers are:

1. LADTECH, Inc.

2. Or approved equivalent.

2.6 GROUT – CONCRETE MANHOLE

A. Grout shall be pre-mixed or job-mixed non-shrink and non-metallic.

B. The acceptable types and manufacturers for pre-mixed, non-shrink, non-metallic grout are:

1. QUIKRETE ® - Hydraulic Water – Stop Cement #1126

2. DAYTON Superior – Re-Crete 20 Minute Set

3. Or approved equivalent.

2.7 GROUT – POLYMER MANHOLE

A. All materials needed for grouting and patching will be a polyester mortar compound provided by the manufacturer or an approved equal by the manufacturer

2.8 RING AND COVER

A. All rings shall be maximum eight-inch (8") in height and have an internal diameter of twenty-four inches (24").

B. Standard iron ring and covers shall be HS-20 load capable gray iron conforming to ASTM A48 Class 305B, with a black bituminous finish.

1. The word "SEWER" shall be cast in the cover.

2. Horizontal bearing surfaces of all rings and covers shall be machined to eliminate any rocking action or non-uniform bearing.

3. Pick-hole shall be one and on-half inch (1 ½") wide by one-half inch (½") deep.

4. Acceptable rings and covers are:

   a. Castings, Inc. – MH-250-24 CI

   b. Or approved equivalent.

C. For manholes in traffic areas, covers shall be HS-20 load capable and meet the same criteria listed above. For non-pedestrian traffic areas, covers shall be non-perforated checker pattern with maximum 3/16 inch (3/16") raised pattern. For pedestrian traffic areas, manhole covers shall also have a non-skid pattern, complying with American with Disabilities Act (ADA) requirements.

1. Covers shall be bolt down and not rock under traffic.

2. Acceptable ADA covers are:

   a. Castings, Inc. – MH-310-24CI

   b. Or approved equivalent.

D. Manhole covers located within designated 100-year floodplains and areas subject to water inundation shall meet the criteria listed above for standard iron ring and covers as well as the following:

1. Cover shall be the non-perforated, solid, bolt down,gasket type cover.

   i. Gasket shall be 1/8"x3/4" Rubber

   ii. Or approved equivalent.

2. Ring and covers shall be HS-20 load capable gray iron conforming to ASTM A48 Class 30, with black coat finish.

3. The word "SEWER" shall be cast in the cover.

4. Acceptable manufacturers are:

   a. Castings, Inc.

   b. Pamrex

   c. Rexus

   d. Or approved equivalent.

2.9 MANHOLE ENCAPSULATION SYSTEM

A. Manhole encapsulation is required when groundwater is present or expected to be present in the area.

B. Heat-shrinkable sleeves shall be high shrink irradiated and cross-linked polyethylene impermeable backing, coated with protective heat activated adhesive.

C. A separate closure seal shall be provided to secure the sleeve in place during installation and seal overlap area.

D. Approved sleeve manufacturers are:

1. WrapidSeal™

2. Or approved equivalent.

E. Approved primer manufacturers are:

1. WrapidSeal™ "G" Primer

2. Or approved equivalent.

2.10 STEPS

A. Steps in manholes shall not be installed unless approved otherwise by the Water and Sewer Department.

2.11 PREFORMED MASTIC GASKETS

A. All preformed mastic gaskets shall conform to Federal specifications SS-S-00210 (210-A). Type I, rope form.

B. The diameter of the preformed mastic gasket shall be 1.5 inches (1.5").

C. The application temperature range shall be between 40ºF and 110ºF.

D. Gasket is to be pliable.

E. Approved gasket manufacturers are:

1. Hamilton-Kent Manufacturing Co. – Kent Seal

2. Con Seal – CS-202

3. RAM-NEK – RN101

4. Or approved equivalent.

2.12 MODULAR SEALING UNITS

A. Link-Seal®

B. Or approved equivalent.

2.13 DROP MANHOLE BOWL

A. Reliner®

B. Or approved equivalent.

2.14 INTERIOR MANHOLE COATING

A. See construction specifications *Section 02957 A, Sewer Manhole Rehabilitation* and *Section 02957 B, Sewer Manhole Coating* for additional information.

2.15 MANHOLE PIPE PENETRATION SEALS

A. For pipe penetrations in a cast-in-place manhole base, an approved expanding hydrophilic waterstop/swellstop seal on pipe barrel shall be used. Approved swellstop manufacturers are:

1. Sika – Strip Applied Waterstops (Swellstop)
2. Aquafin – Waterstop-strip
3. Or approved equivalent.

B. For pipe penetrations in a pre-cast manhole base, an approved rubber boot connector seal on pipe barrel shall be used. Approved rubber boot connector manufacturers are:

1. A-LOK – Boot Connectors
2. Or approved equivalent

PART 3 – EXECUTION

3.1 INSPECTION

A. Manholes and accessories shall be inspected for cracks, abrasions, or other flaws prior to installation.

B. Damaged or flawed manholes and accessories shall be rejected, marked, and removed from the site.

3.2 PREPARATION

A. Reference construction specification *Section 02315, Excavation and Fill*.

3.3 MANHOLE INSTALLATION

A. Manholes shall be installed in accordance with Standard Drawings and be constructed in accordance with the approved Construction Drawings.

B. Flat-top manholes are required whenever the distance between the finished ground surface and the manhole barrel section does not allow room for a cone section.

1. Access holes for flat-top manholes shall be offset from center.

2. If the distance from the manhole cover to the invert of the sanitary sewer line main is less than 3 feet, the access hole shall be centered.

C. Cast-In-Place Concrete Base

1. Invert channels shall be smooth and semi-circular in shape conforming to the inside of the adjacent sanitary sewer pipe section.

2. Form inverts directly in the concrete of the base, or for a straight through manhole with no other inlets the channel may be constructed by laying a full pipe section through the manhole and cutting out the top half of the pipe after the surrounding concrete has hardened.

3. Changes in direction of flow shall be made with a smooth curve having as large a radius as the manhole will permit.

4. The floor of the manhole outside of the channels shall have a smooth trowel finish and shall slope toward the channels at one-inch (1") per foot.

5. Pipe size changes shall be accomplished by matching the pipe crowns and forming the channel to accommodate the pipe size differential.

6. Where shown on the approved Construction Drawings, a piece of pipe of the proper size shall be built into the manhole where future laterals may be connected. The stub-out shall be sealed with a plug at its outer end and an invert shall be built into each manhole for such lateral connections.

7. Manhole bases shall be thoroughly bonded to the barrel of the pipe.

   a. Install an approved rubber gasket on the pipe barrel.

   b. All connections with the pipe shall be made without projections or voids.

   c. Inverts must meet the requirements of the City.

D. Manholes shall be constructed at the location and to the elevation indicated on the accepted Construction Drawings, or as stated by the City to accommodate field conditions.

1. Reference construction specification *Section 02530, Sanitary Utility Sewerage Piping*.

2. All buried manhole covers shall be referenced to a minimum of two (2) permanent surface references and recorded on the As-Constructed Record Drawings.

E. The manhole shall be set plumb.

F. Manhole sections shall be joined to each other using performed flexible plastic gaskets on both interior and exterior shiplaps. The manhole section shall be joined to the base using a double row of preformed flexible plastic gaskets.

1. All joint surfaces shall be kept clean and dry during installation.

2. Gaskets shall be pliable at the time of installation.

3. Primer shall be used on both section/base surfaces unless otherwise directed by the City.

G. Adjustment rings, and ring covers shall be joined to the manhole section and to each other using flexible plastic gaskets.

1. All joint surfaces shall be kept clean, dry, and warm during installation.

2. Manhole section shall be grouted to ring and covers on the inside.

H. All lifting holes, joints, and other imperfections shall be filled with non-shrink grout, to provide a smooth finished appearance.

3.4 CONNECTIONS TO EXISTING MANHOLES

A. Construct in such a manner that the finished work conforms to the requirements specified for new manholes.

B. Connections shall be made by core-drilling as small a hole as necessary to insert the new pipe and modular sealing unit. Chipping or breaking out manhole walls is not allowed. Use of a rotary hammer is not acceptable.

C. Grind the existing manhole base to the cross-section of the new pipe and finish with grout to form a smooth continuous invert. Chipping or breaking out the manhole base is not acceptable.

D. Seal the annular space between the pipe and existing manhole wall with a modular sealing unit and smooth finish inside the manhole wall with non-shrink grout.

E. Flow is to be maintained through temporary pumping. Prior approval of the proposed pumping plan shall be obtained from the City.

3.5 MANHOLE TESTING

A. Testing to be completed in compliance with construction specification *Section 01715, Sewer and Manhole Testing*

SECTION 02666

NON-POTABLE POND LINERS

PART 1 - GENERAL

1.1 SCOPE

A. This specification covers pond liners using High Density Polyethylene (HDPE), Linear Low Density Polyethylene (LLDPE), Ethylene Propylene Diene Monomer (EPDM), and Polypropylene (FPP) flexible polypropylene liner, Nonwoven Geotextile, seams, gaskets, metal battens, bolts, embed channels, clamps, and sealant.

1.2 REFERENCES

A. ASTM International (ASTM)

1. C33/C33M, *Standard Specification for Concrete Aggregates*, latest revision.

2. D5199, *Standard Test Method for Measuring the Nominal Thickness of Geosynthetics*, latest revision.

B. American Water Works Association (AWWA)

1. C652, *Disinfection of Water-Storage Facilities*, latest revision.

1.3 ABBREVIATIONS

A. HDPE – High Density Polyethylene Geomembrane

B. LLDPE – Linear Low Density Polyethylene Geomembrane

C. LLDPE-R – Reinforced Linear Low-Density Polyethylene Geomembrane,

D. EPDM – Ethylene Propylene Diene Terpolymer Geomembrane

E. FPP – Flexible Polypropylene Geomembrane

F. FPP-R – Reinforced Flexible Polypropylene Geomembrane

1.4 SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, and accessories for geomembrane liners.

B. Shop Drawings: Include panel layout, seams, penetrations, perimeter anchorage, and methods of attachment and sealing to other construction. Differentiate between factory and field seams and joints.

C. Samples: For each exposed product and for each color specified. Include one 12-inch (300-mm) seam length for factory-bonded sheets and one 12-inch (300-mm) seam length for field-bonded sheets.

D. Qualification Data: For Installer.

E. Product Certificates: For each type of geomembrane liner.

F. Product Test Reports: For each geomembrane sheet, for tests performed by a qualified testing agency.

G. Source quality-control reports.

H. Field quality-control reports.

I. Sample Warranty: For manufacturer's special warranty.

J. Maintenance Data: For geomembrane liner to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. All flexible membrane installations shall be certified by the installer or manufacturer as meeting the material and installation requirements of the plans and specifications.

1.6 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair or replace geomembrane liner that fail(s) in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Leaks in geomembrane liner.

b. Defects in seams.

c. Cracks and holes in floating cover.

2. Warranty Period: twenty-five (25) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain geomembrane liner, accessories, and required seaming materials, solvents, and adhesives from single source.

2.2 PERFORMANCE REQUIREMENTS

A. Provide geomembrane liners that prevent the passage of water.

B. Anchor liners to pre-vent uplift due to wind or slippage down the side slope.

C. Subsurface conditions such as soil type and groundwater levels will dictate the direction and scope of the design of the drainage and venting system beneath the geomembrane liner. An inadequate drainage and venting system may result in floating of the geomembrane liner. Hydrostatic pressures from fluctuating groundwater levels or leakage through the liner may cause the liner to float. Gas production and buildup beneath the liner due to the presence of organic material in the soil or leachate leakage through the liner may cause “whales” or bubbling of the liner.

D. If the groundwater level may be near the invert elevation of the pond, groundwater monitoring should be conducted during the site investigation to verify the expected water table location. In some situations, it may be necessary to install groundwater monitoring wells for a year or more to determine the ground water levels and gather enough information to properly determine the required flow capacity of the drainage system. If high water tables could adversely affect the proper functioning of the structure, interceptor or relief-type drainage systems shallbe included to control uplift pressures. Leakage through the liner due to liner damage should also be considered.

2.3 LINER MATERIALS

A. Flexible membrane liner materials shall have a nominal thickness as specified in the following table:

Minimum Geomembrane Thickness Criteria	
Type	Minimum Thickness
HDPE	40
LLDPE	40
LLDPE-R	36
EPDM	45
FPP	40
FPP-R	36

B. Liner Properties

1. The liner shall be uniform in color, thickness, and surface texture. The liner shall be resistant to fungal or bacterial attack and free of cuts, abrasions, holes, blisters, contaminants, and other imperfections.

2. HDPE and LLDPE—The HDPE or LLDPE liner shall be manufactured from virgin polymer material and shall meet the property values specified in Tables 521A–1 through 521A–4 as applicable.

3. EPDM—The EPDM liner shall be formulated from virgin compounding materials and shall meet the property values specified in Tables 521A–5 and 521A–6 as applicable. Regrind, reworked, or trim materials shall be from the same manufacturer and the same formulation as the liner. Recycled materials shall not be allowed.

4. FPP—The FPP liner shall be manufactured from virgin polymer material and shall meet the property values specified in Tables 521A–7 and 521A–8 as applicable. A reinforced FPP liner shall consist of one ply of reinforcing polyester (scrim) between two sheets of FPP. The polyester scrim shall be of an open weave that permits strike-through of the FPP.

Table 2.3-1 Requirements for smooth HDPE Liner

Property	Test Methods	Requirements[1]		
		Nominal Thickness (mils)		
		30	40	60
Density, g/cc	ASTM D 1505	0.940	0.940	0.940
Tensile Properties	ASTM D 6693			
Yield Stress, lb/in	(type IV at 2 in/min)	63	84	126
Break Stress, lb/in		114	152	228
Yield Elongation, %		12	12	12
Break Elongation, %		700	700	700
Tear Resistance, lb	ASTM D 1004	21	28	42
Puncture Resistance, lb	ASTM D 4833	54	72	108
Carbon Black Content, %	ASTM D 1603	2-3	2-3	2-3
Carbon Black Dispersion	ASTM D 5596	Cat 1-2	Cat 1-2	Cat 1-2
Seam Properties	ASTM 6392			
Shear Strength, lb/in		60	80	120
Peel Strength[2], lb/in		39/FTB	52/FTB	78/FTB

1. All values, unless specified otherwise, are minimum average roll values as reported for the test method.
2. Film tear bond: A failure of one of the bonded sheets by tearing prior to complete separation in the bonded area.

Table 2.3-2 Requirements for Textured HDPE Liner

Property	Test Methods	Requirements[1]		
		Nominal Thickness (mils)		
		30	40	60
Density, g/cc	ASTM D 1505	0.940	0.940	0.940
Tensile Properties	ASTM D 6693			
Yield Stress, lb/in	(type IV at 2 in/min)	63	84	126
Break Stress, lb/in		45	60	90
Yield Elongation, %		12	12	12
Break Elongation, %		100	100	100
Tear Resistance, lb	ASTM D 1004	21	28	42
Puncture Resistance, lb	ASTM D 4833	45	60	90
Carbon Black Content, %	ASTM D 1603	2-3	2-3	2-3
Carbon Black Dispersion	ASTM D 5596	Cat 1-2	Cat 1-2	Cat 1-2
Seam Properties	ASTM D 6392			
Shear Strength, lb/in		60	80	120
Peel Strength[2], lb/in		39/FTB	52/FTB	78/FTB

1. All values, unless specified otherwise, are minimum average roll values as reported for the specified test method.
2. Film tear bond: A failure of one of the bonded sheets by tearing prior to complete separation in the bonded area.

Table 2.3-3 Requirements for Smooth LLDPE Liner

Property	Test Methods	Requirements[1]		
		Nominal Thickness (mils)		
		30	40	60
Density, g/cc	ASTM D 1505	0.915	0.915	0.915
Tensile Properties	ASTM D 6693			
Break Stress, lb/in	(type IV at 2 in/min)	114	150	228
Break Elongation, %		800	800	90
Tear Resistance, lb	ASTM D 1004	16	22	33
Puncture Resistance, lb	ASTM D 4833	42	56	84
Carbon Black Content, %	ASTM D 1603	2-3	2-3	2-3
Carbon Black Dispersion	ASTM D 5596	Cat 1-2	Cat 1-2	Cat 1-2
Seam Properties	ASTM D 6392			
Shear Strength, lb/in		44	58	90
Peel Strength[2], lb/in		37/FTB	50/FTB	75/FTB

1. All values, unless specified otherwise, are minimum average roll values as reported for test method.
2. Film tear bond: A failure of one of the bonded sheets by tearing prior to complete separation in the bonded area.

Table 2.3-4 Requirements for Textured LLDPE Liner

Property	Test Methods	Requirements[1]		
		Nominal Thickness (mils)		
		30	40	60
Density, g/cc	ASTM D 1505	0.915	0.915	0.915
Tensile Properties	ASTM D 6693			
Break Stress, lb/in	(type IV at 2 in/min)	60	80	120
Break Elongation, %		350	350	350
Tear Resistance, lb	ASTM D 1004	17	22	33
Puncture Resistance, lb	ASTM D 4833	33	44	66
Carbon Black Content, %	ASTM D 1603	2-3	2-3	2-3
Carbon Black Dispersion	ASTM D 5596	Cat 1-2	Cat 1-2	Cat 1-2
Seam Properties	ASTM D 4437			
Shear Strength, lb/in	(1 in wide at 2 in/min)	40	53	79
Peel Strength[2], lb/in		33/FTB	44/FTB	66/FTB

1. All values, unless specified otherwise, are minimum average roll values as reported for test method.
2. Film tear bond: A failure of one of the bonded sheets by tearing prior to complete separation in the bonded area.

Table 2.3-5 Requirements for Non-Reinforced EPDM Liner

Property	Test Methods	Requirements[1]	
		Nominal Thickness (mils)	
		45	60
Specific Gravity	ASTM D 792	1.1	1.1
Tensile Properties	ASTM D 882		
Break Stress, lb/in	(type IV at 20 in/min)	50	50
Break Elongation, %		400	400
Tear Resistance, lb	ASTM D 1004	9	11
Puncture Resistance, lb	ASTM D 4833	35	60
Low Temperature Brittleness, °F	ASTM D 1790	< -45	< -45
Seam Properties	ASTM D 413/4437		
Shear Strength[2], lb/in	(NSF modified 20 in/min strain rate)	35	35
Peel Strength[3], lb/in		14	14

1. All values, unless specified otherwise, are minimum average roll values as reported for the test method.
2. At 200 percent strain.
3. Cohesive bond mode.

Table 2.3-6 Requirements for Reinforced EPDM Liner

Property	Test Methods	Requirements[1]
		Nominal Thickness (mils)
		45
Specific Gravity	ASTM D 792	1.1
Tensile Properties	ASTM D 751 Method A	125
Tear Resistance, lb	ASTM D 5884 Method B	130
Puncture Resistance, lb	FTMS 101C Method 2031	45
Ply Adhesion, lb/in	ASTM D 413 Machine Method	7
Low Temperature Brittleness, °F	ASTM D 1790	< -45
Seam Properties		
Shear Strength[2], lb/in	ASTM D 751	35
Peel Strength[3], lb/in	ASTM D 413	14

1. All values, unless specified otherwise, are minimum average roll values as reported for the test method.
2. At 200 percent strain.
3. Cohesive bond mode.

Table 2.3-7 Requirements for Unreinforced FPP Liner

Property	Test Methods	Requirements[1]		
		Nominal Thickness (mils)		
		30	40	60
Specific Gravity	ASTM D 792	0.90	0.90	0.90
Tensile Properties	ASTM D 638			
Break Stress, lb/in	(type IV at 20 in/min)	60	72	130
Break Elongation, %		600	600	600
Tear Resistance, lb	ASTM D 1004	9	11	16
Puncture Resistance, lb	ASTM D 4833	28	35	65
Carbon Black Content, %	ASTM D 1603	2-4	2-4	2-4
Carbon Black Dispersion	ASTM D 5596	Cat 1-2	Cat 1-2	Cat 1-2
Low Temperature Brittleness, °C	ASTM D 1790	< -40	< -40	< -40
Seam Properties	ASTM D 6392, D 6214, D 4437[3]			
Shear Strength, lb/in		35	45	55
Peel Strength[2], lb/in		20/FTB	30/FTB	40/FTB

1. All values, unless specified otherwise, are minimum average roll values as reported for test method.
2. ASTM D 6392 shall b used for thermally welded seams, D 6214 for chemically welded seams, and D 4437 for all other types.
3. Film tear bond: A failure of one of the bonded sheets by tearing prior to complete separation in the bonded area.

Table 2.3-8 Requirements for Reinforced FPP Liner

Property	Test Methods	Requirements[1]	
		Nominal Thickness (mils)	
		36	45
Specific Gravity	ASTM D 792	0.90	0.90
Tensile Properties	ASTM D 751 Method A	225	225
Tear Resistance, lb	ASTM D 5884 Method B	55	75
Puncture Resistance, lb	FTMS 101C Method 2031	200	250
Ply Adhesion, lb/in	ASTM D 413 Machine Method	20	20
Carbon Black Content, %	ASTM D 1603	2-4	2-4
Carbone Black Dispersion	ASTM D 5596	Cat 1-2	Cat 1-2
Low Temperature Brittleness, °F	ASTM D 2136	< -40	< -40
Seam Properties			
Shear Strength, lb/in	ASTM D 751	160	200
Peel Strength[2], lb/in	ASTM D 413	20/FTB	20/FTB

1. All values, unless specified otherwise, are minimum average roll values as reported for the test method.
2. Film tear bond: A failure of one of the bonded sheets by tearing prior to complete separation in the bonded area.

Table 2.3-9 Requirements for Non-Woven Geotextiles

Property	Test Methods	Material[1]
Mass per Unit Area, oz/sy[2]	ASTM D 5261	10
Grab Tensile Strength, lb	ASTM D 4632	230
Grab Tensile Elongation, %	ASTM D 4632	>50
Trapezoidal Tear Strength, lb	ASTM D 4533	95
Puncture (pin) Strength, lb	ASTM D 4833	120
Puncture (pyramid) Strength, lb[4]	ASTM D 5494	300
Puncture (CBR) Strength, lb[4]	ASTM D 6241	700
Puncture (CBR) Elongation, in[4]	ASTM D 6241	1.5
UV Resistance 500 hr Exposure[2]	ASTM D 7238	70
Apparent Opening Size (AOS)	ASTM D 4751	As specified[3], max #100
Permittivity, 1/seconds	ASTM D 4491	0.70 min.

1. All values are minimum average roll value except UV resistance which is a minimum value.
2. Evaluation to be on 2.0 inch strip tensile specimens after 200 lt. hours exposure.
3. U.S. Standard sieve analysis.
4. Alternative puncture test methods to be considered in place of Pin Puncture, ASTM D 4833.

2.4 MISCELLANEOUS MATERIALS

A. Gaskets: Gasket material shall be neoprene, closed-cell medium, 0.25 inch thick, with adhesive on one side, or other gasket material as approved by the liner manufacturer.

B. Adhesives: Provide types of adhesive primers, compounds, solvents, and tapes recommended in writing by geomembrane liner manufacturer for bonding to structures (if required), for sealing of seams in geomembrane liner, and for sealing penetrations through geomembrane liner.

C. Penetration Assemblies: Provide manufacturer's standard factory-fabricated assemblies for sealing penetrations. Include joint sealant recommended in writing by geomembrane liner manufacturer and compatible with geomembrane liner, containment conditions, and materials.

D. Battens Strips:

1. Long-length strips of material indicated, size as indicated on Drawings. Fabricate battens with sharp projections removed and edges eased and then predrilled or punched for anchors. Provide stainless steel anchors and bolts, or other type of attachment, of type and spacing recommended in writing by geomembrane liner manufacturer for attaching geomembrane liner system to substrate and as indicated.

2. Batten strips are normally used to secure geomembrane liner materials to concrete substrates. Verify compatibility of manufacturer's recommended sealant, usually silicone or butyl rubber, with containment conditions and materials.

3. Batten Material: Stainless Steel

4. Minimum Dimensions: 0.25-inch-thick by 2-inch-wide.

E. Sand: ASTM C33/C33M; fine aggregate, natural or manufactured sand.

F. Cover Soil: Cover soil may be used on other liners but is not required unless essential for the proper performance, protection and durability of the installation. Cover soils shall not contain sharp, angular stones or any objects that could damage the liner. Maximum allowable particle size of soil cover material shall be 3/8-in for geomembrane liners unless the liner is protected by a 10-oz/sq yd or heavier non-woven geotextile cushion material. Cover materials shall be stable against slippage down the slope under all operational and exposure conditions, such as rapid drawdown or saturation by precipitation or snowmelt.

2.5 FABRICATION

A. Fabricate geomembrane liner panels from sheets in sizes as large as possible with factory-sealed seams, consistent with limitations of weight and installation procedures. Minimize field seaming.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for soil compaction and grading; for subgrade free from angular rocks, rubble, roots, vegetation, debris, voids, protrusions, and ground water; and for other conditions affecting performance of geomembrane liner.

B. Examine anchor trench excavation or concrete perimeter, where geomembrane liner will be secured, for substrate conditions indicated above and for correct location and configuration.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Subgrade preparation shall conform to manufacturer recommendation and applicable state regulations. Subgrade materials shall not contain sharp, angular stones or any objects that could damage the liner or adversely affect its function unless a cushion layer is used.

B. Cushion. A cushion layer shall be placed be-neath the liner if the subgrade particles contain sharp angular stones that could damage the liner or particles greater than 3/8-inch for geo-membrane liners. The cushion may be a 10-oz/sq yd or heavier non-woven geotextile or a layer at least 6 inches thick of soil meeting the particle size and shape requirements of the subgrade. Geotextile cushion material shall meet the requirements of GRI Test Method GT12(a). Follow the manufacturer’s recommendations for any additional protective measures.

C. Provide temporary ballast, until edges are permanently secured, that does not damage geomembrane liner or substrate, to prevent uplift of geomembrane liner in areas with prevailing winds.

D. Prepare surfaces of construction penetrating through geomembrane liner according to geomembrane liner manufacturer's written instructions.

E. Remove curing compounds and coatings from concrete surfaces to be sealed to geomembrane liner.

3.3 INSTALLATION

A. General: Place geomembrane liner over prepared surfaces to ensure minimum handling. Install according to Shop Drawings and in compliance with geomembrane liner manufacturer's written instructions. Begin placing geomembrane liner at Project's upwind direction and proceed downwind. Install geomembrane liner in a relaxed condition, free from stress and with minimum wrinkles, and in full contact with subgrade. Do not bridge

over voids or low areas in the subgrade. Fit closely and seal around inlets, outlets, and other projections through geomembrane liner. Permanently secure edges.

B. Field Seams: Comply with geomembrane liner manufacturer's written instructions. Form seams by lapping edges of panels 2 to 4 inches (50 to 102 mm), unless instructions require a larger overlap. Wipe contact surfaces clean and free of dirt, dust, moisture, and other foreign materials. Use solvent-cleaning methods and grind geomembrane seam surfaces if recommended by geomembrane liner manufacturer. Proceed with seaming at required temperatures for materials and ambient conditions. Continuously bond sheet to sheet to construct single or double seams of width recommended for method of seaming used. Seal or fuse free seam edges. Inspect seams and reseal voids.

1. Adhesive Bonding: Apply bonding cement to both contact surfaces in seam area and press together immediately, or use other seaming methods as instructed by geomembrane liner manufacturer. Roll to press surfaces together, to distribute adhesive to leading edges of panels, and to remove wrinkles and fishmouths. Remove excess adhesive.

C. Installation in Anchor Trench: Install geomembrane liner in trench according to manufacturer's written instructions. Backfill and compact to lock liner into trench.

D. Attachment to Concrete: Use manufacturer's standard system to suit Project conditions. Support adhesive and geomembrane on minimum 8-inch- (200-mm-) wide concrete substrate unless otherwise indicated.

1. Install batten strips over geomembrane liner as indicated on Drawings.

E. Liner Repairs: Repair tears, punctures, and other imperfections in geomembrane liner field and seams using patches of geomembrane liner material, liner-to-liner bonding materials, and bonding methods according to geomembrane liner manufacturer's written instructions. Apply bonding solvent or weld to contact surfaces of both patch and geomembrane liner, and press together immediately. Roll to remove wrinkles.

F. Cover soil shall be placed within 24 hours after placement of the liner to minimize the potential for damage from various sources, including precipitation, wind, and ultra-violet exposure.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Contractor to engage a qualified testing agency to perform tests and inspections.

B. Nondestructive Testing: Follow the testing requirements as indicated by the manufacturer to maintain warranty coverage. Record locations of failed seams and patches. Individually number and date occurrences and details of leak and remedial action. Repair leaking seams and patches.

C. Destructive Testing: Follow the testing requirements as indicated by the manufacturer to maintain warranty coverage. Record locations of sample locations and failed seams.

Individually number and date occurrences and details of leak and remedial action. Repair leaking seams and patches, and test sample locations.

D. Prepare test and inspection reports.

3.5 PROTECTION

A. Protect installed geomembrane liner according to manufacturer's written instructions. Repair or replace areas of geomembrane liner damaged by scuffing, punctures, traffic, rough subgrade, or other unacceptable conditions.

B. Before initial filling of pond or placement of earth cover, inspect seams and patched areas to ensure tight, continuously bonded installation. Repair damaged geomembrane liner and seams and reinspect repaired work.

SECTION 02957 B

SEWER MANHOLE COATING

PART 1 - GENERAL

1.1 SCOPE

A. Manhole coating with cementitious liner including preparation, build back and corrosion protection. Manhole coating shall follow any miscellaneous manhole rehabilitation work associated with *Section 02957 A, Sanitary Sewer Manhole Rehabilitation*.

1.2 REFERENCES

A. ASTM International (ASTM)

1. C94/C94M, *Standard Specification for Ready-Mixed Concrete*, latest revision.
2. C109/C109M, *Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 2-in or [50 mm] Cube Specimens*, latest revision.
3. C267, *Standard Test Method for Chemical Resistance of Mortar, Grout, and Monolithic Surfacings and Polymer Concrete*, latest revision.
4. C348, *Standard Test Method for Flexural Strength of Hydraulic-Cement Mortars*, latest revision.
5. C496/C496M, *Standard Test Method for Splitting Tensile Strength of Cylindrical Concrete Specimens*, latest revision.
6. C596, *Standard Test Method for Drying Shrinkage of Mortar Containing Hydraulic Cement*, latest revision.
7. C666/C666M, *Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing*, latest revision.
8. C882/C882M, *Standard Test Method for Bond Strength of Epoxy-Resin Systems Used With Concrete by Slant Shear*, latest revision.

1.3 SYSTEM DESCRIPTION

A. Manhole lining under this specification shall govern all work, materials, and equipment required for the following:

1. Substrate rehabilitation for the purpose of eliminating infiltration, providing corrosion protection, repair of voids, and restoration of the structural integrity of the substrate as a result of the applying a monolithic fiber reinforced structural/structurally enhanced cementitious liner to the wall and the bench surfaces of brick, concrete, or any other masonry construction material.

B. Manhole lining shall be applied by an applicator who is approved and trained by the manufacturer of the lining system materials. All aspects of the installation shall be in accordance with the manufacturers recommended and per the following specification.

C. Manhole lining as referred to on the Drawings and specified herein shall include:

1. The removal of any loose unsound materials.

2. Cleaning of the area to be sprayed with high pressure water.

3. The repair and filling of voids.

4. The repair and sealing of the pipe seals, pipe invert, and benches.

5. The elimination of active infiltration prior to making the application.

6. The spray application of a cementitious mix to form a structural/structurally enhanced monolithic liner.

1.4 SUBMITTALS

A. Work Plan: Prior to the pre-construction conference, the Contractor shall submit a work plan for review and acceptance by the City. The following items shall be addressed in the work plan, as a minimum:

1. Written description of construction procedures, including bypassing pumping sewage flow and reconnection of service laterals.

2. The locations, dimensions, and number of equipment staging areas and working areas.

3. Product data for review by City. Detailed and complete data pertaining to the manhole lining products and installations

4. Applicator shall provide to City 3 references from Municipal projects completed in the last 12 months.

5. Certificate of “Compliance with Specifications” for the manhole rehabilitation material and installation.

6. Certificates for each applicators experience with installation of the proposed product from the manufacturer of the manhole lining product.

7. Manufacturer’s certifications indicated in Section 1.6.

B. Manhole rehabilitation product testing reports which shall include but not be limited to:

1. Compressive strength

2. Bond Strength

3. Tensile Strength

4. Flexural Strength

5. Shrinkage

6. Freeze/Thaw

C. Manhole acceptance testing reports

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with manufacturer's instructions.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the products specified in this Section with minimum ten years documented experience.

B. Applicator: Material manufacturer shall provide owner with current written certification that applicator's current employees have been trained and approved in handling mixing and application of the product to be used.

C. Applicator shall initiate and enforce quality control procedures consistent with applicable ASTM, NACE and SSPC together with the manufacturer's recommendations.

D. Applicator shall have completed and follow all OSHA confined space regulations along with having completed all hazard communication training.

E. Contractor shall provide to City 3 references from Municipal projects completed in the last 12 months indicating successful application of products to be used by application method generally used for the product.

F. Equipment: Certification that the equipment to be used for applying the products has manufacturer approval and applicator personnel have been trained and certified for proper use of equipment by manufacturer.

1.7 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated on shop drawings.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Manhole Lining Products: Products shall be manufactured by SewperCoat or City preapproved equal. Labor, equipment, and materials, including the machinery specially designed for the application, shall be provided by the applicator.

B. Patching Material: A quick setting corrosion resistant cementitious material shall be a used as a patching material, and is to be mixed and applied according to manufacturer's recommendations, and shall have the following minimum requirements:

1. Compressive Strength ASTM C109 >1800 psi, 1 hr.

			>2600 psi, 24 hrs.
2.	Bond	ASTM C882	>1600 psi, 28 days
3.	Applied Density		105 pcf ± 5 lbs.
4.	Shrinkage	ASTM C596	0% at 90% R.H.
5.	Cement		Sulfate resistant
6.	Placement Time		5 to 10 minutes
7.	Set Time		15 to 30 minutes

8. Patching material shall equal or exceed requirements for the liner material.

9. Material shall be:

   a. Strong Seal "QSR"

   b. City Approved Equal.

C. Infiltration Control Material: A rapid setting cementitious product, specifically formulated for leak control, shall be used to stop minor water infiltration, shall be mixed and applied according to the manufacturer's recommendations and shall have the following minimum requirements:

1.	Compressive Strength	ASTM C109	>1000 psi, 1 hour
			>2500 psi, 24 hours
2.	Sulfate Resistance	ASTM C267	No weight loss after 15
			cycles @ 2000 ppm
3.	Freeze Thaw	ASTM C666	Method A 100 Cycles
4.	Pull Out Strength		14,000 lbs.
5.	Set Time		<1.0 minute

6. Material shall be:

   a. Strong Seal "Strong-Plug"

   b. City Approved Equal.

D. Grouting Material

1. Chemical or grouts may be used for stopping very active infiltration and shall be mixed and applied per manufacturer's recommendations. Grout for this purpose

shall be volume stable and have a minimum 28-day compressive strength of 250 psi.

2. If pressure grouting is required the material shall be:

   a. Avanti A-220, Deneef

   b. City-Approved Equal.

E. Liner Material: A cementitious product shall be used to form a structural/structurally enhanced monolithic liner covering all interior substrate surfaces. The liner material shall be applied with machinery specially designed for the application, and shall have the following minimum requirements at twenty-eight (28) days:

Compressive Strength	ASTM C109	>7000 psi
Tensile Strength	ASTM C496	>700 psi
Flexural Strength	ASTM C348	>1300 psi
Shrinkage @ 90% R.H.	ASTM C596	0.07%
Bond	ASTM C882	>2000 psi
Density, when applied		151 +/- 4 lbs./ft3 pcf
Freeze/Thaw	ASTM C666	300 previous cycles no visible damage

1. Liner material shall be the following:

   a. SewperCoat

   b. City Approved Equal

F. Water: Water used to mix product shall be clean and potable. A laboratory shall test questionable water in accordance per ASTM C-94 procedure. Potable water need not be tested.

G. Other Materials: No other material shall be used with the mixes described above without prior approval or recommendation of the City.

PART 3 - EXECUTION

3.1 MANHOLE LINING

A. Equipment Application equipment shall be as recommended by materials manufacturer.

B. Application:

1. Preparation:

   a. Provide means, labor and equipment to dam, plug, and/or divert or bypass the flow from services entering the manhole.

   b. Place covers over invert to prevent extraneous material from entering the sanitary sewer. Adequately sized pumps shall be provided and used by the Contractor continuously to protect the work.

c. All foreign material shall be removed from the manhole wall and bench using a high pressure water spray (minimum 3,500 psi). Loose and protruding brick, mortar, and concrete shall be removed using a mason's hammer and chisel and/or scraper. Detergent water cleaning and hot water blasting may be necessary to remove oils, grease or other hydrocarbon residues from the manhole surface. Cleaned surface shall be a sound uniform neutralized and are not excessively damaged.

d. Fill any large voids with patching material as specified herein. Submit proposed method of discovering voids and proposed product to fill voids.

e. A mild chlorine solution may be used to neutralize the surface to diminish microbiological bacteria growth unless it is not acceptable to the manufacture of the product to be supplied. Provide manufacturer's acceptance.

f. Surface preparation shall produce a cleaned, abraded and sound surface with evidence of laitance, loose concrete, brick or mortar, contaminants or debris, and shall display a surface profile suitable for application of liner system.

i. If required, sandblasting or abrasive blasting may be used to create a roughened surface.

g. Active leaks shall be stopped using infiltration control material according to manufacturer's recommendations. Some leaks may require weep holes to localize the infiltration during the application. After application, the weep holes shall be plugged with infiltration control material prior to the application of the final coat. When severe infiltration exists, drilling may be required in order to pressure grout using a cementitious grout or chemical grout, as specified herein for grouting material. Manufacturer's recommendations shall be followed when pressure grouting is required.

h. All manhole steps shall be removed and the wall repaired prior to lining.

i. Structure to be lined shall be wetted per the manufacturer's recommendations prior to applying lining material.

j. Manhole frames and covers that are shifted or are not flush with pavement elevation shall be reset.

i. Center the manhole frame and cover over the manhole opening

ii. Adjust the frame and cover top elevation to City standards.

2. Invert, pipe seal, and bench repair:

a. After all preparations have been completed, remove all loose material and wash wall again.

b. Any bench, invert, pipe seal and/or service line repairs shall be made at this time using patching material and shall be used per manufacturer's recommendations.

c. Invert repair shall be performed on all inverts with visible damage or where infiltration is present, or when vacuum testing is specified. After blocking through the manhole, and thoroughly cleaning invert, the patching material shall be applied to the invert in an expeditious manner. The material shall be troweled uniformly onto the damaged invert at a minimum thickness of ½ inch at the invert extending out onto the bench of the manhole sufficiently to tie into the structural/structurally enhanced monolithic liner to be applied. The finished invert surfaces shall be smooth and free of ridges. The flow may be reestablished in the manhole within thirty (30) minutes after placement of the material.

3. Mixing:

a. Mixing shall be done in strict accordance with the material manufacturer's instructions.

b. Addition of water to the mix shall be in strict accordance with the manufacture's recommendations.

c. Re-mixing or tempering shall not be permitted. Rebound material shall not be reused.

d. The mixer shall be cleaned to remove all adherent materials for the mixing valves and from the drum at regular intervals.

4. Spraying:

a. The surface shall be clean and free of all foreign material and shall be damp without noticeable free water droplets or running water, but totally saturated, just prior to application. Materials shall be spray applied up to one (1) inch thick in one or more passes from the bottom of the frame, however, minimum total thickness shall not be less than ½ inch to insure that all cracks, crevices, and voids are filled and a relatively smooth surface remains after light troweling. The light troweling is performed to compact the material into voids and to set the bond.

b. Bench application: The covers shall be removed at this time and the bench sprayed with materials mixed as specified in Part 2 and spray applied in such a manner that a gradual slope is produced from the walls to the invert with the thickness at the edge of the invert to be no less than 1 inch. The wall/bench intersection shall be rounded to a uniform radius the full circumference of the intersection.

c. Operations: Manufacturer recommended equipment shall control the actual amounts of material applied.

d. Surface Defect Repair:

i. Continual inspection during coating application shall be maintained

ii. Any imperfections shall be removed and replaced with sound material.

C. Curing:

1. Care should be taken to minimize exposure of applied product to sunlight and air movement. At no time should the finished product be exposed to sunlight or air movement for longer than fifteen (15) minutes before covering or closing access. In extremely hot and arid climates, manhole should be shaded while application is in process. Contact manufacturer for curing compound recommendations.

a. The application shall have a minimum of four (4) hours cure time before being subjected to active flow.

b. For traffic areas, calcium aluminate based products shall be used. Traffic shall be deferred for a maximum of six (6) hours.

D. Weather: No application shall be made to frozen surfaces or if freezing is expected to occur within the substrate within twenty-four (24) hours after application. If ambient temperatures are in excess of 95 degrees F, precautions shall be taken to keep the mix temperature at time of application below 90 degrees F. Mix water temperature shall not exceed 85 degrees F. Chill with ice if necessary.

E. Product Testing: Four two inch cube specimens shall be cast each day or from every fifty (50) bags of product used and shall be properly packaged, labeled, and returned to manufacturer for testing in accordance with the Owner's or manufacturer's directions for compression strength testing as described in ASTM C109.

F. Acceptance Testing: Contractor shall test rehabilitated manholes as follows:

1. Visually verify the absence of leaks. Visible leaks shall be corrected immediately.

2. Vacuum tests in accordance with construction specification *Section 01715, Sewer and Manhole Testing* shall be conducted on all manholes

3. Visual inspection shall be made by the Owner. Any deficiencies in the finished liner system shall be marked and repaired according to the procedures set forth by the Manufacture.

SECTION 02960

TEMPORARY SANITARY SEWER BYPASS PUMPING

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Temporary sanitary sewer bypass pumping to maintain sanitary sewer service during construction.

1.2 RELATED SECTIONS:

A. All Sections.

1.3 SUBMITTALS

A. Submittals shall conform to requirements of Section 01300 – Submittal Procedures.

B. Submit Temporary Sanitary Sewer Bypass Plan for review by the Engineer and Owner prior to start of any fieldwork. A Professional Engineer licensed by the State of Colorado shall sign the Plan. The Plan shall include the following:

1. Names and qualifications of equipment suppliers and installation subcontractors. The Contractor shall document at least 5 years of experience and verifiable history of projects requiring bypass pumping.

2. A description of the proposed temporary bypass systems indicating arrangement, location, capacities of system components, installation details and criteria, and operation and maintenance procedures. This description shall also include the following information:

   a. Bypass pumping phasing plan with exhibits and descriptions for each phase, including a schedule for installation and maintenance of bypass pumping system, and staging areas for pumps.

   b. Bypass pump sizes, capacity, number of each size to be onsite, and power requirements.

   c. Size, length, material, location, and method of installation for suction and discharge piping.

   d. Standby power generator size and location.

   e. Method of noise control for each pump and/or generator.

f. Design calculations demonstrating adequacy of the proposed systems for intended applications. Calculations shall include flow and head calculations including friction loss for the length and type of pipe and static head.

g. Bypass pump curve(s) showing pump operating range.

h. Daily operations of the pump(s) and the maintenance of the pump(s) during the non-working hours.

i. Calculation of available time between pump failure and flooding, backups, etc.

3. Diagrams indicating the location of all system components, including, but not limited to, pumps, pipes, catch points, and discharge points. Include road crossing details.

4. Name and telephone number for the Sewer Flow Control Supervisor who is to be on call 24 hours per day while pumps are in operation.

1.4 ENVIRONMENTAL REQUIREMENTS

A. Comply with Colorado Department of Public Health and Environment (CDPHE) guidelines.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND MATERIALS

A. Contractor shall provide all labor, materials, and equipment necessary to provide adequate sanitary sewer bypass during construction of the Project without causing damage to public or private property or allowing unauthorized discharges of sanitary sewer flows.

B. The Contractor is responsible for determining the capacity of the sanitary sewer bypass system. The Contractor shall consider the “full pipe” capacity of the sewer system being bypassed when determining the capacity of the bypass system. Based on City of Greeley modeling data, the peak hourly flow rate is expected to be approximately 1,550 GPM through the 18-inch diameter pipe, and the peak hourly flow rate is expected to be approximately 176 GPM through the 12-inch diameter pipe. Equipment and materials to provide this range of flow capacity are at the option and risk of Contractor.

C. Temporary Bypass Pumping System: All bypass pumping system materials shall be suitable for contact with domestic sanitary sewage. The bypass pumping system shall include the following components:

1. Bypass pump(s) with sufficient capacity to bypass sanitary sewer flows without causing damage to public or private property.

2. Backup pump(s) on site to provide 100% redundancy; backup pumps shall be isolated from the primary system by a valve.

3. Bypass pumping control system.

4. Bypass pumping system failure alarm(s).

5. Discharge piping with leak-free joints.

D. Temporary Pumps: Pumps utilized in the bypass pumping system shall be self-priming and non-clog type capable of passing a non-compressible four-inch (4") sphere, designed for pumping domestic sewage containing solids and stringy materials. Pumps shall not require the use of foot valves or vacuum pumps in the priming system. All pumps used must be constructed to allow dry running for long periods of time to account for the cyclical nature of effluent flows. The pumps may be electric, or diesel powered. Engine exhaust shall be invisible, without objectionable fumes, smoke, oil mist, or carbon particles. Provide equipment of sufficient capacity to handle peak flow rates.

E. Discharge and suction piping sizing shall be determined according to flow calculations and system operating calculations.

F. High Density Polyethylene (HDPE): Piping shall be homogenous throughout, free of visible cracks, discoloration, pitting, varying wall thickness, holes, foreign material, or other deleterious faults. Pipe shall be assembled and joined on site using coupling, flanges, or butt-fusion method to provide leak proof joints. Thread or solvent joints are not acceptable. Pipe fusion shall be carried out by personnel certified as fusion technicians by manufacturer of HDPE pipe and/or fusing equipment. Butt-fusion joints shall be true alignment and uniform roll-back beads resulting from use of proper temperature and pressure.

G. Flexible Hoses and Associated Couplings and Connectors: Flexible hose and couplings shall be abrasive resistant and suitable for the intended services (i.e., fire hoses are not permitted). They shall be rated for external and internal loads anticipated including test pressure. External load design shall incorporate anticipated traffic loadings, including traffic impact loading where applicable. When subjected to traffic loading, the system shall be composed of traffic ramps and covers maintaining an H-20 loading requirement while in use or as directed by the Engineer.

H. All rigid or hard piping shall be constructed with positive restrained joints.

I. Under no circumstance will aluminum irrigation type piping or glued PVC pipe be allowed.

J. Unmanned Bypass Pumping: All unmanned bypass pumping operations shall be fitted with an auto-dialer feature to monitor the operation of the pump and notify the Contractor in the event of a pump failure or overflow situation.

K. Noise Control: Bypass pumping system components shall not have excessive noise levels and shall be restricted to a maximum of seventy decibels (70 dB) at a distance of 100

feet. If pumping is required on a 24-hour basis, engines shall be equipped in a manner to keep noise to a minimum.

PART 3 - EXECUTION

3.1 TEMPORARY BYPASS PUMPING

A. Sanitary sewer bypass shall be completed in such a manner that there is no damage to public or private property. Repair and reparations for damage caused by or associated with sanitary sewer flows are the sole responsibility of the Contractor to fix, repair, clean and make whole.

B. Sewage Spills: Violations of any state or federal laws caused by sewage spills shall be the sole responsibility of the Contractor. Should any liquid or solid matter from the sewer collection system be spilled, discharged, leaked, or otherwise deposited to the open environment as a result of the bypass operations, Contractor shall be responsible for all cleanup and disinfection of the affected area and all associated costs. The Contractor shall also be responsible for notifying the Owner, sewer system operating personnel, and appropriate regulatory agencies and performing all required cleanup operations at no additional cost to the Owner.

C. Install, operate, and maintain temporary bypass systems in accordance with the Temporary Bypass Plan. Notify Engineer in writing of any changes made to accommodate field conditions and changes to the Work. Provide revised drawings and calculations with such notification.

D. In the event of accidental spill or overflow, immediately stop the overflow and take action to clean up and disinfect spillage. Promptly notify Engineer so that required reporting can be made to the Colorado Department of Public Health and the Environment (CDPHE).

E. Flow shall not be transferred to any new or modified facilities until the Owner has inspected and accepted the work.

3.2 FIELD QUALITY CONTROL AND MAINTENANCE

A. Testing: Contractor shall perform leakage and pressure tests of the bypass pumping discharge piping using clean water prior to actual operation. The Owner will be given 24 hours' notice prior to testing.

B. Inspection: Contractor shall inspect bypass pumping system every two hours to ensure that the system is working properly.

C. Maintenance Service: Contractor shall ensure that the temporary pumping system is properly maintained.

D. A Sewer Flow Control Supervisor is required to be on call 24 hours per day and be physically located within 30 minutes of the project site at all times while the pumps are in

operation. The Sewer Flow Control Supervisor shall be knowledgeable in the operation of the sanitary sewer bypass system and shall have the authority to purchase replacement parts as needed to repair the sanitary sewer bypass system.

E. Extra Materials:

1. Spare parts for pumps and piping shall be kept on site as required.

2. Adequate hoisting equipment for each pump and accessories shall be maintained on the site.

3.3 PREPARATION

A. Precautions:

1. Contractor is responsible for locating any existing utilities in the area the Contractor selects to locate the bypass pipelines. The Contractor shall locate their bypass pipelines to minimize any disturbance to existing utilities and shall obtain approval of the pipeline locations from the Owner. All costs associated with relocating utilities and obtaining approvals shall be the responsibility of the Contractor.

2. During all bypass pumping operation, the Contractor shall protect the pumping station and main and all local sewer lines from damage inflicted by any equipment. The Contractor shall be responsible for any physical damage to the pump station and mains and all local sewer lines caused by human or mechanical failure.

B. Notifications:

1. Contractor shall notify property owners, residents, and business managers in writing prior to plugging, bypassing, or otherwise affecting a sewer service. This notification shall be provided a minimum of 72 hours in advance, but no more than 144 hours in advance prior to plugging or bypassing a sewer service. Contractor shall not plug a sewer service for more than 4 hours without providing additional accommodations.

3.4 INSTALLATION AND REMOVAL

A. Contractor shall remove manhole sections or make connections to the existing sewer and construct temporary bypass pumping structures only at the access location indicated on the Drawings and as may be required to provide suction conduit.

B. Plugging or blocking of sewage flows shall incorporate primary and secondary plugging devices. When plugging or blocking is no longer needed for performance and acceptance of Work, it is to be removed in a manner that permits the sewage flow to slowly return to normal without surge, to prevent surcharging, or causing other major disturbances downstream.

C. When working inside a manhole or force main, the Contractor shall exercise caution and comply with OSHA requirements for working in the presence of sewer gases, combustible oxygen-deficient atmospheres, and confined spaces.

D. The installation of bypass pipelines is prohibited in all saltmarsh/wetland areas. The pipeline must be located off streets, sidewalks, and on shoulders or the roads. When the bypass pipeline crosses local streets and private driveways, where roadway ramps cannot be used, the Contractor must place the bypass line in trenches and cover with temporary pavement or plates.

E. Upon completion of the bypass pumping operations, and after the receipt of written permission from the Owner, the Contractor shall remove all piping, restore all property to pre-construction condition, and restore all pavement and roadways. The Contractor is responsible for obtaining any approvals for placement of temporary pipelines from local agencies.

SECTION 03300

CAST-IN-PLACE CONCRETE

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses cast-in-place concrete for thrust restraints, sanitary sewer manhole bases, and cut-off walls, including forms, reinforcing steel, finishing and curing, and other appurtenant work.

B. All other concrete work shall conform to the Design Criteria and Construction Specifications Streets Volume I (*SDC).*

1.2 REFERENCES

A. American Concrete Institute (ACI):

1. 117, *Specifications for Tolerances for Concrete Construction and Materials*, latest revision.

2. 301*, Specifications for Structural Concrete*, latest revision.

3. 305.1, *Hot Weather Concreting,* latest revision.

4. 306.1, *Cold Weather Concreting,* latest revision.

5. 309, *Guide for Consolidation of Concrete*, latest revision.

6. 350.1, *Specification for Tightness Testing of Environmental Engineering Concrete Containment Structures*, latest revision.

B. ASTM International (ASTM):

1. A185, *Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete*, latest revision.

2. A615, *Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement*, latest revision.

3. A996, *Standard Specification for Rail-Steel and Axle –Steel Deformed Bars for Concrete Reinforcement*, latest revision.

4. C31/C31M, *Standard Test Practice for Making & Curing Concrete Test Specimens in the Field*, latest revision.

5. C33, *Standard Specification for Concrete Aggregates*, latest revision.

6. C39/C39M, *Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens*, latest revision.

7. C94/C94M, *Standard Specification for Ready-Mixed Concrete*, latest revision.

8. C143/C143M, *Standard Test Method for Slump of Hydraulic Cement Concrete*, latest revision.

9. C150, *Standard Specification for Portland Cement*, latest revision.

10. C157/C157M, *Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete*, latest revision.

11. C231, *Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method*, latest revision.

12. C260, *Standard Specification for Air-Entraining Admixtures for Concrete*, latest revision.

13. C494/C494M, *Standard Specification for Chemical Admixtures for Concrete*, latest revision.

14. A1064, *Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete*, latest revision.

15. C618, *Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete*, latest revision.

16. C1218/C1218M, *Standard Test Method for Water-Soluble Chloride in Mortar and Concrete*, latest revision.

17. C1260, *Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method)*, latest revision.

18. C1315, *Standard Specification for Liquid Membrane-Forming Compounds Having Special Properties for Curing and Sealing Concrete*, latest revision.

19. C1602/1602M, *Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete*, latest revision.

1.3 SUBMITTALS

A. Submit batch tickets for each load at the time of delivery indicating the following:

1. Identification name and number.

2. Date.

3. Quantity delivered.

4. Mix design.

5. Mix time.

6. Time at which the water was added.

7. Amount of water added at job site.

8. All quantities of mix ingredients in batch.

9. Amounts of admixtures added to mix.

B. Mix Designs:

1. Submitted to the City for review and approval not less than two (2) weeks prior to first concrete placement.

2. Concrete mix designs shall contain proportions of materials and admixtures to be used on work, signed by mix designer.

3. Documentation of average strength for each proposed mix design in accordance with ACI 301.

4. Letter of Certification that Concrete Producer has verified compatibility of constituent materials in design mix.

5. Test Reports:

a. Cement: Chemical analysis report.

b. Supplementary Cementitious Materials: Chemical analysis report and report of other specified test analyses.

c. Water-Soluble Chloride-Ion Content in Hardened Concrete: Unless otherwise permitted, in accordance with ASTM C1218 at an age between 28 and 42 days.

d. Shrinkage Test Results: In accordance with ASTM C157 as modified herein.

6. Aggregates:

a. Gradation for coarse aggregates. List gradings and percent passing through each sieve.

b. Gradation for fine aggregates. List gradings and percent passing through each sieve.

c. Percent of fine aggregate weight to total aggregate weight.

d. Deleterious substances in fine aggregate per ASTM C33, Table 1.

e. Deleterious substances in coarse aggregate per ASTM C33, Table 3.

f. Manufacturer’s Letter of Certification that the aggregate conforms to the specified class designation for coarse aggregate.

g. Test Reports:

i. Alkali Aggregate Reactivity: Aggregate shall be classified as nonpotentially reactive in accordance with Article Concrete Mix Design. Include documentation of test results per applicable standards.

7. Admixtures:

a. Manufacturer's catalog cut sheets and product data sheets for each admixture used in proposed mix designs.

b. Manufacturer's Letter of Certification of conformance to specified standards.

C. Product Data: Specified ancillary materials.

D. Detailed plan for curing and protection of concrete placed and cured in cold weather. The details shall include, but not be limited to, the following:

1. Procedures for protecting the subgrade from frost and the accumulation of ice or snow on reinforcement and other metallic embeds or forms prior to placement.

2. Procedures for measuring and recording temperatures of reinforcement and other embedded items prior to concrete placement.

3. Methods for temperature protection during placement.

4. Types of covering, insulation, housing, or heating to be provided.

5. Curing methods to be used during and following the protection period.

6. Use of strength accelerating admixtures.

7. Methods for verification of in-place strength.

8. Procedures for measuring and recording concrete temperatures.

9. Procedures for preventing drying during dry, windy conditions.

E. Detailed plan for hot weather placements including curing and protection for concrete placed in ambient temperatures over 80 degrees F. The plan shall include, but not be limited to, the following:

1. Procedures for measuring, and recording temperatures of reinforcement and other embedded items prior to concrete placement.

2. Use of retarding admixture.

3. Methods for controlling temperature of reinforcement and other embedded items and concrete materials before and during placement.

4. Types of shading and wind protection to be provided.

5. Curing methods (including use of evaporation retardant).

6. Procedures for measuring and recording concrete temperatures.

7. Procedures for preventing drying during dry, windy conditions.

F. Manufacturer's application instructions for bonding agent and bond breaker.

G. Manufacturers' Letter of Certification of conformance to specified standards:

1. Portland cement.

2. Fly ash.

3. Aggregates.

4. Admixtures.

5. Bonding agent.

6. Bond breaker.

H. Statement of Qualification:

1. Batch Plant: Certification as specified herein.

2. Mix designer.

3. Installer.

4. Testing Agency.

I. Field test reports.

J. Results of tightness tests.

K. Concrete Delivery Tickets:

1. For each batch of concrete before unloading at Site.

2. In accordance with ASTM C94/C94M, including requirements 14.2.1. through 14.2.10.

3. Indicate amount of mixing water withheld, and maximum amount that may be permitted to be added at Project site.

a. Document all water added on site during or prior to placement.

4. Indicate all components included in the concrete mix and any admixtures.

L. Curing

1. Manufacturers' data for the following products:

    a. Evaporation retardant.

    b. Curing compound.

    c. Clear sealer.

    d. Clear floor hardener.

2. Curing methods proposed.

3. Curing Compound

    a. Manufacturer's Certificate of Compliance showing moisture retention requirements.

M. Submittal Drawing

1. Submitted to the City for review and approval not less than two (2) weeks prior to placement and must include information on steel placemen, sizing, compressive strength, and grade of steel reinforcement. Steel placement and sizing are to meet the City of Greely Standard Drawing.

1.4 QUALITY ASSURANCE

A. See the quality assurance requirements in the City of Greeley Design Criteria and Construction Specifications Streets Volume I.

PART 2 – PRODUCTS

2.1 CEMENT

A. All cement shall be Portland Cement. No other cement shall be used without prior written permission of the City.

B. Portland Cement shall conform to ASTM C150, Type I/II.

2.2 AGGREGATES

A. Unless otherwise permitted, furnish from one source for each aggregate type used in a mix design.

1. Normal-Weight Aggregates:

    a. In accordance with ASTM C33, except as modified herein.

        i. Class Designation: 4S unless otherwise specified.

    b. Free of materials and aggregate types causing pop outs, discoloration, staining, or other defects on surface of concrete.

c. Alkali Silica Reactivity: See Article Concrete Mix Design.

2. Fine Aggregates:

a. Clean, sharp, natural sand.

b. ASTM C33.

c. Limit deleterious substances in accordance with ASTM C33, Table 1 and as follows:

i. Limit material finer than 75-pm (No. 200) sieve to 5 percent mass of total sample.

ii. Limit coal and lignite to 0.5 percent.

3. Coarse Aggregate:

a. Natural gravels, combination of gravels and crushed gravels, crushed stone, or combination of these materials containing no more than 15 percent flat or elongated particles (long dimension more than five times the short dimension).

b. Limit deleterious substances in accordance with ASTM C33, Table 3 for specified class designation.

2.3 WATER

A. Mixing water for concrete shall be potable. Alternative sources of water may be permitted with prior approval from the City.

1. If approved by the City, water from alternative sources shall comply with requirements of ASTM C1602/C1602M, and the concentration of chemicals in combined mixing water shall be less than:

a. 1,000 ppm chloride content.

b. 3,000 ppm sulfate content as SO4

c. 600 ppm alkalis as (Na,O + 0.658 KSO).

d. Total solids by mass less than 50,000 ppm.

2.4 ADMIXTURES

A. Admixtures shall be certified to be compatible with each other.

B. Admixtures shall not contain calcium chloride.

C. Air-Entraining Admixture

1. An air entraining agent shall be used in all concrete. All air entraining agents shall conform to ASTM C260.

2. Total air content: 5% to 8%

D. Water Reducing Admixture

1. A water reducing admixture may be used, if approved by the City.

2. A water reducing admixture shall conform to ASTM C494 for Type A or Type D chemical admixture.

3. The water reducing admixture shall be compatible with the cement being used and shall not contain any calcium chloride ($CaCl_2$).

E. Accelerators shall conform to ASTM C494 and ACI 306.

F. Fly Ash

1. When fly ash is used in concrete, the cement replacement shall not exceed 20%.

2. Fly ash shall conform to ASTM C618, Class C or F. Class C fly ash will not be permitted where sulfate resistant concrete is required.

G. Antimicrobial Crystalline Waterproofing Admixture

1. Xypex Bio-San C500

2. Xypex Bio-San C500 must be added to concrete mix at batch plant.

3. The antimicrobial crystalline powder shall be added to the concrete mix at 1% by weight of the cementitious material content

H. Any admixture including air entraining agents, accelerators, and retarders must be approved by the City.

2.5 REINFORCING MATERIALS

A. All deformed reinforcing bars shall conform to ASTM A615 or ASTM A996. All bars shall be Grade 60.

B. All welded steel wire fabric shall conform to ASTM A1064 and ASTM A185.

C. Reinforcement supports and spacers shall be plastic coated steel or heavy duty plastic of design and strength to hold reinforcement accurately in place before and during placement of concrete.

2.6 FORMWORK

A. Forms

1. Forms shall be designed to produce hardened concrete having the shape, lines, and dimensions shown on the approved Construction Drawings.

2. Plywood shall be PSI, waterproof, resin-bonded, exterior type, Douglas Fir.

3. Lumber shall be straight, uniform width and thickness, free from knots, offsets, holes, dents and other surface defects.

4. Form oil shall be light colored paraffin oil or other non-staining material.

5. Forms shall be coated with a form releasing agent before the form or reinforcement is placed in final position. The coating shall be used in accordance with the manufacturer's instructions.

6. Commercial formulation form coating compounds shall not bond with, stain, nor adversely affect the concrete surface's bond or adhesion, and shall not impede wetting of surfaces to be cured with water or curing compounds. Surplus coating on form surfaces and coating on reinforcing steel and construction joints shall be removed before placing concrete.

B. Form Ties

1. Commercially manufactured, removable or snap-off metal form ties designed to withstand applied stresses, prevent spreading of forms during concrete placement, and prevent concrete from spalling upon removal.

   a. Form ties shall be submitted for approval by the city prior to use.

2. For water holding structures, form tie shall have integrated water stops.

3. Use of wire ties is prohibited.

2.7 MIX DESIGN

A. Concrete shall develop a minimum field compressive strength of 4000 psi after 28 days, unless otherwise specified by the City (i.e. thrust blocks).

1. Exception: Concrete utilized for thrust blocks shall develop a minimum field compressive strength of 2500 psi after 28 days. Contractor may utilize standard concrete plant mix design for exterior use and air entrainment.

B. The water/cement ratio shall not exceed 0.50 by weight.

1. The water/cement ratio may be increased to 0.56, by weight, if a water reducing agent is used.

2. High early or rapid set concrete may be allowed in high traffic situations.

2.8 Curing Compound:

A. Water-based, high solids content non-yellowing curing compound meeting requirements of ASTM C309 and ASTM C1315.

1. Moisture Loss: 0.40 kg/m^2/72 hours maximum.

2. Capable of meeting moisture retention at manufacturer's specified application rate.

B. Manufacturers and Products:

1. BASF; Masterkure.

2. Euclid Chemical Co.; Super Diamond Clear VOX.

3. WR Meadows, Inc.; VOCOMP-30.

4. Vexcon Chemical, Inc.; Starseal 1315.

5. Dayton Superior.

C. Water: Clean and potable, containing less than 500 ppm of chlorides.

PART 3 – EXECUTION

3.1 TESTING CONCRETE

A. Testing procedures and testing frequency shall be in accordance with the *SDC*.

B. Making and curing concrete cylinders, ASTM C31.

C. Testing concrete cylinders, ASTM C39.

D. Slump, ASTM C143.

E. Slump Tolerance, ACI 117

F. Air content, ASTM C231.

3.2 MIXING AND TRANSPORTING READY-MIXED CONCRETE

A. In accordance with ACI 301, except as modified herein.

B. The maximum elapsed time from the time water is added to the mix until the concrete is in place shall not exceed 1 ½ hours when concrete is transported in revolving drum truck bodies.

C. The temperature of the concrete shall never exceed 90º F.

3.3 PROTECTION

A. Cold Weather Concrete

1. Concrete shall not be placed unless the air temperature adjacent to the concrete placement is 30º F and rising, unless prior written acceptance for cold weather concrete operations is obtained from the City.

2. If cold weather concrete operations are accepted by the City, when daily low temperatures are below 40º F or when temperatures are predicted to be below 40º F within three (3) days of concrete placement, comply with ACI 306.1.

3. Water shall not be heated to a temperature greater than 150º F.

4. If hot air heaters are used, cover exposed surfaces of concrete with impervious sheet material or curing compound to prevent dehydration of concrete.

5. Do not place concrete against frozen ground or against surfaces with frost or ice present.

6. Provide maximum and minimum temperature sensors placed on concrete surfaces spaced throughout the work to allow monitoring of concrete surface temperatures representative of the work. Unless otherwise permitted, record surface temperature of concrete at least once every 12 hours during the specified curing period.

B. Hot Weather Concrete

1. Concrete shall not be placed if the daily high temperature exceeds 90º F unless otherwise accepted by the City.

2. When daily high temperature is 90º F or above, or hot weather conditions exist that would impair quality and strength of concrete, comply with ACI 305.1.

3. Temperature of concrete immediately before placement in forms shall be between 50º F and 90º F.

4. Provide for windbreaks, shading, fog spraying, sprinkling, ice, wet cover, or other means as necessary to maintain concrete at or below specified temperature.

5. To facilitate the placement of concrete in hot weather, the aggregate or the water may be cooled.

3.4 FORMS

A. Brace or tie forms to maintain desired position, shape and alignment before, during, and after placement.

B. Do not remove or disturb forms until the concrete has attained sufficient strength to safely support all dead and live loads.

C. Remove forms with care to avoid surface gouging, corner or edge breakage, and other damage to the concrete.

3.5 REINFORCING

A. Prior to placing concrete, accurately place reinforcing steel. Maintain in proper position while concrete is being placed and vibrated.

3.6 CONCRETE PLACEMENT

A. In accordance with ACI 301, except as modified herein.

B. Batch ticket shall indicate amount of mixing water withheld, and maximum amount that may be permitted to be added at Project site. Any water added must be document and amount provided to City. Any additional water above noted maximum amount shall be rejected and removed from the Project site.

C. Convey concrete to the point of final deposit by methods which will prevent the separation or loss of concrete components.

D. Height of concrete freefall shall be limited to four (4) feet.

E. During and immediately after placement, concrete shall be thoroughly consolidated by mechanical vibrating equipment supplemented by handspading, rodding or tamping worked around reinforcements and embedments, and worked into all corners of the forms. Use equipment and procedures for consolidating concrete in accordance with ACI 309.

F. Notify City at least 1 full working day in advance before starting to place concrete.

G. Hot Weather Placement:

1. Prepare ingredients, mix, place, cure, and protect in accordance with ACI 301, ACI 305.1, and as follows:

   a. Maintain concrete temperature below 95 degrees F at time of placement, or furnish test data or provide other proof that admixtures and mix ingredients do not produce flash set plastic shrinkage, or cracking as a result of heat of hydration. Cool ingredients before mixing to maintain fresh concrete temperatures as specified or less.

   b. Provide for windbreaks, shading, fog spraying, sprinkling, ice, wet cover, or other means as necessary to maintain concrete at or below specified temperature.

2. Cure concrete as specified in Section 3.8, Concrete Curing.

H. Cold Weather Placement:

1. Unless otherwise permitted, shall be in accordance with requirements of ACI 306.1 and as follows:

   a. Cold weather requirements shall apply when ambient temperature is below 40 degrees F or approaching 40 degrees F and falling.

   b. Do not place concrete over frozen earth or against surfaces with frost or ice present. Frozen earth must be thawed to the acceptance of the City.

c. Unless otherwise permitted, do not place concrete in contact with surfaces less than 35 degrees F. This requirement is applicable to all surfaces including reinforcement and other embedded items.

d. Provide supplemental external heat as needed when other means of thermal protection are unable to maintain minimum surface temperature of concrete as specified in ACI 306.1.

e. Maintain minimum surface temperature of concrete as specified in ACI 306.1 for no less than 3 days during cold weather conditions.

f. Cure concrete as specified in Section 3.8, Concrete Curing. Protect concrete from freezing until the end of the curing period and until the concrete has attained a compressive strength of 3,500 psi (or the design compressive strength if less than 3,500 psi).

3.7 FINISHING UNFORMED SURFACES

A. Screed and give an initial float finish as soon as concrete has stiffened sufficiently for proper working.

B. Initial floating shall produce a surface of uniform texture and appearance.

C. Follow with a second floating at the time of initial set. This floating shall produce a finish of uniform texture and color.

D. In areas where concrete is to remain exposed, the final finish shall be obtained with a light brooming.

E. Manhole inverts shall be true to line and grade and smooth.

3.8 CURING

A. Finished concrete shall be cured by protecting it against moisture loss, rapid temperature change, precipitation, flowing water, and mechanical injury for a minimum of seventy-two (72) hours after placement.

B. Concrete shall be maintained at a minimum of 50º F during the curing period.

C. Curing compound shall be used on all flat exposed surfaces.

D. The Contractor shall be responsible for protecting the concrete from traffic and the elements.

3.9 CARE AND REPAIR OF CONCRETE

A. The Contractor shall protect all concrete against injury or damage from excessive heat, lack of moisture, overstress, or any other cause until final acceptance by the City.

B. All concrete structures shall not have backfill placed against them until the concrete has reached sufficient strength so as not to have any damage caused by the backfill or backfill operations.

C. Any concrete found to be damaged, or that may have been originally defective, or that becomes defective after any time prior to the final acceptance of the completed work, or that departs from the established line or grade, or that, for any other reason, does not conform to the requirements of the City shall be satisfactorily repaired as directed by the City or removed and replaced with acceptable concrete at no expense to the City.

3.10 FIELD QUALITY CONTROL

A. General:

1. Provide adequate facilities for safe storage and proper curing of concrete test specimens onsite for first 24 hours, and for additional time as may be required before transporting to test lab.

2. Unless otherwise specified, sample concrete for testing for making test specimens, from the point of delivery.

3. When concrete is pumped, sample and test air content at point of delivery and at the point of placement.

   a. For Each Concrete Mixture: Provided the results of the air content tests for the first load of the day are within the specified limits, testing need only be performed at the point of delivery for subsequent loads of that concrete mixture except that testing should be performed at the point of placement every four hours.

4. Evaluation will be in accordance with ACI 301 and Specifications.

5. Test specimens shall be made, cured, and tested in accordance with ASTM C31/C31M and ASTM C39/C39M.

6. Frequency of testing may be changed at the discretion of City.

7. Pumped Concrete: Take concrete samples for slump (ASTM C143/ C143M) and test specimens (ASTM C31/C3 IM and ASTM C39/C39M) and shrinkage specimens (ASTM C157/C l57M) at placement (discharge) end of line.

8. If measured air content at delivery is greater than the specified limit, a check test of air content will be performed immediately on a new sample from delivery unit. If check test fails, the concrete has failed to meet requirements of Contract Documents. If measured air content is less than the lower specified limit, adjustments will be permitted in accordance with ASTM C94/C94M, unless otherwise specified. If the check test of the adjusted mixture fails, the concrete has failed to meet requirements of Contract Documents. Concrete that has failed to meet requirements of Contract Documents shall be rejected.

B. Concrete Strength Test:

1. Unless otherwise specified, one specimen at age of 7 days for information, and two 6-inch diameter or when permitted three 4-inch diameter test specimen at age of 28 days for acceptance.

2. If result of 7-day concrete strength test is less than 50 percent of the specified 28-day strength, extend the period of moist curing specified in Section 3.8, Concrete Curing, by 7 additional days.

3. Provide a minimum of one spare test specimen per sample. Spare cylinder shall be tested as directed by City.

C. Shrinkage Tests:

1. When required to conform to shrinkage limits, collect actual concrete materials being batched and before liquids have been added to the mix. Mix sampled material in a laboratory at proportions matching the batched concrete. Test shrinkage characteristics every 5,000 cubic yards of concrete used on job and every 3 months during construction when compression test cylinders are made.

2. Concrete Shrinkage Limits: Test in accordance with ASTM C157/ Cl57M, with the following modifications:

a. Prisms shall be moist cured for 7 days prior to the 28-day drying period.

b. Comparator reading at the end of the 7-day moist cure shall be used as the initial length in the length change calculation.

c. Reported results shall be the average of three prisms.

d. If drying shrinkage of any specimen departs from the average of that test age by more than 0.004 percent, disregard results obtained from that specimen.

e. Results at the end of the 28-day drying period shall not exceed 0.040 percent if 3-inch prisms are used, or exceed 0.038 percent if 4-inch prisms are used.

f. If the 7-day or 14-day shrinkage tests results exceed the shrinkage limits established by the design mix testing, furnish an additional 14 days of water curing beyond the original curing period, for concrete surfaces of hydraulic structures represented by prisms. Modify the concrete mix design to reduce shrinkage prior to casting additional concrete for the work.

D. High Range Water Reducer (Superplasticizer) Admixture Segregation Test: Test each truck prior to use on job.

1. Segregation Test Objective: Concrete with a 4-inch to 8-inch slump must stay together when slumped. Segregation is assumed to cause mortar to flow out of mix even though aggregate may stay piled enough to meet slump test.

2. Test Procedure: Make slump test and check for excessive slump and observe to see if mortar or moisture flows from slumped concrete.

3. Reject concrete if mortar or moisture separates and flows out of mix.

E. Cold Weather Placement Tests:

1. During cold weather concreting, cast cylinders for field curing as follows. Use a method that will produce a greater number of specimens:

   a. Six extra test cylinders from the last 100 cubic yards of concrete.

   b. Minimum of three specimens for each 2 hours of placing time or for each 100 cubic yards.

2. These specimens shall be in addition to those cast for lab testing.

3. Protect test cylinders from weather until they can be placed under the same protection provided for the concrete structure that they represent.

4. Keep field test cylinders in the same protective environment as the parts of structure they represent to determine if specified strength has been obtained.

5. Test cylinders in accordance with applicable sections of ASTM C31/ C31M and ASTM C39/C39M.

6. Use test results to determine the specified strength gain prior to falsework removal or for prestressing.

F. Tolerances:

1. Slab Finish Tolerances and Slope Tolerances:

   a. Floor flatness measurements shall be made the day after the floor is finished and before shoring is removed to eliminate effects of shrinkage, curing, and deflection.

   b. Support 10-foot-long straightedge at each end with steel gauge blocks of thicknesses equal to specified tolerance.

   c. Compliance with the designated limits in four of five consecutive measurements is satisfactory, unless defective conditions are observed.

G. Liquid Tightness Tests:

1. Purpose: To determine integrity and liquid-tightness of finished exterior and interior concrete surfaces of liquid containment structures.

2. All liquid-containing concrete structures are to be tested for liquid- tightness as specified, unless otherwise noted on the Drawings.

3. Water for the initial tightness test shall be from a city approved source. Contractor shall provide means to transport water to the structure to be tested. If additional tightness tests are required due to failure to meet criteria, the Contractor shall provide water for the subsequent tests.

4. After testing has been completed, dispose of test water in a manner approved by the City. Requirements for Liquid-Tightness Test:

    a. Perform tightness tests in accordance with ACI 350.1 and as specified herein.

    b. Do not place backfill, coatings, or other work that will cover concrete surfaces until tightness testing has been completed an approved.

5. Measure water surface at two points 180 degrees apart when possible where attachments, such as ladders exist, at 24-hour intervals.

6. Acceptance Criteria:

    a. Volume loss shall not exceed 0.050 percent of contained liquid volume per 24-hour period, adjusted for evaporation, precipitation, and temperature

    b. Acceptance that the structure has passed the tightness test shall be based on the total volume loss at the end of the specified test period.

7. Repairs When Test Fails: Dewater structure; fill leaking cracks with crack repair epoxy or polyurethane material that is specific to the type of repairs and meets manufacturer requirements. Patch areas of damp spots previously recorded, and repeat water leakage test in its entirety until the structure successfully passes the test.

    a. Contractor has one attempt at fixing the leaking of the structure. Any subsequent repairs shall be performed by a City approved structural leak repair expert.

3.11 PROTECTION OF INSTALLED WORK

A. After curing as specified in Section 3.8, Concrete Curing, and after applying final floor finish, cover slabs with plywood or particle board or plastic sheeting or other material to keep floor clean and protect it from material and damage as a result of other construction work.

B. Repair areas damaged by construction, using specified repair materials and approved repair methods

SECTION 03400

PRECAST CONCRETE

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses precast concrete products (manholes, vaults, etc.).

1.2 REFERENCES

A. American Concrete Institute (ACI);

1. 304R, *Guide for Measuring, Mixing, Transporting, and Placing Concrete*, latest revision.

2. 350, *Environmental Structures: Code Requirements*, latest revision.

B. ASTM International (ASTM)

1. C31, *Standard Practice for Making and Curing Concrete Test Specimens in the Field*, latest revision.

2. A36, *Standard Specification for Structural Steel*, latest revision.

C. Precast/Prestressed Concrete Institute (PCI)

1. MNL-117, *Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products*, latest revision.

2. MNL-120, *Design Handbook for Precast and Prestressed Concrete*, latest revision.

1.3 SUBMITTALS

A. Sealer for Exterior Surfaces

1. Product data with mixing/application instructions.

B. Calculations and Technical Data

1. Proposed details and design calculations for stresses in all critical sections of precast members for all loading conditions including transportation, handling, and erection.

C. Precasting Manufacturers

1. Experience record on production of precast concrete as shown, with information on precasting plant, that will indicate capability to satisfactorily perform the work.

2. Evidence of current PCI plant certification.

D. Certificate of Compliance

1. Certify admixtures and concrete do not contain calcium chloride.

E. Test Reports

1. For precast manufacturer's concrete test cylinders.

2. Inspection of installed panels.

F. Submittal Drawing

1. Submitted to the City for review and approval not less than two (2) weeks prior to placement and must include information on steel placement, sizing, compressive strength, and grade of steel reinforcement. Steel placement and sizing are to meet the City of Greely Standard Drawing.

1.4 QUALITY ASSURANCE

A. Qualifications of Precasting Manufacturers:

1. Precast Concrete: Product of manufacturer with a minimum of 3 years' experience producing precast concrete products of quality specified.

2. Precast Plant: PCI certified plant with current certification.

3. Calculations shall be stamped by an engineer registered in the State of Colorado.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Reference construction specification *Section 03300, Cast-In-Place Concrete*, for precast concrete minimum requirements for mix design (cement, aggregate, water, admixtures, and reinforcement).

B. Formwork:

1. One-piece, full length and without seams.

C. Embedded Items:

1. ASTM A36 steel.

2. Anchor Studs: Headed anchor studs (HAS), deformed bar anchors (DBA), or threaded studs as manufactured by Nelson Stud Welding Co., Lorain, OH.

3. Furnish inserts for lifting precast slabs, and as otherwise required.

D. Sealer for Exterior Surfaces:

1. Silane Sealer: One-component penetrating sealer, hydrophilic (isopropyl alcohol as a carrier) with 40 percent active ingredients.

2. Manufacturers:

a. Master Builders Co.

b. Euclid Chemical Co.

E. Antimicrobial Crystalline Waterproofing Admixture

1. Xypex Bio-San C500

2. Xypex Bio-San C500 must be added to concrete mix at batch plant.

3. The antimicrobial crystalline powder shall be added to the concrete mix at 1% by weight of the cementitious material content

2.2 DESIGN REQUIREMENTS

A. Structural Precast Members

1. Meet applicable sections of PCI MNL-120.

2. Design for all loading conditions including transportation, handling, and erection.

3. Minimum reinforcing steel cover to be 2 inches conforming to ACI 350.

4. Any structure to be installed in a roadway shall be designed for an AASHTO HS-20 loading.

2.3 FABRICATION

A. Comply with PCI MNL-117.

B. Reinforcing Steel: Place in position before concrete is cast and keep clean and free from form oil or other substances harmful to bond.

C. Concrete: Deposit, vibrate, finish, and cure in accordance with recommended practices of ACI 304R.

D. Sealer:

1. Apply to precast panels at precast plant site after sandblasting panels, in accordance with manufacturer's instructions.

2. Protect surface until installed in the Work.

3. Repair damage as approved by manufacturer.

2.4 SOURCE QUALITY CONTROL

A. Prepare minimum three standard concrete test cylinders for each 50 cubic yards or fraction thereof of concrete placed in the precast work in accordance with ASTM C3l.

B. Test and record concrete strengths.

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine each precast section upon arrival to the job site for cracks and other unsightly imperfections or structural defects. Record location and condition of damaged sections.

B. Resolution:

1. Repair damage to satisfaction of City.

2. Remove panels with damage or repairs not acceptable to City and install new acceptable panels in place of those removed.

3. Perform reinspection and obtain acceptance by City.

3.2 INSTALLATION

A. Set precast sections in accordance with the manufacturer's erection drawings.

3.3 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle all materials to ensure installation in sound and undamaged condition.

B. Do not deliver precast sections to the job site until the concrete has attained at least 80% of specified design strength.

C. Precast concrete members shall be lifted and supported during manufacturing, stockpiling, transportation, and erection operations only at the lifting or supporting point, or both, as shown on shop drawings.

D. Transportation and on-site handling shall be performed with acceptable equipment and methods, as well as by qualified personnel.

E. Care shall be taken to avoid tensional stresses during transportation.

F. Place units so that identification markings are discernible.

G. Stack so that lifting devices are acceptable and undamaged.

3.4 CLEANING

A. After installation, clean soiled precast concrete surfaces with detergent and water, using fiber brush and sponge. Rinse thoroughly with clean water immediately after using cleaner.

B. Use extreme care to prevent damage to precast concrete surfaces and to adjacent materials.

3.5 FIELD QUALITY CONTROL

A. Inspection:

1. Inspect panels with City for cracks or damage. Record location and condition of damaged panels.

2. Any structure that requires liquid tightness shall be leak tested prior to acceptance. Refer to Liquid Tightness Test in *Section 03300, Cast-In-Place Concrete.*

B. Resolution:

1. Repair damage to satisfaction of City.

2. Remove panels with damage or repairs not acceptable to City.

3. Install new acceptable panels in place of those removed.

4. Perform reinspection and obtain acceptance by City.

SECTION 11230

NON-POTABLE POND AERATION SYSTEM

PART 1 - GENERAL

1.1 SCOPE

A. It is the intent of this specification to describe the construction of an automatic pond aeration system for a raw water irrigation ponds. All components of the aeration system including compressors, electrical controls, valves, prefabricated pipe manifolds, flow meters, gauges, pond aeration tubing and modules, and all other items necessary for the proper assembly and operation of the system must be provided by a single supplier as a "knocked down" aeration system. The intent is to provide sole source responsibility for the materials, installation, and warranty of the system.

B. Furnish all labor, materials, supplies, equipment, tools, and transportation, and perform all operations in connection with and reasonably incidental to the complete installation of the aeration system, and guarantee/warranty as shown on the drawings, the installation details, and as specified herein. Items of work specifically included are:

1. Procurement of all applicable licenses, permits, and fees as required by local codes and utilities.

2. Connection of electrical power supply to the aeration system.

3. Installation of compressors, electrical controls, piping, valves, aeration feeder / distribution tubing, aeration modules, and appurtenances necessary for the complete operation of the aeration system.

4. Coordinating installation of aeration mechanical system with the installation of the pump system concrete mounting pad, conduit penetrations, building walls, doors, vents, and other equipment in the building.

5. Testing and start-up, and adjustment of aeration system.

6. Start-up, testing, adjustment of aeration system, training, and demonstration of performance to the City’s Representative.

7. Maintenance period.

1.2 DISCREPANCIES:

A. It is the intent of these plans and specifications that the aeration system be complete and workable. It is the Contractor's responsibility to make sure that the equipment furnished is compatible and adheres to all regulations. Any discrepancies should be noted immediately and should be reported to the City’s Representative for clarification.

1.3 SUBMITTALS:

A. Deliver all submittals under provisions of Section 01300.

B. Materials List: Include pipe, valves, flow meters, fittings, compressors, control system components, and electrical equipment. Quantities of materials need not be included.

C. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating and maintenance instructions for all equipment supplied.

D. Maintenance Manual: Submit in all manufacturer's data listed above and recommended operating procedures, adjustments, system trouble shooting, and preventive maintenance procedures.

E. Shop Drawings: Submit shop drawings of compressor system, electrical controls, and flow meter control unit installation. Show products required for proper installation, their relative locations, and critical dimensions. Note modifications to the installation drawings.

1.4 RULES AND REGULATIONS:

A. Work and materials shall be in accordance with the latest edition of the National Electric Code and applicable laws and regulations of the governing authorities. When a discrepancy exists between the national and local codes, the local codes shall prevail.

B. When the contract documents call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, provide the quality and size required by the contract documents.

C. All electrical control panels with controls shall be built in accordance to N.E.C.,

D. U.L. and E.T.L. standards. The electrical components and enclosure shall be labeled as a complete U.L. listed assembly with manufacturer’s U.L. label applied to the door. All equipment and wiring shall be mounted within the enclosure and labeled for proper identification.

1.5 SYSTEM PERFORMANCE

A. Refer to Section 5 Non-Potable Irrigation System Design Criteria.

1.6 TESTING:

A. Notify the City's Representative three days (72 hours) in advance of testing.

B. On completion of assembly, the aeration system piping shall be hydrostatically tested at a pressure not less than 50 PSI.

C. Control and safety shut off devices shall be tested and verified operational.

D. Flow and discharge pressure shall be verified with specified values.

E. All costs, including travel expenses and site visits by the City’s Representative, for any re-testing that may be required due to non-compliance with the Construction Documents shall be the sole responsibility of the Contractor.

1.7 REVIEWS:

A. The purpose of on-site reviews by the City's Representative is to observe the Contractor's interpretation of the construction documents and to address questions with regards to the installation.

1. Scheduled reviews such as those for testing should be scheduled with the City's Representative as required by these specifications.

2. Impromptu reviews may occur at any time during the project.

3. Final review will occur at the completion of the aeration system installation and As-Built Drawings.

1.8 GUARANTEE/WARRANTY AND REPLACEMENT:

A. The purpose of this guarantee/warranty is to insure that the City receives aeration system materials of prime quality, installed and maintained in a thorough and careful manner.

1. The manufacturer shall warrant the aeration system to be free of defects and product malfunctions for a period of two years from date of start up or 30 (thirty) months after shipment, whichever occurs first.

2. Failures caused by lightning strikes, power surges, vandalism, flooding, or operator abuse are excluded from warranty coverage.

3. Repair damage to the premises caused by a defective item. Make repairs within seven days of notification from the City's Representative.

4. Contract documents govern replacements identically as with new work. Make replacements at no additional cost to the contract price.

PART 2 - MATERIALS

2.1 QUALITY:

A. Materials used in the system shall be new and without flaws or defects of any type, and shall be the best of their class and kind.

2.2 SUBSTITUTIONS:

A. Make complete submittals of all manufacturer's data showing compliance with the Contract Documents.

B. In making a request for a substitution, the Contractor represents that they:

1. Has investigated the proposed substitution and found that it is the same or better quality, level, capacity, function, or appearance than the specified product, and can demonstrate that to the City's Representative.

2. Will coordinate the installation and make all modifications to the work that may be required for complete installation and operation of the system.

C. The City will determine acceptability of the proposed substitution and will notify Contractor of acceptance or rejection.

D. Pipe sizes referenced in the construction documents are minimum sizes, and may be increased at the option of the Contractor upon approval by the City's Representative.

2.3 GENERAL REQUIREMENTS:

A. The complete aeration mechanical system and related equipment shall be designed to function in an outdoor environment exposed to all of the elements. Furnish protective enclosures and covers as required for proper operation of the system.

B. The prefabricated aeration system shall have a capacity as shown in the drawings.

C. The aeration system includes one oil-less compressor, one air-cooled aftercooler, one corona discharge unit, flow meters, gauges, fittings, valves, and piping as required and as shown on the drawings and details.

D. Completely assemble and operate all components of the aeration system prior to shipment to insure proper fit, assembly and operation on the job site.

E. Construction shall include a fabricated steel skid assembly to support all components during shipping and to serve as the installed mounting base.

F. Connection of the aeration system to 240 or 480 three-phase, 460 volt, 60 hertz power supply to service control panel for compressor and air cooler.

G. All system components shall be supplied and be the responsibility of one manufacturer, even though some components were manufactured by others.

H. The aeration system and related equipment shall meet all the general and technical specifications; shall be designed, fabricated and installed in a workmanlike manner; and shall be delivered within schedules negotiated between Contractor and manufacturer.

I. Furnish shop drawing for approval prior to installation.

J. Provide a factory-trained technician to supervise the installation of the aeration system.

In addition to the time required for installation supervision, the technician shall provide a minimum of 1 day of training for the City's staff in the operation, maintenance, and programming of the aeration system. Notify the City's Representative one week in advance of training to schedule with City.

K. Acceptable Manufacturers:

1. Aqua Sierra, Inc.

   Contact: Bill Logan, Aqua Sierra, Inc., 8350 South Mariposa Drive, Morrison, Colorado, 80465, (303) 697-5486, FAX (303) 697-5069.

2. Keeton Fisheries, Inc.

Contact: Jim Keeton, Keeton Fisheries, Inc., 300 Lincoln Court, Fort Collins, Colorado, 80524, (303) 493-4831, FAX (303) 493-4921.

3. City Approved Equivalent.

2.4 COMPRESSOR SYSTEM:

A. Furnish "oil-less" air compressor designed for continuous duty operation as main aeration compressor.

1. Manufactured by Powerex or approved equivalent, having the capacity and operating discharge pressure as shown in the drawings.

2. Constructed with motor mounted 840 RPM, 460 volt, 3-phase, 60 HZ, electric motor, and all electrical controls.

3. Equipped with air inlet filter and silencer.

4. Furnish ventilation and sound suppression enclosure and components to reduce sound level by 7 dBa.

5. The control system shall include NEMA motor starter with overload protection, 120V transformer, HOA switch, pressure switch, pressure gauge and runtime hour meter, and 24-hour field programmable time clock.

6. Furnish automatic drain valve, safety relief valve, pressure gauge, and necessary brass valves and copper piping.

2.5 AIR COOLED AFTERCOOLER:

A. Furnish air-cooled aftercooler with 1/12 HP fan, and copper tube, aluminum fin heat exchanger designed for continuous duty operation.

1. Speedaire Model 5Z757 rated for 20 CFM at 100 PSI or approved equivalent.

2.6 CONDENSATE SEPARATOR:

A. Furnish condensate separator with automatic drain valve.

1. Wilkerson Model WSA-04-FM0 or approved equivalent.

2.7 PIPING:

A. Compressor Piping: Furnish Type L rigid copper pipe, brass fittings, and components necessary for the complete installation of the aeration mechanical system. Submit shop drawing for approval prior to construction. Show pressure gauges, flow meter, filters, valves, etc.

B. Air Distribution Tubing: Furnish 100 PSI 1/2-inch high density flexible PVC connecting pond aeration modules to discharge pipe from compressor assembly.

1. Use non-leaded, self-weighted high density flexible PVC air feeder tubing from compressor assembly discharge to aeration modules.

C. Pond Aeration Modules: Furnish stainless steel disk aeration modules for installation on the bottom of the ponds.

1. Furnish Model as shown in the drawings as manufactured by Air Diffusion Systems, Lake Bluff, Illinois, 60044, (847) 615-0044.

2. City approved equivalent.

D. Piping Hardware: Furnish stainless steel clamps, fittings, nylon ties (cable ties), supports, and gaskets as required for all piping and tubing connections.

2.8 VALVES:

A. Check Valves: Furnish bronze check valves downstream of each compressor.

B. Isolation Valves: Furnish bronze ball valves for isolation of compressors.

C. Regulating Control Valves: Furnish 1/2-inch bronze ball valves where indicated on aeration flow diagram detail.

2.9 GAUGES:

A. Furnish 2.5-inch diameter liquid filled or vibration/pulsation dampened pressure gauges. Install ball valves to provide total isolation of pressure gauges.

2.10 FLOW METERS:

A. Furnish flow meters, located on each lateral pipe, for each pond aeration module. Label each flow meter with the associated module and location of the module in the pond. Provide a diagram of the modules showing location and label to match the flow meters.

2.11 ELECTRICAL:

A. Enclosures:

1. Mount the aeration system electrical controls in a self-contained NEMA 3S enclosure with drip lip, fabricated from not less than 14 gauge steel. Furnish door gasket seals constructed from neoprene sponge, sufficient to protect interior components from weather and dust.

2. Furnish operating handle for main station power disconnect located on the front of the panel. Provide dust and weatherproof enclosures for all external operating devices.

3. Mount all internal components of the enclosures on removable back panels. Do not mount components on the panel enclosure with screws that protrude from enclosure.

B. Compressor Motor Starters, Disconnect, and Electrical Switch Gear:

1. Furnish compressor motor starters contained within a single NEMA 3S enclosure with a single access door and main disconnect. Each starter shall be protected on

each power leg by a time delay fuse of the appropriate amperage. Motor starter coils shall be 120 volt operated.

2. Use ambient-compensating type overload relays installed on each power leg set to trip at 105% of motor full-load current rating.

C. Electrical Control Panel:

1. The electrical control panel shall be NEMA 3S enclosure equipped with a gasketed enclosure door. Isolate the incoming power by means of a circuit breaker or fused disconnect.

2. The operation of the compressors shall be controlled by an industrial grade, field programmable, and timer.

3. All starting circuits, stations safety shutdown circuits and any optional equipment control circuits shall have an operating voltage not exceeding 120 volts. All time delay control relays shall be plug-in type for easy replacement.

4. Switches: The control panel shall be equipped with a flow switch to disconnect the electrical power in the event of the main compressor failure. An indicating lamp on the control panel will alert the maintenance person as to the failure.

D. Aeration System Wiring:

1. All wiring from control panel to compressors shall be in liquid-tight conduit with copper conductors rated not less than 600 volts AC and of proper size to carry the full load amperage of the motors without exceeding 70% capacity of the conductor. A grounding cable shall be included in the liquid-tight conduit. Splices between the motor starters and the motor connection boxes are not allowed.

2. Furnish multi-conductor shielded cable suitable for Class ll low voltage controls for wiring to flow sensors.

E. Lightning Arrestor:

1. The main power supply feeding the aeration system station shall be equipped with a 3 phase secondary lighting arrestor having a breakdown current rating of not less than 60,000 amps at 14,000 volts discharge. Power supplies, 300 volts and less, shall use 300 volt rated arrestor with an 800 volt spark-over voltage. Power supplies 301-600 volts shall use 600 volt rated arrestor with a 1,000 volt spark-over voltage.

F. Standards:

1. All wiring shall conform to the National Electrical Code Standards.

2. Flexible conduit sections shall be less than 5 feet in length to meet code. All conduit to devices shall be attached securely to avoid trip hazards.

3. A wiring schematic shall be provided by the manufacturer for approval prior to manufacture. The schematic shall show all devices, connections and wire numbers. Furnish a laminated copy of the schematic attached to the interior door of the panel.

4. All controls and electrical equipment shall be thoroughly inspected and tested before shipment.

2.12 PAINTING:

A. Painting of the entire unit shall consist of a multi-step coating system which includes metal preparation, rust inhibitive prime coat, and a two-part catalyzed acrylic finish having a total dry film thickness of not less that 4 mils. Paint aeration system components with the manufacturer's standard color. Paint all electrical enclosures and accessory panels with a minimum thickness of 3 mils and baked at 160-180 F.

PART 3 - EXECUTION

3.1 INSPECTIONS AND REVIEWS:

A. Site Inspections:

1. Verify site conditions and note irregularities affecting work of this section. Report irregularities to the City's Representative prior to beginning work.

2. Beginning work of this section implies acceptance of existing conditions.

3.2 AERATION SYSTEM INSTALLATION:

A. Shipping, off-loading and the technical start up shall be furnished by the aeration system manufacturer. Location and mounting details shall be furnished to the Contractor by the aeration system manufacturer.

B. Coordinate the installation of the aeration system with the installation of the irrigation pumping system and the construction of the concrete floor slab referenced in other sections of the specifications.

C. Install the system as recommended by the manufacturer and as shown in the drawings. Make all connections and adjustments necessary for the proper operation of the aeration system.

D. Install compressors, filters, coolers, flow meters, valves, pressure gauges, and pipe including copper manifolds, sleeves, air distribution pipe, pond aeration tubing, and pond aeration modules.

1. Install pond aeration tube as shown on plans

a. Tie all self-weighted feeder / distribution tubing together at the bottom of the pond with a maximum distance of 20-ft between ties.

b. Install ties no closer than 30-ft to the pond aeration module to allow for surfacing and removal of the module.

2. Make connection between air distribution feeder pipe and pond aeration modules where shown on plans and as recommended by the manufacturer.

3. Install sleeving where indicated on the drawing. Coordinate the installation of the pond edge sleeves with the installation of the trench wall and the pond liner and seal all penetrations as recommended by the manufacturer.

E. Technical start up procedures by the aeration system manufacturer shall include the following:

1. Provide detailed start-up procedure to City's Representative for review, one week prior to start-up.

2. System start up and pressurization of aeration piping system.

3. Pressure, flow, and balance adjustments.

3.3 INSTALLATION OF ELECTRICAL COMPONENTS:

A. Install electrical control panels and disconnect on wall of mechanical enclosure as recommended by manufacturer and as shown on drawings.

B. Install all conduit and wiring as recommended by the manufacturer and as necessary for the proper operation of the system.

3.4 PAINTING:

A. Paint all bare metal surfaces to match paint as applied by pump system manufacturer. Touch up all dings and scratches as required.

3.5 OPERATION AND MAINTENANCE MANUALS:

A. Furnish System Operation and Maintenance manuals to City's Representative prior to project completions. Furnish four copies of single, bound manual.

3.6 OTHER ITEMS:

A. Tools and Spare Parts:

1. Prior to Substantial Completion of the Work, supply to the City operating keys, servicing tools, test equipment, and any other items indicated on the drawings.

2. Prior to Substantial Completion, supply to the City one complete set of gaskets for the compressor, and one filter (replacement) cartridge for each filter assembly.

3. Furnish other spare parts indicated on the drawings.

B. Other Materials: Install other materials or equipment shown on the drawings or installation details to be part of the aeration system, even though such items may not have been referenced in these specifications.

3.7 PROJECT AS-BUILT DRAWINGS:

A. Submit As-Built Drawings in accordance with Specification Section 01785.

B. Record pipe system alterations. Record work that is installed differently than shown on the construction drawings.

3.8 MAINTENANCE:

A. Upon completion of the Work (installation of aeration system and irrigation pond filled with water), maintain system for a duration of 30 calendar days. Make periodic examinations and adjustments to aeration system components as necessary.

B. Following completion of the Contractor's maintenance period, the City will be responsible for maintaining the system in working order during the remainder of the guarantee/warranty period, and for performing necessary routine maintenance.

3.9 CLEANUP:

A. Upon completion of work, remove from the site all machinery, tools, excess materials, and rubbish.

B. Contractor shall clean all surfaces and touch up scratches with factory paint to match original.

SECTION 11285

SLIDE GATES

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Furnish all materials and services necessary for the slide gate system as shown on the Contract Drawings and as specified in accordance with provisions of the Contract Documents, and completely coordinated with work of all other trades. Although such work is not specifically shown or specified, furnish all supplementary or miscellaneous items, appurtenances, and devices incidental to or necessary for a sound, secure and complete installation.

B. Furnish all materials and services necessary for the installation of the handwheel on the dissipation structure.

1.2 RELATED SECTIONS

A. Section 03300—Cast-In-Place Concrete

1.3 REFERENCES

A. Where reference is made to any standard, the version in affect at the time of bid opening shall apply.

B. American Society for Testing and Materials International (ASTM):

1. A36: Standard Specification for Carbon Structural Steel

2. A126: Standard Specification for Gray Iron Castings for Valves, Flanges, and Pipe Fittings

3. A307: Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod

C. American National Standards Institute / American Water Works Association (ANSI/ AWWA):

1. C560: Cast-Iron Slide Gates

D. The Society for Protective Coatings/National Association of Corrosion Engineers (SSPC/NACE):

1. SSPC SP 10/NACE No. 2 – Near-White Blast Cleaning

1.4 SUBMITTALS

A. General:

1. Submit under provisions of Section 01330—Submittals.

2. Prior to manufacturing any of the components for the installation of the slide gate and appurtenances, detailed shop drawings shall be submitted to the Engineer for approval.

3. Manufacturer drawings shall be certified as meeting ANSI/AWWA C560 Standards for dimensions, construction, and materials used for all parts of the slide gate and manual slide-gate actuator mechanism.

1.5 SYSTEM WARRANTY

A. Defects in material or workmanship of new system components shall be repaired or replaced at no cost to the Owner for a period of two (2) years from date of final completion as determined by the Engineer and Owner.

PART 2 - MATERIALS

2.1 GENERAL

A. The slide gate shall be installed on the outlet end of the non-potable water pipe at the dissipation structure.

B. The slide gate shall be designed for totally submerged silty conditions.

C. The slide gate handwheel shall be installed on the dissipation structure at the top of the ditch in accordance with the Drawings.

D. The slide gate shall be rated for 20 feet of seating head and 10 feet of unseating head.

E. Use of slide gates within the non-potable pump station shall require specific design and specification for each application.

2.2 SLIDE GATE MATERIALS

A. Seat – Cast Iron – ASTM A126, Class B

B. Slide – Cast Iron – ASTM A126, Class B

C. Cross Bar – Cast Iron – ASTM A126, Class B

D. Cross Bar Bolt & Nut – Steel, Plated – ASTM A307, A164

E. Wedqe – Cast Iron – ASTM A126, Class B

F. Wedge Fasteners – Steel, Plated – ASTM A307, A164

G. Side Angle – Steel, Galvanized – ASTM A36

H. Stem Support – Steel, Galvanized – ASTM A36

I. Head Bar – Steel, Galvanized – ASTM A36

J. Head Bar Fasteners – Steel, Plated – ASTM A307, A164

K. Stem – Steel – ASTM A108, Grade 1045

L. Keeper – Cast Iron – ASTM A126, Class B

M. Keeper Bolts & Nuts – Steel, Plated – ASTM A307, A164

N. Lift Nut – Brass – ASTM B584, Alloy 844

O. Stop Nut – Brass – ASTM B16

P. Handwheel – Cast Iron – ASTM A126, Class B

Q. Handwheel Set Screw – Steel, Plated – ASTM A307, Al64

R. Stem Supt., Bolts/Nuts – Steel, Plated – ASTM A307, A164

2.3 Manufacturers

A. Series 6400 as manufactured by Fresno Gates.

B. Series C-20 as manufactured by Waterman USA.

C. Approved equal.

PART 3 - EXECUTION

3.1 TESTING

A. Field Leakage Test:

1. A field leakage test shall be performed by the Contractor after installation of the slide gate.

2. The manufacturer shall be notified of the test in sufficient time to enable manufacturer to have a representative present for that test.

3. After all adjustments have been made and the mechanisms properly lubricated, each gate slide shall be run through three complete cycles as a final check on proper operation before starting the leakage test.

4. Seating and unseating heads shall be measured from the top surface of the water to the center of the gate.

5. At the design seating head, the leakage shall not exceed 0.1 gpm per foot of seating perimeter.

B. Manufacturer's Representative:

1. The system manufacturer shall provide a field representative for a minimum of one (1) day of field time as required to inspect, test, or approve all aspects of the installation.

SECTION 15140

NON-POTABLE PUMP STATION

PART 1 – GENERAL

1.1 SCOPE

A. This section addresses the installation and manufacture of non-potable irrigation pumping stations including factory assembled pump system and buildings. The pump station shall automatically deliver water to the turf irrigation system. It shall include vertical turbine pumps; submersible pressure maintenance pump; variable frequency drives; controls, alarms, sensors, displays, valves, and other devices as specified below; and all interconnecting piping and wiring. All equipment shall be fabricated, mounted on a structural steel base.

B. Furnish all labor, materials, supplies, equipment, tools, and transportation and perform all operations in connection with and reasonably incidental to the complete installation of a non-potable irrigation pumping station and guarantee/warranties.

1.2 REFERENCES

A. ASTM A523, *Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless*, latest revision.

B. ASTM A234, *Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service*, latest revision.

C. ANSI/AWWA C200, *Steel Water Pipe – 6 in. (150mm) and Larger*, latest revision.

D. ANSI/AWWA C206, *Field Welding of Steel Water Pipe*, latest revision.

E. ANSI/AWWA C207, *Steel Pipe Flanges For Waterworks Service – Sizes 4 in. Through 144 in. (100 mm Through 3,600 mm)*, latest revision.

F. ANSI/AWWA C208, *Dimensions for Fabricated Steel Water Pipe Fittings*, latest revision.

G. ANSI/AWWA C213, *Fusion-Bonded Epoxy Coating for the Interior and Exterior of Steel Water Pipelines*, latest revision.

H. ANSI/AWWA C218, *Coating the Exterior of Aboveground Steel Water Pipelines and Fittings*, latest revision.

I. NFPA 90A, *Standard for the Installation of Air-Conditioning and Ventilation Systems*, latest revision.

1.3 DEFINITIONS

A. ETL ETL Testing Laboratories, Inc.

B. Hz Hertz

C. IBC International Building Code

D. lbs Pounds

E. LCD Liquid Crystal Display

F. PLC Programmable Logic Controller

G. NEC National Electric Code

H. NEMA National Electrical Manufacturers Association

I. NFPA National Fire Protection Association

J. PM Pressure Maintenance Pump

K. PTFE Teflon

L. RPM Revolutions Per Minute

M. SCADA Supervisory Control and Data Acquisition

N. UL Underwriters Laboratories Inc.

O. VFD Variable Frequency Drive

P. HMI Human Machine Interface

1.4 QUALITY ASSURANCE

A. The pump equipment shall be furnished by a single supplier, who shall be solely responsible for the design and fabrication of the equipment. The supplier shall be regularly engaged in the design and fabrication of such equipment.

B. List of references for similar pump station installations.

1.5 PROVISIONS FOR LOSS PREVENTION

A. The complete pump station shall be UL and ETL Listed. The pump station control panel(s) shall be UL listed and labeled. UL listing and labeling of individual electrical components only shall not be acceptable.

1.6 SUBMITTALS

A. The Contractor shall deliver four (4) copies of all submittals to the City a minimum two (2) weeks prior to ordering materials.

B. Pump Equipment

1. Materials List: Include piping, valves, fittings, pumps and motors, control system components, and electrical equipment. Quantities of materials need not be included.

2. Manufacturer's Data: Submit manufacturers' catalog cut sheets, pump performance curves, specifications, startup manuals, and operating instructions for equipment shown on the materials list. Submit complete instructions for installation, operation, and recommended maintenance of the pump system.

3. Shop Drawings: Submit shop drawings of the proposed pump system. Show products required for proper installation, their relative locations, and critical dimensions. Submit technical data sheets, electrical/wiring schematics showing all devices, connections and wire numbers, sequence of operation, and UL listing authorization form.

4. Operation and Maintenance (O&M) Manual: Include operating procedures, adjustments, and preventative maintenance procedures. Include a guide for troubleshooting operational problems with the pump system and complete documentation for programming (i.e. recommended settings, adjustments). Deliver the O&M Manual to the City prior to pump system start-up. Provide an unlocked, unencrypted electronic backup copy of all programming and equipment settings for all programmable equipment on a USB drive that can be used to reprogram a replacement component in the event of a memory loss or failure.

5. Electrical Studies: Include complete Arc Flash Study including load flows, short circuit calculations and coordination study of all overcurrent protective devices down to each disconnecting means of each branch circuit. Studies to be completed using SKM per the IEEE 1584-2018. Entire SKM Project File is to be provided to the City of Greeley, including all subfolders, reports, tables, and settings files to allow for future updates of study. SKM Project File to be unlocked and unencrypted delivered via USB flash drive. Study to be based upon actual installed cable length and conduit types in addition to actual equipment and protective devices installed.

C. Pump House:

1. Materials List: Include pipe, fittings, mechanical, and electrical components. Quantities of materials need not be included.

2. Manufacturers' Data: Submit manufacturers' catalog cuts, specifications, and operating instructions for all equipment supplied.

3. Shop Drawings: Submit shop drawings of building and other drawings called for in the installation details or specifications. Show products required for proper installation, their relative locations, and critical dimensions. Note modifications to the installation detail.

1.7 WARRANTY

A. Pumping System:

1. A two (2) year warranty shall be provided for the non-potable irrigation pump station system including performance, materials, and installation.

2. The date of substantial completion shall be specifically determined, in writing, for the non-potable pumping system.

B. Building:

1. For a period of two year from commencement of the formal maintenance period, guarantee/warranty materials, equipment, and workmanship against defects. Fill and repair depressions. Restore landscape or other components damaged by the building installation. Repair damage to the premises caused by a defective item. Make repairs within seven days of notification from the Owner's Representative.

2. Contract documents govern replacements identically as with new work. Make replacements at no additional cost to the contract price.

3. Guarantee/warranty applies to originally installed materials and equipment and replacements made during the guarantee/warranty period.

1.8 PERMITTING

A. Obtain permits for the precast building, electrical within and outside of building, and all other necessary permits required for this Work.

1.9 DISCREPANCIES

A. It is the intent of the plans and specification that all equipment installed in the pump building be complete and operational. It is the Contractor's responsibility to make sure that the equipment furnished is compatible and adheres to all regulations. Any discrepancies should be noted immediately and should be reported to the Owner’s Representative for clarification.

1.10 RULES AND REGULATIONS

A. Work and materials shall be in accordance with the latest edition of the International Building Code, the International Electric Code, the International Plumbing Code, and applicable laws and regulations of the governing authorities.

B. When the contract documents call for materials or construction of a better quality or larger size than required by the above-mentioned rules and regulations, provide the quality and size required by the contract documents.

C. If quantities are provided either in specifications or drawings, these quantities are provided for information only. It is the Contractor's responsibility to determine the actual quantities of all material, equipment, and supplies required by the project and to complete an independent estimate of quantities and wastage.

1.11 CONTROL FEATURES

A. A pressure start time delay, a stop time delay, and a minimum run timer with automatic and manual time out; shall be provided for each pump. Flow ON and OFF sequencing set points and a 100 percent speed start time delay shall be provided for each main pump.

B. "Double successive" automatic alternation shall be provided for the main pumps to prevent short cycling while limiting equal wear. Time delayed automatic "sequence shifting" shall be provided to ensure that all operating pumps will sequence properly when one or more of them have been disabled due to a motor overload or a manual shutdown.

C. An auto-pressurizing mode with adjustable settings that gradually restores system pressure with the VFD main pump shall be provided to protect the irrigation piping at station startup and after extended station shutdowns.

D. An energy saving mode with adjustable settings shall be provided to reduce the system pressure at low flow rates when friction losses in the system are lower.

1.12 OPERATION

A. During non-irrigation times, the pressure maintenance (PM) pump will cycle ON and OFF as required to maintain irrigation system pressure. The cycling pressures shall be user selected and set substantially below normal set point pressure, if desired.

B. If the PM pump cannot maintain the desired pressure, then the programmable logic controller (PLC) will start the first main pump and will gradually ramp the pressure up to desired irrigation pressure to meet small demands.

C. If the first main pump cannot maintain the desired pressure, the PLC will start the second main pump and will gradually ramp the pressure up to the desired irrigation pressure, and so on and so forth until all pumps are operating to maintain the desired pressure.

D. Pump speeds will be modulated to hold a constant discharge pressure regardless of flow. As the flow rate increases and the main VFD pump can no longer maintain pressure while at maximum speed, the next sequential pump will be started and the VFD drive pump will accordingly reduce its speed and modulate.

E. An algorithm shall be included for accurately reducing the VFD pump speed as the next sequential pump is started so that no pressure surges are generated during the transition (even with across the line starting). Algorithm shall apply to all transitions between pumping states.

F. As the flow continues to increase, pumps will sequentially be started until all pumps are operating. As the flow begins to decrease, pumps will be sequentially turned off until only a single VFD driven pump is operating. When a no flow condition occurs, the last pump in operation shall be turned off.

PART 2 – PRODUCTS

2.1 GENERAL

A. Materials used in the system shall be new and without flaws or defects of any type and

shall be the best of their class and kind.

B. Pumping stations shall have a capacity and discharge pressure as shown on the Construction Drawings.

C. Prefabricated pump skids shall be completely piped, wired, hydraulically and electrically tested before shipment to the construction site. The pump station and related equipment shall meet all the general and technical specifications and shall be designed, fabricated, and installed in a workmanlike manner.

D. All components of the pumping system shall be designed to function within an indoor environment. Furnish protective enclosures, covers, and HVAC system as required for proper operation and maintenance of the system.

E. Construction shall include skid assembly to support all components during shipping and to serve as the installed skid base. Skid base shall be of sufficient size and strength to resist twisting and bending from shipping, installation, and hydraulic forces and support the full weight of the pumps and motors.

F. A trained representative or technician from the pump manufacturer shall supervise the installation of the pump skid. The pump manufacturer's representative shall also provide a minimum two (2) days for the startup and training to City personnel in the operation, maintenance, and programming of the new pumping system.

G. All pump skid components including but not limited to pumps, self-cleaning filters, steel piping, valves, fittings, and pump controls and magnetic flow meter shall be supplied by one (1) manufacturer, even though others manufactured some components. Refer to 2.2, 2.5, and 2.8 for items to be supplied by pump skid manufacturer.

2.2 PREMANUFACTURED PUMP SKID

A. Vertical Turbine Pumps:

1. Furnish variable frequency drive (VFD) vertical turbine pumps, electric motor driven, complete with the required length of threaded column assembly. Surfaces in contact with water shall be epoxy coated or stainless steel.

2. Pump discharge head shall be surface mounted and have 125 class, 200 psig rated, discharge flange of the same size as the pump check valves. Discharge head shall be cast iron.

    a. A check valve assembly consisting of two 3/4-inch swing type, 125 class, 200 psig rated, brass or bronze, check valves shall be mounted vertically on each main pump discharge head. The check valves shall be placed in series, in opposite directions, and modified to quickly release air from a main pump when it starts, and to slowly allow air to return when it stops. Each check valve assembly shall remain closed when its pump is running.

3. The pump discharge head shall include a stuffing box and be provided with a drain for the stuffing box wastewater to drain to the wet well.

4. Suction strainers shall be of the basket type and have total inlet areas of at least four times those of the suction bells.

5. Pump efficiency shall be minimum 80% at the specified operating point. The performance curve of each pump selected shall be continuously rising as it approaches shutoff.

6. Bowl assemblies including the suction, intermediate, and discharge bowls shall be furnished with epoxy coating or stainless steel flanged connections. Furnish bronze, dynamically balanced, impellers that are vertically adjustable by a hex nut located at the top of the pump motor.

7. Line shafts shall be supported by bearings no further than 10 feet apart.

8. Column pipe sections shall be no longer than 10 feet and joined together using threaded couplings.

9. Furnish each pump with a flanged, cast iron discharge head complete with a cast iron adjustable packing gland, gland plate, grease seal, packing bushing, packing and water slinger.

10. Provide a continuous bypass flush line from the stuffing box of each pump to the wet well.

11. All bowl bearings shall be constructed of bronze, all column bearings shall be fluted rubber. Each pump shaft, column line shaft, and pump motor shaft shall be turned, ground and polished 416 stainless steel, sized to transmit full nameplate HP of the motor. Minimum acceptable shaft size is one-inch (1”).

12. All shaft couplings shall be threaded and machined from 300 series stainless steel. Furnish two (2) piece head shaft assembly. All shaft couplings shall have left hand threads that tighten during pump operation.

13. Each motor shaft shall be removable and couple to the pump head shaft between the bottom of the motor and the packing gland with sufficient clearance to allow removal of the packing gland assembly without motor removal.

14. Materials List

Item	Material
Pump Bowls	Cast Iron with Enamel Lining
Suction and Discharge Cases	Cast Iron with Enamel Lining
Pump Discharge Head	Cast Iron
Impeller	Bronze
Suction and Discharge Case Bearing	Bronze
Intermediate Bowl Bearing	Bronze
Column Bearing Retainer	Bronze
Packing Follower	Bronze
Packing Bushing	Bronze
Motor Shaft Hex Nut	Bronze

Column Bearings	Fluted Rubber
Pump Shaft and Motor Shaft	Polished 416 Stainless Steel
Line Shaft	416 Stainless Steel
Line Shaft Couplings and Motor Shaft Couplings	300 stainless steel
Column Piping and Couplings	Steel
Packing Material	Graphite Impregnated
Water Slingers	Rubber
Pump Suction Strainers	Zinc Plated or Stainless Steel

B. Vertical Holllowshaft Pump Motors

1. Vertical hollowshaft pump motors shall be premium efficiency squirrel cage induction type motors with WP-1 enclosures and Class F insulation, manufactured in the United States, rated for continuous inverter duty and designated NEMA MG 1, Part 31.

2. A thrust bearing sized to carry the weight of all rotating parts plus the hydraulic thrust of the pump at shutoff shall be incorporated into each motor.

3. Motors shall be rated for continuous inverter duty, VFD rated, and shall be sized to drive the pump at any point on its operation curve without exceeding motor HP nameplate rating. All motor shall have a 1.25 service factor rating.

4. All motor bearings shall be rated for at least five years of continuous operation.

5. Pump shaft connections shall be made through a bolted coupling at the top of each motor.

6. Motors shall be equipped with non-reverse ratchets and space heaters.

7. All vertical turbine pump motors shall be 1800 RPM nominal.

8. All motors shall be coated with the motor manufacturer's original paint only.

9. Furnish motor thrust bearings of ample capacity to accommodate the weight of all rotating parts plus the hydraulic thrust of the pump at shutoff conditions. Furnish motor bearings rated for a minimum service life not less than five (5) years continuous operation at the design rating point.

10. Furnish motors manufactured in the United States.

11. Acceptable motor manufacturers are:

    a. Nidec/US Electrical Motors

    b. Or approved equivalent

12. Miscellaneous:

    a. Install vibration sensors on each motor.

b. All motors shall have shaft grounding systems. Grounding systems shall be installed per manufacturer recommendations.

C. Pressure Maintenance Pump (PM Pump)

1. Furnish a PM pump, with a multistage, submersible type, well pump.

2. Pump shall be equipped with a motor shroud for proper cooling of submersible motor and stainless steel suction screen.

3. The pump discharge connection and all riser pipe couplings shall be threaded steel.

4. The submersible pump, riser pipe, riser pipe support plate, and discharge connection shall be removable as a single unit by unbolting the riser pipe support plate from the skid base.

5. Materials

Item	Material
Pump Suction Interconnector	416 Stainless Steel
Inlet Screen	416 Stainless Steel
Pump Shaft	416 Stainless Steel
Check Valve Housing	416 Stainless Steel
Check Valve	416 Stainless Steel
Diffuser Chamber	416 Stainless Steel
Top Bearing	416 Stainless Steel
Split Cone	416 Stainless Steel
Impellers	416 Stainless Steel
Couplings	416 Stainless Steel
Straps	416 Stainless Steel
Cable Guard	416 Stainless Steel
Priming Inducer	416 Stainless Steel
Check Valve Seat	NBR Rubber and Stainless Steel
Intermediate Bearings	NBR Rubber, Bronze or Stainless Steel
Riser piping and couplings	Galvanized Steel

6. The motor leads shall be strapped to the riser pipe on three foot maximum centers with a 12” service loop.

7. Manufacturer: The pump and motor shall be as manufactured by Grundfos or approved equivalent.

D. Skid Base

1. The skid base shall be constructed from structural steel channel, cross members, a 3/4 inch solid steel pump mounting plate, and 3/16 inch steel “diamond” plate. Angle iron shall be used only to support open areas of the deck. The skid base shall completely cover the wet well. A wet well access hatch or flap shall be

provided.

E. Piping

1. All piping 3-inches and larger shall be Schedule 40, black steel, ASTM A120 or A53 Grade B, electric resistance welded pipe.

2. All welded flanges shall be forged steel with slip-on or welding neck type. All welding fittings shall be seamless, conforming to ASTM A234, with pressure rating not less than 150 psi.

3. All fabricated piping shall conform to AWWA standards.

4. All piping smaller than 3 inches shall be schedule 40, galvanized steel, ASTM A120 Grade B, continuous welded pipe.

5. All threaded pipe fittings shall be galvanized, malleable iron, 150 class, ASTM A126 Grade B.

6. All pressurized tubing material shall be Impolene polymer.

F. Valves

1. Pressure Relief Valves

a. Furnish a hydraulically operated, pilot controlled, diaphragm-type pressure relief valve and bypass piping to the wet well installed on the discharge piping. Size the pressure relief valve to bypass sufficient water to avoid operating pumps at or near shut off head conditions. The valve size shall be based on at least 50 percent of the total station capacity:

i. 2.5 inch - 670 GPM,

ii. 3 inch - 1000 GPM, and

iii. 4 inch - 1800 GPM

2. The relief valve discharge shall be piped to the wet well through a diffuser tube assembly. The assembly shall be the same size as the relief valve and shall extend into the wet well to a depth of 3 feet below the normal water level. Relief valves discharging directly into the wet well, without diffusing it below the water line, is not acceptable. The portion of the assembly above the skid decking shall be constructed with steel pipe, a steel support plate, and 150 class steel flanges at the relief valve and the diffuser tube.

3. The diffuser tube shall be made of schedule 40 PVC pipe, fittings, and end cap. The tube shall have 3/4 to 1-inch diameter holes drilled around the bottom one to two foot section of the tube. The total area of the holes shall be at least 4 times the area of the diffuser tube diameter.

4. Pilot controls shall include an adjustable 20 to 200 psig rated, pilot valve with a bronze body, a stainless steel stationary seat, and a buna-n resilient seat. An

adjustable needle valve closing speed control shall be provided. The inlet connection to the pilot system shall be on the discharge piping with an isolation ball valve and a wye-strainer strainer. The inlet connection to the pilot system shall not be permitted on the body the pressure relief valve itself. An air release cock shall be provided at the cover tip connection of the relief valve.

5. A brass hose bib shall be provided at the inlet side tapping of the pressure relief valve.

6. Pressure Relief Valve shall be a model CRL-60 as manufactured by Cla-Val or approved equivalent.

G. Check Valves

1. Provide check valves on each pump mounted directly to its pump head's discharge flange and one on the discharge end of the Automatic Self-Cleaning Filter.

2. Check valves shall be of the spring loaded, center guided, silent wafer type.

3. Valve bodies shall be cast iron. Valve internals shall be bronze and stainless steel with buna-n seats. The valves shall have a compound sealing action: metal to metal, and metal to buna-n rubber.

4. The valves shall be 400 psig W.P.

5. Velocities shall be limited to 10 fps, and pressure drops shall be limited to 2.5 psig.

6. Check Valve shall be as manufactured by Val-Matic.

H. Pump Discharge Isolation Valves

1. Each pump shall have a discharge isolation valve. Valves shall be of the lug body, butterfly type rated at no less than 200 psig working pressure.

2. Valves 6-inches and under shall have a 10 position, locking, lever handle. Valves 8-inches and over shall have a hand wheel / gear operator with position indicator.

3. Each valve body shall be ductile or cast iron with an aluminum bronze disc, a 416 stainless steel shaft, bronze shaft bushings, and an EPDM rubber seat.

I. Pressure Relief Valve Inlet Isolation Valves

1. Provide an isolation valve on the inlet of the Pressure Relief Valve. The isolation valve shall be the same as the Pump Discharge Isolation Valves.

J. Station Discharge Isolation Valve

1. Provide an isolation valve at the end of the meter run pipe. The isolation valve shall be the same as the Pump Discharge Isolation Valves

K. Air/Vacuum Valves

1. A 1-inch air-release valve shall be located on the discharge manifold. The valve shall be capable of releasing air while the pumps are running at any flow rate or delivery pressure. The valve shall open under a vacuum to allow air to enter when the station is drained. Its exhaust port shall be tubed back to the wet well. The valve shall have a cast iron body, stainless steel trim and float ball, a Viton seat, and a minimum pressure rating of 200 psig.

L. Ball Valves

1. Provide ball valves to isolate the following items:

   a. Air Release Valve

   b. Each pilot assembly connection of the System Relief Valve

   c. Pressure transducer sensing line connection

   d. Drain connections

   e. Pressure gauges

2. Each isolation valve shall be a full port ball valve, rated for 200-psig minimum, with a brass body, a chrome plated brass ball, and a Teflon seat.

M. Drain Valves

1. Drain valves are to be provided at any possible low point in the system and are to consist of ¼" brass angle valves unless otherwise noted.

2. Provide a drain valve in the pump discharge manifold between the pump check valve and control valve.

3. Provide a ¾" brass hose bib in the discharge piping to function as a wash down connection and a drain.

N. Gauges

1. All gauges shall be isolated from electrical switch gears and control panels.

2. Provide a pressure gauge near the inlet of the pressure relief valve. The gauge shall be 2-1/2-inch, glycerin filled, and have an accuracy of ANSI Class B or better.

O. Drain Tubes

1. Drain lines shall be provided from packing drain area of each pump discharge head, from the packing gland bypass connection of each pump, from the air-in/air-out check valve assembly on each pump, from the exhaust port of the air/vacuum valve, all drain valves. All of these drain connections shall discharge into the wet well.

P. Automatic Self-Cleaning Filter

1. Provide an appropriately sized automatic backwash filter, with a self-cleaning mechanism, driven by an electric motor.

2. The filter shall have a 300 micron stainless steel mesh screen.

3. An additional pressure gauge shall be provided so that up & downstream filter pressures can be read.

4. The filter shall be operated by the pump system control panel. A filter selector switch, filter flush totals, 4 flushing modes, and 6 diagnostic alarms shall be provided with the PLC and HMI programming.

5. Manufacturer:

a. Amiad SAF Series

b. No equivalent allowed.

Q. Painting

1. The entire station, with the exception of the control panel, motors, and the underside of the skid base, shall be machine cleaned and painted with a multipart coating system having a total dry-film thickness of not less than 8 mils. One coat of white, polyamide, epoxy primer shall be applied to a dry film thickness of not less than 4 mils. Two coats of Mayan Green, gloss, aliphatic, acrylic, polyurethane, finish shall be applied to a dry-film thickness of not less than 4 mils. A 1-quart can of the finish paint shall be shipped with the station for job site touch up.

2. The underside of the skid shall be coated with a black, polyamide, epoxy lining, not less than 10 mils thick. The control panel and the motors shall retain their manufacturer's original coatings.

R. Electrical and Controls

1. Refer to Section 2.5.

S. Acceptable Pump Skid Manufacturers are:

1. SyncroFlo, 6700 Best Friend Road, Norcross, GA 30071, www.syncroflo.com

a. Local Representative: Cascade Industries, 970-402-3252
email: cascadeindustrieslimited@gmail.com

b. Or approved equivalent.

2.3 PIPE SUPPORT STANDS

A. Furnish manufactured steel pipe support stand as shown on the Construction Drawings or City of Greeley Standard Drawings.

B. Support must be capable of supporting 500 lbs dead load and be adjustable within the range shown on the pump piping detail.

C. Approved pipe stands are:

1. Material Resources – Standon S89, Flanged Adjustable Pipe Support

2. Material Resources – Standon S92, Adjustable Pipe Saddle Support

3. Or approved equivalent.

2.4 DISCHARGE "Z" PIPING

A. A welded steel pipe with two 45 degree steel bends (Z-Pipe) shall be provided for installation between the pump station discharge valve located inside the pump station building and the buried irrigation main line. The Z-pipe shall have a welded steel flange for connection to the discharge valve, an underground welded steel thrust plate, and a plain end for connecting to the buried irrigation main piping. The Z-Pipe outside diameter shall be compatible with AWWA C-900 and C-905.

B. A 2-inch threaded steel outlet shall be welded to the top of the Z-pipe located at the top of the pipe outside the pump building for a winterizing connection. A 2-inch steel threaded plug shall be provided.

C. Steel: AWWA C200 steel pipe for both direct bury and exposed applications. Submit proposed interior and exterior coatings for City review and approval.

2.5 PUMP SKID ELECTRICAL AND CONTROLS

A. General

1. All electrical control panels with controls and wiring shall be built in accordance with NEC, UL, and ETL standards. The electrical components and enclosure shall be labeled as a complete UL listed assembly with manufacturer's UL label applied to the door.

2. All equipment and wiring shall be mounted within the enclosure and labeled for proper identification.

3. The power supply to the pump station shall be three (3) phase, 480 volt.

4. All wiring from control panels to motors shall be in liquid-tight conduit with MTW or THWN, stranded copper conductors rated not less than 600 volts AC. All wiring shall follow NEC code and local code. All wiring from the control panel to the motors shall be sized according to NEC requirements based on motor full load current. A grounding cable shall be included in the liquid-tight conduit. There shall be no splices between the motor starters and the motor connection boxes, except for the submersible pump motor.

5. Wiring to flow sensors and pressure transducer shall be multi-conductor shielded cable suitable for Class 2 low voltage controls. Must use Black and red wiring in

cable for all class 2 low voltage controls.

6. All control wiring carrying more than 24 volts, shall be 16-gauge minimum with wire numbers at all termination points. The wiring to all devices outside the control panel shall be contained in metal lined, liquid-tight conduit.

7. All secondary control components shall be powered with 120 VAC or 24 VDC. All control relays shall be plug in type for easy replacement. No 120 VAC powered components shall be allowed on the door of the control panel, just 24 VDC components are permitted on the door.

8. Primary and secondary circuit breakers shall be provided for the control power transformer. A circuit breaker shall also be provided for the motor space heater circuits.

9. Provide full alarms and safety features needed to protect equipment and piping.

B. Enclosures

1. The pumping station electrical controls shall be mounted in a self-contained UL Type 4 or 12 (NEMA-4 or 12) enclosure.

   a. The enclosure shall be mounted on the pump skid or placed on a concrete maintenance pad.

2. Door gasket seals shall be neoprene sponge, sufficient to protect interior components from weather and dust. The electrical panel doors shall be constructed from 12-gauge steel with integral locking screws and latches.

3. All internal components of the enclosures shall be mounted on removable back panels.

4. All internal wiring within, and interconnecting between, the panels shall be complete and no field wiring within the panels shall be permitted. Wiring troughs and cable raceways shall be self-contained within the enclosures and no external cable trays or wiring troughs are permitted.

5. No pressure gauges, pressure switches, water activated devices, or water lines of any sort shall be installed in any electrical control panel.

6. All adjustments and maintenance shall be capable from the front of the control enclosure. A complete wiring circuit and legend with all terminals, components, and wiring identification shall be provided. Main disconnect shall be interlocked with door.

7. All electrical starter and control panels in the pump system shall be assembled from components that are UL listed.

8. A closed type cooling system shall be included to cool the enclosure and reject heat from the VFD. Open type cooling systems allowing outside ambient air to enter the panel are not acceptable.

9. Adjustable, ambient temperature compensated, bimetallic, inverse time, UL class 10 thermal overload relays or motor circuit protectors shall be provided for each motor.

10. Provide complete instrumentation and controls to automatically start, stop, and modulate pump speeds for efficient and reliable pump flow rates, at a constant discharge pressure.

C. Power Monitor

1. The main power supply in the pump station shall be equipped with a 3-phase power monitor. It shall detect low voltage, phase loss, reversal, shift, or improper sequence. A voltage adjustment, status light, and a plug-in base shall be provided.

D. Surge Protection Device

1. The main power supply in the pump station shall be equipped with a 3 phase, 480 volt rated, UL 1449 surge protected device (SPD). The SPD shall be mounted external to the main cabinet. The SPD shall have a current rating of not less than 10,000 amps, an SCCR rating 200,000 amps, and shall include a green OK status light. The SPD shall be connected to the power distribution block immediately downstream of the main circuit breaker, so it can be isolated for replacement. The SPD shall include an event counter and an audible alarm in the event of SPD failure.

E. Variable Frequency Drive

1. Must have Ethernet/IP communication capabilities with Allen Bradley PLCs and manufacturer supported Add On Instruction for AB PLC programming integration. Preference given to drives that interface to Allen Bradley PLC with AB supported Add On Profile and Automatic Device Configuration. Provide sample code and AOI for non-AB drives.

2. Provide suitable drive input impedance to prevent damage due to power system transients.

   a. For drives without built-in inductors – add line impedance whenever the transformer kVA is more than 10 times larger than the drive kVA, or the percent source impedance relative to each drive is less than 0.5%. • For drives with built-in inductors – add line impedance whenever the transformer kVA is more than 20 times larger than the drive kVA, or the percent source impedance relative to each drive is less than 0.25%. Or follow tables in publication Drives-IN001 for Allen Bradley VFDs.

   b. Alternate requirements for the inclusion of added input impedance will be evaluated if the requirements are product specific and within manufacturer published documents. The inclusion or omission of devices shall be documented with a reference to the source publication.

3. Provide Harmonic reduction devices as needed to prevent interference and impaired function of other equipment connected to the source transformer. Requirement is based upon IEEE 519. Distortion of voltage should be less than 5%. Suitable harmonic mitigation can be decided based on the size of the main power transformer. Contractor to verify if harmonic mitigation is needed and provide required harmonic mitigation.

    a. Preferred solution is the use of Active Harmonic Filter (AHF) sized to expected loads. If requirement 2 (above) does not indicate need for reactor and the AHF can be sized without input reactors, it is allowed to provide the drives without input reactor. Adding a 3% input reactor to all drives can reduce the size of AHF requirement and is suggested best practice.

    b. Passive Harmonic Filters (PHF), provided with each drive are acceptable means of harmonic mitigation. When provided, they shall be provided with means to disconnect internal capacitance when the VFD is running at low power level or not running.

    c. Active Front End (AFE) VFDs are acceptable when they are provided with isolating impedance and background distortion is lower than 3%. AFE drives shall have settings as needed for multiple input types such as utility power and backup generator. It is not recommended to mix and match different vendors of AFE drives or put drives on power systems that have unfiltered 6-pulse drives.

    d. Document using a harmonic calculation tool that the harmonics levels will meet requirements.

        i. Results/calculation output provided by a manufacturer provided tool such as those from drive and filter manufacturers is acceptable. (Does not have to be provided by a professional engineering tool.)

4. When using an AHF, contact the manufacture for their recommendations on active harmonic filters sizing and suitability.

    a. Preferred manufacturer is Mesta/Hammond

    b. Include documentation of sizing provided by manufacturer.

5. Provide long lead length protection as needed to prevent motor failures. Follow drive manufacturer instructions on lead length recommendations. Mitigation/protection shall be manufacturer specific and shall follow published guidelines. Application must consider if the motor meets inverter rated duty and use minimum voltage rating of the inverter motor standard (1488V). If the motor does not meet inverter duty rated standards, apply suitable devices to protect the motor.

    a. Allen Bradley 7-class drives 3-300 HP do not require any output devices when powering inverter duty rated motors at distance up to 300 feet. For

distance from 300 to 600 feet it is preferred to use AB motor terminator (connects at motor) so that drive enclosure can be kept small. It is acceptable to use an output reactor for distance up to 600 ft. For distance above 600 feet it is allowed to use a dV/dT or Sine filter. Note that other AB drives and other manufacturers do exactly follow the previous recommendations. See publication drives-in001.

b. Use of reactors/terminators/filters shall follow the published guidelines of their respective manufacturer. The inclusion or omission of devices shall be documented with a reference to the source publication.

6. VFD cable shall be installed on the output of the VFD to the Motor to assure suitable insulation rating, protection against noise interference and to help mitigate bearing failures and other common mode related problems. Grounding practice and wire type and composition must follow manufacturer guidelines.

a. Document the source publication(s) used as reference.

b. For Allen Bradly drives the best practice document is Publication Drives-IN001. It also covers lead length and input impedance. The publication 750-IN001 also covers some drive specific guidelines for installation of 750 class drives.

7. Complete schematic, wiring and interconnection diagrams showing connections to both internal and external devices:

a. Include terminal number and wire numbers.

8. Complete single-line and 3-line diagrams including, but not limited to, circuit breakers, motor circuit protectors, contactors, instrument transformers, meters, relays, timers, control devices, and other equipment comprising the complete system:

a. Clearly indicate device electrical ratings on the drawings.

9. The VFD manufacturer shall be responsible for start-up of the VFDs in the presence of the equipment suppliers, Contractor, Engineer, and Owner.

10. Approved manufacturers are:

a. Allen Bradley

b. Eaton

c. ABB

d. No equivalent allowed.

F. Pressure Transducer

1. Standardize with GE UNIK5000UK 0-150 PSI Part # PTX5032-TA-A2-CA-HO-PF.

2. No equivalent allowed.

G. Wet Well Monitoring

1. Wet wells shall be equipped with an E&H radar sonic liquid level indicator probe and level transmitter.

2. Low level cut off switch (float) shall be provided to send a discrete signal to the PLC to shut down the pumps on low wet well level.

H. Programmable Logic Controller

1. Provide a programmable logic controller (PLC) to control all functions of the station. Relays may be used for interface purposes only. The PLC shall include non-volatile EEPROM memory (no battery needed) that prevents loss of program or settings during power failures; POWER, RUN, BATTERY, ERROR, and I/O status lights; a Modbus TCP or Ethernet port for SCADA communications; an Ethernet port for HMI communications, 2 amp rated dry contact relay outputs (solid state outputs are not allowed); 24 VDC inputs standard and high-speed digital inputs; analog inputs; and an analog output. The PLC shall be rated for locations where electro-magnetic noise, voltage spikes, high temperature, humidity, and mechanical shock exist.

2. All logic for system control, timing, and control of VFD speed shall be handled by the PLC. No external relay logic or timers are permitted. A separate set point controller is not acceptable.

3. The City shall be provided with an unlocked PLC program.

4. Approved PLC manufacturers are:

a. Allen Bradley Studio 5000 Platform

b. Mitsubishi.

c. No equivalent allowed.

I. Human Machine Interface

1. A UL Type 4 rated, 24 VDC powered color touch screen operator interface shall be provided. 120 VAC powered interfaces are not acceptable. The interface shall be a high resolution, backlit color, LCD touch screen. Should the interface fail, a signal shall be sent to the PLC, and the station will continue to run normally. The interface shall also provide protected access to changing all operational settings as well as a re-load factory settings function.

2. HMI program shall be unlocked and copy of program given to City of Greeley I&C department after commissioning of pump station.

3. Approved HMI manufacturers are:

a. Redlion G15C1100

b. Maple Systems

c. Or approved equivalent.

4. Human Machine Interface screen shall provide access to operator controls, alarms, and system data such as:

a. Operator set points.

b. Pump HAND-OFF-AUTO selector switches.

c. An inverter TEST-OFF-AUTO selector switches.

d. An inverter SETUP MODE button.

e. A DISABLE-ENABLE switch to prevent the low system pressure and high flow rate alarms from shutting down the station.

f. An ALARM RESET push button.

g. An ALARM LIGHT TEST button.

h. Flood Alarm. Provide flood alarm sensor to detect a flooding in the building.

i. Irregular Power.

j. Runtime for each pump. – Reset yearly.

k. Runtime for each filter. – Reset yearly.

l. Count of filter back flushes.

m. Total pump starts.

n. Flow Rate.

o. Total Gallons Pumped – YTD.

p. Total Gallons Pumped – Previous day total.

q. System Efficiency (Watts/Gallon) including trending.

r. System Pressure.

s. Filter inlet and outlet pressure.

t. VFD/Pump speed for all pumps.

u. VFD/Pump feedback speed for all pumps.

v. VFD/Pump current draw for all pumps.

w. VFD/Pump Voltage for all pumps.

x. On/Off control of pump station.

y. Vibration sensors on motors.

z. Provide VFD speed reference and speed feedback.

aa. ON/OFF/faulted/manual/auto status of VFDs/soft starters and motor starters.

bb. Ability to change pumps in manual or auto.

cc. Pond level.

dd. Wet Well level.

ee. Alarms page. Show existing and acknowledged alarms.

ff. Valve positions.

gg. Password protected.

i. Operator level

ii. Admin level

J. Alarms and Shutdown

1. Pumps shall be shutdown with the appropriate alarm whether they are operating in HAND or AUTO mode.

2. Alarms:

a. A power failure alarm with trip delay, manual and delayed automatic reset.

b. An irregular power alarm with trip delay, manual and delayed automatic reset.

c. A leak detection alarm with manual reset.

d. low pressure alarm with trip time delay and manual reset.

e. A high-pressure alarm with trip time delay and manual reset.

f. A high flow rate alarm with trip delay and manual reset.

g. A low-level alarm with trip delay and manual reset.

h. A high panel temperature alarm trip delay.

i. A manual and automatic reset.

j. An individual motor overload alarms with manual reset.

k. A contactor fault alarms with manual reset.

l. A pressure transducer failure alarm with manual reset.

m. A level transducer failure alarm with manual reset.

n. A flow meter failure alarm with manual reset.

o. An inverter (VFD) fault alarm with a two-attempt automatic reset,

p. A third trip lockout function with timed rollover, and manual reset.

q. A PLC failure alarm with automatic reset, and display failure alarm with automatic reset,

r. A low battery alarm with automatic reset, an input failure alarm with automatic reset.

3. The following specific alarm conditions along with procedures for correction will be displayed in English on the HMI:

a. Low discharge pressure (with override switch)

b. High discharge pressure

c. Low wet well level (Attempts restart)

d. Phase loss (Attempts restart)

e. Low voltage (Attempts restart)

f. Phase unbalance (Attempts restart)

g. Individual motor overload/phase loss (indicates which individual motor was shut down)

h. VFD fault (shutdown VFD pump only and attempts restart)

2.6 SCADA

A. General

1. Coordinate SCADA requirements with the City of Greeley I&C Department. The City shall be provided with an unlocked the PLC program. Programming of SCADA system shall be done by an approved and qualified controls contractor. Use approved City of Greeley radio system.

2. Provide 40-foot pole for SCADA radio antenna. Alternatively, the SCADA radio

antenna can be integrated with light pole. Ground antenna mast according to NEC guidelines and provide lighting protection isolators on all cables between antenna and control panel. Install conduit from antenna pole and SCADA control panel.

3. A SCADA radio shall be mounted in the control cabinet. A 15 amp 120 Volt AC circuit shall be made available to power up the SCADA radio.

4. If mounted on the exterior wall, install mast through the pump station building wall and then overhead or under floor to the pump control panel.

5. 120 Volt AC outlet for chemical feed pump. Outlet to be on if main pumps are on.

6. Contractor to build and test SCADA screens before starting up the pump station. Provide one workshop to review design of new SCADA screens.

7. Contractor to setup and test SCADA alarming and program SCADA phone to call out.

B. Radio Equipment

1. Provide and install the following radio equipment.

a. Cambium - 3 GHz 450b High Gain, Single Radio - Requires High Gain Antenna Assembly (PN # C030045B032A)

b. Cambium - 3 GHz 450b High-Gain Antenna Assembly (PN # N030045D001A)

c. Cambium - PoE Gigabit DC Injector, 15W Output at 30V, Energy Level 6 Supply (PN # N000900L001D)

d. Cambium - AC US Line Cord, C5 Connector (PN # N000900L001D)

e. Radio can’t be power up until coordinating with I&C department. Contractor to support alignment of radio.

f. Must use outdoor rated, shielded, gel or gel tape CAT6e cable

g. Radio can’t be power up until coordinating with I&C Staff. Contractor to support alignment of radio.

h. Install Cat6e cable from SCADA control panel to radio

i. Install moxa ethernet switch in control panel.

C. Contractor to verify with COG I&C department that we have align of sight from existing radio tower to new radio.

1. Controls, Alarms & Data.

a. Flood Alarm. Provide flood alarm sensor to detect a flooding in the building.

b. Irregular Power.

c. Runtime for each pump. – Reset yearly.

d. Runtime for each filter. – Reset yearly.

e. Count of filter back flushes.

f. Station Flow Rate GPM.

g. Total Gallons Pumped – YTD.

h. Total Gallons Pumped – Previous day total.

i. System Pressure.

j. VFD/Pump speed for all pumps.

k. VFD/Pump feedback speed for all pumps.

l. VFD status - ON/Off status bits for all pumps.

m. On/Off control of pump station.

n. Wet Well level.

o. Pond level.

p. Vibration sensors on motors.

q. VFD faulted. – On all VFDs.

r. Building temp.

s. Remotely Start and Stop Pump Station.

t. VFD amperage for all VFDs and soft-starts.

u. Low discharge pressure alarm.

v. High discharge pressure alarm.

w. Low and high wet well level alarms.

x. Phase loss alarm.

y. Low voltage alarm.

z. Phase unbalance alarm.

aa. Individual motor overload/phase loss alarm.

bb. VFD Voltage – on all VFDs.

cc. VFD/Pumps Efficiency (Watts/Gallon).

dd. Flume level in inches.

ee. Flume flow in GPM.

ff. Flume Total Gallons.

gg. Flume Yearly total in Gallons x 1,000.

hh. Wet well level in feet

ii. Pump runtimes in hours

jj. Building Temperature in degrees F°

kk. Total number of pump starts and number of pump start for yesterday; twenty-four (24) hour period.

ll. Total filter runtime and total filter runtime for yesterday; twenty-four (24) hour period.

mm. Control Panel Main Power Voltage

nn. Control Panel Main Power Current

oo. Instantaneous Efficiency – (Voltage * Current) / Flow Rates – Sampled (15) seconds and stored 24 hours.

pp. Average Efficiency – (Average Voltage * Average Current) Average Flow Rates – Averaged for 15 min intervals stored 30 Days.

2. Common alarms:

a. Pump run status

b. Low level well

c. High level well

d. Filter fault alarm

e. Irregular power

f. High panel temperature alarm

g. Station in remote shutdown

h. Filter run status

i. Reset station alarms

j. Station shutdown

k. Station restart

l. Flow totals should be messaged via Ethernet.

m. HMI shall indicate if the pump station is in shutdown mode due to SCADA input.

3. SCADA historical data.

a. Flow data

b. Pressure sensor data

c. Vibration sensor data

d. Start and Stop Pump Station.

e. VFD or soft-starts feedback speed.

f. VFD Voltage

g. VFD/Pump Current

h. VFD/Pump Efficiencies (Watts/Gallon)

i. Wet Well level.

j. Pond level

k. System Pressure

4. Status Colors

a. Motor Status

i. Green - Running in Auto

ii. Red - Off

iii. Yellow – Running in Hand or Manual

iv. Red flashing – Faulted

b. Valve position

i. Green – Open and Auto

ii. Yellow – Open and Manual

iii. Red – Closed in Auto

iv. Red Flashing - Faulted

5.

2.7 MISCELLANEOUS ELECTRICAL COMPONENTS

A. Pump Station should have an arc flash study and labeled per the NEC and NFPA 70E. Labels shall be designed to meet the NFPA 70E.

B. Pump Station shall meet the NEC standard for electrical equipment work space clearances.

C. Lightning Arrestor

1. The main power supply feeding the pumping station shall be equipped with a three (3) phase secondary lighting arrestor having a breakdown current rating of not less than 60,000 amps at 14,000 volts discharge.

2. Power supplies, 300 volts and less, shall use 300 volt rated arrestor with an 800 volt spark-over voltage.

3. Power supplies 301-600 volts shall use 600 volt rated arrestors with a 1,000-volt spark-over voltage.

4. Main Station Disconnect

a. The disconnect shall conform to the requirements of the NEC and applicable local codes.

b. The main station disconnect shall have an operating handle on the front of the panel.

5. Secondary Control Circuit Fuses

Single-pole secondary distribution fuses with appropriate ratings shall supply power to each pump starter coil circuit, the control system, and to other circuits as required.

2.8 FLOW SENSOR

A. Provide a meter readout on OID for monitoring the flow rate, totalizing gallons used, and for shifting the flow sequencing set point range. Total gallons for previous day.

B. Adjustable settings for pipe diameter, and analog outputs shall be provided. The totalizer shall be capable of counting to two (2) billion gallons and it must be resettable. Both settings and the gallons total shall be held in non-volatile memory (no battery required) and protected by a user defined password with a hidden override key.

C. The flow sensor shall have the following requirements:

1. Liner Material – PTFE

2. Ethernet or Modbus TCP. Must be able to get flow and flow totals off of the flow meter.

3. Flow Measurement – as low as 6.0 micromhos/cm

4. Empty pipe detection

5. Bi-directional flow sensing/totalization

6. Automatic zero point stability

7. 1% repeatability or better

8. Sensor or remote wall mount

D. Acceptable flow sensor manufacturers are:

1. E&H Magnetic flow meter

2. Rosemount Magnetic flow meter

3. No equivalent allowed.

2.9 BUILDING

A. The structure shall be designed by a Colorado licensed Architect in accordance with currently adopted building code. Building specific construction specifications (ie. building materials, electrical) shall be provided. Considerations of the building design shall include the following:

1. Concrete floor with floor drains connected to the wet well.

2. Roof hatches or scuttle located directly above each vertical turbine pumps and wet well slide gate for removal and placement

3. LED interior lighting with minimum lighting levels within the building of 30fc with a 90CRI.

4. LED exterior lighting to operate under an automatic day/night switch, photometric study compliant with municipal code is required with submittals.

5. Exhaust fans and louvers for ventilation

6. Electrical heaters controlled by remote, wall mounted thermostat

7. Vandal-proof hardware on exterior

8. Precast Concrete Building

9. Wet well equipped with LED light, vapor proof with minimum 4000 lumens and located for easy maintenance and replacement.

B. Provide materials required by local codes for installation of the pump building.

1. Minimum inside dimensions as shown on the drawings.

2. Sealed exposed aggregate concrete finish, clear coated with graffiti guard, and welding plates.

3. Provide entry doors as indicated on plans. Door handles to be Best Lock. Include hydraulic arms to each door intended for slow closing and providing means to keep doors open.

4. Provide roof hatch per the drawings and installation details.

5. Precast concrete roof and walls with cast out openings for fans, louvers, conduit and piping as shown in the details. Thicken roof slab at seam and slope roof slab away from the seam. Piping penetrations to be core drilled and sealed per the plans.

6. Wall Penetration Seal: Use hydraulic cement.

7. Manufacturers:

a. Stresscon Corporation

b. Wells Precast Innovations

c. Approved equal.

C. Electrical Components:

1. Refer to Electrical drawings and specifications.

2. Fan: Refer to drawings and installation details.

3. Louver: Refer to drawings and installation details.

4. Heater: Refer to drawings and installation details.

5. Conduit:

a. Use galvanized, rigid or flexible, conduit in the pump building.

b. Use PVC type, approved waterproof conduit for buried underground installations.

c. All conduit which conforms to Underwriters Laboratories specifications.

d. Furnish inert plastic yellow warning tape, minimum 3-inches wide, imprinted with "CAUTION: BURIED ELECTRIC LINE BELOW"

above all direct buried conduit.

2.10 SUBSTITUTIONS

A. Make complete submittals of all manufacturer's data showing compliance with the Contract Documents.

B. In making a request for a substitution, the Contractor represents that he:

1. Has investigated the proposed substitution and found that it is the same or better quality, level, capacity, function, or appearance than the specified product, and can demonstrate that to the City and the Design Engineer.

2. Will coordinate the installation and make all modifications to the work, which are required for the complete installation and operation of the system.

C. The Design Engineer and City will determine acceptability of the proposed substitution and will notify Contractor of acceptance or rejection.

PART 3 - EXECUTION

3.1 PUMPS AND MOTORS

A. Shipping, off-loading, mounting details, and the technical start up shall be furnished by the pump station manufacturer. City of Greeley I&C Department representative shall be onsite for startup.

B. Affix pump system to concrete mounting pad and complete all piping connections prior to startup and operation of the pump system.

C. Electrical connection shall consist of a single conduit from three (3) phase, 480 volt, 200 amp disconnect to the pump station main disconnect.

D. Pump electrical connections shall use an Insulated Multitap Connector.

1. Manufacturers.

a. Polaris insulated Multitap connector.

b. Or approved equivalent.

E. Technical startup procedures by the pump station manufacturer shall include the following:

1. Station start up and pressurization

2. Pressure and flow

3. Programming adjustments

4. Monitoring of irrigation cycle

F. A manufacturer's representative/technician will instruct City personnel as to the operation, adjustment and maintenance of the pump station.

G. Provide the detailed start-up procedures from manufacturer to the City, a minimum two (2) weeks prior to start-up. City of Greeley I&C Department representative shall be onsite for start and review start-up procedures.

3.2 PRECAST CONCRETE BUILDING AND COMPONENTS

A. Precast Concrete Building: Construct precast building as shown in drawings. Submit shop drawings of proposed building prior to construction.

1. Compacted subgrade, slab and foundation per soils report.

2. Install buried conduit prior to building slab installation.

3. Install building per manufacturer's instructions. Seal all joints and penetrations. Use caulking consisting of 1 part urethane sealant.

4. Install galvanized vandal proof screens for all louvers. Paint screens to match building exterior.

B. Concrete Building Floor/Slab: Refer to Structural drawings and specifications.

1. Coordinate location and installation of building welding plates with building manufacturer prior to construction.

3.3 INSTALLATION OF PIPING COMPONENTS

A. Wall Penetration Seal:

1. Install hydraulic cement where indicated on drawings.

3.4 INSTALLATION OF ELECTRICAL

A. Refer to Electrical drawings and specifications. All installation of electrical components shall be performed by a licensed electrician (Colorado) and conform to the National Electric Code and all local building codes.

B. Conduit:

1. Install a continuous run of warning tape, placed in the backfill 6-inches above all direct buried conduit.

3.5 INSTALLATION OF OTHER COMPONENTS

A. Tools: Prior to substantial completion, supply to the Owner operating keys, servicing tools, test equipment, and any other items indicated on the drawings.

B. Other Materials: Install other materials or equipment shown on the drawings or installation details to be part of the pump building and mechanical system, even though such items may not have been referenced in these specifications.

3.6 TESTING

A. Notify the City two (2) week in advance of testing.

B. Pump System:

1. On completion of assembly of the pumping stations, all discharge pipe and valves shall be hydrostatically tested at 150% of the maximum pump shutoff head.

2. Test, verify, and demonstrate to the City the proper operation of all control and safety shut off devices.

3. Verify flow and discharge pressure from the pump system and demonstrate to the City system performance based on the specified values.

4. Coordinate availability of water with the City.

C. Building:

1. Operate fans, heaters, outlets, and building lights.

2. Adjust, move, repair system components to correct deficiencies. Repeat the test until the Owner's Representative approves the test results.

3. Cement or caulking to seal piping leaks is prohibited.

3.7 OTHER ITEMS

A. Prior to the pump start-up, the City shall be supplied with operating keys, servicing tools, test equipment, and any other items required for proper operation and maintenance of the pump station.

B. Install all materials or equipment shown on the Construction Drawings to be part of the non-potable irrigation pumping system, even though such items may not have been referenced in these specifications.

C. At the completion of project construction, As-Constructed Record drawings shall be submitted to the City in accordance with construction specification *Section 01785, Project Record Documents*.

3.8 PROJECT RECORD (AS-BUILT) DRAWINGS

A. Maintain on-site and separate from documents used for construction, one complete set of contract documents as Project Documents. Keep documents current. Do not permanently cover work until as-built information is recorded including photos of work as performed.

B. Record pipe and wiring network alterations. Record work which is installed differently than shown on the construction drawings. Record accurate reference dimensions, measured from at least two permanent reference points.

C. Prior to Final Review, obtain from the Engineer a reproducible copy or CAD files of the drawings. Using pen or CAD, duplicate information contained on the project drawings maintained on site. Label each sheet "Record Drawing". Completion of the Record Drawings will be a prerequisite for substantial completion.

D. Provide copy of all Record Drawings for Electrical and Instrumentation Controls wiring diagrams and programming information within a SCH 40 PVC conduit, large enough to hold documents, painted “SAFETY ORANGE” capped on both ends and labeled with 2” tall blocked black letters “RECORDS DRAWING” securely mounted to the wall inside the building, located in easily accessible and visible location adjacent to electrical equipment. Include CAD AND PDF versions of the drawings on a flash drive attached to a lanyard attached to the top cap of the container. Both ends shall have screwed on caps, not plugs, for easy removal and to shed water.

3.9 MAINTENANCE

A. Upon completion of Final Review, maintain the pump building mechanical system for a duration of 30 calendar days. Make periodic examinations and adjustments to the system components so as to achieve the most desirable operating conditions.

3.10 CLEANUP

A. Upon completion of work, remove from the site all machinery, tools, excess materials, and rubbish.

B. Remove all debris and foreign material from the construction area and pump building prior to operating the system.

Water and Sewer Department: Updated Design Criteria Standards and Specifications

City Council

Introduction and First Reading of Ordinance to Adopt – Jan. 17, 2023

Presented by City of Greeley Water & Sewer Utilities Department

Goals

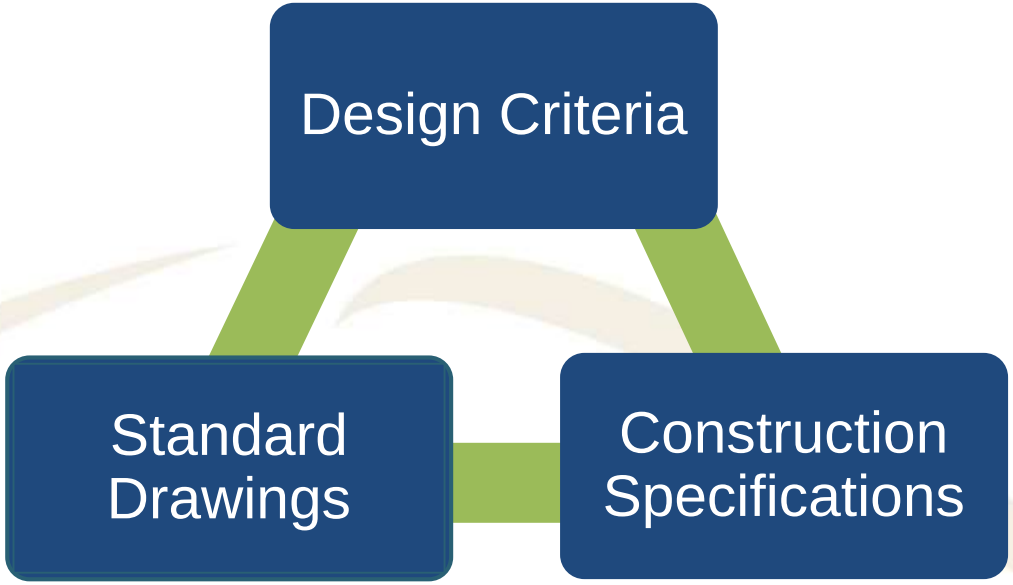
- Alignment with:
  - 2021 Water and Sewer Master Plans
  - 2022 Water Efficiency Plan
  - Other City Plans, Policies, and Procedures
- Updated technology and equipment standards
- Potential cost savings
- Comprehensive and easy to follow
- Conformance with new statewide Subsurface Utility Engineering (SUE) Laws

Public Outreach & Engagement

- ✓ City Water and Sewer Board 4/20/22, 7/20/22, & 11/16/22
- ✓ Planning Commission 3/8/22, 8/10/22, 11/8/22 & 12/13/22
- ✓ City Department Reviews (2020-current)
  - ✓ Engineering Development, Planning, CPRD & Civil Inspections
- ✓ Targeted local businesses & development community stakeholders
  - ✓ Builders, Realtors, & Developers Workshops- 7/19/21, 3/2/22, 3/3/22, & 4/29/22
  - ✓ Engagement and Feedback (December 2021-December 2022)
  - ✓ Landscape & Irrigation stakeholders 3/2/22, 3/3/22, 4/29/22, 9/30/22, 11/8/22 & 12/5/22

City of Greeley Colorado

Design Criteria Standards & Specifications



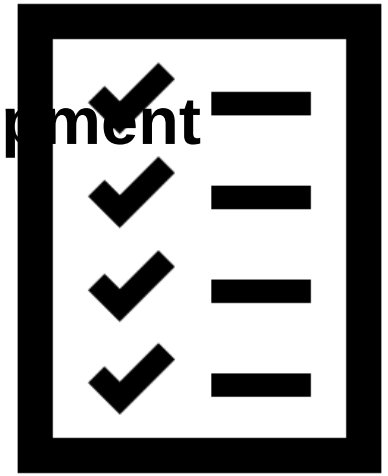
Section 1: General Requirements of Development
Section 2: Submittal Requirements
Section 3: Potable Water
Section 4: Sanitary Sewer
Section 5: Non-potable water
Section 6: Commercial Landscape and Irrigation

City of Greeley Colorado

Sections 1 and 2

Section 1: General Requirements of Development

- **Minor updates and streamlined with Engineering Development Reviews**



Section 2: Submittal Requirements

- **Consistent modeling**
- **Better survey verifications and as-built drawings**
- **More details for reimbursement of oversized public infrastructure**

City of Greeley Colorado

Sections 3 and 4

Section 3: Potable Water

- Demand management per development type
- Ensure flows are more accurately calculated
- Protects infrastructure from corrosion
- Aligns with wastewater for consistency

Section 4: Sanitary Sewer

- Flows per development type
- Detailed lift station criteria
- Aligns with potable water for consistency

Section 5: Non-Potable Water

- **Aligns with 2021 Non-Potable Master Plan**
- **Plans for sub-regional systems and oversizing**
- **Consistency of systems & sizing**
- **Conservation strategy**
  - Reduces energy, controls chemical costs & manages peak water demands on potable water infrastructure

Section 6: Commercial Landscape & Irrigation

Goals

- Provides long-range water wise planning
- Support attractive and sustainable landscapes

Applicable to:

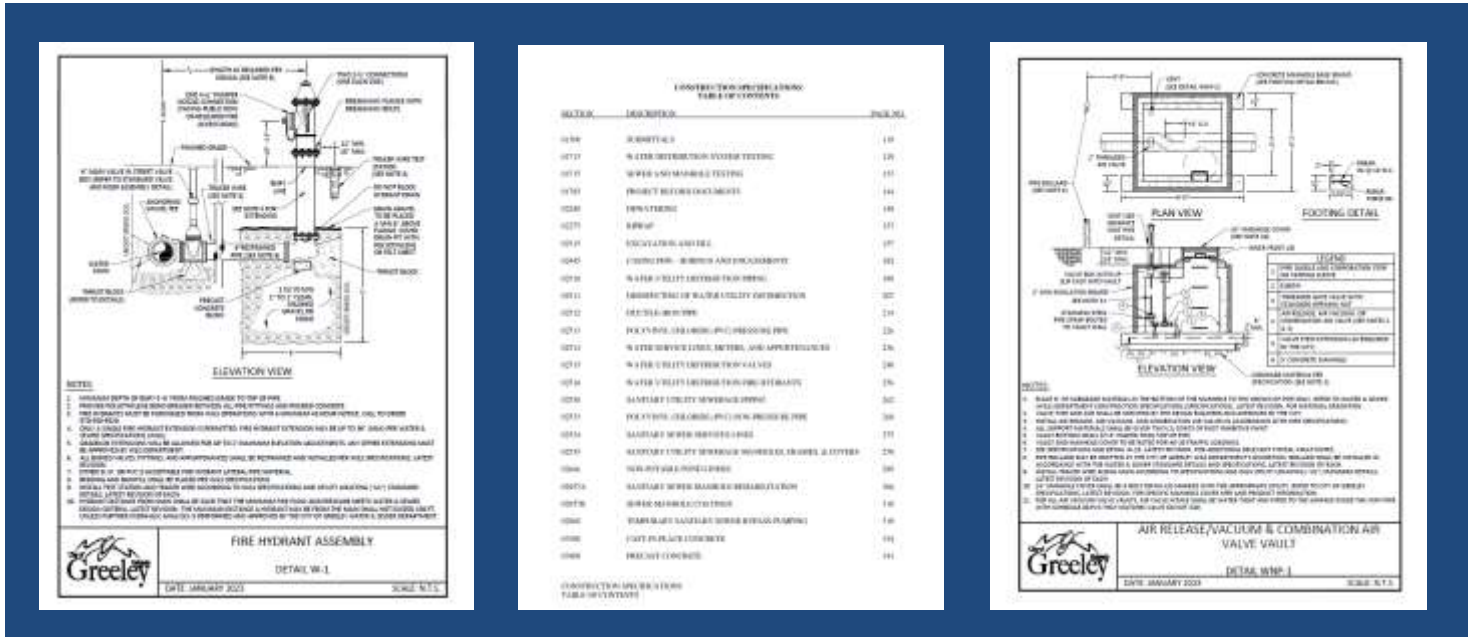
- Common areas
- Right-of-ways
- Municipal buildings
- Non-residential (commercial/industrial)
- Multi-family residential

Section 6: Commercial Landscape & Irrigation

- Landscape & Irrigation Plans
  - Site Plan & Construction Drawings
  - Certified Irrigation Designer
- **Hydrozones**
  - Pairs irrigation with right plant type
  - Aligns with Comprehensive Plan
- Landscape water demand guidance
- Irrigation Equipment & Installation Specifications
- Irrigation Performance Verifications
- Maintenance (irrigation)
  - Leak repair obligations that align with code

Standard Drawings & Construction Specifications

- Details with current material & equipment
- Added Standard lift station drawings, restraint details, and PRV, and many others
- Utility locating details in accordance with the new SUE law in Colorado (SB 18-167)



City of Greeley Colorado

Recommendations

- Greeley Water & Sewer Board approved and recommended the Updated Criteria and Standards to City Council on July 20, 2022
- Planning Commission reviewed on August 9th 2022, and subsequently approved and recommended to City Council on December 13th 2022

Staff Recommendation: Adopt the ordinance to amend Title 20 of the Greeley Municipal Code concerning the adoption of the Water & Sewer Department Design Criteria and Construction Specification

City of Greeley Colorado

Questions

City of Greeley Colorado

Council Agenda Summary

Title:

Pulled Consent Agenda Items

Summary:

Pulled Consent Agenda items will be considered in the order they appeared on the consent agenda.

Council Agenda Summary

January 17, 2023

Key Staff Contact: Becky Safarik, Interim Community Development Director

Title:

Public hearing and consideration of a Resolution to approve the Downtown 2032 - Plan Update

Summary:

In 2011, the Greeley Downtown Development Authority completed the "Downtown Greeley Investment Strategy", which provided a vision, analysis of conditions, goals and strategies to help direct downtown investments. In the ensuing decade numerous and significant public and private improvements have been made to advance those redevelopment objectives.

To capitalize on that momentum, take stock of existing conditions, gaps, and opportunities, the City initiated an update of the existing strategic plan. Using another 10-year planning horizon – 2032 – the City contracted with a consultant, P.U.M.A, to undertake this work.

The attached plan was crafted with extensive technical and community engagement and participation over the duration of the study. The updated plan includes a market analysis, capital improvement and urban quality assessments, a vision and core values summary, and a set of action steps to achieve these objectives.

As with the previous plan, it is contemplated that this plan, if approved, would update the plan referenced in the City's Comprehensive Plan and be used to evaluate future land use proposals.

This Plan was reviewed and endorsed by the Downtown Development Authority on December 15, 2022. The Planning Commission conducted a public hearing to consider the Plan on January 10th and voted unanimously to recommend its approval. The City Council reviewed this Plan at its January 10th work session.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
Is there grant funding for this item?	N/A

Legal Issues:

Consideration of this matter is a legislative process which includes the following public hearing steps:

1) City staff presentation (if requested)
2) Council questions of staff

3) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
4) Council discussion
5) Council decision

Other Issues and Considerations

None

Strategic Focus Area:

Business Growth

Community Vitality

Housing for All

Infrastructure and Mobility

Quality of Life

Safe and Secure Communities

Decision Options:

1) Adopt the resolution as presented; or
2) Amend the resolution and adopt as amended; or
3) Deny the resolution; or
4) Continue consideration of the resolution to a date certain.

Council's Recommended Action:

A motion to adopt the resolution approving the 2032 downtown plan update.

Attachments:

Resolution
Exhibit A - Downtown Plan
Planning Commission minutes (January 10, 2023, draft)
Slide presentation

THE CITY OF GREELEY, COLORADO
RESOLUTION NO. 3, 2023

A RESOLUTION APPROVING THE 2032 DOWNTOWN PLAN UPDATE

WHEREAS, the City of Greeley has adopted a Comprehensive Plan to guide the growth and development of the City; and,

WHEREAS, the City's adopted Comprehensive Plan was most recently updated in 2018 following extensive community engagement and support; and,

WHEREAS, a variety of topic-specific plans related to community development and services have been incorporated into the City's Comprehensive Plan by reference; and,

WHEREAS, a Downtown Greeley Investment Strategy was prepared in 2011to guide development activity and improvements within the boundaries of the Downtown Development Authority and is incorporated into the City of Greeley Comprehensive Plan by reference; and,

WHEREAS, the City of Greeley has completed an update to the 2011 Downtown Plan to reflect achievements, complete current market, capital improvement and urban quality assessments, confirm a vision for Downtown and identify a set of actions to continue to advance redevelopment and community vitality in downtown Greeley; and,

WHEREAS, the updated plan, known as the 2032 Downtown Plan, was the result of extensive community engagement, guidance from technical advisors, and participation from key community focus groups; and

WHEREAS, the 2032 Downtown Plan has been endorsed by the Downtown Development Authority and Greeley Planning Commission.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. The Greeley City Council adopts the 2032 Downtown Plan, attached hereto as Exhibit A, for incorporation by reference into the City's Comprehensive Plan.

Section 2. This Resolution shall become effective immediately upon its passage, as provided by the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED THIS 17h DAY OF JANUARY 2023.

ATTEST: **THE CITY OF GREELEY**

City Clerk **Mayor**

DOWNTOWN 2032 - THE PATH FORWARD

GREELEY, COLORADO DOWNTOWN PLAN UPDATE

ADOPTED JANUARY 2023

ACKNOWLEDGEMENTS

*It is with gratitude that we express thanks to the **over 1,250** individuals, groups, institutions, organizations, and City staff who helped inform the development of the Greeley Downtown Plan Update. The Plan was created through a partnership between the City of Greeley and Greeley Downtown Development Authority (DDA).*

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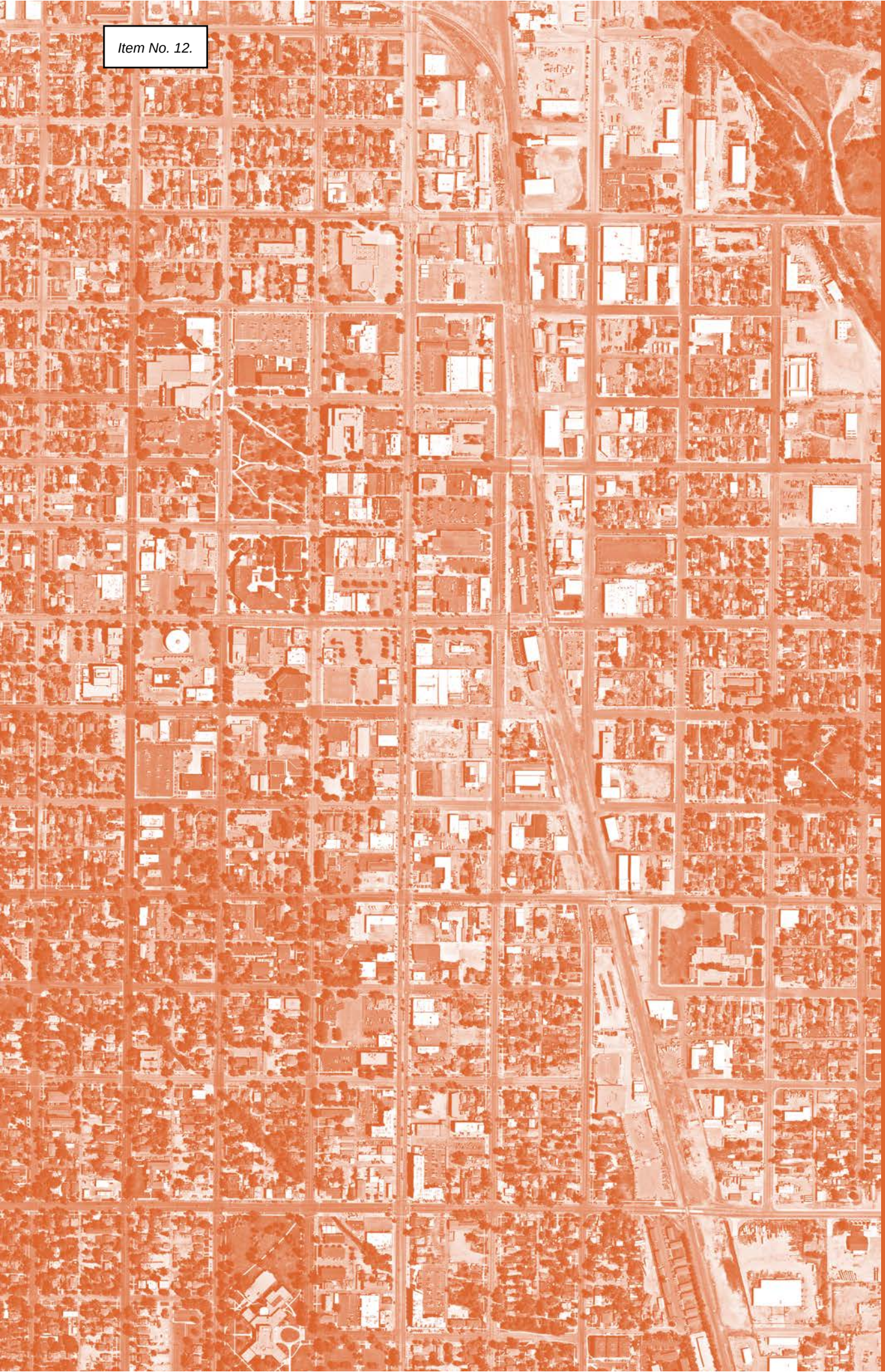


PLAN SUMMARY

PLAN OVERVIEW

EXISTING CONDITIONS

COMMUNITY OUTREACH

PHYSICAL FRAMEWORK

ACTION PLAN

PLAN OVERVIEW

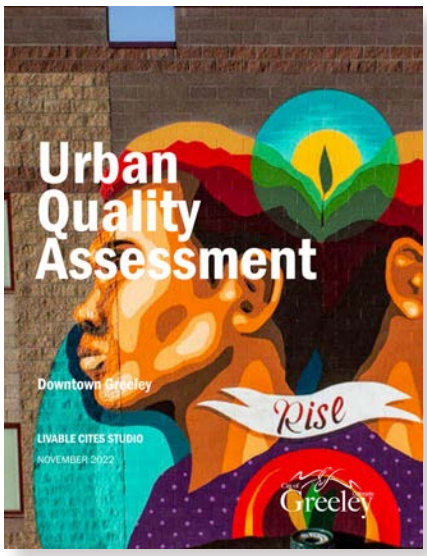
In early 2022, the City of Greeley and the Greeley Downtown Development Authority (DDA) initiated Downtown 2032 – The Path Forward, to help guide growth, investments, and improvements in Downtown Greeley over the next decade. **Downtown 2032 – The Path Forward** provides a roadmap for citywide decision-making and strengthening Downtown's role as the heart of the region. It also educates the general public about Downtown's importance to the larger Greeley community and Northern Colorado.

In order to create the roadmap that will guide Downtown investments and improvements for the next decade, the P.U.M.A. Team, City of Greeley, and DDA staff worked collaboratively to chart and complete a Downtown planning process that included an analysis of existing conditions, community outreach, and development of a physical framework and detailed action plan.

EXISTING CONDITIONS

In order to evaluate existing conditions, the P.U.M.A. Team conducted a review of past plans and studies, an analysis of market conditions, and an assessment of physical conditions, including an evaluation of capital improvements and urban quality characteristics. Together, the market, capital improvement, and urban quality assessments serve as the analytical foundation for physical framework and action plan recommendations.

The **Market Assessment** provides an overview of four market segments - Live (residential), Work (office, manufacturing, and other primary employment), Shop & Dine (retail and restaurants) and Visit & Stay (hospitality and tourism). This Market Assessment is intended to provide baseline data for Downtown Greeley, before and after the beginning of the COVID disruption, when possible, which will inform the community as it continues to transition past the pandemic. The Market Assessment also explores strengths and vulnerabilities in each market segment to ensure subsequent plan recommendations are grounded in economic reality.



The **Capital Improvement Assessment** is a physical evaluation of the existing streets, plazas, and parks located within the study area boundary. The purpose of the Capital Improvement Assessment is to evaluate the current conditions of the public realm between the curb and edge of the right-of-way, which includes most of the streetscape, to identify gaps and opportunities that can inform public realm and placemaking recommendations in the Downtown 2032 – The Path Forward Plan.

The **Urban Quality Assessment** is intended to establish a foundation for a high-quality public realm environment by evaluating current conditions in four key areas: existing public spaces, forms of movement, existing street hierarchy, and safety. The Urban Quality Assessment combined with the Capital Improvement Assessment provides a foundation for developing the public realm recommendations found in the physical framework and action plan.

EXISTING CONDITIONS KEY FINDINGS

MARKET ASSESSMENT KEY FINDINGS

- The housing market and demand for additional housing remains robust, and will remain a key economic driver in Downtown Greeley moving forward.
- The industrial sector, including manufacturing, and agriculture serve as enduring economic anchors in Downtown. The legacy and continued strength of these sectors offers the potential to define a differential advantage from other downtowns and attract additional anchor employers in these industries.
- Downtown's office market is likely to remain niche over the next market cycle, though there could be opportunities for small businesses, incubation, and co-working in existing or renovated spaces. The low cost of office space in Downtown offers a lower barrier to entry for entrepreneurs and new businesses compared to peer downtowns.
- Retail continues to strengthen in Downtown. The retail sector could be further bolstered by continuing to build housing and tapping into primary market opportunities like younger and Latinx households and UNC students.
- Connections to UNC remain an underutilized market opportunity.

CAPITAL IMPROVEMENT ASSESSMENT KEY FINDINGS

- Areas on the eastern edge of Downtown have the lowest quality public realm, as the majority were ranked as poor and many locations lack basic sidewalks.
- Areas around the Downtown core have a higher ranked capital improvement quality due to additional investment that has occurred on 8th Street, 9th Street, Lincoln Park, 8th Avenue, and surrounding streets.
- The residential areas south of the Downtown core generally have a higher quality public realm with mature trees, lawns, and generous sidewalks.
- 8th Avenue and 9th Avenue have distinctly different but complementary characters and they generally provide good north to south connectivity through Downtown. These corridors are also supported by 10th Avenue and 11th Avenue that run north-south on the west edge of Downtown.
- In most cases, non-residential areas are fair to poor quality with significant stretches lacking basic sidewalks.

URBAN QUALITY ASSESSMENT KEY FINDINGS

- There is a lack of a distinct public space network and unequal distribution of public spaces throughout the study area geography.
- For an urban core, Downtown has a disproportionate amount of land area dedicated to vehicles, including surface parking lots, wide roads, high volume traffic streets, and on-street parking.
- There is a bicycle infrastructure foundation in Greeley that can be built upon, but that needs to be completed and fully connected to increase bicycling in Downtown moving forward.
- There are pockets of adequate lighting near the core of Downtown, but lighting is lacking in other parts of Downtown.

COMMUNITY OUTREACH

Inclusive and broad community engagement was vital for the creation of the Downtown 2032 – The Path Forward plan. Throughout the planning process consultant team, City, and DDA were able to gather **over 1,250 inputs** to identify priorities and inform Plan recommendations. Outreach methods used throughout the Downtown Plan Update process included:

- Downtown Plan Advisory Committee
- Technical Working Group
- DDA Board Engagement
- Topic-Based Focus Group Meetings
- Community Open House
- Focused Outreach to Historically Marginalized Populations

Topic-Based Focus Group Meeting at the Downtown Greeley Recreation Center

Community Open House at the Downtown Greeley Recreation Center

An **online survey** was conducted that collected **1,100 responses** in both English and Spanish language formats. Full results from the online survey are provided in **Appendix D**.

From the online survey responses, the highest rated **physical improvement priorities** for Downtown Greeley were:

#1 **Redevelop and repurpose underutilized surface parking lots and vacant buildings and lots - 32%**

#2 **Maintain the historic character and authenticity - 15%**

#3 **More beautification (continue public art, additional alleyway enhancements, landscaping and greening, etc.) - 12%**

From the online survey responses, the highest rated **service and program priorities** for Downtown Greeley were:

#1 **More retail and restaurants - 24%**

#2 **Enhance public safety - 15%**

#3 **Provide more services to address the unhoused population - 11%**

Respondents were asked for three words that best describe their long-term vision for Downtown Greeley. The word cloud below shows words that were most frequently used – the larger the word, the more times it was listed.

SAFE
CLEAN
FUN
FRIENDLY
FAMILY
VIBRANT
FOOD
ARTS
PARKING
SHOPPING
DIVERSE
BEAUTIFUL
ENTERTAINMENT
WALKABLE
ACCESSIBLE
CULTURAL
EVENTS
DESTINATION
UNIQUE
AFFORDABLE
GROWING
MODERN
RENOVATED
INCLUSIVE
COMMUNITY
LIVELY
BARS
DINING
ECO
ACTIVE
INVITING
LOCAL
OUTDOOR
ART
SOCIAL
GREEN
LIGHTING
OPEN
DRINKS
SMALL
TRENDY
BIKE
MUSIC
PARK
BUSINESSES
CREATIVE
NEW
HOUSING
DISTRICT
OPTIONS
GOOD
AIR
TREES
THRIVING
ENGAGING
WELCOMING
FRESH
ENTERTAINING
TOWN
HIP
LIVE
KID
HUB
VARIETY
HISTORIC
ATTRACTIVE
INNOVATIVE
NATURE
MORE
RETAIL
BUSY
OF
TO
AND
FLOWERS
SPACES
URBAN
MULTICULTURAL
PROGRESSIVE
MURALS
HOMELESSNESS
GROWTH
ACTIVITIES
PARKS
PROSPEROUS
QUALITY
UNC
BIG
UP
STORE
FOR
SHADE
GATHERING
COOL
WATER
OR
CHARMING
FESTIVALS
REVITALIZED
COLORFUL
EXCITING
SHOPPING
NIGHTLIFE
SEATING
VENUES
UPSCALE
LIGHTING
PARKING
DOWNTOWN
COMMUNITY
HEALTHY
FAST
DOG
VIBE
CENTER
FULL
YOUNG
CONVENIENT
BICYCLE
CAMPUS
CONNECTED
SERVICES
CLOTHING
CONCERTS
ALIVE
STABLE
ENJOYABLE
INSPIRED
EVENT
UPBEAT
SESSION
INCLUSION
TOURISTS
ATTRACTIVE
LINCOLN
PEDESTRIAN
HOURS
FORTCOLLINS
DENSE
HOMELESS
OPPORTUNITIES
ECLECTIC
APPEALING
PUBLIC
BUILDING
TRADITIONAL
WITH
NICHE
STILL
SHARED
ALL
LOVELY
TRANSIT
EXPERIENCE
COSMOPOLITAN
ARTISTIC
FRIENDS
PROUD
OLD
PLACE
LIKE
SKATE
RELAXING
SUSTAINABLE
TECH
AESTHETICS
GROCERY
LOTS
EASY
NO
TENNIS
HOTSPOT
STUDENT
COLLABORATING
PRESERVATION
DESIGNATED
DISTILLERIES
CRAFT
MEMORIES
HAPPY
PLEASANT
GATHER
ACCESS
FESTIVAL
SPACE
MOVIE
QUEER
ENVIRONMENT
RELIGIOUS
ARTWORK
SERVICES
CONNECTED
THINGS
FLOWERS
CAMPUS
BICYCLE
YOUNG
CONVENIENT
AFFORDABLE
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BAKERY
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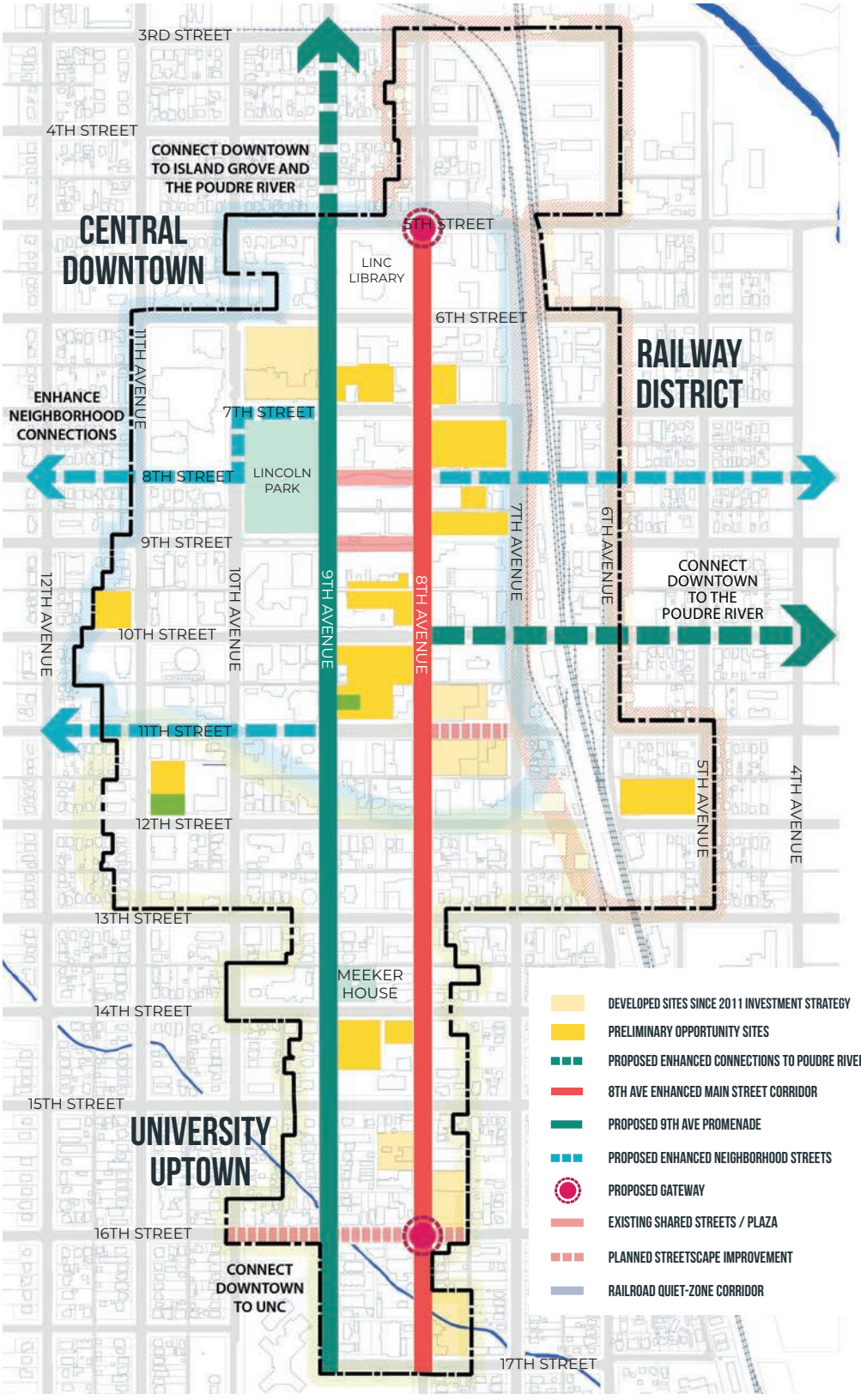
ENTERTAINMENT
RETAIL
UNIQUE
GROWING
DOG
AFFORDABLE
FULL
BAKERY
GREENER
CENTER
VIBE
TRADITIONAL
BUILDING
HEALTHY
FAST

PHYSICAL FRAMEWORK

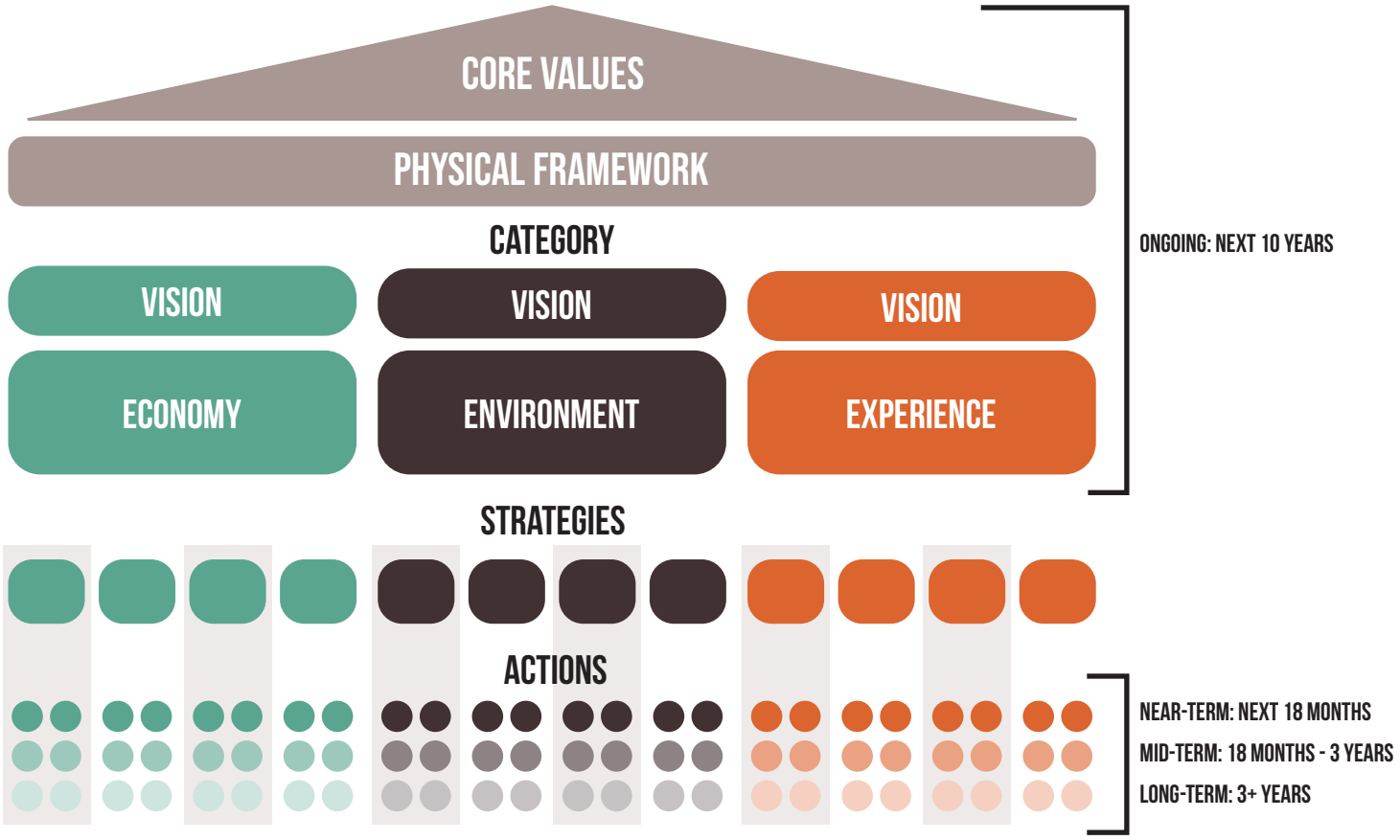
Drawing on the above inputs, the consultant team developed a physical planning framework to guide investments in the public realm that support and enhance market opportunities in Downtown and deliver a Downtown environment that is in sync with community values. The framework maps and descriptions that can be found in **Chapter 4: Physical Framework** are a key component of this Plan. The Physical Framework includes revised and redefined sub-areas within Downtown, the identification of opportunity sites for future infill development or redevelopment, and transformative projects that can be catalysts for investment and are recommended for priority funding and implementation over the next five to ten years.



ACTION PLAN

Created using the Market, Capital Improvement, and Urban Quality Assessments, and priorities identified through community engagement as building blocks, the Action Plan is intended to provide an implementation roadmap for Downtown Greeley over the next ten years. The Action Plan is guided by the overarching physical framework and core values, and is sorted into three topic areas – Economy, Environment, and Experience – with supporting vision and strategy statements.

The Action Plan is structured by strategies within each topic area, while specific actions can be found in Chapter 5 of the full Plan. The project team developed immediate, short- and mid-term actions for Downtown improvements and investments to guide the City of Greeley, the DDA, the development community, and downtown stakeholders for the next ten-year investment cycle. Responsible parties and illustrative cost are also identified to provide implementation guidance on each of the actions in the full plan.



CORE VALUES AND VISION

CORE VALUES

The Core Values identified below provide an overarching foundation for the Action Plan and are interwoven into all three topic area sections, with each action encompassing one or more of these Core Values:

WELCOMING AND INCLUSIVE

PROSPEROUS AND VIBRANT

A COMPLETE NEIGHBORHOOD

ACCESSIBLE AND CONNECTED

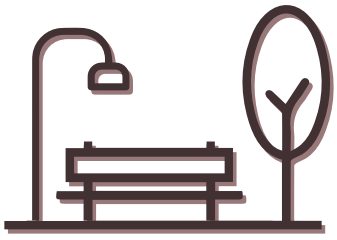
VISION

The consultant team worked closely with the City of Greeley, the DDA, and the Advisory Committee to synthesize the following vision that forms the basis for the Action Plan recommendations described and illustrated throughout this document.

In 2032..

Downtown Greeley's **ECONOMY** will be robust and diverse, offering residents, employees, students, patrons, and visitors a range of options for jobs, housing, shopping, and dining.

The Downtown physical **ENVIRONMENT** and public realm will be inviting and accessible for people walking or using mobility devices, biking, riding transit, or driving.



The Downtown **EXPERIENCE** will be vibrant, fun, welcoming, and inclusive.

STRATEGIES

ECONOMY

EC.1 Continue to stimulate infill development and redevelopment of underutilized sites.

EC.2 Encourage diverse, vibrant storefront uses throughout Downtown.

EC.3 Continue to diversify the housing base in Downtown.

EC.4 Sustain and attract more primary employers and jobs.

EC.5 Cultivate a Downtown economy that is relevant and welcoming to an array of community stakeholders and visitors.

ENVIRONMENT

EN.1 Enhance connections to the Poudre River north and east of Downtown.

EN.2 Improve connections to the UNC campus.

EN.3 Create new public spaces focused on families, residents, visitors, and the everyday use of inviting and comfortable outdoor spaces, ensuring that each sub-area has an identifiable and destination public space.

EN.4 Unify Downtown's public realm with standards that provide consistency and improve the overall quality.

EN.5 Enhance the quality of the connections to the adjacent neighborhoods around Downtown.

EXPERIENCE

EX.1 Promote local arts and creative experiences in Downtown.

EX.2 Ensure Downtown is clean, safe, and welcoming.

EX.3 Celebrate historic character, charm, and distinctive environment in Downtown.

EX.4 Continue to activate Downtown through programming and events that are relevant and inclusive to Greeley's diverse population.

EX.5 Market existing Downtown assets and amenities to both locals and visitors.

Daris Uroon Retail Store
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01

BACKGROUND

PLAN PURPOSE

ACCOMPLISHMENTS SINCE THE 2011 INVESTMENT STRATEGY

HISTORICAL CONTEXT

STUDY AREA

PROCESS

REVIEW OF PAST PLANS AND STUDIES

PLAN PURPOSE

In early 2022, the City of Greeley and the Greeley Downtown Development Authority (DDA) initiated the Greeley Downtown Plan Update, entitled Downtown 2032 – The Path Forward, to help guide the growth and development of Downtown Greeley for the next decade.

After a competitive bid and selection process, the City of Greeley engaged a Denver-based consulting team that included Progressive Urban Management Associates (P.U.M.A.), a firm specializing in downtown organizational and strategic planning and Livable Cities Studio, an urban design and landscape architecture studio focused on improving public spaces and connections to the natural environment.

P.U.M.A. was also contracted by the DDA in 2011 to complete the 2011 Downtown Greeley Investment Strategy, a process that evaluated market conditions and trends, engaged Downtown stakeholders, developed a framework for Downtown that included four sub-areas, and provided an organizational and financing strategy for the DDA to guide investments. This Downtown Plan Update is intended to build on the 2011 Investment Strategy, while identifying new initiatives and priorities looking forward to the next ten years.

HOW TO USE THIS PLAN

Both public agencies and private sector stakeholders will use Downtown 2032 – The Path Forward to guide decisions and actions that affect the form and function of Downtown. The Plan provides a basis for citywide decision-making and strengthening Downtown's role as the heart of the region. It also educates the general public about Downtown's importance to the larger Greeley community and the region.

The plan includes an analysis of existing conditions through market, capital improvement and urban quality assessments. More than 1,250 Downtown and Greeley community members provided opinions that shaped plan priorities. The findings from the assessments and community engagement process informed the subsequent structure of the plan, including recommendations for Downtown's future physical framework, vision, core values, strategies and detailed actions. The Plan's various sections are outlined in sequence, below:

In order to evaluate **existing conditions**, the P.U.M.A. Team conducted an assessment of market conditions and an assessment of physical conditions, including an evaluation of capital improvements and urban quality characteristics.

- The **Market Assessment** includes a wide range of data inputs, including primary and secondary sources, that offers a snapshot of existing market conditions Greeley, a Primary Market Area, and Downtown, as well as comparisons between Downtown and downtowns in peer cities. The market assessment provides an overview of four market segments, including Live (residential), Work (office, manufacturing and other primary employment), Shop & Dine (retail and restaurants) and Visit & Stay (hospitality and tourism). This Market Assessment is intended to provide baseline data for Downtown Greeley, before and after the beginning of the COVID disruption when possible, which will inform the community as it continues to transition past the pandemic.
- The **Capital Improvement Assessment** is a physical evaluation of the existing streets, plazas, and parks located within the study area boundary. The purpose of the Capital Improvement Assessment is to evaluate the current conditions of the public realm between the curb and edge of the right-of-way, which consists most of the streetscape, to identify gaps and opportunities that can be inform public realm and placemaking recommendations in the Downtown 2032 – The Path Forward Plan.

» The **Urban Quality Assessment** is intended to establish a foundation for a high-quality public realm environment by evaluating current conditions in four key areas: existing public spaces, forms of movement, existing street hierarchy, and safety. The Urban Quality Assessment combined with the Capital Improvement Assessment provides a foundation for developing a public realm improvements plan to encourage Downtown Greeley to continue to grow and thrive for years to come.

A summary of the Market Assessment, Capital Improvement Assessment, and Urban Quality Assessment are included in this plan in **Chapter 2: Existing Conditions**, while the full documents are in Appendices A, B, and C.

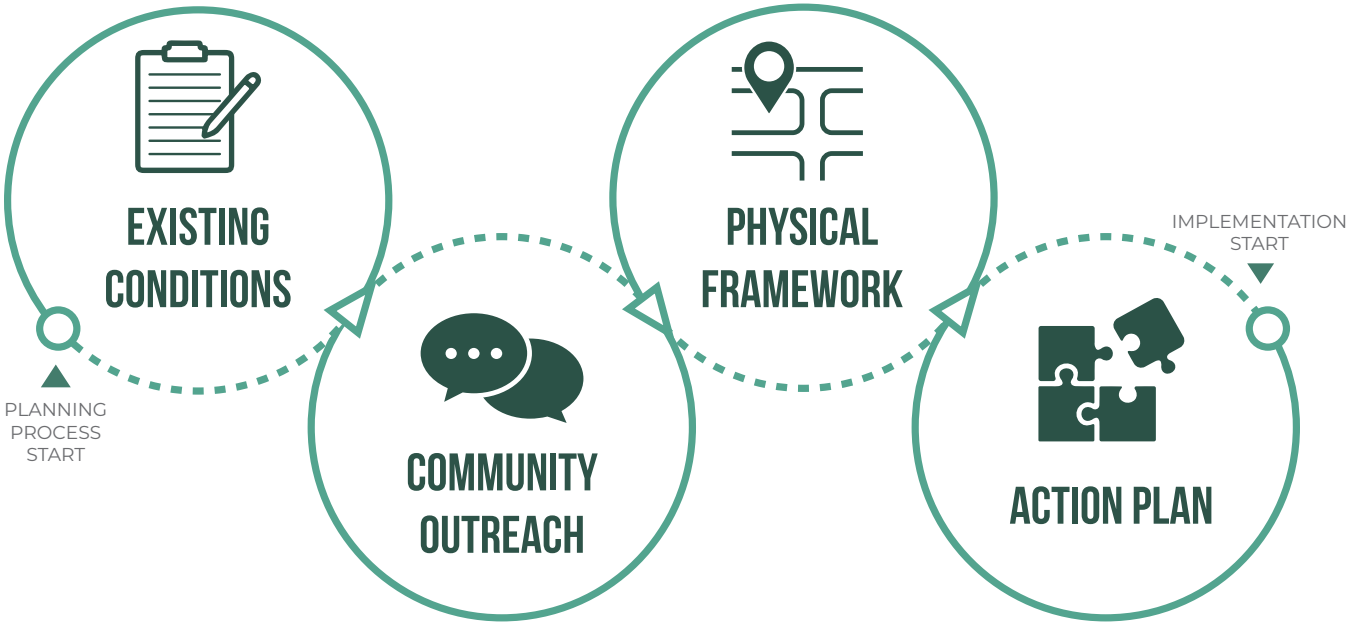
The Downtown 2032 – The Path Forward planning process included a significant community outreach effort that was undertaken by the City of Greeley, the DDA, and the P.U.M.A. team to identify priorities and craft plan recommendations. Additional detail on the methods used to engage the community, key themes from stakeholder engagement, and findings from the online survey can be found in **Chapter 3: Community Outreach**.

Informed by community outreach and an in-depth analysis of existing conditions, the **Physical Framework** section provides an overarching guide for future development, investment, and public realm improvements for Downtown. This section includes an analysis of and recommendations for sub-areas within Downtown, identifies opportunity sites for potential infill development or new public realm amenities, and describes transformative projects that can have a catalytic impact on continuing Downtown's vitality moving forward. The Physical Framework, including descriptions of its various components, can be found in **Chapter 4: Physical Framework**.

The final section, the **Action Plan**, provides detailed policy and physical improvement recommendations organized into three topic areas; Economy, Environment, and Experience. The Action Plan also provides responsibility centers, illustrative cost, and sequencing for each action. The full Action Plan can be found in **Chapter 5: Action Plan**.

At the back of this document, **Appendices** are included that provide the full assessment of market conditions, the full capital improvement and urban quality assessments, detailed online survey results, and the full summary of past plans and studies.

PLAN DOCUMENT SEQUENCING



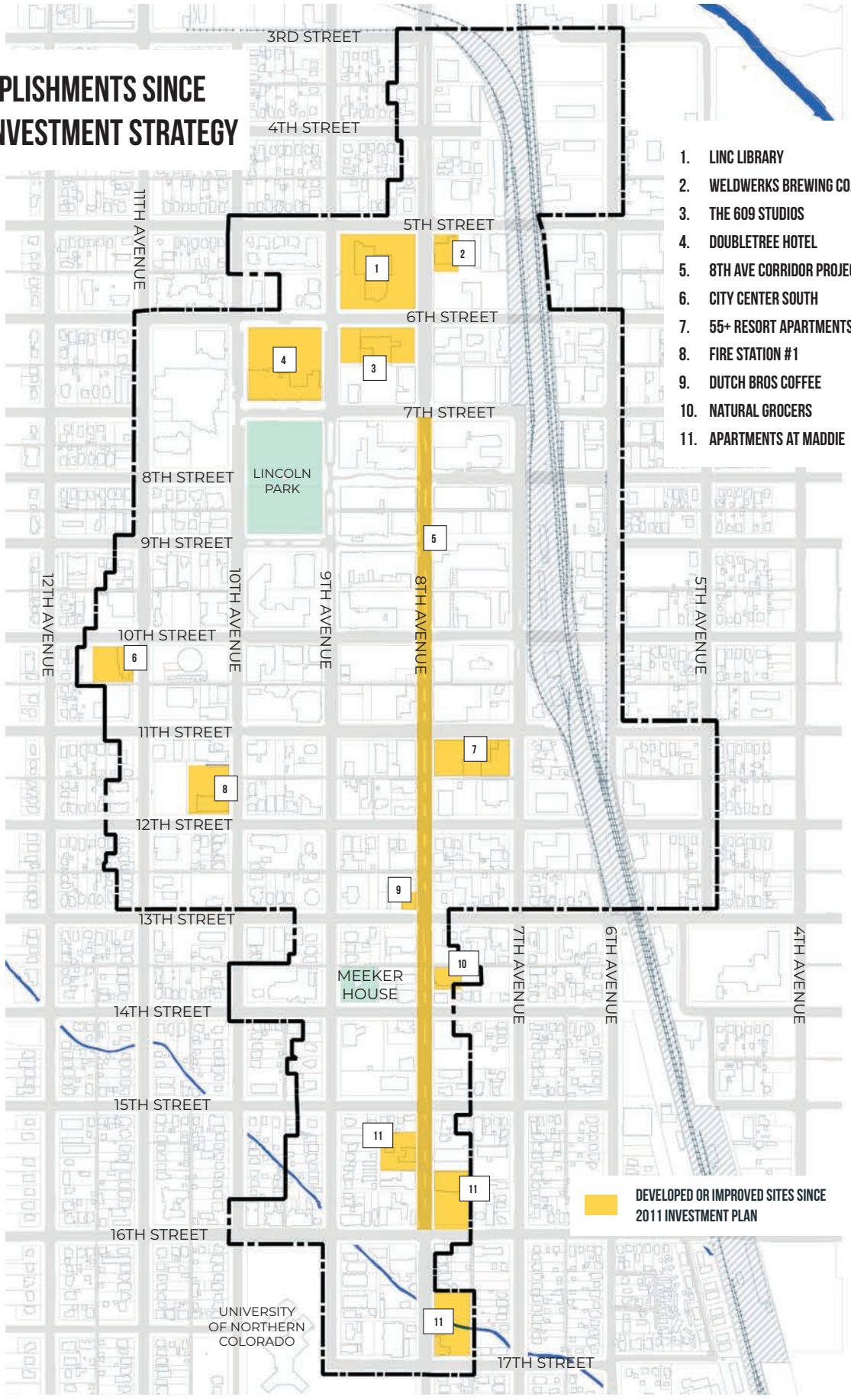
ACCOMPLISHMENTS SINCE THE 2011 INVESTMENT STRATEGY

Since the 2011 Downtown Greeley Investment Strategy, both the City of Greeley and the Greeley Metropolitan Statistical Area (MSA) have experienced significant growth and development, and the City of Greeley and DDA have accomplished many of the actions recommended in the Investment Strategy. The City and DDA's role in implementing the Downtown Investment Strategy has continued to strengthen Downtown Greeley's role as a regional economic and civic anchor. Since 2011, key accomplishments include:

- 16th Street Streetscape and Intersection Improvement Plan
- New 55+ Resort Apartments & Austin's American Grill
- 8th Avenue Corridor Streetscape Improvements
- 8th Street Complete Street Improvements
- Lincoln Park Improvements
- Greeley Recreation Center Upgrade
- Expanded Public Art Program
- New Syntax Distillery Development
- Parking Management System Implementation
- Establishment of the Greeley Creative District
- New Signature Events Initiated (e.g. Friday Fest, Monster Day, Youth Arts Month, Trick or Treat Street, Oktobrewfest, St. Patrick's Day Parade, etc.)
- Installation of New Downtown Entryway Signage
- New Development of Apartments at Maddie
- New City Center South Municipal Complex
- City Hall Renovation and City Center North Phase 2 Improvements
- New DoubleTree Hotel and Conference Center Development
- New Dutch Bros Coffee Company
- New Fire Station #1
- Firestone Retail
- Rehab of Immaculata Plaza 1 Apartments/ Condominiums and Breaking Ground on Immaculata Plaza II New Affordable Housing Development
- Library Innovation Center (LINC) Redevelopment
- New Natural Grocers Grocery Store
- Creation of a Railway Quiet Zone through Downtown Greeley
- The 609 Studio Apartment Building Renovation
- WeldWerks Brewing Co. Adaptive Reuse, Taproom, and Restaurant

A map highlighting key improvements and development since the 2011 Investment Strategy can be found on the following page.

KEY ACCOMPLISHMENTS SINCE THE 2011 INVESTMENT STRATEGY



HISTORICAL CONTEXT

Beginning more than 12,000 years ago, many of the original inhabitants of the area we now call Colorado were far-ranging people who traveled the southwestern deserts and northern plains, moving with the seasons for the best hunting, gathering, and harvesting. Colorado is just one of the many ancestral lands where the Ute Nation, Apache, Arapaho, Cheyenne, and Comanche grew their culture for thousands of years.

In 1851, the Treaty of Fort Laramie was established between the U.S. government and several local tribes as part of the government's attempt to protect the growing number of settlers moving west and to launch a military presence in the region. Per the treaty, each Native American tribe consented to sovereignty over a bounded territory in exchange for allowing free passage of white migrants as well as the construction of roadways and forts on their land. However, the Colorado Gold Rush of 1858-59 made the treaty obsolete, as settlers moved into the land that was supposedly protected. Renegotiations took place and the Treaty of Fort Wise was signed in 1861, which relegated the tribes to a much smaller tract of land (about one thirteenth the size) in eastern Colorado where they lived under government supervision.[1]

1 (Treaty of Fort Laramie, 2022)

Present-day Greeley began as the Union Colony of Colorado, which was established in 1869 by Nathan C. Meeker, an agricultural reporter for the New York Tribune, as an experimental Utopian farming community "based on temperance, religion, agriculture, education and family values;" it also had the backing of the Tribune's editor Horace Greeley, who popularized the phrase "Go West, young man." A committee that included Meeker and former Civil War general Robert Alexander Cameron traveled to Colorado to find a suitable site and purchased 12,000 acres at the confluence of the Cache la Poudre and South Platte Rivers. The site, formerly known as the "Island Grove Ranch," included the area of Latham, an Overland Trail station, and was halfway between Cheyenne, Wyoming, and Denver, Colorado along the tracks of the Denver Pacific Railroad.[2] The name Union Colony was later changed to Greeley in honor of Horace Greeley, who had settled in Colorado during the 1859 Pike's Peak Gold Rush.[3]

2 (Union Colony of Colorado, 2021)
3 (Virtual Tour, n.d.)

▲ *Maple Street (Now 7th Street) in Downtown Greeley in the 1870's. Photo from Denver Public Library*

Meeker had foreseen Greeley's future as an agricultural hub and future generations would come to find great success in the creation of irrigated farmland for the growth of sugar beet, carrot, alfalfa, potato, onion, and corn. With railroad access and its position at the confluence of two rivers, Greeley was set to flourish. At the turn of the 20th century, the economic boon of agriculture attracted labor-ready immigrants of European, Asian, and eventually Hispanic/Latinx descent, culturally diversifying the Front Range town.

In the late 1930s, as the area's water rights were over-appropriated, the Colorado-Big Thompson River Project was created to provide farming irrigation, diverting water from multiple sources on the east side of the Rockies. Today, the project provides water for 33 cities and towns in the state.

Cattle ranching has always been a part of Greeley's story – but had a global impact starting in the 1930s when Monfort Colorado, Inc., a local family-owned company, modernized the beef industry. The company first introduced the feedlot, changing cattle diet from grass to grain, and later combined feeding, slaughter, meatpacking, sales, and distribution under one roof, revolutionizing the process.

DOWNTOWN'S HISTORY

The first downtown area in Greeley was located on 8th Street between 8th and 9th Avenues. The buildings were adobe, wood frame, or brick structures. By 1879 the area had grown, bounded by the railroad tracks and 9th Avenue on the east and west, and by 7th Street and 9th Street on the north and south. Most of the original commercial buildings have been replaced, mainly with brick buildings. There were several reasons for the use of brick, including that several brick factories operated in Greeley, and that an 1880 fire destroyed a wood frame hotel known as the Greeley House. Greeley's Downtown Development Authority (DDA) was created in 1998. In 2000, the DDA nominated Downtown Greeley as one of Colorado's Most Endangered Places due to threats brought about as a result of economic deterioration, urban growth to the west, businesses' flight to the suburbs, and the high vacancy rate of its downtown buildings. The Downtown Greeley of 1998 stood in stark contrast to that of the mid-1970s, when it was recognized as a thriving urban center that was even made internationally famous by the novel, Centennial.

Once Downtown Greeley was added to the Endangered Places list, the Downtown Development Authority, along with the support of the Greeley Historic Preservation Commission, began building a strong support network of business professionals through the Main Street Board. It initially focused on plaza redevelopment, opening them to automobile traffic, as well as removing some of the newer facades to reveal historic storefronts, which in turn began attracting businesses back to the district. Momentum of the preservation of Downtown grew when Greeley became part of Colorado's Main Street program in 2001. Private LLCs purchased and rehabilitated key properties in the Downtown district, which served as a catalyst to demonstrate the potential of older properties and underscore the economic power of historic preservation.[4]

In 2011, Downtown Greeley became the first in the state of Colorado to take advantage of the Common Consumption legislation. Downtown regularly sees thousands of people at its First Friday Fests held throughout the summer months as well as its many other successful events throughout the year. Today, the DDA is very active, employing four champions for Downtown, which is enjoying extremely low vacancy rates, strong business growth, new development, and a positive reputation not only in Greeley but regionally as well.

4 (Downtown Greeley, 2022)

UNIVERSITY OF NORTHERN COLORADO (UNC)

UNC is a public university located in Greeley, adjacent to the southern boundary of Downtown. The university was founded in 1889 as the State Normal School of Colorado and has a long history in teacher education. The institution has officially changed its name four times, but has had its current name since May 1, 1970 reflecting its status as a fully accredited university. Nearly 10,000 students are enrolled at UNC in six colleges, with extended campus locations in Loveland, Denver/Aurora, and Colorado Springs.[5] UNC is currently in the process of becoming a U.S. Department of Education-certified Hispanic Serving Institution (HSI), as 25% of the full-time undergraduate student body is Hispanic, Latino, or Latinx-identifying, in line with the Advancing Educational Equity, Excellence, and Economic Opportunity for Hispanics initiative requirements.

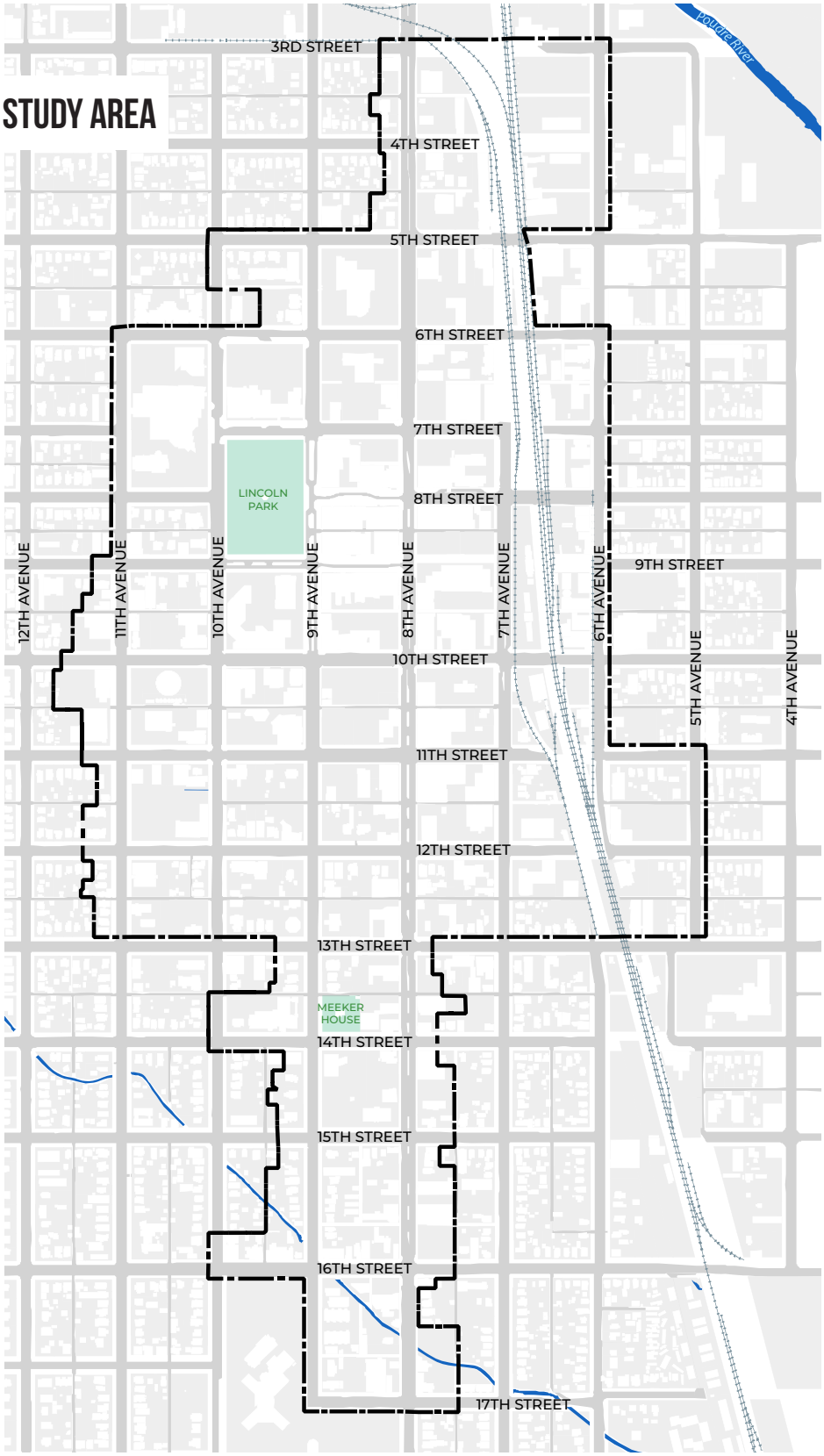
Additional information on Greeley's history can be found in **Appendix A: Market Assessment**.

5 (University of Northern Colorado, 2022)

▲ *University of Northern Colorado (UNC) Campus. Photo from UNC.*

STUDY AREA

For the purpose of the Downtown 2032 – The Path Forward planning process, 'Downtown' is defined as the area encompassed by the DDA Boundary. The study area as illustrated to the right is roughly bound by 3rd Street to the north, 5th Avenue to the east, 17th Street to the south, and between 11th and 12th Streets to the west. The study area and its context and relationship with adjacent neighborhoods is also acknowledged with this plan.

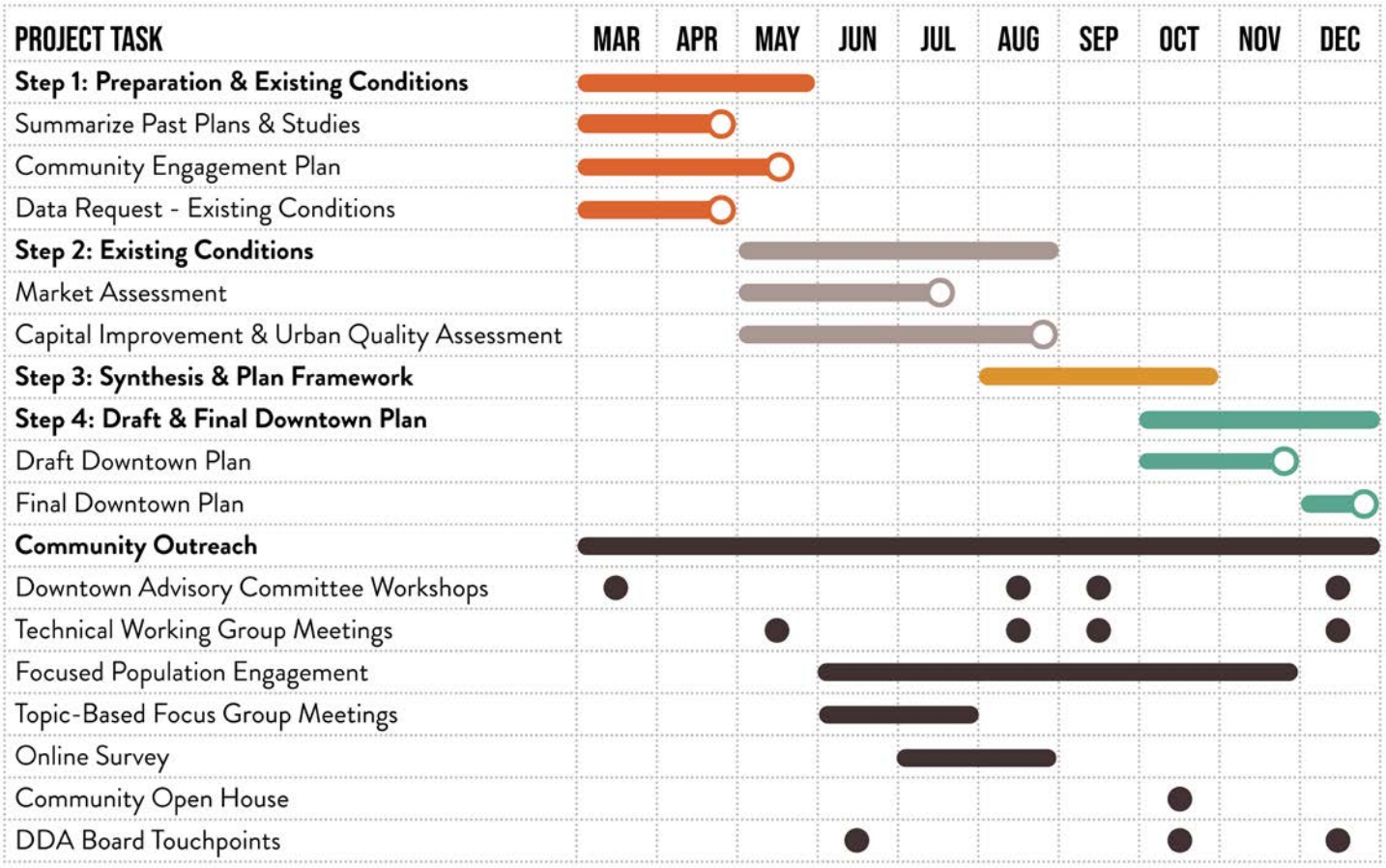


PLANNING PROCESS

The P.U.M.A. Team, City of Greeley, and DDA staff worked collaboratively to chart and complete a downtown planning process with the following major components:

- **Review and analysis of prior plans and studies** conducted in Downtown Greeley over the past 10 years;
- The completion of several foundational assessments of existing conditions for Downtown 2032 – The Path Forward, including **comprehensive market, capital improvement,** and **urban design evaluations**;
- Extensive **community engagement with Downtown stakeholders**, civic partners such as the City and UNC, DDA board members and the community-at-large that included **over 1,250 inputs**;
- Based upon the preceding data and analysis, the plan includes a **physical framework** and **detailed action plan** to guide Downtown Greeley's evolution the next ten years.

PLANNING PROCESS TIMELINE

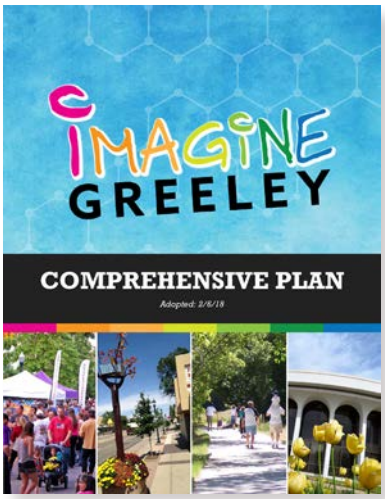


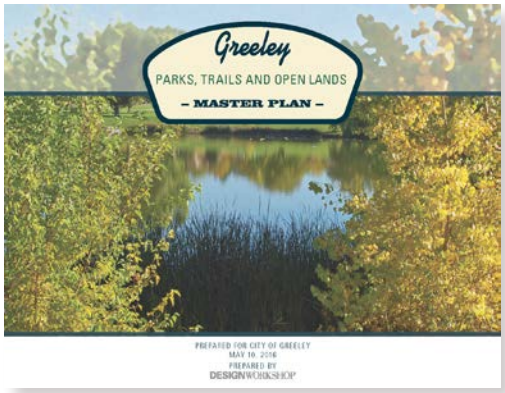
REVIEW OF PAST PLANS AND STUDIES

The City of Greeley and DDA provided the consultant team with all prior and evolving planning efforts that impact Downtown Greeley. The consultant team reviewed all the plans made available in order to ensure that this process would build upon such efforts. Summaries of past plans are included in **Appendix E**. Plans reviewed include:

- Imagine Greeley Comprehensive Plan, February 2018
- Downtown Greeley Investment Strategy, July 2011
- Downtown Greeley Accomplishments, August 2021
- 2022 Annual Growth & Development Projections Report, February 2022
- Greeley Downtown Development Authority 2020 Annual Snapshot, 2020
- City of Greeley Energy Action Plan, 2019
- Master Transportation Impact Study: 8th Avenue Redevelopment, March 2018
- City of Greeley Strategic Housing Plan, 2018
- Market Study & Recommendations: Downtown Apartment Market, April 2017
- Greeley Parks, Trails, and Open Lands Master Plan, May 2016
- Landscape Policy Plan for Water Efficiency, December 2015
- Bicycle Master Plan, May 2015

Greeley citywide plans, particularly the Imagine Greeley Comprehensive Plan, offer a high-level framework to guide and influence decisions that affect the future of the city. They are used as a foundation for the more specific vision, strategies, and actions contained in the Downtown Plan Update. Any future updates to citywide plans should incorporate and refine recommendations from this Downtown Plan.





02

EXISTING CONDITIONS

KEY TAKEAWAYS: EXISTING CONDITIONS ANALYSIS

MARKET ASSESSMENT SUMMARY

CAPITAL IMPROVEMENT AND URBAN QUALITY ASSESSMENT SUMMARY

KEY TAKEAWAYS: EXISTING CONDITIONS ANALYSIS

MARKET ASSESSMENT KEY FINDINGS

- The housing market and demand for additional housing remains robust, and will remain a key economic driver in Downtown Greeley moving forward.
- The industrial sector, including manufacturing, and agriculture serve as enduring economic anchors in Downtown. The legacy and continued strength of these sectors offers the potential to define a differential advantage from other downtowns and attract additional anchor employers in these industries.
- Downtown's office market is likely to remain niche over the next market cycle, though there could be opportunities for small businesses, incubation, and co-working in existing or renovated spaces. The low cost of office space in Downtown offers a lower barrier to entry for entrepreneurs and new businesses compared to peer downtowns.
- Retail continues to strengthen in Downtown. The retail sector could be further bolstered by continuing to build housing and tapping into primary market opportunities like younger and Latinx households and UNC students.
- Connections to UNC remain an underutilized market opportunity.

CAPITAL IMPROVEMENT ASSESSMENT KEY FINDINGS

- Areas on the eastern edge of Downtown have the lowest quality public realm, as the majority were ranked as poor and many locations lack basic sidewalks.
- Areas around the Downtown core have a higher ranked capital improvement quality due to additional investment that has occurred on 8th Street, 9th Street, Lincoln Park, 8th Avenue, and surrounding streets.
- The residential areas south of the Downtown core generally have a higher quality public realm with mature trees, lawns, and generous sidewalks.
- 8th Avenue and 9th Avenue have distinctly different but complementary characters and they generally provide good north to south connectivity through Downtown. These corridors are also supported by 10th Avenue and 11th Avenue that run north-south on the west edge of Downtown.
- In most cases, non-residential areas are fair to poor quality with significant stretches lacking basic sidewalks.

URBAN QUALITY ASSESSMENT KEY FINDINGS

- There is a lack of a distinct public space network and unequal distribution of public spaces throughout the study area geography.
- For an urban core, Downtown has a disproportionate amount of land area dedicated to vehicles, including surface parking lots, wide roads, high volume traffic streets, and on-street parking.
- There is a bicycle infrastructure foundation in Greeley that can be built upon, but that needs to be completed and fully connected to increase bicycling in Downtown moving forward.
- There are pockets of adequate lighting near the core of Downtown, but lighting is lacking in other parts of Downtown.

MARKET ASSESSMENT SUMMARY

A comprehensive Market Assessment was completed in the second quarter of 2022 to help inform the Downtown 2032 – The Path Forward planning effort. Data was compiled using primary and secondary sources, including the City of Greeley, Weld County, Esri Business Analyst, the U.S. Census Bureau, real estate research, interviews with local real estate experts and Downtown stakeholders, and other available sources.

It is important to note that the Market Assessment was conducted more than two years into the COVID-19 public health and economic disruption. Given the lag time in data gathering and/or funding to update some databases (typically done on an annual basis), some of the information that follows presents conditions pre-pandemic. This Market Assessment is intended to provide baseline data for Downtown Greeley, before and after the beginning of COVID when possible, which will inform the community as it continues to transition to a new normal.

The following summary of the Market Assessment provides an overview of key findings by sector - Live (residential), Work (office, manufacturing, and other primary employment), Shop & Dine (retail and restaurants) and Visit & Stay (hospitality and tourism). The full Market Assessment can be found in **Appendix A.**

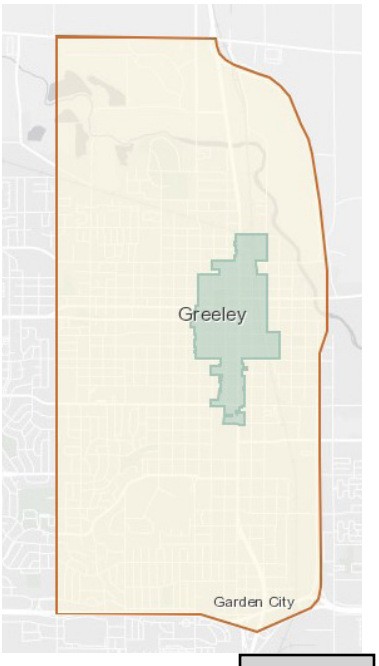
MARKET AREAS

Data was collected, when available, for Downtown Greeley, a Primary Market Area, and the City of Greeley. The Downtown study area is tied to the Downtown Development Authority boundary area shown in the maps below.

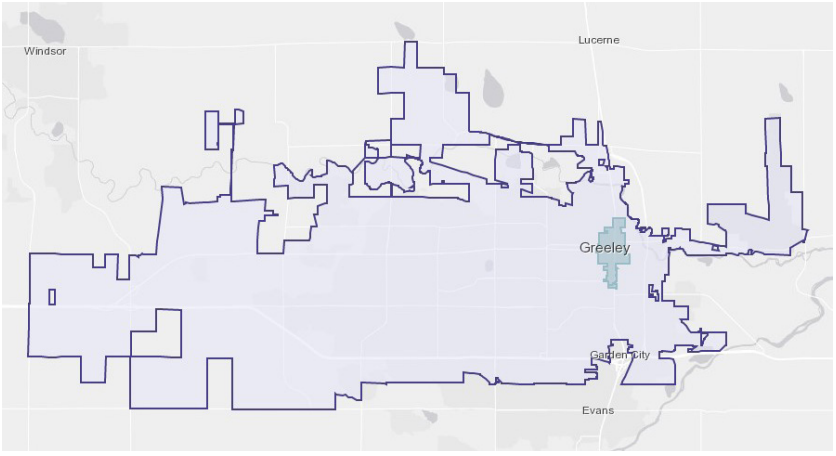
The 7.7 square mile Primary Market Area, also pictured below, was defined by the City of Greeley and was also used in P.U.M.A.'s 2011 Downtown Greeley Investment Strategy report. This broader area is used to better understand market opportunities and demand for offerings from within the Downtown boundaries. The Primary Market Area boundary incorporates the Downtown area, as well as adjacent neighborhoods where residents are readily able to access (i.e., with a maximum ten-minute walk or bike ride) and support establishments within Downtown. It is bounded by County Road 64 to the north, U.S. Highway 85 (8th Avenue/Business Rt.) to the east, U.S. Highway 34 to the south, and 23rd Avenue to the west.

The City of Greeley is approximately 49.8 square miles, also shown below, and is a key market and point of comparison for Downtown data. It also offers a wider array of data than the customized, Downtown boundary.

DOWNTOWN AND PRIMARY MARKET AREA



DOWNTOWN AND CITY OF GREELEY



PEER CITIES

Peer cities and their downtowns are used as comparisons throughout the Market Assessment. They include Cheyenne, WY; Flagstaff, AZ; Grand Junction, CO; Fort Collins, CO; Idaho Falls, ID; and Ogden, UT. They were selected by Greeley's Department of Economic Health and Housing Department and verified by P.U.M.A. due to their downtowns being similar in size and other characteristics (i.e., most have universities). Overall, these peer cities share many of the same market dynamics that exist in Greeley today. Boundaries for peer downtowns were set based on Improvement District boundaries or downtown cores as defined in their downtown plans if an improvement district was not present.

DOWNTOWN'S IMPACT ON GREELEY

The "Summary of Impact" callout to the right demonstrates that while its land area is small (~1% of the City), Downtown is one of the most productive and valuable neighborhoods of the community. It contains a modest proportion of Greeley's residents (3%), but more substantial portions of the City's workers as well as dining, drinking and shopping options (~15% each).

About 3% of the City's assessed value lies in Downtown land, with each Downtown acre generating about three times more value than citywide land in 2021 (see "Assessed Value Per Acre" callout below).

ASSESSED VALUE PER ACRE, 2021

	ACRES	ASSESSED VALUE	PER ACRE VALUE
DOWNTOWN	314	$71.9 million	$229.4 thousand
GREELEY	31,872	$2.1 billion	$64.5 thousand

Source: Weld County Assessor's Office

SUMMARY OF DOWNTOWN'S IMPACT IN THE CITY OF GREELEY

- 0.48 SQUARE MILES → 1% OF CITY TOTAL
- 1,637 RESIDENTS → 3% OF CITY TOTAL
- 7,112 EMPLOYEES → 14% OF CITY TOTAL
- 107 RESTAURANTS, BARS, RETAILERS → 15% OF CITY TOTAL
- $71.9M IN ASSESSED VALUE* → 3% OF CITY TOTAL

**includes exempt properties*

LIVE

DEMOGRAPHICS

» Compared to the Primary Market Area and City of Greeley, in Downtown:

› Households have fewer people than the primary market or City of Greeley, especially children, and many are non-family households containing just one person, which is similar to peer downtowns.

› There is greater diversity, with high proportions of residents identifying as Hispanic.

› Median household income and educational attainment are lower, which is true for peer downtowns and partially explains why Downtown Greeley has historically been associated with higher levels of poverty.

- The white-collar proportion of occupations decreases, while the proportion of blue-collar and services occupations increases; a pattern that is true for about half of peer downtowns in terms of white- and blue-collar workers; all peers examined had higher percentages of service workers living in their downtowns.

» While Greeley's citywide population grew more than any of its peer cities during the most recent decade, the population growth of Downtown, as well as the Primary Market Area, has lagged behind the City's.

» Downtown Greeley is on the low end of population density when compared to its peers.

» Downtown could stand to attract young professional and student residents, especially considering that its university is directly adjacent to Downtown. Greeley's peer cities with universities have much greater proportions of student populations to reside in and/or patronize their downtowns.

HOUSING MARKET

» While Greeley is a desirable place to live, there is little inventory, as making Downtown a residential neighborhood has only recently become a focus.

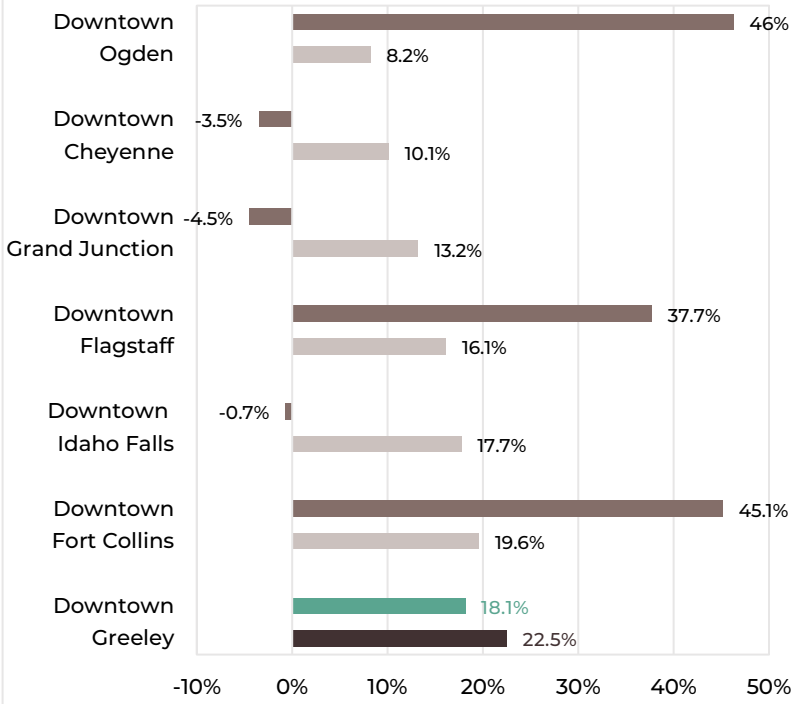
» Housing is a strong market for Downtown moving forward, and there is healthy demand for more units at all price points.

» Downtown's strongest age segment is 15-34 (~40% of the population) – the "young professional," Millennial, and student bracket that downtowns and walkable neighborhoods with plentiful amenities are well-positioned to continue to attract.

» Downtown has a high concentration of poverty, as its low rents have historically attracted residents with low incomes and education levels to live Downtown.

» Downtown (and the City) is challenged when introducing density.

POPULATION GROWTH, 2010-2021

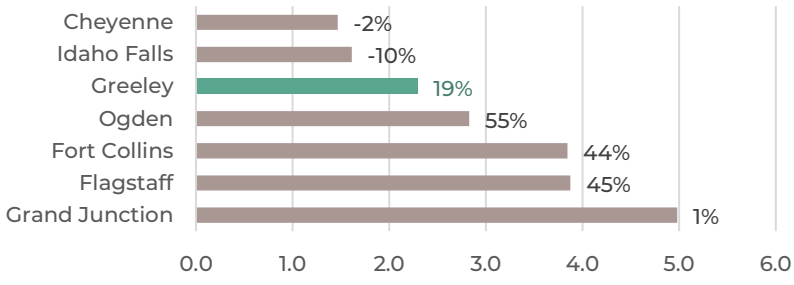


PERCENT OF POPULATION THAT ARE COLLEGE STUDENTS, 2021

FLAGSTAFF	37%
FORT COLLINS, CO	37%
OGDEN, UT	33%
GRAND JUNCTION, CO	12%
GREELEY, CO	7%

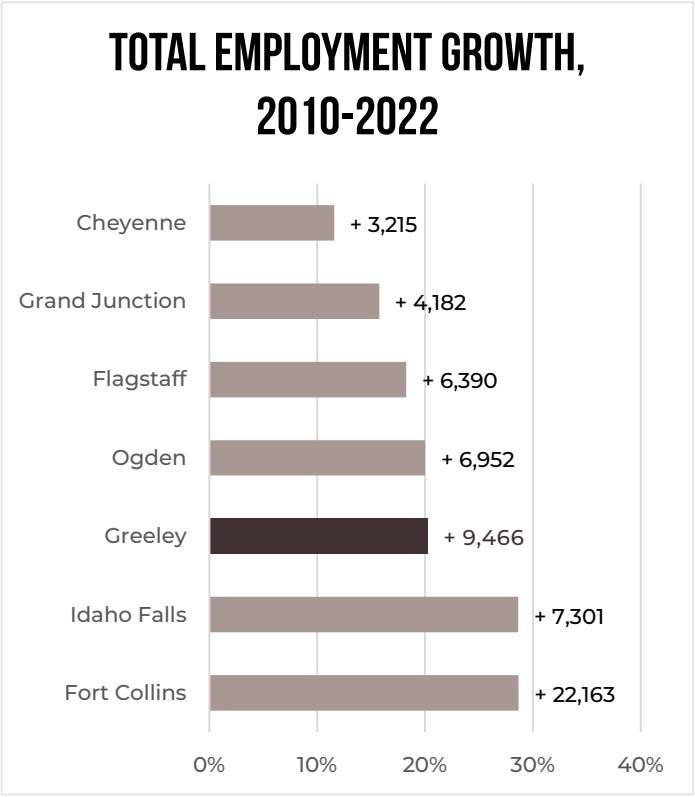
DOWNTOWN HOUSING DENSITY

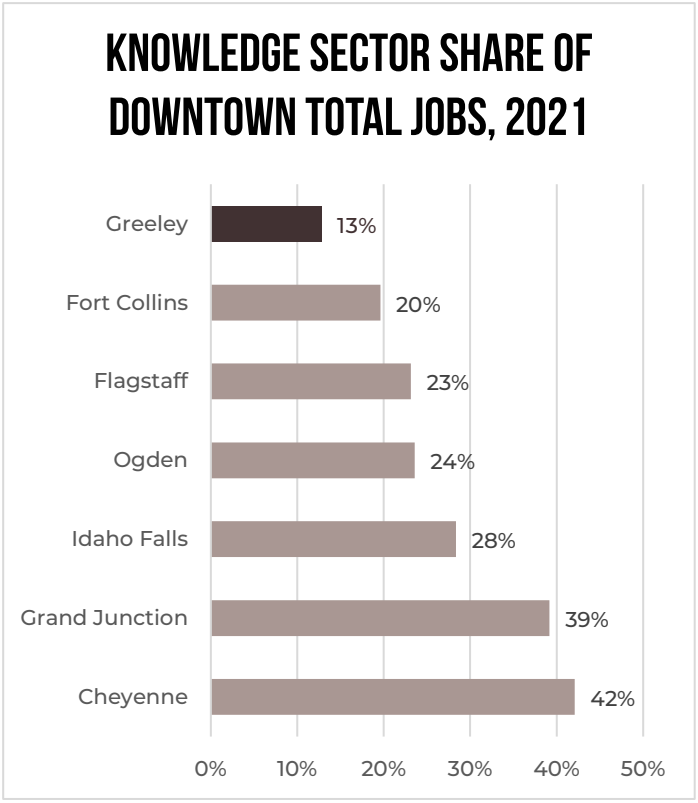
(housing units/sq. acre and % change 2010-2022 in labels)



WORK

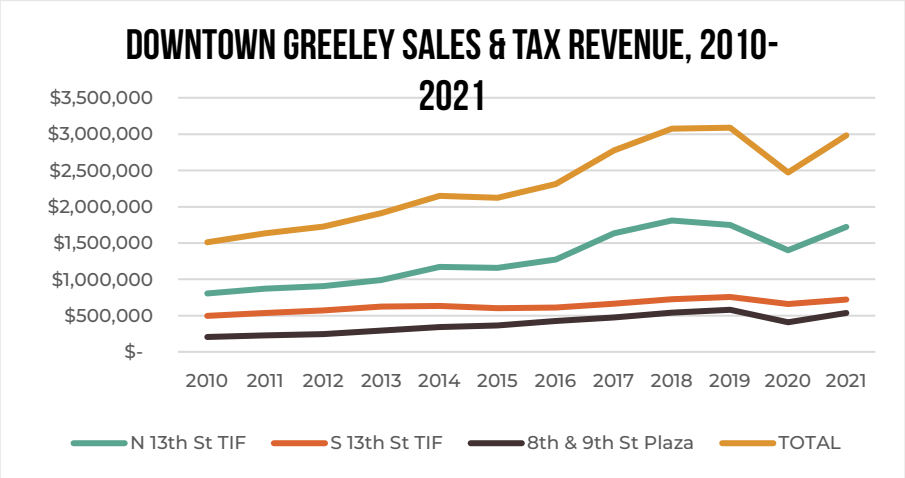
- Healthcare, manufacturing, education, retail, restaurants, and government are the foundations of the Greeley economy. Downtown employment is anchored by manufacturing and government, which together provide over 60% of Downtown jobs.
- Greeley's growing economy gets a lot of recognition by the press, which garners the attention of prospective employers.
- About 24% of the City's workers are employed in Downtown. Downtown lacks major private sector employers, which contributes to its below-average number of workers and as well as employees per acre compared to its peers.
- Downtown's industrial buildings, situated along the railroad tracks, are home to its high concentration of manufacturing jobs, are a welcome fixture are perceived as an asset that positively contributes to the unique character of Downtown, and should be preserved.
- While Downtown's existing office space might not be particularly appealing to primary employers, its low rents make entry into the market more accessible to Greeley's small business owners and entrepreneurs. However, there is nearly no (or suitable) office or industrial space available for new or expanding businesses to locate in Downtown.
- Downtown Greeley has little primary employment and few knowledge-based workers, which both trend toward concentrating in downtowns and have high growth potential.
- Greeley's resident populations are not as well-educated as some, which presents a challenge in attracting both primary and knowledge-based employers.
- There is a high degree of competition from Greeley's other market areas.
- Nationally, the office sector continues to struggle due to uncertainty around the course of COVID, a potential recession, and the increasing popularity of working from home, which poses complications for a downtown such as Greeley's that is looking to further develop its employment base and bolster its daytime activities.





SHOP & DINE

- Downtown has a strong mix of street level businesses and services (numbering 331), with 31% dedicated to dining and shopping.
- Since 2016, Downtown's sales and use tax revenues have increased 29%. The pandemic hit Downtown harder than the rest of the city, causing a decrease of 20% in revenues between 2019 and 2020, but Downtown has made a full and rapid recovery, increasing 21% between 2020 and 2021.



- Downtown businesses are primarily local, independent, and specialty; some, such as the growing number of distilleries and breweries, even build on its manufacturing heritage. This helps to cultivate a distinct character and sense of place, in contrast to many downtowns that have lost some of their local vibe in recent years. Much like the office sector, the low rent structure allows local entrepreneurs to enter the market with unique concepts that further shape the Downtown experience.
- Nationally, food and beverage has been expanding while retail has contracted in most downtown markets. Downtown Greeley is consistent with these trends, having a strong food and beverage market that is on its way to becoming the sector's anchor.
- Greeley (as well as Downtown, the Primary Market Area and neighboring Evans) has a high concentration of Hispanic residents. Downtown can evolve to better welcome and serve this community, both as business-owners, employees, visitors, and cultural contributors.
- Downtown does not have a critical mass of workers or residents to support the addition of substantial amounts of retail currently.
- Despite a low vacancy rate, the high cost of construction and low rents will continue to inhibit the feasibility of building new retail space or rehabbing existing space that is aging and in need of substantial and expensive upgrades.
- The perception that there is insufficient parking that is convenient for accessing Downtown's restaurants and retailers might deter prospective customers, especially as employee and resident populations grow.

VISIT & STAY

- Tourism has undoubtedly become an important part of Greeley's economy, especially in the last ten years. Its location proximate to other destinations along the Front Range and its comparatively low room prices make it an attractive place to visit. Downtown Greeley has become a destination, with its high concentration of attractions and increasingly popular events that draw residents and visitors alike.
- The City recognizes the importance of its burgeoning art and culture scene and has thus accelerated its cooperative efforts to highlight and grow it in recent years.
- Despite the pandemic setback, its historically limited lodging sector has been maturing over the last decade and has even largely rebounded from its COVID slump in the last year. The recent addition of the DoubleTree hotel, with its modern amenities, has put Downtown on the map as a venue to hold state and regional conferences and events and could pave the way for more national brands to develop hotels in Downtown. Greeley enjoys hotel occupancy rates that are typically higher than the national average as well as that of other communities throughout Northern Colorado, which is another metric of interest to hotel developers.
- So far, Greeley is somewhat unique in that its short-term rental market has not yet posed much of a threat to its traditional lodging market.
- Other Front Range communities such as Fort Collins, Boulder, and Denver still generate a lot of competition for visitors as well as highly-sought after performers and other entertainment draws.

CAPITAL IMPROVEMENT AND URBAN QUALITY ASSESSMENT SUMMARY

The following summary of the Capital Improvement Assessment and Urban Quality Assessment provides an overview of each report, focusing on key findings from an in-depth analysis of existing conditions in Downtown Greeley's public realm. The full Capital Improvement Assessment and Urban Quality Assessment can be found in **Appendices B** and **C**, respectively.

CAPITAL IMPROVEMENT ASSESSMENT

The Capital Improvement Assessment is a physical evaluation of the existing streets, plazas, and parks located within the Downtown 2032 – The Path Forward plan area boundary. The existing assets, mostly included in the right-of-way or on City of Greeley owned property, comprise a majority of the occupiable public realm in the plan area boundary, which is intended to create a walkable, safe, attractive, and welcoming user experience within the Downtown area. Capital improvements assist in helping the City of Greeley and DDA pursue their mission to create, support, and promote meaningful Downtown experiences, business growth, and private development in Downtown Greeley. While the DDA has other tools to encourage and support business growth and private development, the Downtown user experience is directly impacted by the various capital improvements that shape the built environment of Downtown. From streets and avenues to alleys, plazas, and parks, the interwoven public realm creates the physical environment that users experience Downtown.

The purpose of the Capital Improvement Assessment is to evaluate the current conditions of the public realm between the curb and edge of the right-of-way, which includes the majority of the streetscape, to identify gaps and opportunities that can used to inform public realm and placemaking recommendations in the Downtown 2032 - The Path Forward Plan.

METHODOLOGY

The methodology used for the Capital Improvement Assessment includes an evaluation of the physical condition using a combination of site visits and web-based analysis. Three categories of assets were created for this evaluation: streets, plazas, and parks. Each street, plaza, and park was then ranked using a scoring system of Good, Fair, or Poor conditions. This ranking system assesses the quality of each asset holistically, and then provides some additional notes on each specific streetscape component, including paving, trees/landscape, site furnishings, etc.

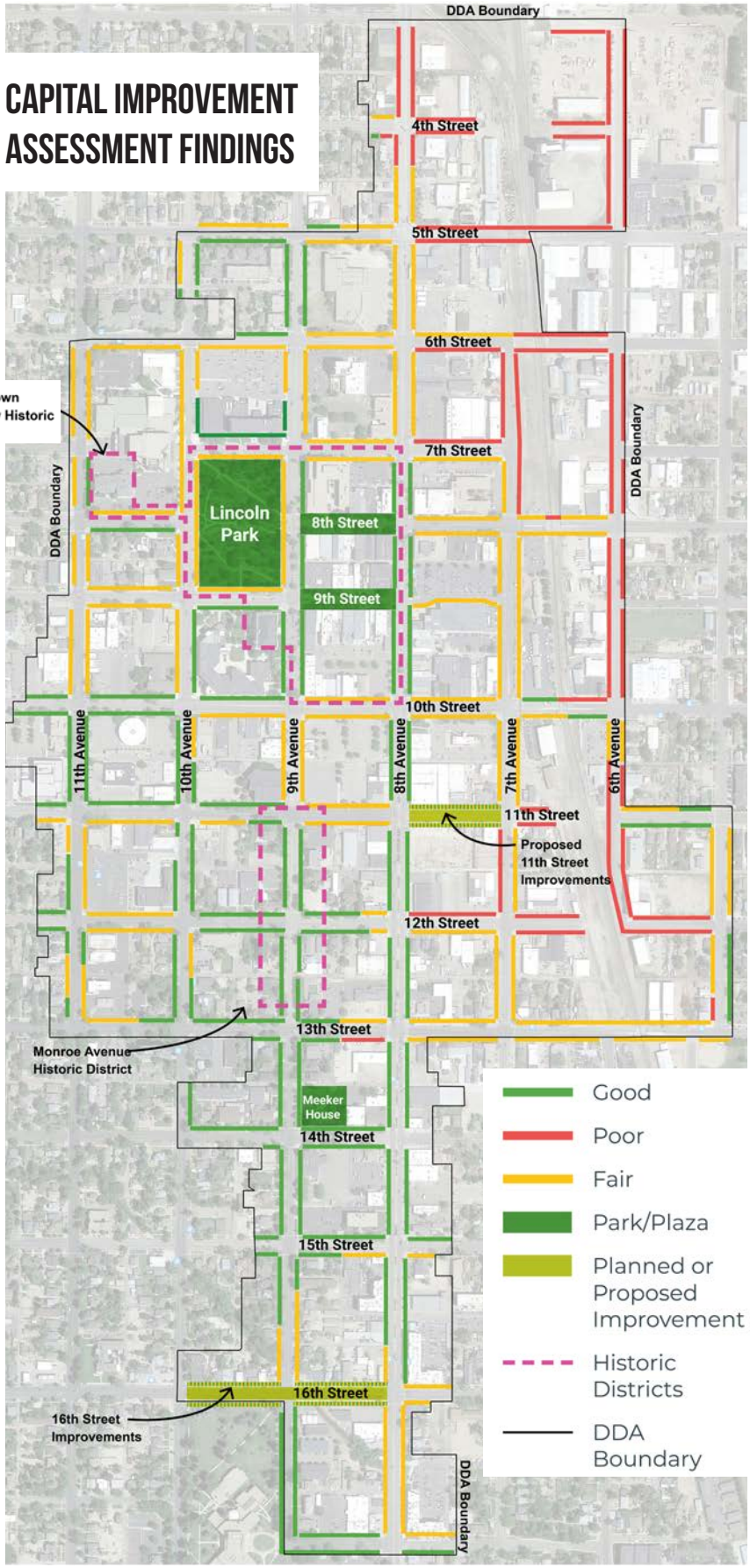
STATE OF DOWNTOWN GREELEY PUBLIC REALM

The Capital Improvement Assessment reveals that Downtown Greeley has an average foundation of basic infrastructure and a few areas where the pedestrian has been prioritized, such as 8th Street and 9th Street. However, the evaluation described above indicates there is an overall lack of public realm infrastructure oriented toward the pedestrian and an absence of consistent high-quality public realm experiences throughout Downtown.

The public realm assessment map to the right illustrates the outcome of the overall ranking of Downtown streets, parks, and public spaces at the time of this study. The findings indicate that apart from a few key streets and areas around the Downtown core near Lincoln Park, a majority of the public realm is of fair or poor quality. This indicates that basic assets comprising the public realm need additional improvements, maintenance, or increased inspections to create a public realm that attracts more residents, visitors, and employees.

KEY FINDINGS

- Areas on the eastern edge of Downtown have the lowest quality public realm, as the majority were ranked as poor and many locations lack basic sidewalks.
- Areas around the Downtown core have a higher ranked capital improvement quality due to additional investment that has occurred on 8th Street, 9th Street, Lincoln Park, 8th Avenue, and surrounding streets.
- The residential areas south of the Downtown core generally have a higher quality public realm with mature trees, lawns, and generous sidewalks.
- 8th Avenue and 9th Avenue have distinctly different but complementary characters and they generally provide good north to south connectivity through Downtown. These corridors are also supported by 10th Avenue and 11th Avenue that run north-south on the west edge of Downtown.
- In most cases, non-residential areas are fair to poor quality with significant stretches lacking basic sidewalks.



URBAN QUALITY ASSESSMENT

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▲ *Public Realm in Downtown Greeley*

The Urban Quality Assessment is intended to evaluate the public realm beyond just the public right-of-way. The City of Greeley is fortunate to have a vibrant, successful, and celebrated Downtown that serves as the core of the Greeley community. For decades, Downtown has provided its residents and visitors with businesses, shops, stores, civic buildings, parks, and history that make Greeley the unique place it is today. More recently, new public realm improvements, redevelopment activities, the formation of the Greeley Creative District, and the public art program have brought new life and energy to Downtown. Despite recent improvements, Greeley's streets and public spaces do not do Downtown justice to its lively community. Over time, the balance of streets and public space design has swung too far in favor of cars and functional infrastructure, often at the expense of residents, placemaking, and the environment.

Although the Downtown community and City of Greeley have done a tremendous job addressing this imbalance through previous projects and initiatives, there is still much work to be done. The Urban Quality Assessment aims to address this imbalance by establishing a foundation for a high-quality public realm. By building within the human scale, physical improvements can accommodate the needs of all people and continue to build on previous Downtown place enhancement successes.

METHODOLOGY

The consultant team performed two types of analysis to assess the urban quality. The first type of analysis focused on the core Downtown area near Lincoln Park to evaluate how the public space is experienced by users. The second type of analysis included a comprehensive evaluation of the entire Downtown and focused on sub-areas, forms of movement, street hierarchy, and safety.

To evaluate how the public space is experienced by users, the consultant team visited several locations throughout Downtown and evaluated the quality of each space. The public realm quality rating is based on what fosters successful public spaces, provides protection, offers comfort, and creates interesting experiences for people.

The consultant team evaluated the public realm using the Twelve Quality Criteria method, which is a tool developed by Gehl Architects for researching how public spaces are experienced by their users. More specifically, it is used to evaluate whether different features of a public space are protective, comfortable, and enjoyable for people spending time there.

The thinking behind these three categories is as follows:

1. Without basic protection from cars, noise, rain, and wind, people will generally avoid spending time in a space.
2. Without elements that make walking, using a wheelchair, standing, sitting, seeing, and conversing comfortable, a place won't invite people to stay.
3. Great public spaces tend to offer positive aesthetic and sensory experiences, take advantage of local climate, and provide human-scale elements so visitors don't feel lost in their surroundings.

The comprehensive analysis of Downtown evaluates key areas for future recommendations: sub-areas within Downtown, existing public spaces, forms of movement, existing street hierarchy, and safety. The two forms of analysis conducted for the Urban Quality Assessment combined with the Capital Improvement Assessment provides a foundation for developing a public realm improvements plan to encourage Greeley to continue to grow and thrive for years to come.

FINDINGS BY AREA:

SUB-AREAS

» There is a lack of clearly defined sub-areas within Downtown Greeley.

» There is a lack of a sense of place within subareas, as they have no clear edges, destinations, or distinct places.

PUBLIC SPACES

» There is a lack of a legible public space network and unequal distribution of public spaces throughout the study area geography.

» The sub-areas lack recognizable character and identifiable public space.

» Other than the 8th Avenue corridor streetscape improvements over the last ten years extending south, there are no other public spaces south of 9th Street in the Downtown plan study area.

» The eastern portion of Downtown lacks any type of park or public space.

FORMS OF MOVEMENT

» For an urban core, Downtown has a disproportionate amount of land area dedicated to vehicles, including surface parking lots, wide roads, high volume traffic streets, and on-street parking.

» Generally, Downtown Greeley is designed for cars and not people.

» There is a bicycle infrastructure foundation in Greeley that can be built upon, but that needs to be completed and fully connected to increase bicycling in Downtown moving forward.

» There is a complete lack of bicycle connectivity to the eastern portion of Downtown and adjacent neighborhoods to the east in particular.

STREET HIERARCHY

» There is an extensive network of high traffic volume streets in Downtown that are designed for moving cars, making the Downtown environment uncomfortable for pedestrians in many places.

» Major Arterials and Major Collectors create physical barriers in Downtown Greeley, including: 8th Avenue as major vehicle arterial, which may allow 9th Avenue to take on different role looking to the future.

SAFETY

» There are pockets of adequate lighting near the core of Downtown, but lighting is lacking in other parts of Downtown.

» According to available crash data between 2015 and 2019, pedestrian and bicyclist crashes happened mainly on Major Arterial streets without dedicated bike lanes or protections.

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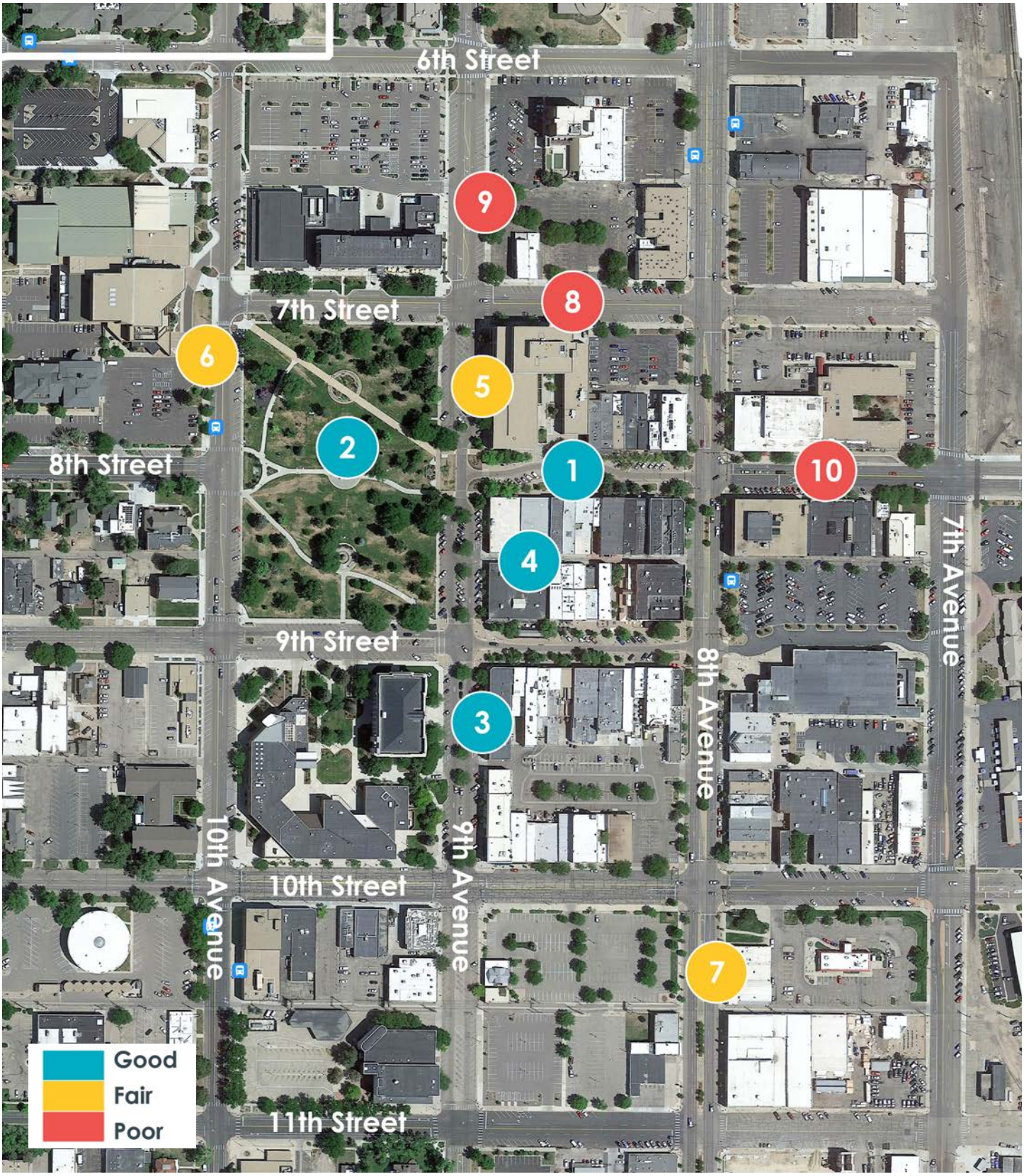
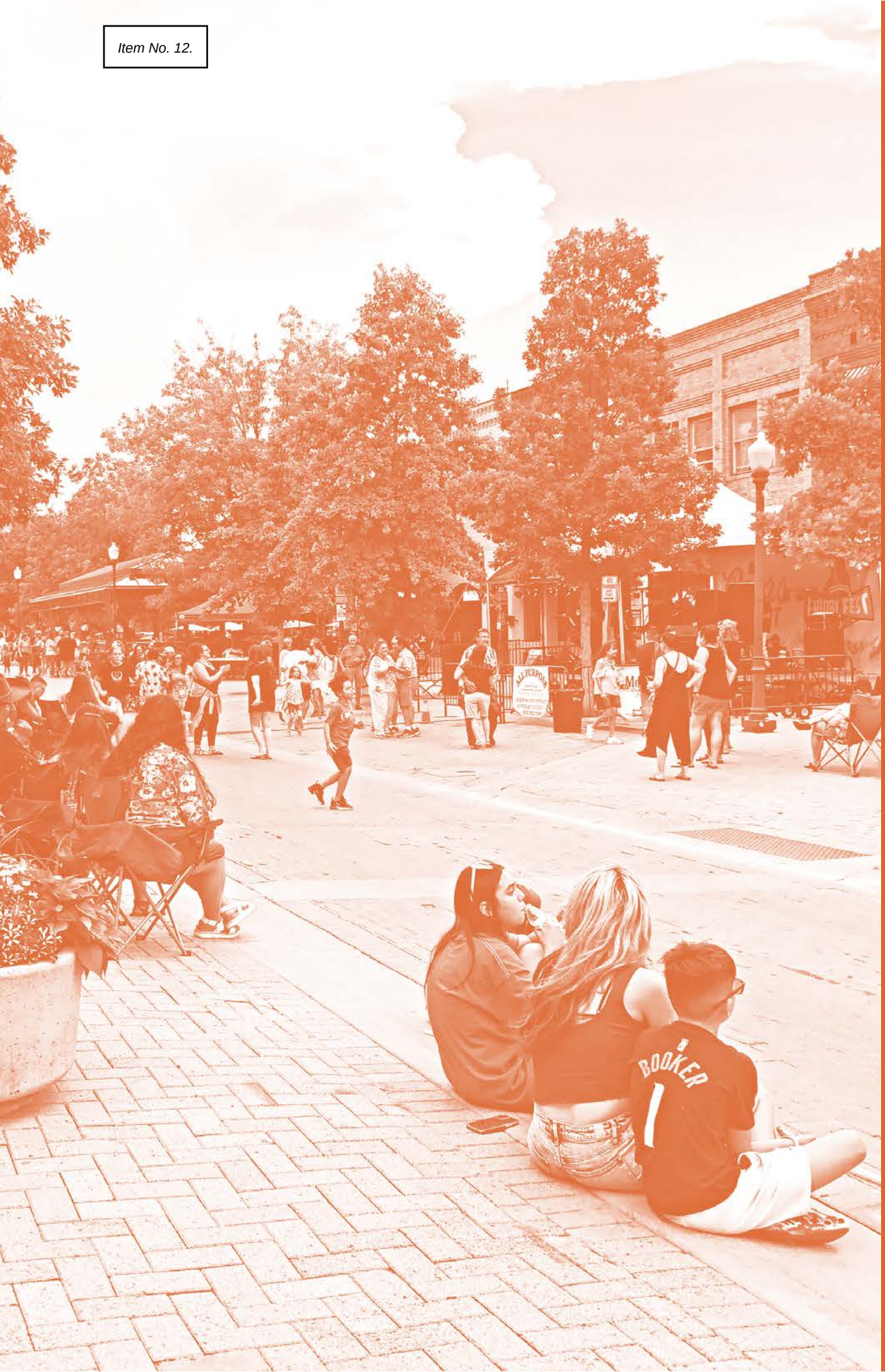
URBAN QUALITY ASSESSMENT FINDINGS BY LOCATION



URBAN QUALITY ASSESSMENT FINDINGS BY LOCATION

		1	2	3	4	5	6	7	8	9	10	OVERALL SCORE
Protection	**Protection against traffic accidents** Do people of all ages and abilities safely experience the public realm? Can you safely bike and walk without fear of being hit by a car?	3	3	3	3	2	2	2	2	2	2	24 / 30
	Protection against harm by others Is it perceived to be safe day and night? Is there adequate visibility, activity, and lighting?	3	2	3	2	2	2	2	1	1	2	20 / 30
	Protection from unpleasant sensory experience Is there noise, dust, odor or other pollution? Is there protection from wind, rain & sun?	3	3	3	1	2	1	1	1	1	2	18 / 30
Comfort	**Options for Mobility** Is the space accessible to all? Are there elements that enhance or limit mobility?	3	3	2	3	2	2	2	1	1	1	20 / 30
	Options to stand and linger Does the space have features to stay and lean on, or facades that invite people to stay?	3	2	3	2	1	1	2	1	1	1	17 / 30
	Options for sitting Are there good public seating options, such as benches, seating walls, or other forms of seating?	2	2	2	1	1	1	1	1	1	1	13 / 30
	Options for seeing Are seating options placed so there are interesting things to look at?	3	2	2	3	1	2	1	2	2	1	19 / 30
	Options for talking & hearing Is it possible to have a conversation here?	3	2	2	3	1	2	1	2	2	1	19 / 30
	Options for play, exercise, and activities Are there options to be active at multiple times of the day, every season, or throughout the year?	1	2	1	1	1	1	1	1	1	1	12 / 30
Experience	**Scale** Are the public spaces and surrounding buildings at a human scale? If people are at the edges of the space, can they still relate to them as people, or are they lost in the surroundings?	3	1	2	3	1	1	1	1	1	1	15 / 30
	Opportunities to enjoy the climate Are there spaces to enjoy the sun in the winter, shade in summer	3	3	3	1	2	1	1	1	1	1	17 / 30
	Experience of aesthetic qualities and positive sensory experiences Is the space beautiful and appealing? Is it clear that there is good design evident in terms of how the spaces are shaped, detailed, and maintained?	3	2	2	2	2	1	2	1	1	1	17 / 30
TOTAL SCORE		33/36	28/36	28/36	25/36	18/36	17/36	17/36	15/36	15/36	15/36	


BOOKER

03

COMMUNITY OUTREACH

KEY TAKEAWAYS: THE COMMUNITY'S TOP PRIORITIES

STAKEHOLDER OUTREACH METHODS

KEY TAKEAWAYS: THE COMMUNITY'S TOP PRIORITIES

Inclusive and effective community engagement was vital for the creation of the Downtown Plan Update for the City of Greeley. Early in the process, the consultant team, in partnership with the City and DDA, developed a **Community Engagement Plan (CEP)** to guide outreach efforts throughout the planning process. The CEP laid out the purpose and goals for community engagement during the Downtown Plan Update process, the methods that were used to achieve those goals at each stage of the process, and how input received through this process was be incorporated into the final Plan. Through the Downtown 2032 – The Path Forward process, the consultant team, City, and DDA were able to gather **over 1,250 inputs**. This section summarizes key findings from engagement with the community and the methods of outreach that were used throughout the process.

The following list is a compilation of the feedback from all community and stakeholder engagement efforts. Understanding community priorities can help the City of Greeley and DDA align their efforts and select actions that fit both the community-wide values and the City's capacity. These themes and priorities form the basis for the Downtown Plan Update and the subsequent opportunities described and illustrated in the following chapter. The common themes and highest rated priorities for improving Downtown Greeley are outlined on the following pages.

WELCOMING AND INCLUSIVE

- Ensure that Downtown is reliably safe and welcoming for all residents, students, and visitors.
- Celebrate and support Greeley's diverse communities through holding culturally relevant events, offering a wide variety restaurant and grocery options, and strengthening partnerships between the City, the DDA, and organizations serving diverse populations.
- Improve the marketing and storytelling of Downtown, replacing historic stigma with community pride.

PROGRAMMING AND ACTIVATION

- Consider adding a permanent stage or amphitheater to an existing or new Downtown green space.
- Incorporate family- and child-friendly amenities into the Downtown environment.
- Continue to enhance and activate the public realm, including parks, streetscape, alleys, etc.
- Improve the programmatic synergy with UNC to draw students Downtown.
- Continue to hold events that showcase Greeley's diversity, celebrate Greeley's food scene, and highlight locally-owned small businesses.

STOREFRONT ECONOMY AND CHARACTER

- Fill vacant storefronts, encouraging adaptive reuse of existing buildings where possible.
- Continue attracting a variety of restaurant and retail options, including both affordable and higher-end options, to attract people to Downtown both from within Greeley, and from neighboring communities.
- Continue creating pathways and offering resources to encourage entrepreneurs to enter the Downtown market in an affordable way.
- Encourage small businesses to coordinate and extend hours.
- Retain the historic character that makes Downtown Greeley unique.
- Explore opportunities to diversify restaurant and retail offerings by encouraging multicultural businesses to locate in Downtown.

LIVABILITY

- Diversify the housing stock in Downtown and the neighborhoods adjacent to Downtown.
- Encourage upkeep and maintenance of properties (residential and commercial) in and adjacent to Downtown.
- Work to attract an affordable, full-service grocery store in or adjacent to Downtown.
- Attract more primary employment opportunities so that people who live in Greeley can also work in Greeley, including UNC graduates.
- Improve coordination of services for the unhoused population.
- Work to attract affordable grocery options that are relevant to a wide variety of cultures in Downtown.

INFRASTRUCTURE AND INFILL DEVELOPMENT

- Encourage infill development and redevelopment on underutilized sites in Downtown, such as surface parking lots.
- Improve drainage and stormwater management.
- Optimize the parking experience in Downtown.
- Improve utility capacity and encourage undergrounding utilities in Downtown where possible, particularly as infill development continues.
- Address lack of infrastructure and investment in the eastern portion of Downtown and in the adjacent neighborhoods to the east.

CONNECTIVITY

- Improve physical connections between Downtown and UNC, including creating a more pedestrian- and bicycle-friendly environment, adding more wayfinding signage, and increasing pedestrian lighting to improve feelings of safety.
- Enhance multi-modal connections both within Downtown and to and from the neighborhoods adjacent to Downtown.
- Improve physical connectivity between Downtown and the Poudre River and Poudre River Trail.

STAKEHOLDER OUTREACH METHODS

TECHNICAL WORKING GROUP

A Technical Working Group, comprised of representatives from various City of Greeley departments, was convened to meet with the consultant team at key milestones during the planning process to provide a "sense of reality" into the process and draft plan recommendations.

ADVISORY COMMITTEE

To advise the consultant team, and to develop alignment and consensus among a diverse array of Downtown stakeholders, a Downtown Plan Advisory Committee was created. This Advisory Committee consisted of people representing various facets of downtown Greeley, including key influencers, representatives from the DDA board, other civic partners, residents, property and business owners, and emerging leaders in downtown. The Advisory Committee met throughout the process in a series of meetings and creative workshops to provide creative input and eventual ownership of the Greeley Downtown Plan Update.

TOPIC-BASED FOCUS GROUPS

Early in the process, Topic-Based Focus Group meetings made up of approximately 30 local Greeley leaders and experts in their fields were held that were organized by topics that supported development of the Plan. The intent of the Focus Groups was to contemplate the variety of issues that are relevant to Downtown, engage a broad cross-section of Greeley's civic leadership, plus offer insight into downtown Greeley's challenges, opportunities, and priorities. Group topics included: 1) Public Realm and Infrastructure, 2) Events and Activation, 3) Economy and Housing, and 4) Real Estate and Development.

DDA BOARD

The P.U.M.A. team met with the Downtown Development Authority Board several times during the Downtown 2032 – The Path Forward planning process. The DDA Board provided input during the initial phase of the plan on strengths, challenges, and priorities for Downtown Greeley moving forward, was consulted as draft plan recommendations formed to provide feedback, and provided an endorsement for Plan adoption to City Council.

▲ *Topic-Based Focus Group Meeting at the Downtown Greeley Recreation Center*

POP-UP AT FRIDAY FEST

In order to meet people where they are, the consultant team attended and hosted a pop-up booth at a Friday Fest event in July 2022. This pop-up allowed the consultant team an opportunity to interface with and gather input from community members attending Friday Fest, and to observe Downtown Greeley during a community event.

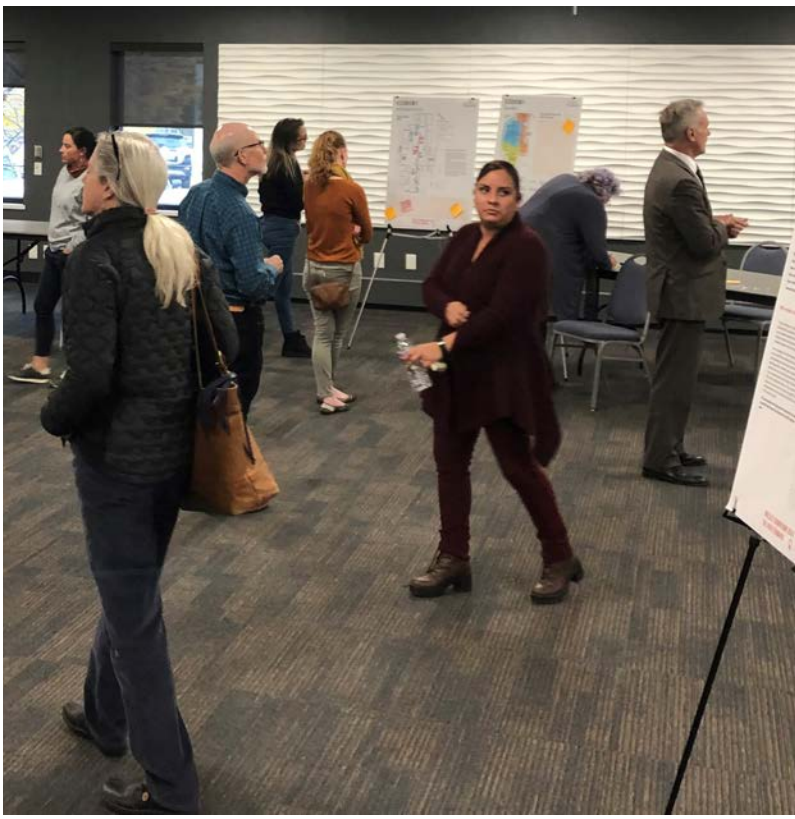
▲ *Pop-up at Friday Fest*

FOCUSED OUTREACH

Focused population engagement was tailored to understand the needs of underserved or underrepresented groups throughout during the Greeley Downtown Plan Update process. The purpose of focused population engagement was to identify the interests of these historically underserved populations who contribute to economic vitality, staff influential industries, access services, and recreate in Downtown Greeley. Over 20 community leaders were interviewed as part of the process to integrate the perspective of historically marginalized populations into the Downtown 2032 – The Path Forward process.

OPEN HOUSE

During the latter part of the Downtown Plan Update process, an open house was held at the Greeley Recreation Center that gathered nearly 40 community members. This open house served as touchpoint with the broader Greeley community and provided an opportunity to invite individuals who participated in earlier stages of Plan outreach to review and comment on draft plan concepts and recommendations. The workshop was widely advertised through the City's online platforms and social media, sandwich board flyers at key locations in City facilities, and was sent to City and DDA listservs.



▲ *Community Open House at the Downtown Greeley Recreation Center*

ONLINE SURVEY

An online survey was prepared by Progressive Urban Management Associates (P.U.M.A.) as part of the Greeley Downtown Plan Update, Downtown 2032 – The Path Forward. This survey was open to the public with the goal of gathering information from a broad audience about their experience and desires for Downtown Greeley for the future. The survey, which was available in both English and Spanish, ran from June 28th to August 15th, 2022. It collected 1,100 responses.

Demographics: Survey participants represented a cross-section of community stakeholders. Respondents represented a wide variety of age groups (with highest response from 25-44 years old at forty-four percent), were heavily white (87%), and female (63%), and represented a range of household incomes (with 37% of respondent households reporting $100,000 to $200,000 in annual income, 35% in the $50,000 to $100,000 range). Eleven percent of respondents are Downtown residents and 62% of respondents live outside of Downtown but in Greeley. Fifty percent of respondent live in the 80634 zip code and 35% in 80631.

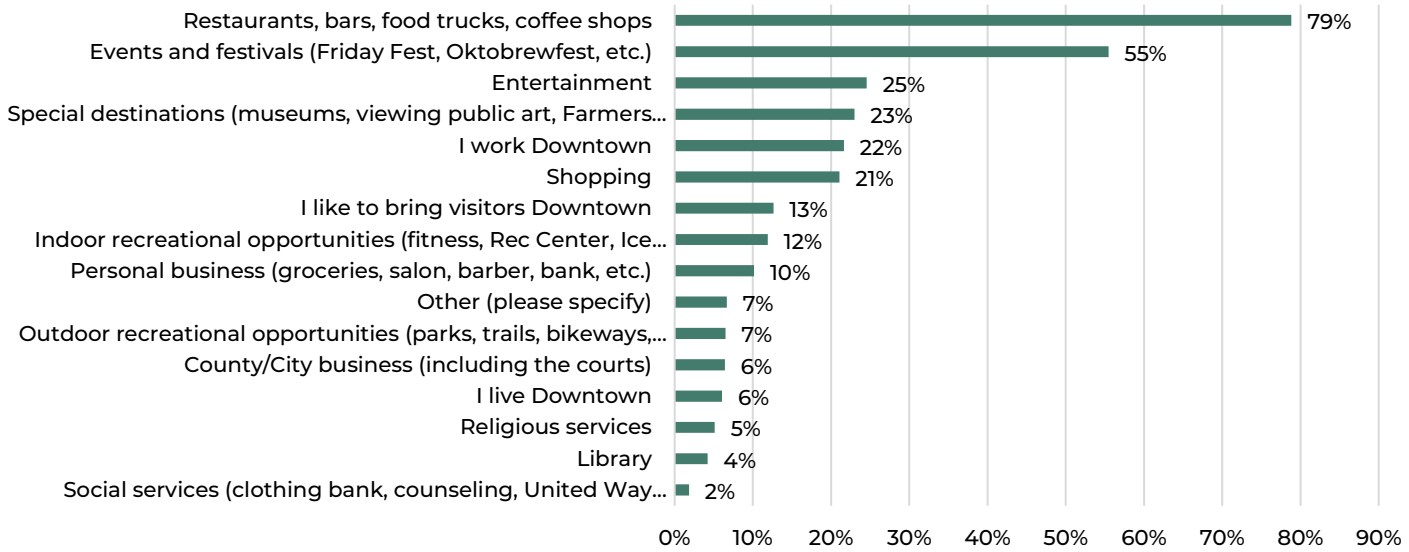
Cross-tabulations: Key survey questions were also cross-tabulated by demographics including interest in Downtown Greeley, age, household income, and race and ethnicity. Key findings from cross-tabulations can be found in Appendix D: Online Community Survey Results.

SUMMARY OF FINDINGS

DOWNTOWN GREELEY TODAY

- Sixty-five percent of respondents come to Downtown Greeley at least once per week, with 23% of respondents visiting downtown on a daily basis.
- Food/beverage and entertainment are significant draws: 79% of respondents cited restaurants, bars, food trucks, and coffee shops as key reasons they come Downtown. The second most significant amenity that draws people downtown are events and festivals, such as Friday Fest and Oktobrewfest (55%). The third highest answer was entertainment more generally, with 25% of respondents selecting this option.
- While many respondents indicated support for greater bike, pedestrian, and non-vehicle transportation options, the majority of respondents (90%) typically drive to get Downtown.

WHAT BRINGS YOU TO DOWNTOWN GREELEY?



DOWNTOWN GREELEY IN THE FUTURE

» When asked to provide three words that best capture their vision for Downtown Greeley in the year 2032, the top responses, were safe, food (& restaurants), clean, and fun.

» The physical improvement answer choices given the most ratings of 'important' or 'very important' to implement in order to achieve respondents' vision for Downtown Greeley were: redevelop and repurpose underutilized surface parking lots and vacant buildings (92%), more beautification (88%), and increase lighting in the public realm throughout Downtown (83%).

› When asked to select the one most important physical improvement, respondents' top choices were: redevelop and repurpose underutilized surface parking lots and vacant buildings (32%), maintain the historic character and authenticity (15%), and more beautification (13%).

› The services responses considered most highly desired (i.e., those given the most ratings of 'important' or 'very important') to implement in order to achieve their vision for Downtown Greeley were: more retail and restaurants (90%), enhance public safety (87%), and improve property maintenance (83%).

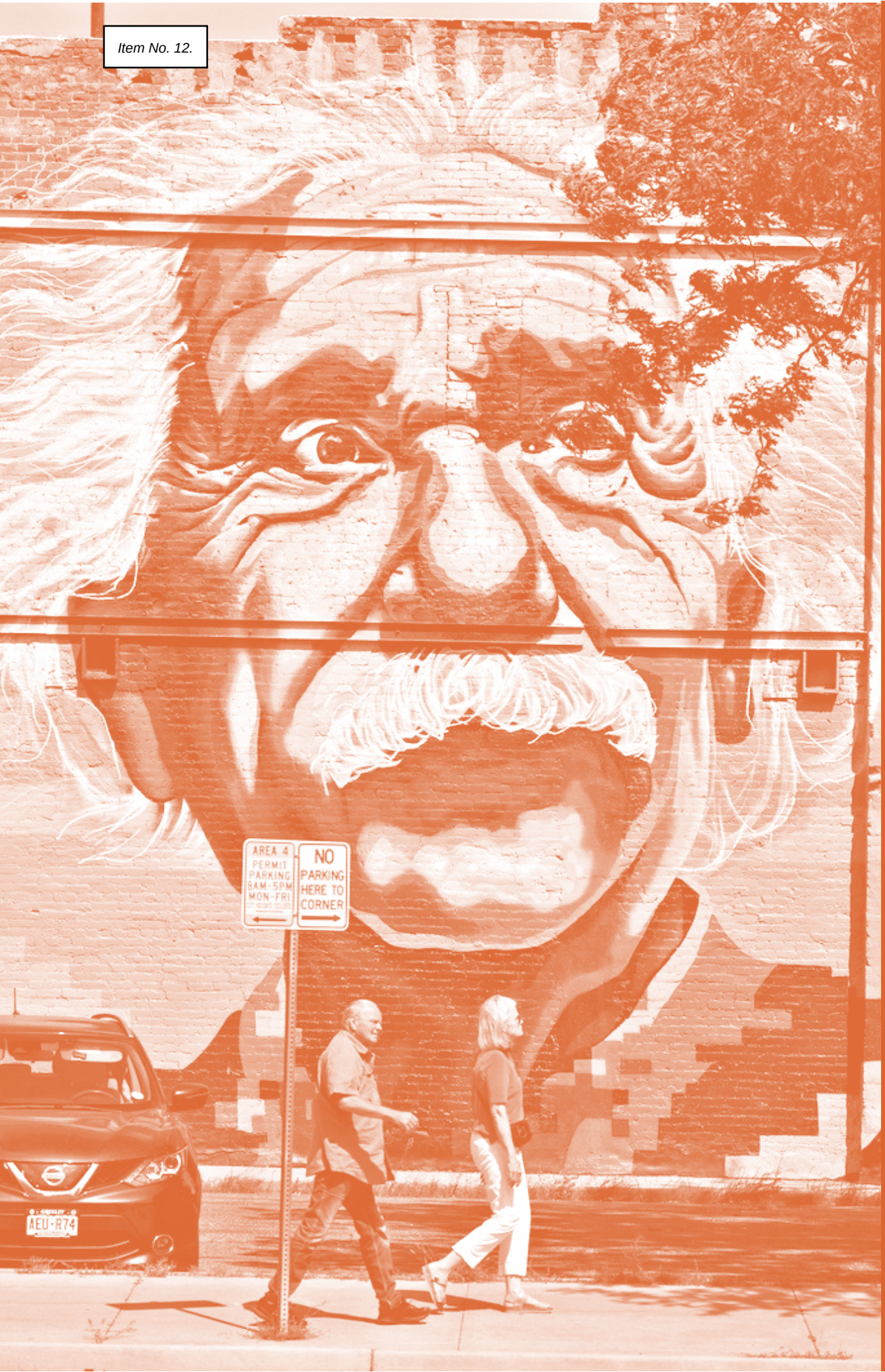
› When asked to select the most important of those programs and services listed, respondents' top choices were: more retail and restaurants (23%), enhance public safety (15%), and more services to address the unhoused population (11%).

» When asked if they would consider living downtown, 69% indicated they would consider living in Downtown Greeley, and the following were the top housing choices: townhouse (ownership), condominium building unit (ownership), and single-family residence with 29%, 28%, and 26% of responses, respectively.

» When asked to select which amenities would make Downtown Greeley a more attractive neighborhood to live in, the top responses were: full-service grocery store (50%), improved sidewalks and bike routes (35%), and more art and cultural options, such as museums and theaters (35%).

» Respondents were asked if they would consider starting or relocating a business to downtown. 26% of respondents answered "yes."

Respondents were asked for three words that best describe their long-term vision for Downtown Greeley. This word cloud shows words that were most frequently used – the larger the word, the more times it was listed.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04

PHYSICAL FRAMEWORK

PHYSICAL FRAMEWORK OVERVIEW

SUB-AREAS

OPPORTUNITY SITES

TRANSFORMATIVE PROJECTS

OVERALL DOWNTOWN PHYSICAL FRAMEWORK

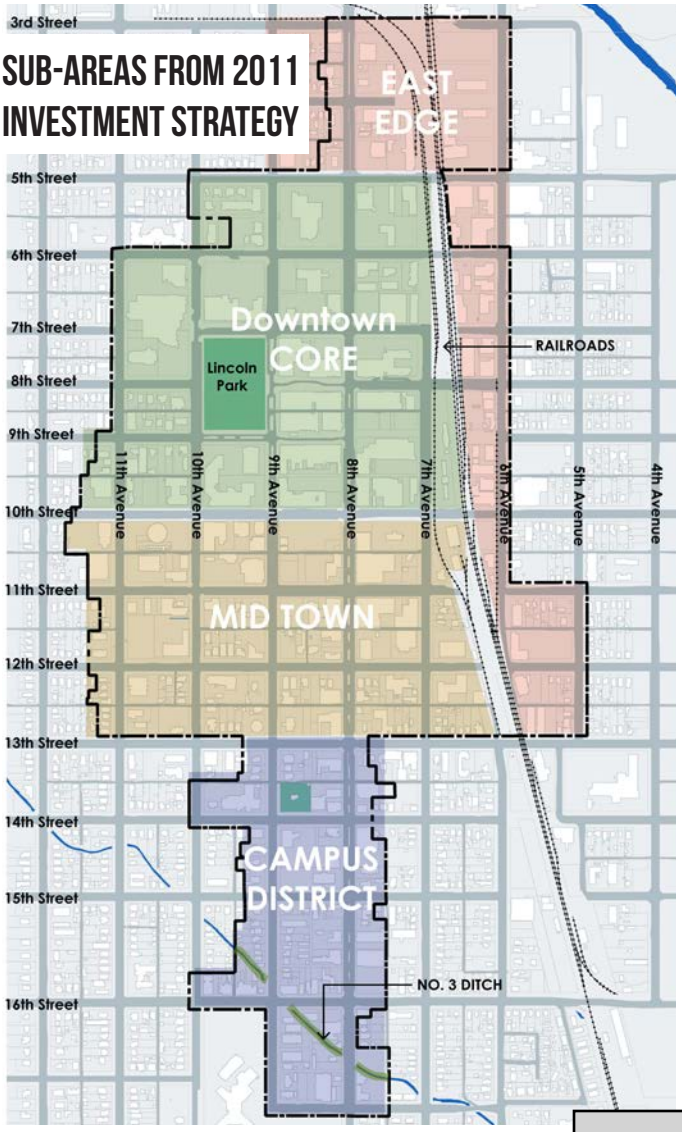
PHYSICAL FRAMEWORK OVERVIEW

Building on the key takeaways from the analysis of existing conditions and engagement with the community, the Physical Framework is intended to provide an overall foundation for Downtown Plan Update recommendations. The Framework, consisting of sub-areas, opportunity sites, and transformative projects, lays out a roadmap to guide physical improvements and redevelopment in Downtown Greeley for the next ten years, and provides a basis for the Action Plan found in Chapter 6 of this document.

SUB-AREAS

OVERVIEW OF SUB-AREAS FROM 2011 INVESTMENT STRATEGY

The 2011 Downtown Greeley Investment Strategy identified four sub-areas within Downtown, pictured in the map to the right; Downtown Core (shown in green), East Edge (shown in red), Mid-town (shown in yellow), and Campus (shown in blue). The 2011 plan was organized around creating strategies to strengthen each of the four subareas, as well as some collective strategies for the entire Downtown area.

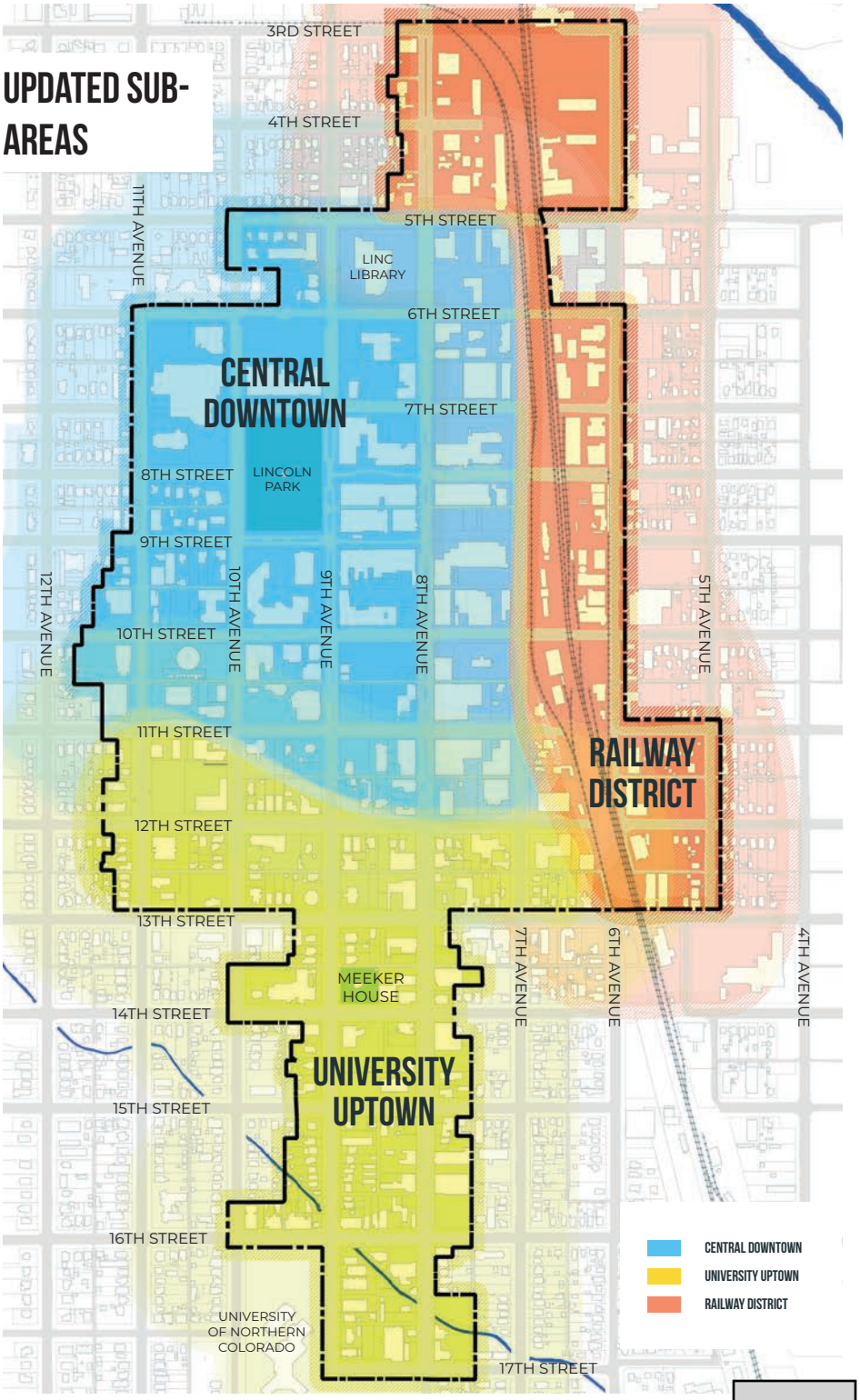


UPDATED SUB-AREAS

Through the consultant team's analysis and outreach with Downtown stakeholders, it became clear that the four sub-areas included in the 2011 Investment Strategy have evolved with new development and investment, and no longer resonate with community members who regularly interact with Downtown Greeley. The Urban Quality Assessment also revealed that there is currently not a distinct sense of place or identity in each sub-area, as users still perceive Downtown as one larger area, and that each of the sub-areas does not have a distinguishing change in character or hard edge that delineates it from the neighboring sub-area, or from adjacent neighborhoods. Although the sub-areas are differentiated due to a change in current land uses, some architectural character, and/or historic land uses, they lack a distinct sense of place and individuality from the other districts that comprise Downtown. Looking forward, there is an opportunity to better define and leverage strengths of each sub-area, and to create a distinct sense of place within each.

This iteration of the Downtown Plan streamlines sub-areas to three distinct districts within Downtown, eliminating the 'Mid-Town' sub-area that was identified in the previous plan, and adjusting the boundaries of the sub-areas to better reflect on-the-ground conditions. The sub-area names have also been adjusted from 'Downtown Core' to 'Central Downtown,' from 'East Edge' to 'Railway District,' and from 'Campus District' to 'University Uptown.'

The following sections include a description of existing conditions in each of the sub-areas that was informed by the Urban Quality and Capital Improvement Assessments, the Market Assessment, and engagement with the community, as well as opportunities that exist for each area. Opportunities are sorted by the categories provided in the Market Assessment (Live, Work, Shop and Dine, Visit and Stay), and amenities. These recommendations are carried forward in Chapter 6: Action Plan as more detailed implementation steps, including sequencing, responsibility centers, timing, and illustrative cost.



CENTRAL DOWNTOWN

BOUNDARIES

Central Downtown is the area roughly bounded by 5th Street to the north, between 11th Street and 12th Street to the south, between 11th Avenue and 12th Avenue to the west, and 7th Avenue to the east.

EXISTING CHARACTER

Central Downtown is rich in amenities and destination attractions. Together, the amenities abutting or adjacent to Lincoln Park including the DoubleTree Hotel and conference center, Union Colony Civic Center, the Greeley Recreation Center, the Weld County Courthouse, the Greeley Ice Haus, numerous entertainment and event venues, and the Greeley Active Adult Center generate substantial local and regional visitor activity. Lincoln Park itself also serves as a draw, particularly during events and other activations that occur in the park, as do additional events and activities held in other Central Downtown public spaces. Central Downtown is home to a number of locally-owned restaurants and shops that create a vibrant storefront economy, particularly along 9th Avenue, 8th Avenue, 8th Street, and 9th Street. Upon completion, the LINC Library will serve as an additional draw for locals and visitors alike.

Central Downtown also serves as the historic heart of Greeley and has a largely in-tact historical building stock and character. The Downtown Greeley Historic District encompasses Lincoln Park, the old courthouse building, the old Greeley High School, and the blocks between 7th Street and 10th Street and 8th Avenue and 9th Avenue.

Due to investment made by the City of Greeley, the DDA, property owners, the Creative District, and other partners, the public realm in Central Downtown has improved substantially over the last ten years. Streetscape improvements along 8th Avenue, investment in public art throughout Central Downtown, and other key public realm enhancements have created a pleasant pedestrian environment on many key Downtown corridors. Eighth Avenue and 9th Avenue serve as major north-south routes that connect Central Downtown to the UNC Campus and adjacent commercial and residential areas. Fifth Street and 10th Street are major east-west travel routes that serve as gateways and connect Downtown to adjacent neighborhoods.

There is substantial opportunity to build on the energy that already exists in Central Downtown. Market and amenity opportunities for Central Downtown are highlighted in the table to the right.

▲ *Existing Character in Central Downtown*

MARKET AND AMENITY OPPORTUNITIES

LIVE	Higher Density housing: infill development apartments (rent), condominiums (own), mixed-use
WORK	Office employers, retail, arts and culture, entertainment
SHOP AND DINE	Restaurants, boutique retail
VISIT AND STAY	Entertainment (music & private event venues, theaters), community events, recreation (Ice Haus), museums, hotels/ convention center, public art
AMENITIES	Enhanced bike/pedestrian connections to the Poudre River, dog park, activation of existing parks/public realm, adaptive reuse of historic buildings to retain character, activated alleys, small plazas, or courtyards

RAILWAY DISTRICT

BOUNDARIES

The Railway District is the area roughly bounded by 3rd Street to the north, 13th Street to the south, 7th Avenue to the west, and 6th Avenue and 5th Avenue to the east.

EXISTING CHARACTER

Characterized by grain silos, brick warehouses, wide streets, and the railroad tracks, the Railway District has a distinctive feel to it that pays homage to Greeley's manufacturing and agricultural heritage. The Railway District has several facilities that embrace this history, including the Colorado Model Railroad Museum, WeldWorks Brewing, Co., the Greeley Chamber of Commerce, and the Greeley Farmers' Market. Additionally, the under-construction LINC Library is located just outside of the Railway District, and will provide resources, space, and equipment to foster innovation and making, including a woodshop and 3-D printers.

Currently, there is a lack of multi-modal connectivity in the Railway District. Street connections, basic sidewalk and other pedestrian infrastructure, and bicycle infrastructure are missing in many locations throughout this sub-area. Overall, the rail tracks serve as a substantial mental and physical barrier between Downtown Greeley and the area east of the railroad. Additionally, 100-year floodplain has been mapped in the northernmost portions of the Railway District and addressing these physical challenges substantially increases the cost of redevelopment on affected parcels.

The Railway District has the potential to be an even more unique and interesting sub-area where adaptive reuse of the agricultural and railroad buildings should be encouraged. There is also ample opportunity to enhance physical connections to the neighborhoods east of the Railway District to spread needed investment and resources to that area. Opportunities to build on the Railway District's manufacturing and industrial past can be found in the table below.

▲ *Existing Character in the Railway District*

MARKET AND AMENITY OPPORTUNITIES

LIVE	Mixed density housing: live/work, affordable multi-family
WORK	Primary employers in light industrial or agriculture, maker businesses
SHOP AND DINE	Agriculture, bulk, experiential, maker products
VISIT AND STAY	Museums, events, public art, destination/ experiential businesses, public art
AMENITIES	Enhanced bike/ped connections to adjacent neighborhoods to the east, flexible/adaptive streets and plazas, adaptive reuse of agriculture/industrial buildings to retain character

UNIVERSITY UPTOWN

BOUNDARIES

University Uptown is the area roughly bounded by 11th Street and 12th Street to the north, 17th Street to the south, 9th Avenue and 10th Avenue to the west, and 8th Avenue to the east.

EXISTING CHARACTER

Central Downtown is rich in amenities and destination aUniversity Uptown serves as the connector between Central Downtown and the University of Northern Colorado campus. North of 13th Street is primarily residential with intermittent commercial activity concentrated primarily along 8th Avenue and 13th Street. 8th Avenue serves as the major vehicular route that connects the UNC to Central Downtown, while the residential Monroe Street Historic District includes a mix of single family and student housing that encompasses 9th Avenue from approximately 16th Street to 11th Street. The University Uptown sub-area overlaps with a portion of the University District that was established in 2009 as a partnership between the UNC and the City of Greeley.

The southern portion of University Uptown along 16th Street is currently a mix of student-focused retail shops and quick-serve restaurants. As this Downtown Plan Update is underway, the City of Greeley Public Works Department is working on the 16th Street Enhancement Project. Improvements being considered through this Enhancement Project will aim to slow vehicular speeds, improve safety, create a walkable environment, revitalize the corridor, maintain as much parking as possible, and increase the connection between UNC and Downtown. The project is working through the design phases with plans to initiate the improvements within the year. Other area redevelopment aspirations in this “Canal Shops” area suggest more public realm and adaptive reuse possibilities.

New development that has occurred along 8th Avenue, such as the Maddie Apartments and Natural Grocers, have worked to spread energy south of Central Downtown into University Uptown. However, there is additional opportunity to continue revitalization and public realm improvements along the 8th Avenue corridor to further enhance connectivity between Central Downtown and the UNC campus. Small parcels and disparate ownership throughout this sub-area present a significant challenge to larger-scale redevelopment, so thoughtful commercial and residential infill may be more appropriate throughout where parcel consolidation is not feasible.

▲ *Existing Character in University Uptown*

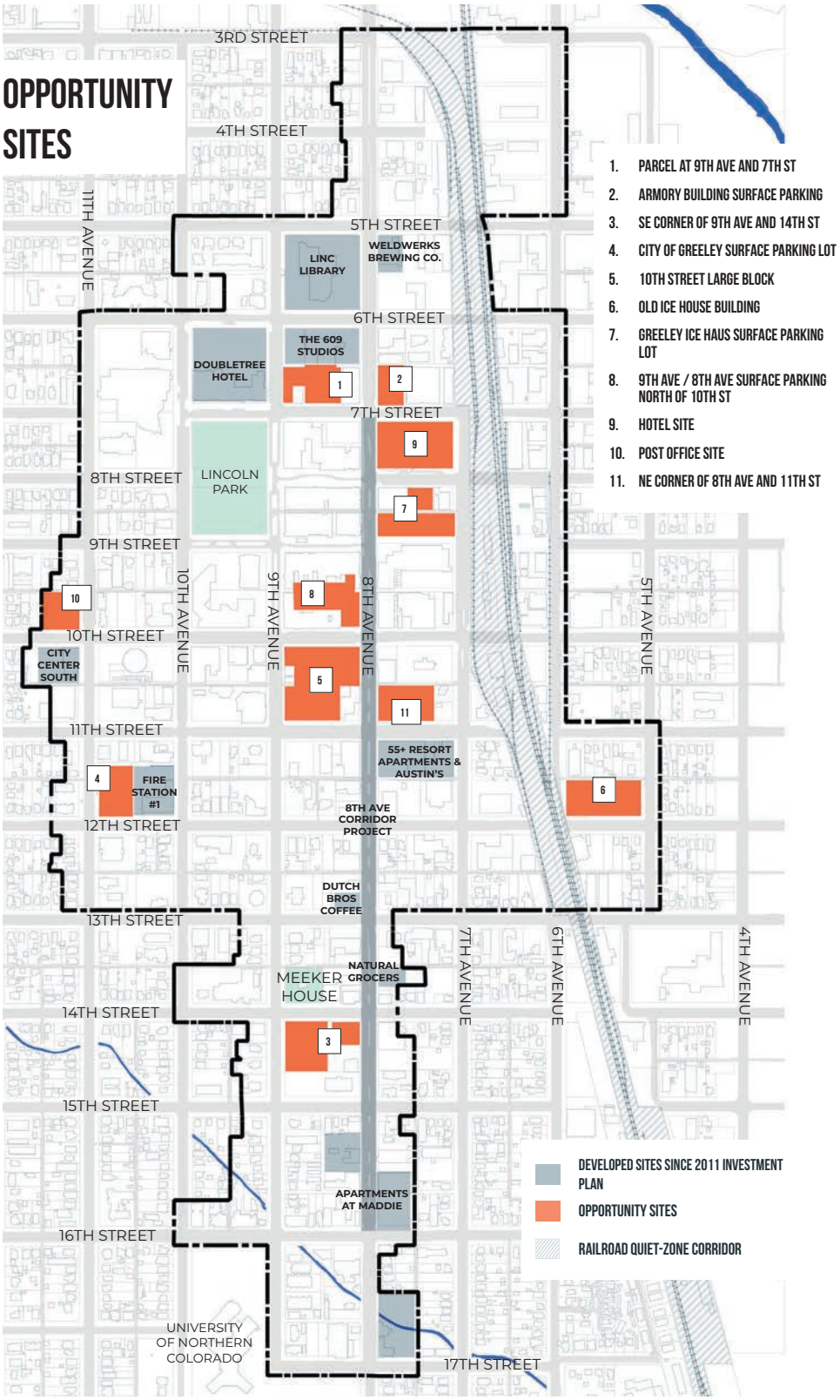
MARKET AND AMENITY OPPORTUNITIES

LIVE	Enhance existing housing and missing middle housing: townhomes, condos, thoughtful infill with gentle density
WORK	Convenience retail, services
SHOP AND DINE	Grocery, service- and convenience- oriented retail, restaurants
VISIT AND STAY	Public art, museums, synergy with UNC, Bed & Breakfasts
AMENITIES	Enhanced bike/pedestrian connections to adjacent neighborhoods and UNC, improved lighting, more green space for daily use of students and families

OPPORTUNITY SITES

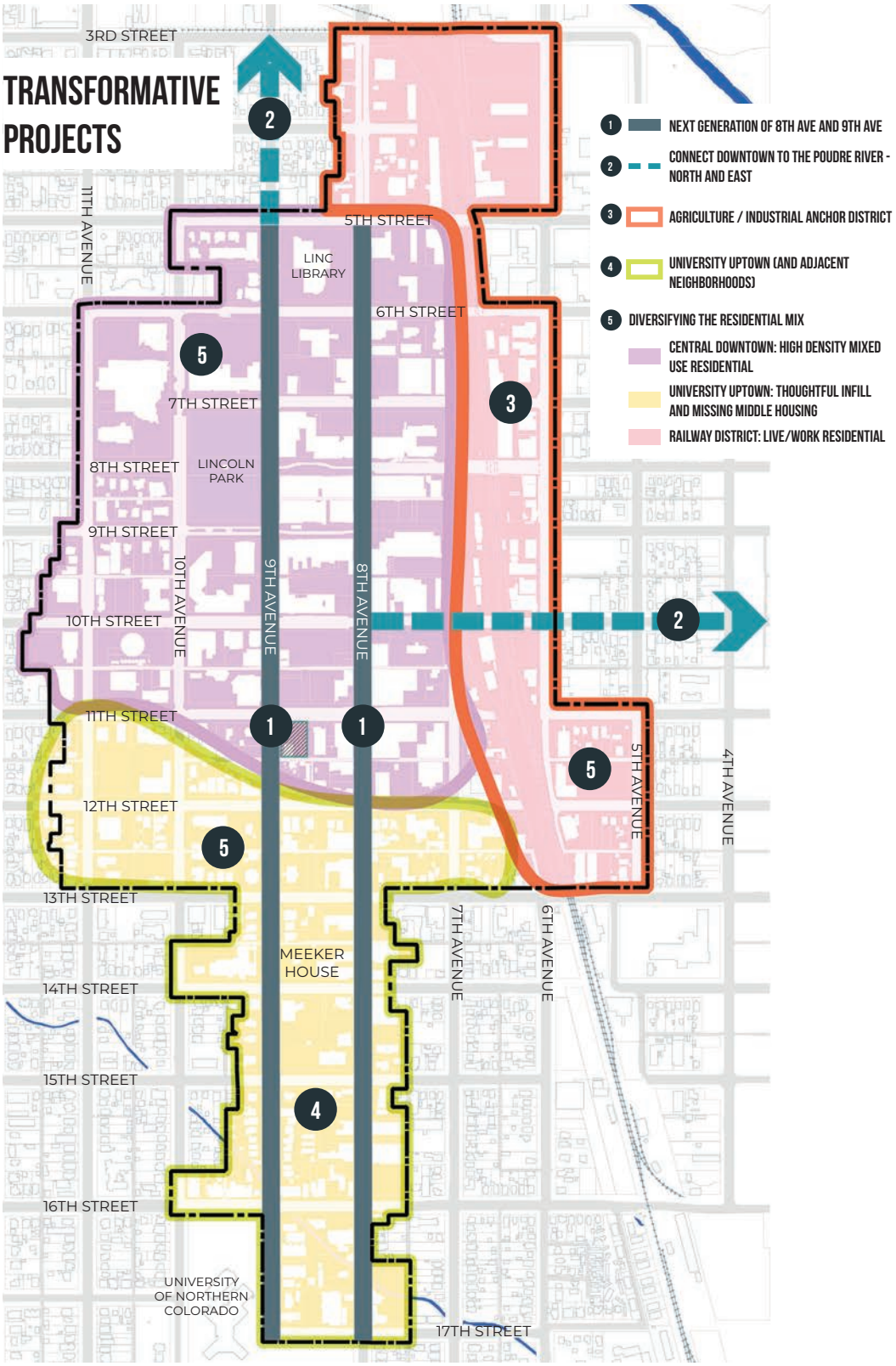
Opportunity sites are areas where redevelopment or new development may occur during the 10-year life cycle of this Downtown Plan Update. A set of three criteria were developed to identify opportunity sites:

- Sites that are currently underutilized, including surface parking lots, at key locations within Downtown that if developed or redeveloped, have the potential to make a positive impact on the overall vitality of Downtown.
- Sites identified in the 2011 Downtown Greeley Investment Strategy and have yet to be developed or redeveloped.
- Sites identified through outreach to Downtown stakeholders and through the community-wide online survey administered during this planning process.



TRANSFORMATIVE PROJECTS

A transformative project is one that has the potential to have lasting positive impacts on Downtown and encourage improvements around it. Most of Downtown property is owned by private entities and improvements are dependent on multiple factors, such as one's willingness and financial means to redevelop, access to capital, partnerships, existing leases, and more. However, there is publicly owned land downtown as well – some parcels are owned by the City of Greeley or Weld County, and streets, sidewalks, and parks may also offer transformative opportunities. Based on the assessment of Downtown land, property ownership, and property conditions conducted in the previous section on Opportunity Sites and engagement with Downtown citizens and stakeholders described in Chapters 2 through 4 in this Plan, a list of transformative projects was developed. This list, along with ideas and recommendations, should serve as preliminary guidance to get conversations started and hopefully generate excitement about possibilities for the future.



1 NEXT GENERATION OF 8TH AVENUE AND 9TH AVENUE

8th Avenue and 9th Avenue serve as the primary north-south corridors running through Downtown Greeley, and thus act as gateways in and out of Downtown. These two corridors each have a very different character and feel – 8th Avenue, or CDOT Hwy 85, serves as the primary north-south vehicular route through Downtown and is primarily commercial, while 9th Avenue is generally less auto-centric, and has a mix of residential and civic uses with some commercial interspersed throughout. Looking forward to the next ten years, there is opportunity to embrace and enhance the character that currently exists on each street, while simultaneously strengthening north-south connections between Downtown Greeley and UNC and improving gateways in and out of Downtown.

8TH AVENUE

8th Avenue has historically served as the primary auto-centric commercial corridor connecting Downtown Greeley and UNC, with little cohesion of land uses or appeal to pedestrians, cyclists, or those passing through in a vehicle. In recent years, there has been significant investment in streetscape upgrades to improve the pedestrian experience and overall cohesion along 8th Avenue between 10th Street and 17th Street. Improvements have included the addition of public art, wayfinding signage, medians with trees and plants, widened sidewalks, benches, trash receptacles, and upgraded lamp posts. These investments into the public realm are intended to improve the pedestrian experience between Downtown Greeley and UNC, and to boost the user experience moving into, out of, and through Downtown. The City is continuing to explore ways to provide greater influence on the design and function of the public improvements along this CDOT corridor.

There has also been significant private investment along the 8th Avenue corridor since 2011, including redevelopment and infill development projects like the WeldWerks Brewing Co., Maddie Apartments, Natural Grocers, Dutch Bros coffee shop, the 609 Studio Apartments, and the 55+ Resort Apartments and Austin's American Grill that opened in November 2022.

Looking to the next ten years, it is envisioned that 8th Avenue will continue to serve as the primary north-south commercial corridor in Downtown, building on both the public and private investment that has already been made along the corridor. Although there have been several large-scale development projects along the corridor over the last ten years, the small parcels and disparate ownership of land along 8th Avenue present a challenge to larger-scale development, as consolidation would be required. However, there are ample opportunities for smaller infill residential or commercial projects to continue filling in the frontage along the corridor, or for façade or building improvements to existing structures that would improve the overall look and feel of the corridor. Continued investment in the public right-of-way, particularly in pedestrian infrastructure or other mobility options, will further improve the experience along 8th Avenue.

▲ *Example of Improved Streetscape Along a Commercial Corridor in Fort Collins, Colorado*

▲ *Example of Commercial Adaptive Reuse along a Commercial Corridor in Denver, Colorado*

9TH AVENUE

9th Avenue is the second major north-south street running through the center of Downtown Greeley, connecting major destinations such as Lincoln Park, 8th Street, the new LINC Library, and UNC. Unlike the commercial feel of 8th Avenue, 9th Avenue has a predominantly residential character in the southern sections before transitioning to commercial, civic, and mixed-use to the north of 11th Street. The mature tree canopy, generous sidewalks, and tree lawns make it one of the more pleasant, comfortable, and memorable streets in Downtown. The Monroe Avenue Historic District is also located along 9th Avenue from 12th Street to 16th Street, and contains numerous historically significant structures that contribute to the look and feel of the corridor.

Moving forward, 9th Avenue is envisioned as a community amenity that has enhanced facilities that prioritize pedestrians and bicyclists over vehicles. Ninth Avenue does have consistent sidewalks along the length of the corridor that could be extended farther into the right-of-way to offer patio seating for existing and new businesses, or to incorporate other streetscape amenities like benches, additional pedestrian-oriented lighting, or landscaping.

▲ *Example of Enhanced Pedestrian Facilities in Grand Junction, Colorado*

▲ *Example of Patio Seating Replacing Parking in Wheat Ridge, Colorado*

▲ *Example of a Designated Bikeway and Landscaped Median in Lincoln, Nebraska*

Currently, 9th Avenue does have an on-street bike lane beginning south of 11th Street and north of 6th Street, but these facilities could be upgraded to a protected bike lane or bikeway to make the bicycle experience safer and more accessible, and to better connect Downtown to UNC. There is also an opportunity to extend bike infrastructure (current or enhanced) along 9th Avenue through Downtown between 11th Street and 6th Street to connect the existing bike lanes south of 11th Street and north of 6th Street. There is also an opportunity to highlight bicycle connections and enhance bike infrastructure north of Downtown leading to the Poudre River Trail at Island Grove Regional Park.

In addition to creating an overall environment that prioritizes people over vehicles along 9th Avenue, the feasibility of removing a vehicle travel lane and replacing it with additional public realm amenities, such as a parklet, a dog park, play features for children, or permanent outdoor patios, should be evaluated where possible. There is also an opportunity to better incorporate public art into the physical environment along the entire 9th Avenue corridor, as it is currently lacking south of 9th Street.

The image below provides an illustrative example of what improvements to the 9th Avenue corridor could look like moving forward.

▲ *Illustrative Example of 9th Avenue Improvements*

2 CONNECTING DOWNTOWN TO THE POUDRE RIVER

The Cache la Poudre River jogs around Downtown Greeley to the north and east before eventually draining into the South Platte River several miles east of Greeley. Currently, there are primarily commercial and industrial uses abutting the River where it runs closest to Downtown, while several stretches of the Poudre River outside of Downtown and in neighboring communities have been converted into parks and open space amenities. Island Grove Regional Park is one of those stretches of the River, and is located within the City of Greeley northwest of Downtown. Island Grove Park is located roughly a mile from the northern edge of the Downtown Plan area boundary, and is comprised of 145 acres that embrace the Poudre River adjacency and offer numerous amenities, including pavilions, an events center, play equipment, a trail head for the Poudre River Trail, and many more public facilities.

The Poudre River Trail runs from River Bluff Open Space, located on the east edge of the Town of Windsor, to Island Grove Park in Greeley. The Poudre River Trail extends a total of 21 miles and primarily runs through natural areas and parks along the way. There are plans to extend the Poudre River Trail west to the City of Fort Collins, with the possibility of extension southeast of Greeley to the South Platte River in the future as well.

As the City of Greeley continues to embrace the Poudre River, there are opportunities to better connect Downtown to the Poudre River moving forward, which emerged as a community priority during this Downtown Plan Update process. Downtown is already physically connected to the Poudre River by way of the dedicated bike lanes beginning along 9th Avenue north of 6th Street that connect to Island Grove Park. This connection could be further enhanced through additional signage, improved infrastructure like protected bike lanes, or by eventually creating an off-street path or trail for bicyclists and pedestrians.

If the Poudre Trail extension southeast to the Platte River does come to fruition, there are also opportunities to provide connections to the Poudre River and proposed trail by way of 10th Street east of 8th Avenue. It is approximately a mile from Lincoln Park in Downtown Greeley to where the Poudre River and 10th St meet. Enhanced bicycle and pedestrian infrastructure and clear signage would provide users the opportunity to connect Downtown to not only the river, but a regional trail network as well.

▲ *Example of a River Trail Wayfinding Signage in Pueblo, Colorado*

▲ *Example of Detailed River Trail Wayfinding Signage In Salt Lake City, Utah. Photo From Cycling Utah*

3 AGRICULTURE AND MANUFACTURING ANCHOR DISTRICT

Greeley's primary industries have always been closely tied to the railroad tracks that through the heart of the community and bisect Downtown, as freight rail was and is the primary means of importing and exporting goods to and from Downtown and the larger Greeley community. Traditionally, uses along the railway have been primarily industrial and agricultural, as these sectors anchor the City's economy and employment base. While Greeley's economy has been diversifying in recent years, it still is and will likely remain reliant on agriculture and manufacturing as key industries looking forward.

The Railway District sub-area is located along the eastern edge of the Downtown Plan study area, and encompasses the railroad tracks that run through Downtown. This sub-area reflects Greeley's agricultural and manufacturing past and present, and offers the opportunity to embrace and celebrate this history while diversifying the types of manufacturing and agricultural activities that happen in areas adjacent to Downtown. While the railroad tracks are often cited as a physical and mental barrier that separates Downtown from the neighborhoods to the east, there is an opportunity to reimagine how the Railway District, and broader Downtown area by extension, interact with the rail tracks. There are already several amenities that celebrate the past and future of what the Railway District is and can be including the Colorado Model Railroad Museum, WeldWorks Brewing, Co., the Greeley Chamber of Commerce, and the Greeley Farmers' Market.

Example of Infill Development in a Rail-Oriented District in Santa Fe, New Mexico

Example of Art and Signage in a Rail District in Frisco, Texas. Image from Frisco Rail District Merchants

Looking forward, the Railway District can serve as an agriculture and manufacturing anchor district that bridges Greeley's past with its future. This area offers the opportunity to attract primary and knowledge-sector employers that require large-format spaces in industries such as biotechnology. While redevelopment could make sense on several parcels in the Railway District, the existing building stock offers opportunities for adaptive reuse, expanding on the energy being brought to the area by WeldWerks Brewing Co., the Greeley Farmers' Market, and others. Existing buildings could accommodate uses like breweries, wineries, coffee roasting, a commissary or shared kitchen, chocolate making, live/work spaces, light manufacturing, galleries, or an indoor Mercado or Latino Vendor Market or makers' market. Additionally, many of these uses could include a storefront component that would help in improving street-level activation in the Railway District. There is also an opportunity to embrace the agriculture and manufacturing district identity in the public realm through branded wayfinding, banners, crosswalks and intersection stamps, gateways, themed lighting, and public art.

The image below provides an illustrative example of what improvements to the Railway District could look like moving forward.

▲ *Illustrative Example of Railway District Improvements*

4 UNIVERSITY UPTOWN AND ADJACENT NEIGHBORHOODS

While both the UNC campus and Central Downtown have distinct identities and senses of place, the area between these two destinations currently lacks a distinct identity. Many participants in the Downtown Plan Update process cited the lack of connectivity between Central Downtown and UNC as a challenge, and identified strengthening physical and programmatic connections between the two places as a key priority.

Over time, the City of Greeley and UNC have been working together to improve connectivity between Downtown and the UNC campus. In 2009, this effort was formalized through the creation of the University District, which intersects with the plan study area between 13th Street to the north, 17th Street to the south, the railroad tracks to the east, and between 9th Avenue and 10th Avenue to the west. The University District has not only reinforced connections between UNC and the City through physical improvements like signage with shared branding, but resulted in the creation of the pilot Home Ownership Program for Employees (G-HOPE) to promote more home ownership in Greeley's Redevelopment District and around the University of Northern Colorado campus to UNC students.

There is an opportunity to build on the synergy between the City of Greeley and UNC resulting from the creation of the University District by establishing the University Uptown identity for the area between Central Downtown and the UNC campus, and adjacent neighborhoods. Creating this brand is a key step in fortifying both physical and psychological connections between these two destinations. The University Uptown brand can be utilized in City and UNC marketing and communications, and can also be incorporated into physical improvements in the public realm in the University Uptown area and adjacent neighborhoods. Branded public realm amenities that can reinforce University Uptown as a distinct, unique district include banners, crosswalks and intersection stamps, more signage and wayfinding, and improved lighting. Lighting is particularly key along 9th Avenue and 8th Avenue, as these corridors serve as key north-south connections between Central Downtown and UNC.

▲ *Example of Side-by-Side University and City Banners in Fort Collins, Colorado*

16TH STREET ENHANCEMENTS

The 16th Street Enhancement Project is an active project that is currently being led by the City of Greeley Public Works Department. The planned improvements, which encompass 16th Street from 7th Avenue to 11th Avenue, aim to slow vehicular speeds, improve safety, improve and expand the walkable environment, revitalize the corridor, foster the public realm experience with art and amenities, maintain as much parking as possible, and increase the connection between UNC and Downtown. The project is working through the design phases with plans to initiate the improvements in 2023.

▲ *Rendering from the 16th Street Enhancement Project*

5 DIVERSIFYING THE RESIDENTIAL MIX

In order to continue cultivating Downtown as a mixed-use neighborhood, additional residential development is needed. The Market Assessment revealed that Downtown Greeley has lower housing density than many of its peer cities, and that residential remains a robust market opportunity for Downtown moving forward. It is recommended that thoughtful residential development continue over the next ten years to strengthen Downtown's identity as a place where people can live, work, and play. Encouraging a diverse mix of housing throughout Downtown, including both to-own and to-rent options, will continue to build a residential base that accommodates a range of tastes and price points. Each Downtown sub-area has its own distinct character and feel, and thus currently has different types of residential development as well. It is recommended that development of new housing fit the physical look and character of the existing sub-areas where possible, while simultaneously adding to Downtown's housing stock. A description of what housing types are recommended for each sub-area moving forward is provided below.

69%

OF ONLINE SURVEY RESPONDENTS WOULD CONSIDER LIVING IN DOWNTOWN GREELEY.

The top 3 desired housing types are:

- **Townhouse (ownership) (29%)**
- **Condominium building (28%)**
- **Single-family residence (26%)**

CENTRAL DOWNTOWN

As the traditional core of the City of Greeley and area that already accommodates density, Central Downtown is a logical place for additional higher density housing types, such as to-own condominiums, to-rent apartment buildings, and mixed-use development with commercial uses on the ground floor and housing above.

▲ *Example of Mixed-Use Development That Includes Housing, Office, and Retail in Missoula, Montana*

▲ *Example of Higher Density Infill Housing Development in Arvada, Colorado*

RAILWAY DISTRICT

While the Railway District has historically been comprised of commercial and industrial uses, looking to the next ten years, this area could accommodate housing as well. Housing types that would fit with the existing character of the Railway District include live/work and affordable multi-family housing, either as to-own or rental units.

▲ *Example of Live/Work Housing in Denver, Colorado*

▲ *Example of Affordable Housing in Missoula, Montana*

UNIVERSITY UPTOWN

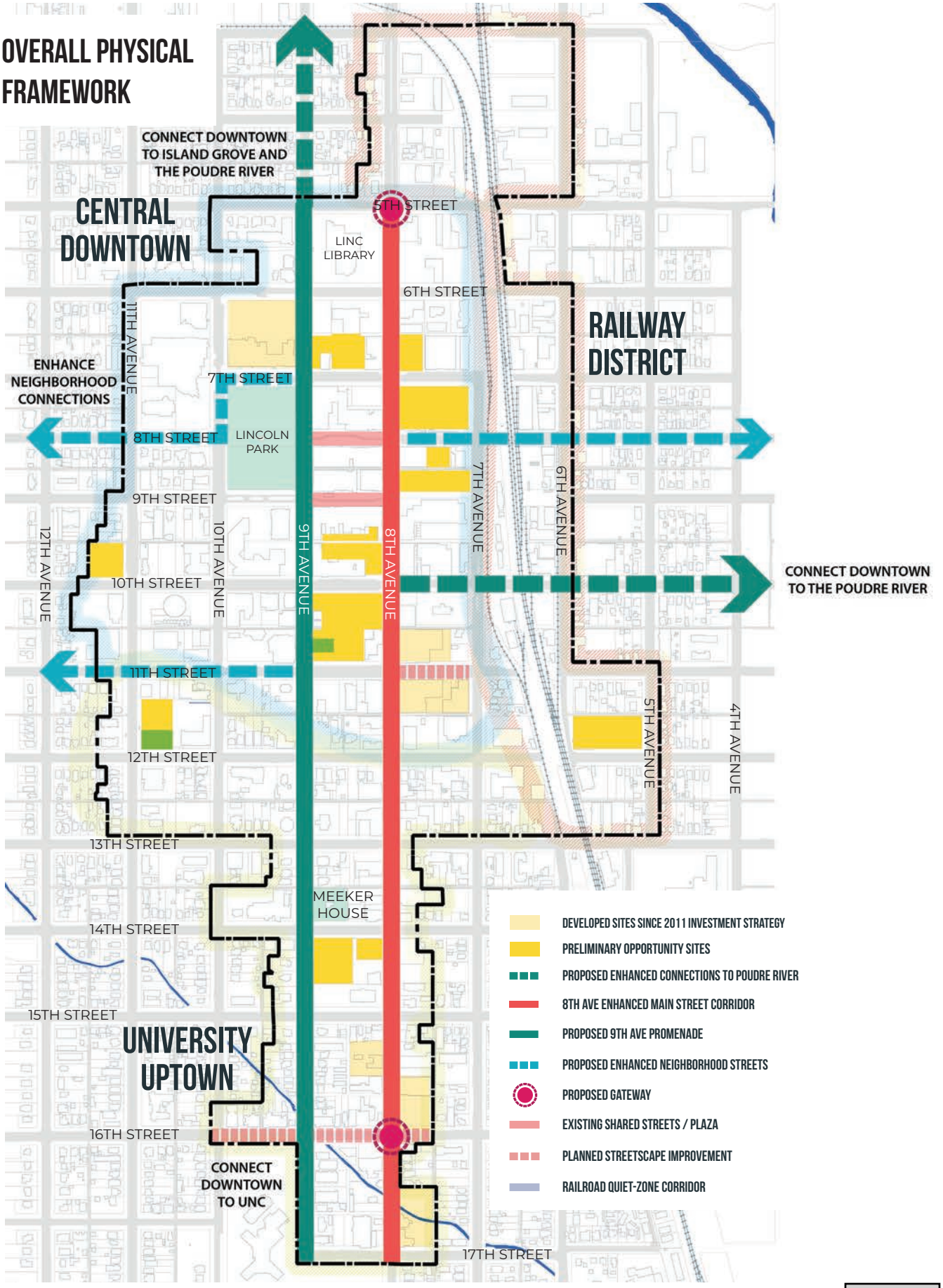
The University Uptown area is already primarily residential, with the exception of commercial uses along segments of 8th Avenue and 16th Street. The housing stock in University Uptown is dominated by single-family units, though there are a number of single-family structures that have been converted to multi-family units. There are also new apartment buildings along 8th Avenue and smaller scale apartment buildings interspersed throughout the sub-area. Moving forward, it is recommended that the existing housing stock be enhanced where possible, either by providing incentives for building improvements, or by enforcing the City's existing building code. Major thoroughfares in University Uptown like 8th Avenue, 9th Avenue, 16th Street, and 13th Street, could accommodate higher density infill mixed-use development, apartments, or condominiums. Along quieter neighborhood streets, it is recommended that thoughtful infill be considered in the form of single-family homes or "missing middle" housing types like townhomes, row houses, multi-plexes, accessory dwelling units, and small-scale apartment or condominium buildings where appropriate. New housing should be encouraged to fit in with the context of the surrounding neighborhood respectful of historic design elements, and should create ownership opportunities when possible.

▲ *Example of 4-Plex Infill Housing Development in Denver, Colorado*

OVERALL DOWNTOWN PHYSICAL FRAMEWORK

Combining all the above pieces (Sub-areas, Opportunity Sites, Transformative Projects) together creates a comprehensive physical framework for Downtown Greeley looking to the future, illustrated in the map ton the following page. This framework works to build on the energy and work that has been done to improve Downtown over the last 10 years by encouraging additional infill development and public realm enhancements at key locations. This framework also illustrates opportunities for improved east-west and north-south connections both within Downtown and to and from adjacent neighborhoods to address that community priority. This overall physical framework also creates the opportunity to:

- **Strengthen the north-south spines of 8th Avenue and 9th Avenue**, leveraging the Opportunity Sites and Transformative Projects to create a dual redevelopment corridor connecting amenities within Downtown, and Downtown to UNC and adjacent neighborhoods.
- **Improve key east-west connections through Downtown by enhancing the neighborhood streets** of 11th Street west of 9th Avenue, 7th/8th Street jogging around Lincoln Park west of 9th Avenue, and 8th Street east of 8th Avenue.
- **Create enhanced gateways along 8th Avenue at 5th Street** to the north and **16th Street** to the south to welcome people into Downtown. Enhancements could include additional gateway signage, enhanced wayfinding signage, landscaping, public art, and other physical improvements.
- **Continue infill development and redevelopment of Opportunity Sites** throughout Downtown to fill in the urban fabric and improve the pedestrian experience.
- **Create distinct, unique sub-areas** that together form an exciting Downtown experience.
- **Incorporate public space amenities wherever possible** to address the unequal distribution of parks and open space throughout the three sub-areas comprising Downtown.


OVERALL PHYSICAL FRAMEWORK
CONNECT DOWNTOWN TO ISLAND GROVE AND THE POUDRE RIVER
CENTRAL DOWNTOWN
5TH STREET
LINC LIBRARY
6TH STREET
RAILWAY DISTRICT
11TH AVENUE
ENHANCE NEIGHBORHOOD CONNECTIONS
7TH STREET
8TH STREET
LINCOLN PARK
9TH STREET
12TH AVENUE
10TH AVENUE
9TH AVENUE
8TH AVENUE
7TH AVENUE
6TH AVENUE
10TH STREET
CONNECT DOWNTOWN TO THE POUDRE RIVER
11TH STREET
5TH AVENUE
4TH AVENUE
12TH STREET
13TH STREET
MEEKER HOUSE
14TH STREET
15TH STREET
UNIVERSITY UPTOWN
16TH STREET
CONNECT DOWNTOWN TO UNC
17TH STREET
DEVELOPED SITES SINCE 2011 INVESTMENT STRATEGY
PRELIMINARY OPPORTUNITY SITES
PROPOSED ENHANCED CONNECTIONS TO POUDRE RIVER
8TH AVE ENHANCED MAIN STREET CORRIDOR
PROPOSED 9TH AVE PROMENADE
PROPOSED ENHANCED NEIGHBORHOOD STREETS
PROPOSED GATEWAY
EXISTING SHARED STREETS / PLAZA
PLANNED STREETSCAPE IMPROVEMENT
RAILROAD QUIET-ZONE CORRIDOR

05

ACTION PLAN

ACTION PLAN OVERVIEW

CORE VALUES AND VISION

ECONOMY

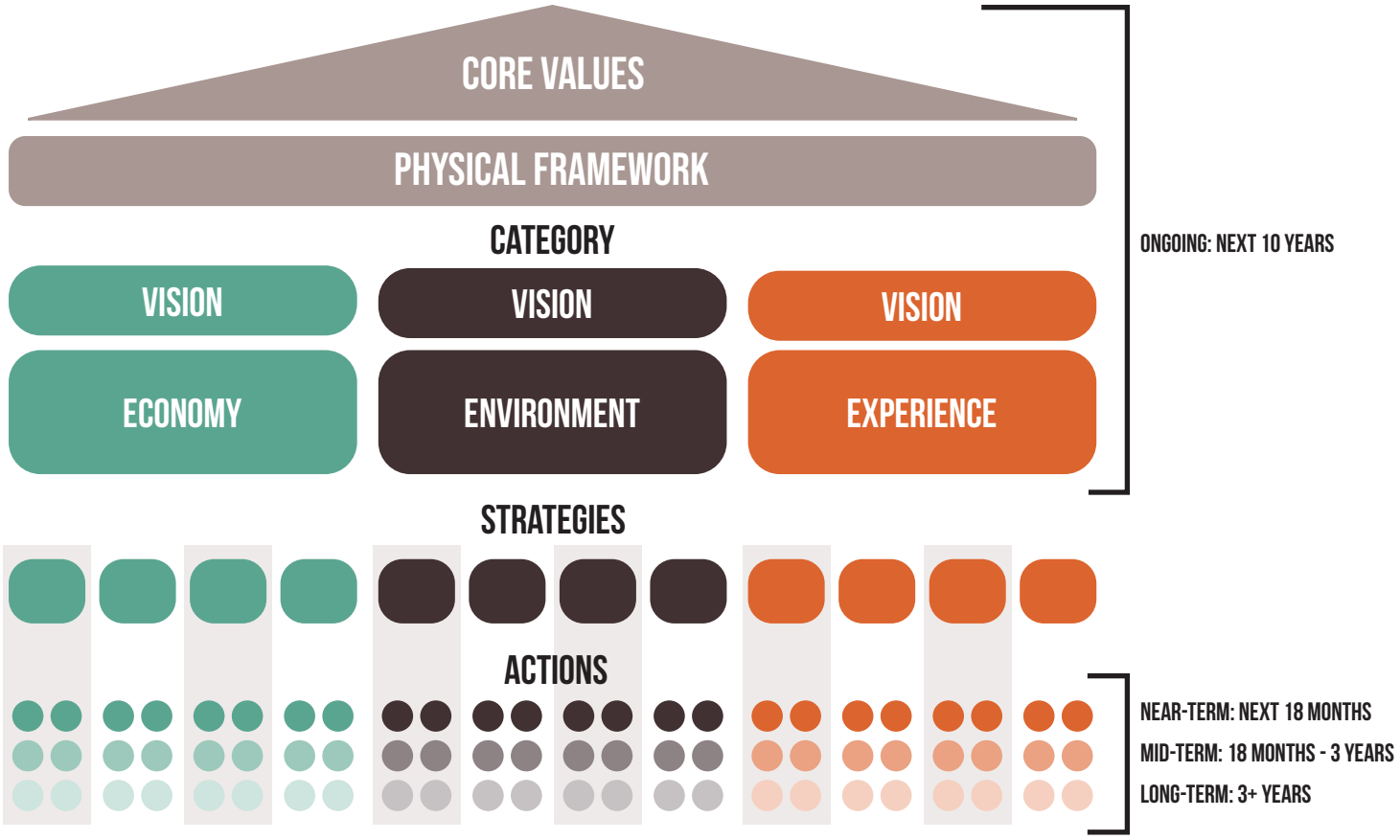
ENVIRONMENT

EXPERIENCE

ACTION PLAN OVERVIEW

The Market Assessment, Capital Improvement Assessment, Urban Quality Assessment, extensive community outreach conducted throughout this process, and Physical Framework all serve as building blocks for this Action Plan that will guide investment in Downtown Greeley for the next ten years.

The Action Plan is guided by a vision statement, written by topic area, and an overarching set of core values that is interwoven throughout the actions found in all three topic sections. The Action Plan also contains strategies and set of tactics organized into three topic areas; Economy, Environment, and Experience. This Action Plan provides downtown physical improvements and policies to guide the DDA and City of Greeley, the development community, and downtown stakeholders for the next ten-year investment cycle. For actions and tactics within each of these categories, timelines (short-, mid-, long-term), responsible parties, and illustrative costs are also identified to aid in implementation.



Upon Plan adoption, it is recommended that a **Downtown Plan Implementation Committee** be formed to provide oversight and track implementation of the Downtown 2032 – The Path Forward Plan. The Downtown Plan Implementation Committee should be comprised of representatives from various City of Greeley departments, the DDA, the Creative District, and other key civic partners. It is recommended this group meet quarterly to check-in on Plan implementation progress.

CORE VALUES AND VISION

CORE VALUES

The Core Values identified below provide an overarching foundation for the Action Plan and are interwoven into all three topic area sections, with each action encompassing one or more of these Core Values.

WELCOMING AND INCLUSIVE

Downtown Greeley should celebrate its diversity of cultures, building upon this strength to create a place where everyone feels safe and welcome.

PROSPEROUS AND VIBRANT

Downtown's economy should be diversified, robust, and relevant to an array of stakeholders.

A COMPLETE NEIGHBORHOOD

Downtown should not only be a destination where people can work, play, or visit, but a place that offers a range of housing types that meet the needs of diverse age groups, lifestyles, and incomes as well.

ACCESSIBLE AND CONNECTED

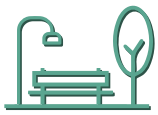
Downtown Greeley should continue to be a place that is easy for people of all ages to move around whether by foot or mobility device, bicycle, transit, or car.

VISION

The 1,250 inputs that were gathered from the community throughout this planning process were synthesized into the vision for Downtown Greeley, provided below and organized into the three guiding topic areas of the Action Plan. These vision statements were also vetted through the Advisory Committee and through the broader Greeley community at the Open House. Each of the three vision elements below is interwoven into its subsequent section of the Action Plan.

VISION FOR THE FUTURE: ECONOMY

Downtown Greeley's **ECONOMY** will be robust and diverse, offering residents, employees, students, patrons, and visitors a range of options for jobs, housing, shopping, and dining. Storefronts will be active and offer a variety of restaurant, retail, and creative business options, highlighting the strong local business community. Historic building character will be retained where appropriate, and strategic infill development and redevelopment will continue to diversify residential and commercial options Downtown.



VISION FOR THE FUTURE: ENVIRONMENT

The Downtown physical **ENVIRONMENT** and public realm will be inviting and accessible for all people. There will be multi-modal connections both to destinations within Downtown and to adjacent neighborhoods. Public spaces in Downtown such as parks, plazas, alleys, and sidewalks will be enhanced and activated wherever possible, creating places and opportunities for people to gather.

VISION FOR THE FUTURE: EXPERIENCE

The **Downtown EXPERIENCE** will be vibrant, fun, welcoming, and inclusive. Downtown Greeley will continue to expand on its entertainment, events, and multicultural offerings, and will serve as a regional artistic and cultural hub for a range of creative and unique social offerings that are reflective of the diversity that exists within Greeley. Public art will continue to play an integral role in enhancing the Downtown experience and celebrating the community's assets. Downtown will be clean, safe, and well-maintained, creating an inviting atmosphere for all.

ECONOMY

** = Top community priority identified during the community Open House in October 2022

Sequencing: Short-term (next 18 months), Mid-term (18 months – 3 years), Long-term (More than 3 years)

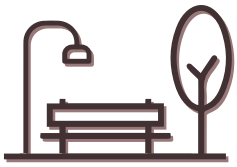
STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
**STRATEGY 1: Continue to stimulate infill development and re-development of under-utilized sites.	EC.1.1	Prioritize development and redevelopment of opportunity sites identified through the Downtown Plan process. Explore opportunities to issue RFPs for the development or of redevelopment these opportunity sites.	$$	Lead: City of Greeley Support: DDA	Short- to Mid-term
	EC.1.2	Review Downtown policies and programs such as TIF, STIP, Opportunity Zones, and Enterprise Zones, to incentivize investment to specific areas (i.e. Railway District) and types of uses (i.e. attainable/affordable housing, small business incubation and ownership, etc.) that require gap financing.	$	Lead: City of Greeley Support: DDA	Short- to Mid-term
	EC.1.3	Continue to offer potential investors and developers information, resources, grant opportunities, and contacts at City departments for development and redevelopment opportunities.	$	Lead: City of Greeley	Short-term
	EC.1.4	Explore resources to demolish, remediate, and redevelop properties that have environmental hazards or other impediments to redevelopment, such as Brownfields.	$$$	Lead: DDA	Mid- to Long-term
	EC.1.5	Facilitate mixed-use – in new and existing buildings – with adaptable ground floor spaces that can accommodate a range of tenant types. Identify appropriate locations for ground floor office or small-scale manufacturing use (i.e., non-retail). Explore overlay or other land use tools to support this goal.	$	Lead: City of Greeley Support: DDA	Mid- to Long-term
	EC.1.6	Explore resetting the Sales Tax TIF base during the DDA renewal process to further stimulate area economic development.	$	Lead: DDA Support: City of Greeley	Short-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
STRATEGY 2: Encourage diverse, vibrant storefront uses throughout Downtown.	EC.2.1	Continue to offer technical assistance to entrepreneurs and current and prospective business owners, such as business planning, location assistance, marketing, pathways to property ownership, and assistance in navigating permitting processes.	$	Lead: City of Greeley Support: DDA, SBDC	Short-term
	EC.2.2	Explore opportunities to bolster UNC's Entrepreneurial Challenge, or E-Challenge, to attract UNC student or graduate businesses to Downtown, such as creating local investment fund financed by Downtown businesses, or exploring angel investor opportunities.	$$	Lead: City of Greeley Support: DDA, UNC, SBDC	Short- to Mid-term
	EC.2.3	Proactively tailor business recruitment strategies to each of the sub-areas in Downtown based on needs and character: » Central Downtown: restaurants, boutique retail, entertainment, hotel/convention center » Railway District: maker, destination, manufacturing, and experiential businesses, museums and galleries » University Uptown: small-format grocery and pharmacy, daily services, neighborhood-serving restaurants, bed and breakfasts	$$	Lead: City of Greeley Support: DDA, SBDC	Short- to Mid-term
	EC.2.4	Nurture and recruit desirable independent businesses to ensure that Downtown continues to be a regional hub for locally-owned enterprises, particularly businesses that reflect the cultural diversity in Greeley.	$$	Lead: City of Greeley Support: DDA, Greeley Creative District	Short- to Mid-term
	EC.2.5	Review and update the Redevelopment Resource Guide for high-value businesses that meet the goals of this plan that includes information on receiving pre-approvals for permitting, expedited development review, flexible standards on outdoor seating, flexible approaches to retrofitting compound water taps, etc.	$	Lead: City of Greeley	Short-term
	EC.2.6	Continue to maintain an inventory of available Downtown commercial spaces to market available properties and match businesses with the appropriate sub-area.	$	Lead: DDA Support: City of Greeley	Short-term
	EC.2.7	Explore creating a virtual help desk to invite new and existing businesses to access specialized support.	$	Lead: City of Greeley	Short-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
STRATEGY 3: Continue to diversify the housing base in Downtown.	EC.3.1	Facilitate a diversity of housing types in Downtown Greeley that provide options for a range of incomes and lifestyle preferences and proactively tailor housing strategies to each of the sub-areas in Downtown based on needs and character: » Central Downtown: higher density housing, infill development of apartments (rent), condominiums (own), mixed-use » Railway District: mixed density housing, live/work, affordable multi-family » University Uptown: enhance existing housing and missing middle housing, including ownership opportunities: townhomes, condominiums, single-family, du/tri/quadplexes; thoughtful infill with gentle density	$$	Lead: City of Greeley	Mid- to Long-term
	EC.3.2	To reduce the impacts from homelessness, support and encourage intervention, treatment, and outreach services to direct individuals experiencing homelessness and mental health challenges to permanent supportive and/or transitional housing and appropriate services.	$$	Lead: City of Greeley Support: DDA, United Way, Weld Trust, Weld County, North Range Behavioral Health	Short- to Mid-term
	EC.3.3	Recognize the opportunity for the City development code to allow housing types that support artists and makers, such as live-work units, particularly in the Railway District.	$	Lead: City of Greeley Support: Greeley Creative District	Mid-term
	EC.3.4	Facilitate Accessory Dwelling Units (ADUs) in the University Uptown District and adjacent neighborhoods to encourage gentle density and missing middle housing as appropriate and desired.	$	Lead: City of Greeley	Short-term
	EC.3.5	Invest in amenities and encourage land uses that increase the desirability of Downtown as a neighborhood to live, work, and play in.	$$	Lead: City of Greeley Support: DDA	Mid- to long-term
	EC.3.6	Explore expanding the G-HOPE pilot program to offer UNC seniors or recent UNC graduates homebuyer down payment assistance to try and entice young professionals in and around Downtown.	$$	Lead: City of Greeley Support: UNC	Short-term
	EC.3.7	Explore the feasibility of an overlay district that encourages multifamily homes to meet a minimum maintenance requirement through performance-based zoning.	$	Lead: City of Greeley	Short-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
STRATEGY 4: Sustain and attract more primary employers and jobs.	EC.4.1	Work with major regional employers in growing industries, including knowledge sector jobs, to identify new opportunities for establishing a presence in Downtown to continue diversifying the economy.	$	Lead: City of Greeley Support: DDA, Upstate Colorado	Mid- to Long-term
	EC.4.2	Identify new primary job sectors to attract to the Downtown that build on Greeley's strengths, such as agriculture technology and light industrial, in the Railway District.	$	Lead: City of Greeley	Mid- to Long-term
	EC.4.3	Incubate and attract small-scale (and creative) craft manufacturers to Downtown Greeley, particularly in the Railway District.	$$	Lead: City of Greeley Support: DDA	Mid-term
	EC.4.4	Encourage strong and appealing economic connections between UNC and Downtown. Identify appropriate UNC programming/innovations, such as UNC's E-Challenge, that can be in Downtown, occupy office space, and help spur new jobs, including fostering graduate entrepreneurship.	$$	Lead: City of Greeley Support: DDA, UNC	Short-term
	EC.4.5	Enhance the "Bear Biz" program that fosters special promotions by local businesses to the UNC community.	$	Lead: City of Greeley Support: DDA, UNC	Short-term
	EC.4.6	Facilitate the development of more office and mixed-use space in the Downtown area to accommodate a range of tenant types, including flexible co-working space or small-format offices, to meeting existing demand and to invite and accommodate entrepreneurship and diverse economic activity.	$$$	Lead: City of Greeley Support: DDA	Mid- to Long-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
STRATEGY 5: Cultivate a Downtown economy that is relevant and welcoming to an array of community stakeholders.	EC.5.1	Continue to build on the Greeley Farmers' Market and recruit businesses that offer household goods and services that are culturally relevant to Greeley's diverse populations to make Downtown a more complete residential neighborhood, such as small-format grocery stores or markets offering a variety of fresh and culturally relevant food options.	$$	Lead: City of Greeley Support: DDA	Mid-term
	EC.5.2	Strengthen the relationship between UNC and Downtown Greeley leadership to help ensure that Downtown is relevant, welcoming, and safe to students. This could include creating a professional, part-time, or student internship liaison position at the City of Greeley.	$	Lead: City of Greeley Support: DDA, UNC	Short-term
	EC.5.3	Proactively engage existing and prospective business owners from Greeley's diverse populations to further promote multicultural entrepreneurship, including exploring a contract with IRC NOCO to provide business resources and services in multiple languages, or creating a bi-lingual business coordinator position at the City of Greeley.	$$	Lead: City of Greeley Support: DDA, Immigrant and Refugee Center of Northern Colorado (IRC NOCO)	Short-term
	EC.5.4	Explore opportunities to establish a regular location for a Multi-cultural Vendor Market or Mercado in or near Downtown to serve the Hispanic/Latinx community in Greeley.	$	Lead: City of Greeley Support: DDA	Short- to Mid-term
	EC.5.5	Explore programs and resources to create pathways to property ownership (residential and commercial) to prevent involuntary displacement and gentrification.	$	Lead: DDA Support: City of Greeley	Short-term



ENVIRONMENT

** = Top community priority identified during the community Open House in October 2022

Sequencing: Short-term (next 18 months), Mid-term (18 months – 3 years), Long-term (More than 3 years)

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
STRATEGY 1: Enhance connections to the Poudre River north and east of Downtown.	EN.1.1	Invest in streetscape improvements along 10th Street (east of 8th Avenue) and 9th Avenue (north of 7th Street), that focus on improved pedestrian experience, bicycle facilities, and signage connecting Downtown to the river. Streetscape improvements would entail: 1. Corridor Studies 2. Conceptual Design 3. Final Design and Phasing 4. Phased Implementation	$$	Lead: City of Greeley Support: Poudre River Trail Corridor, Inc.	Can be phased to distribute cost.
	EN.1.2	Form a partnership between DDA, City, and Poudre Trail Corridor Board to improve branding, advertising, and physical signage promoting the connection between Downtown and the river.	$	Lead: City of Greeley Support: DDA, Poudre River Trail Corridor, Inc.	Short-term
	EN.1.3	Consider adding amenities along the Poudre River south of Island Grove as the Poudre River Trail is extended and connections to the river are enhanced.	$$$	Lead: City of Greeley	Long-term
STRATEGY 2: Improve connections to the UNC campus.	EN.2.1	Invest in 9th Avenue improvements to create an enhanced bicycle and pedestrian experience by repurposing portions of the roadway to non-vehicular uses.	$$$	Lead: City of Greeley Support: DDA, UNC	Mid-term
	EN.2.2	Improve transit/shuttle service from residential housing on campus to key Downtown destinations.	$$	Lead: City of Greeley Support: DDA, UNC	Mid-term
	EN.2.3	Create a joint UNC/City/DDA committee to discuss and determine what types of destinations and uses can be added to Downtown to attract students on a daily and weekly basis.	$	Lead: City of Greeley Support: DDA, UNC	Short-term
	EN.2.4	In cooperation with the Greeley Art Commission, create visual connections throughout the core and to UNC by placing public art displays strategically to guide pedestrians through Downtown.	$$	Lead: DDA Support: UNC, City of Greeley, Greeley Art Commission, Greeley Creative District	Mid-term
	EN.2.5	Recognize 10th Avenue as a direct connector between Downtown and the UNC campus through physical improvements such as enhanced lighting or wayfinding signage.	$$	Lead: City of Greeley Support: DDA, UNC	Short-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
****STRATEGY 3:** Create new public spaces focused on families, residents, visitors, and the everyday use of inviting and comfortable outdoor spaces, ensuring that each sub-area has an identifiable and destination public space.	EN.3.1	Create more kid-friendly activities and amenities in Downtown neighborhoods by adding a collection of small playgrounds, a potential water feature/ splash pad, and play elements that appeal to all ages.	$$	Lead: City of Greeley Support: DDA	Mid- to Long-term
	EN.3.2	Ensure that resources, including amenities and public realm investments, are equally distributed throughout Downtown and adjacent neighborhoods.	$$	Lead: City of Greeley	Long-term
	EN.3.3	Continue to improve alleys in Central Downtown where possible, working with adjacent private property owners and businesses on improvements such as adding paving, managing trash disposal, improving lighting, enhancing maintenance, and exploring undergrounding utilities.	$$	Lead: City of Greeley Support: DDA	Mid- to Long-term
	EN.3.4	Explore vacating additional alleys in Downtown to reinvent as activated public space, similar to 9th Street.	$$	Lead: City of Greeley Support: DDA	Long-term
	EN.3.5	Identify locations and amenities for destination public spaces in the University Uptown and Railway District subareas. Consider opportunity sites identified through this process for these public spaces.	$	Lead: City of Greeley Support: DDA	Mid-term
	EN.3.6	Plan, design, and implement two new destination public spaces in the University Uptown and Railway District subareas.	$$$	Lead: City of Greeley Support: DDA	Long-term
	EN.3.7	Explore feasibility of creating a 9th Avenue Promenade that serves as an open space amenity running through Downtown to and from UNC.	$$$	Lead: City of Greeley Support: DDA, UNC	Mid-term
	EN.3.8	Explore physical infrastructure upgrades in the Railway District to encourage a greater diversity of uses, enhance pedestrian and bicycle connections, and promote infill development and adaptive reuse of existing structures.	$$$	Lead: City of Greeley Support: DDA	Long-term
	EN.3.9	Identify small infill sites for Downtown dog park facilities.	$	Lead: City of Greeley Support: DDA	Mid-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
STRATEGY 4: Unify Downtown's public realm with standards that provide consistency and improve the overall quality.	EN.4.1	Create new design standards and guidelines for Downtown that focus on a consistent treatment to the public realm, streetscape, building frontages, and character.	$	Lead: City of Greeley Support: DDA	Short-term
	EN.4.2	Revise Public Works roadway standards for Downtown for consistency with new design standards and guidelines.	$	Lead: City of Greeley	Short-term
	EN.4.3	Increase right-of-way inspections in Downtown to monitor compliance with city standards.	$	Lead: City of Greeley	Short-term
	EN.4.4	Conduct a comprehensive underground utility study to understand stormwater, power, internet, and other utility capacity to understand future capacity for redevelopment and to understand the feasibility of undergrounding utilities.	$$	Lead: City of Greeley Support: Xcel, Allo	Short- to Mid-term
	EN.4.5	Conduct an American with Disabilities Act (ADA) accessibility study to evaluate Downtown's current ability to meet ADA standards and identify needed infrastructure improvements needed for compliance.	$$	Lead: City of Greeley	Short- to Mid-term
	EN.4.6	Continue enhancing lighting throughout Downtown, particularly along 8th and 9th Streets and 8th and 9th Avenues.	$$	Lead: City of Greeley Support: DDA	Mid-term
	EN.4.7	Conduct a Complete Streets Analysis of 8th Avenue to determine strategies to allow for multi-modal movement along the street, including exploring crossings of 8th Avenue to improve east/west non-vehicular connections.	$	Lead: City of Greeley	Short- to Mid-term
	EN.4.8	Work with the City to establish agreed upon standards for Downtown-focused maintenance and support that standard with adequate resources	$$	Lead: City of Greeley	Short-term
	EN.4.9	Explore options for a special trash overlay district in the Downtown managed by the City to create a more efficient, effective, consistent and pleasant public realm experience.	$$	Lead: City of Greeley Support: DDA	Short-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
STRATEGY 5: Enhance the quality of the connections to the adjacent neighbor-hoods around Downtown.	EN.5.1	Improve pedestrian and bicycle connections across the Union Pacific railroad tracks at 5th and 6th Street.	$$	Lead: City of Greeley	Mid-term
	EN.5.2	Explore 8th Street Improvements, including: » Complete the north sidewalk railroad crossing on 8th Street to enhance pedestrian connections. » Conduct and 8th Street Enhanced Corridor Study to determine improvements required to enhance connections to adjacent neighborhoods east and west.	$$	Lead: City of Greeley Support: DDA	Long-term
	EN.5.3	Conduct a 9th Street or 11th Street enhanced corridor study to determine improvements required to enhance east-west connections to adjacent neighborhoods.	$$	Lead: City of Greeley	Mid-term
	EN.5.4	Pursue streetscape improvements on 11th Street, 8th Avenue, and 7th Avenue	$	Lead: City of Greeley Support: DDA	Short- to Mid-term
	EN.5.5	Complete the planned and designed 16th Street improvements between 8th and 10th Avenues.	$$	Lead: City of Greeley	Short-term
	EN.5.6	Utilize public art or other distinct streetscape features to create a sense of arrival at key gateway points, including 5th Street on the north end of Downtown and 16th Street at the southern end of Downtown.	$$	Lead: City of Greeley Support: DDA, Greeley Creative District	Short- to Mid-term
	EN.5.7	Connect existing bike lanes on 8th Street and 9th Avenue by filling in gaps along 10th Avenue and 7th Street around Lincoln Park to form a contiguous bicycle network through the center of Downtown.	$$	Lead: City of Greeley	Long-term
	EN.5.8	Continue adding wayfinding signs, bicycle signs, light pole banners, and other place enhancements that highlight and direct people to Downtown amenities.	$$	Lead: City of Greeley Support: DDA	Short- to Mid-term
	EN.5.9	Explore the feasibility of adding branded signage and public art to new Railroad Quiet Zone fencing in the Railway District.	$	Lead: City of Greeley Support: Colorado Model Railroad Museum, DDA, Greeley Creative District	Short-term

EXPERIENCE

** = Top community priority identified during the community Open House in October 2022

Sequencing: Short-term (next 18 months), Mid-term (18 months – 3 years), Long-term (More than 3 years)

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
STRATEGY 1: Promote local arts and creative experiences in Downtown.	EX.1.1	Preserve existing and develop or redevelop buildings and spaces that are affordable to artists and creative professionals.	$$	Lead: DDA Support: Greeley Creative District	Mid-term
	EX.1.2	Support and consider more widespread promotion of events related to arts and creative experiences in Downtown.	$	Lead: DDA Support: City of Greeley, Greeley Creative District	Short-term
	EX.1.3	Continue to incorporate art wherever possible throughout Downtown, including permanent and temporary installations.	$$	Lead: DDA Support: City of Greeley, Greeley Creative District	Short-term
	EX.1.4	Work with property owners to offer vacant storefronts in the short-term, at low/no costs to local artists as studio and gallery space.	$	Lead: DDA Support: Greeley Creative District	Short- to Mid-term
	EX.1.5	Work with the Creative District and other local arts partners to continue integrating arts and creative experiences throughout Downtown Greeley.	$	Lead: DDA Support: Greeley Creative District	Short- to Mid-term
****STRATEGY 2:** Ensure Downtown is clean, safe, and welcoming.	EX.2.1	Continue to maintain enhanced maintenance standards and beautification efforts in the Downtown public realm.	$$	Lead: DDA Support: City of Greeley	Short- to Mid-term
	EX.2.2	Support and adopt a holistic approach to addressing real and perceived Downtown safety concerns.	$	Lead: DDA Support: City of Greeley, Greeley Police Department	Short- to Mid-term
	EX.2.3	Explore hiring a consultant to provide training and strategic planning to City and DDA staff and leadership around diversity, equity, and inclusion issues with the goal of making Downtown welcoming to all.	$	Lead: City of Greeley Support: DDA	Short-term
	EX.2.4	Connect people experiencing homelessness with resources, and mental health, employment training, and other supportive services.	$$	Lead: City of Greeley Support: DDA, Greeley Police Department, North Range Behavioral Services, Frontier House, Lutheran Family Services	Short-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
	EX.2.5	Continue to encourage partnerships, collaboration, and coalition building around Downtown initiatives that represent diverse interests.	$	Lead: City of Greeley Support: DDA, UNC DEI Leadership, Greeley Creative District, IRC NOCO, Hispanic Women of Weld County	Short-term
	EX.2.6	Designate the City lead department responsible for developing a work program to manage and support the execution of this Plan.	$	Lead: City of Greeley	Short-term
STRATEGY 3: Celebrate historic character, charm, and distinctive environment in Downtown.	EX.3.1	Continue to support historic preservation of designated properties in Downtown Greeley by identifying available resources and incentives, and helping property owners obtain grants, tax credits, and other financial tools.	$$	Lead: City of Greeley Support: DDA, Historic Preservation Commission	Mid- to Long-term
	EX.3.2	Facilitate adaptive reuse in Downtown that is not limited only to districts or structures that meet historic designation criteria, by providing incentives such as historic preservation grants or tax credits, infrastructure investment, regulatory relief, façade grants, or other incentives as appropriate.	$$$	Lead: City of Greeley Support: DDA, Historic Preservation Commission	Mid- to Long-term
	EX.3.3	Continue to promote events and programs that celebrate Greeley's history, including walking tours, history brown bags, and Historic Preservation Month.	$	Lead: City of Greeley Support: DDA, Historic Preservation Commission	Short-term
	EX.3.4	Ensure that the portrayal of Greeley's history accurately represents and reflects City's diverse population and storied past.	$	Lead: City of Greeley Support: DDA, Historic Preservation Commission	Short-term
STRATEGY 4: Continue to activate Downtown through programming and events that are relevant and inclusive to Greeley's diverse population.	EX.4.1	Encourage events that celebrate the different cultures that exist within Greeley. Work closely with leaders of the Hispanic/Latinx and other communities to help create and plan events that are historically accurate and welcoming.	$	Lead: DDA Support: City of Greeley, Greeley Creative District, UNC	Short-term
	EX.4.2	Increase the frequency and variety of live music events and festivals, and partner with local institutions and organizations to increase diversity of offerings.	$	Lead: DDA Support: City of Greeley	Short-term
	EX.4.3	Continue working with UNC to develop events that appeal to college students such as runs, bike rides, music, and UNC celebrations for sports or other activities. These should be offered during times of the week that accommodate UNC student schedules and encourage students to stay in Greeley on the weekends.	$	Lead: DDA Support: City of Greeley, UNC	Short-term

STRATEGY	NO.	ACTION	CONCEPTUAL COST	RESPONSIBILITY	SEQUENCING
	EX.4.4	Continue to work with UNC's creative communities, including arts, music, and theatre, to showcase student talent in venues Downtown.	$	Lead: DDA Support: City of Greeley, UNC	Short- to Mid-term
	EX.4.5	Explore ways to improve activation of Lincoln Park including creating a pedestrian-focused environment in and around the park, adding a space for performances, providing regular daily or weekly programming, and creating reasons for people to gather and spend time in Lincoln Park.	$$	Lead: City of Greeley Support: DDA, Historic Preservation Commission	Short- to Mid-term
STRATEGY 5: Market existing Downtown assets and amenities to both locals and visitors.	EX.5.1	Improve communication and marketing of Downtown assets to the UNC community.	$	Lead: DDA Support: City of Greeley, UNC	Short-term
	EX.5.2	Continue to develop tailored promotions, marketing campaigns, artistic maps and directories, and outreach to institutions and employers, to attract nearby residents and residents from throughout the region, to visit Downtown shops and restaurants.	$	Lead: DDA Support: Greeley Creative District, City of Greeley	Short-term
	EX.5.3	Build a more distinct brand identify for each of the sub-areas comprising Downtown to improve marketing and promotion of each area.	$	Lead: DDA Support: City of Greeley	Short- to Mid-term
	EX.5.4	Use technology and QR codes to promote user orientation and awareness of Downtown destinations and amenities.	$$	Lead: DDA Support: City of Greeley	Short- to Mid-term
	EX.5.5	Explore ways to attract an additional hotel and/or conference and events center to accommodate larger scale conferences and gatherings.	$$	Lead: City of Greeley Support: DDA	Short- to Mid-term

MOVIE
THEATER
THE PLACE TO BE

APPENDICES

APPENDIX A: MARKET ASSESSMENT

APPENDIX B: CAPITAL IMPROVEMENT ASSESSMENT

APPENDIX C: URBAN QUALITY ASSESSMENT

APPENDIX D: ONLINE COMMUNITY SURVEY RESULTS

APPENDIX E: PAST PLANS & STUDIES SUMMARY

City of Greeley, Colorado
PLANNING COMMISSION PROCEEDINGS
January 10, 2023

(Excerpted)

8. A Public Hearing to Consider the Downtown 2032 – The Path Forward, Greeley Downtown Plan Update.

Commissioner Franzen excused himself from this portion of the meeting due to a conflict of interest.

Becky Safarik, Interim Community Development Director, introduced the Downtown Plan Update and stated that about 10 years' time has passed since the last downtown development investment strategy was completed. The City of Greeley determined an update would be helpful to assess the work to date and to maintain focus and momentum for the next decade. Coincidentally, the City contracted with the same consultant who did he previous plan. She introduced Brad Segal with Progressive Urban Management Associates (PUMA)to describe the Plan update.

Mr. Segal, introduced his team and described the process used to complete the study, noting that they heard from over 1,200 residents in the community who expressed an interest in Downtown. Mr. Siegel said their team completed an analysis of existing conditions and tracked improvements over the last 10 years. He explained that they will provide everyone with an overview of the action plan and then be available for any questions or discussion.

Amanda Kannard, PUMA, reiterated how important it was that they were able to gather so many inputs from the community. She explained that there were a variety of topics discussed early on in the process at a roundtable discussion with an advisory committee that was made up of downtown stakeholders, including business owners, members of the Downtown Development Authority, property owners, and representatives from a variety of businesses. Ms. Kannard said they also had a technical working group that was made up of various city departments. She noted they also had a pop-up presence at one of the Friday Fests in summer fairly early on in the process. In addition to that input they also conducted an online survey that was distributed to the greater Greeley community which netted over 1,100 responses. After they had developed some preliminary recommendations, they hosted a community wide open house where they had nearly 40 people attend. Ms. Kannard stated they also conducted some focused outreach to historically marginalized populations.

She explained that some of the key themes heard from the stakeholder groups was that they want to ensure that Greeley is welcoming and inclusive to everybody who lives and works in or visits Downtown. They want to make sure that the DDA and City of Greeley continue moving forward with doing a good job at programming and activation of the area; bolstering the storefront economy; and maintaining its historic character. She also noted the importance of ensuring downtown is livable with such as dog parks, grocery stores, etc. Another priority was to continue to invest in infrastructure and infill development and underutilized spaces. Finally, she noted the importance of connectivity not only within downtown, but to neighboring communities as well.

DRAFT

Ms. Kannard then highlighted a couple of questions and answers from the online survey, noting the top priority was to redevelop and repurpose underutilized spaces in downtown. Relative to priority services, the number one response was more retail and restaurants, followed by public safety and providing more services to address the unhoused population.

She stated that the existing conditions analysis was the other key that served as a foundation for developing the strategies and actions in the plan including a market assessment. The key findings was that housing is a robust market in downtown and will continue to be, moving forward. The agriculture and manufacturing industrial heritage that exists in Greeley is an enduring economic anchor that can be capitalized on into the future. The office market is likely to remain niche but there are some opportunities to have creative office spaces through small businesses, incubation, and coworking. Retail is a continued strength that would benefit from additional housing development. There are also some underutilized or untapped markets that exist for younger demographics, particularly UNC students and Latinx households, which are key opportunities moving forward.

Todd Wenskoski, team partner from Livable Cities Studio, said that the capital improvement assessment looked at the space from the property lines to the curb line. They found out that the eastern edge has the lowest quality because it's paired with historical industrial uses. He then said that areas around downtown formed a higher ranked quality due to the ongoing upkeep and the investments that have been made over time. Mr. Wenskoski stated that if you move further south the residential areas generally had a higher quality as well, partially due to historic character, etc. He stated the other thing found was although 8th Avenue and 9th Avenue have distinctly different characters one being more commercial the other one being a bit more mixed with historic district, they generally provide a really good north and south connectivity under the core of downtown.

Mr. Wenskoski stated that elsewhere in downtown, in most cases, where there is non-residential areas, especially with older, mid-century developments, they found that they didn't have great frontages because commercial uses sometimes had to have bigger access points and driveways.

He stated the other thing they looked at was regarding the public spaces and uses of downtown. They found the core is strong but there is an unequal distribution in some areas. He further explained that the area around Lincoln Park, including 8th and 9th Avenue are great but outside of that the character is limited. Mr. Wenskoski also stated they noticed the amount of area dedicated to cars, either through wide roadways, or surface parking that could provide an opportunity to repurpose such areas into more productive areas. He said that the bicycle infrastructure is good and getting better and can be built upon going forward. Mr. Wenskoski explained that one of the most important things they discovered was safety and lighting was great in some areas but really lacking in others.

Mr. Segel explained the action plan, recommendations, and how to proceed to implementation. He stated that they started with core values for what they want downtown to be like in the future, starting with the physical framework. He note the three

categories with key recommendations. The first of that is economy, which is how the downtown can be more prosperous and create more jobs. The second is environment which gets into the physical realm of downtown. Lastly, is experience, which is how we activate downtown and what sort of experience one has coming downtown.

He stated that the previous plan had four different sub areas. They have now streamlined that into three sub areas within downtown that have similar character and also have distinctly different market opportunities. Mr. Segel stated that the three sub areas are central downtown, university uptown, and the railway district on the eastern edge of downtown.

Mr. Wenskowski said they went on to create the physical framework plan which guided a lot of the transformative projects into the action plan and touched on connecting downtown to the Poudre River both north to Island Grove and also east.

He spoke about how there were discussions on how to turn the railway district into something exciting and interesting that would create a different type of contribution to downtown. Mr. Wnskowski said that they spoke about diversifying the residential mix with different approaches in each sub area. They want to build off of the core area and still create a sub area that have identities and character relating to their history. He spoke about reinforcing the bike lanes and hopefully taking them a step further to enhance the corridor and carry forward the history. He stated that they also suggest reuse of existing buildings in creative ways and still providing outdoor seating with public art. The character of these two areas is different but they both contribute to downtown and the vision.

Mr. Siegel wrapped the presentation up by giving a summary of the action plan and actual recommendations. He stated that everything they presented is tied to the core values of the city. They want downtown to be welcoming and inclusive, prosperous and vibrant, a complete neighborhood that is accessible and connected. They also provided vision statements for the different elements of the plan. He stated they provided a series of charts and matrices that get into fine grained detail within each of these sections. Each section has strategies and then tactics that are assigned to specific stakeholders to be worked on. They also got into resources and sequencing many of these ideas are more near-term other ideas are longer term in the context of a 10 plus year vision or plan.

Ms. Safarik recognized their presentation by commending their work. She also recognized two other leaders in the project. Bianca Fisher with DDA and Ben Snow with City of Greeley Economic Health and Housing, both who were instrumental in making sure stakeholders were well represented.

Commissioner Briscoe stated that he was impressed with the tremendous amount of effort and work that has gone into this project. He questioned what all of that means for the Commission and why are they seeing this today. He also wondered how they are financing everything.

Ms. Safarik said because the downtown development plan is a part of the Comprehensive Plan by reference, the Planning Commission is asked to make recommendations on land use matters, such as this, to the City Council. She then stated that the city initiated this update using city resources because it is seen as a vital part of

maintaining the economy and infrastructure within the community as well as a partnership with the DDA and the work of the Economic Health and Housing Department.

Commissioner Schulte wondered if there has been anything analogous throughout Greeley where there have been multiple zones coming together. Ms. Safarik said that downtown is unique in that regard because it's got so many partnerships. She said there are five tax increment districts in the city that focus on redevelopment and have the city and private development partnerships.

Commissioner Schulte asked if there's any sort of tension going forward as we move this downtown field into the railroad area and into that existing industrial land. He wondered if we would lose any economic resources in the process. Ms. Safarik said that it was a very intentional decision to include the whole railway corridor as a transitional district into industrial uses. She stated that is will further support "maker spaces" and some of the special uses they have on the east side of downtown and make it an industrial incubator space that allows smaller businesses.

Benjamin Snow, Economic Health and Housing Director, said there are great and creative reuse opportunities with the old agricultural industrial assets which can experience some new life with redevelopment. This could include a mixture of uses, it could be residential, or it could be some light industrial types of places, or live/work kind of arrangements. He opined that the exciting part about that whole railway district is that it opens up an area where we could keep the agricultural heritage alive but embrace some of these new things that are happening in terms of innovation and entrepreneurship.

Ms. Safarik also mentioned that she met with the executive director of the model train museum and reviewed their master plan which strongly complements what is planned for downtown Greeley.

Commissioner Schulte asked if, hypothetically, someone wanted to build a factory in Greeley where would that go? Ms. Safarik said that we have many areas that would be prime for that kind of use, particularly east and north of this area.

Mr. Snow stated that if you look at the overall land use plan for Greeley then there's a wealth of agricultural land between the airport and Hwy 85 which also is parallel with the railroad tracks. So, while the infrastructure is not fully in those areas yet there is enough land in those areas to reach a certain level of scale for industrial development, noting that the railway district in downtown would is really a different kind of product that is smaller scale space.

Chair Yeater opened the public hearing at 2:30 PM.

Bianca Fisher, Executive Director of the Downtown Development Authority, offered thanks to the City and all those that contributed to this project. She believes we've come a long way in the last ten years because of the partnership with the City and with private stakeholders. Ms. Fisher reflected on the opportunities that have come from the City's investment in 8th Avenue improvements and touched on the fortune to be a part of the creative district's public art programs. She noted several creative industries in the area

and closed by saying how thrilled she is to have the City taking a strong lead on this plan and how grateful they are to be partners in this project.

Chair Yeater closed the public hearing at 2:33 PM.

Commissioner Andersen made a motion that the Planning Commission find that the updated study, Downtown 2032: The Path Forward, is consistent with the goals of the City's Comprehensive Plan and recommend its adoption and incorporation into the Comprehensive Plan by reference. Commissioner Briscoe seconded the motion.

Motion carried 6-0 (Commissioner Franzen recused).

Commissioner Franzen stepped back into the chambers to be present for the balance of the Commission meeting.

DRAFT

Plan Overview

City Council Meeting
January 17, 2023

DOWNTOWN 2032 – THE PATH FORWARD

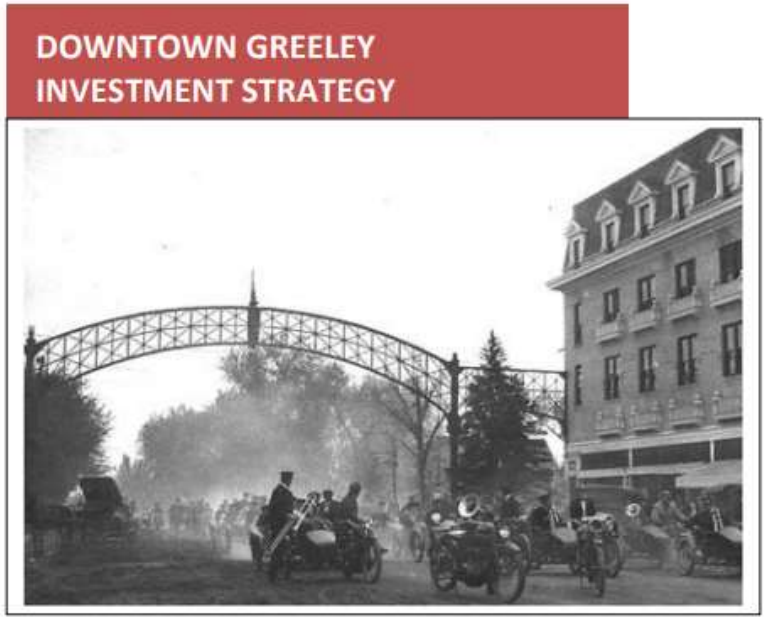
GREELEY DOWNTOWN PLAN UPDATE

Draft - December 2022

Background

- **2011:** the Greeley Downtown Development Authority (DDA) contracted with P.U.M.A. to develop an **area redevelopment and investment strategy**

- A **decade of public and private investments, events, and activities followed** ranging from entryway and corridor improvements, new hotel/conference center, municipal complex & fire station; public realm improvements, new signature events and activities, additional housing, retail and commercial uses, an expanded public art experience, and financial incentives to stimulate redevelopment



Current Initiative

- To capitalize on this **momentum**, the City Manager designated funding in late 2021 to update the plan to review, update and stimulate continued downtown revitalization; a consultant (P.U.M.A.) was selected and work on the update commenced in early 2022.
- **A planning horizon of 2032** was selected to mirror the previous decade's work and the terminus of the existing Downtown Tax Increment district
- The Plan **evaluated existing conditions** via Market, Capital Improvements, and Urban Quality Assessments to provide the foundation for recommendations
- Extensive **technical review and community outreach** informed core values and priorities that resulted in the proposed strategies and actions

City of Greeley Colorado

Market Assessment

- Provides an overview of four market segments (Live, Work, Shop & Dine, and Visit & Stay)
- Provides baseline data before and after the Pandemic disruption
- Explores strengths and vulnerabilities in each market segment to ensure recommendations are grounded in economic reality

City of Greeley Colorado

Market Assessment Key Findings:

- Housing market is robust, will remain a key economic driver
- The industrial sector, including manufacturing, are enduring economic anchors that will attract employers and offer distinction from other peer downtowns
- The office market is likely to remain niche over the next market cycle but the low cost of such space offers a lower barrier to entry for entrepreneurs and new businesses
- Retail continues to strengthen Downtown
- Connections to UNC remain an underutilized market opportunity

City of Greeley Colorado

Capital Improvement/ Urban Quality Assessments

- Evaluated the existing conditions of streets, plazas, and parks in the study area
- Identified gaps and opportunities to support public realm and placemaking recommendations
- Provide a foundation for improvements in four key areas:
  - Public spaces
  - Forms of movement
  - Street hierarchy
  - Safety

City of Greeley Colorado

Capital Improvement & Urban Quality Assessments Key Findings:

- Eastern edge of Downtown and non-residential areas have the lowest quality public realm space and missing infrastructure (e.g. sidewalks)
- The highest quality public realm space and improvements is in the Downtown core and in the residential areas to the south
- 8th and 9th Avenues have different but complementary characteristics and good north to south connectivity
- A need for a distinct public space network and distribution of public spaces throughout the area
- The area has a disproportionate amount of area devoted to vehicles (parking, road width & capacity)
- The bicycle infrastructure can be built upon for greater use and service to the area
- Lighting near the core of Downtown is adequate but lacking in other areas

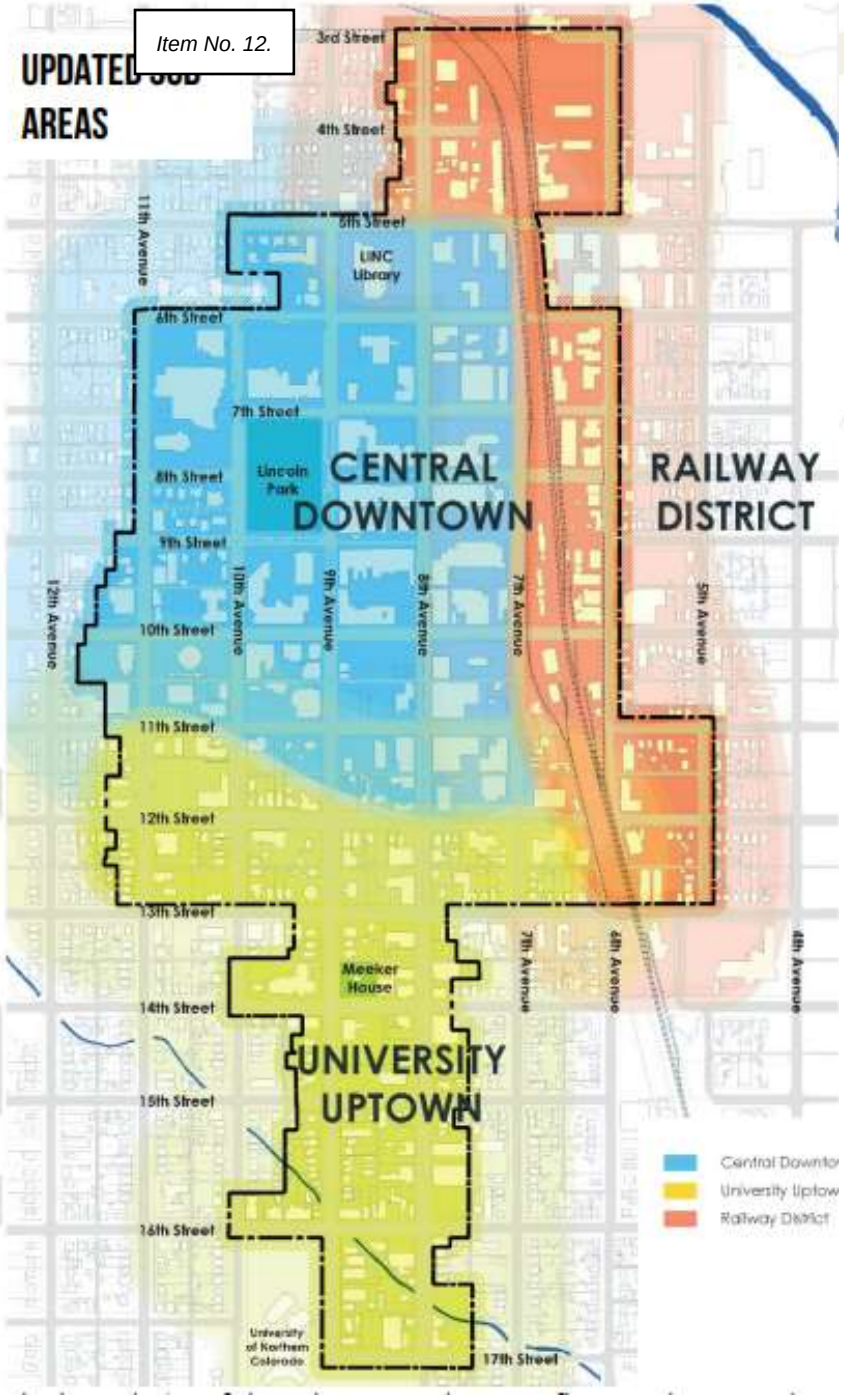
City of Greeley Colorado

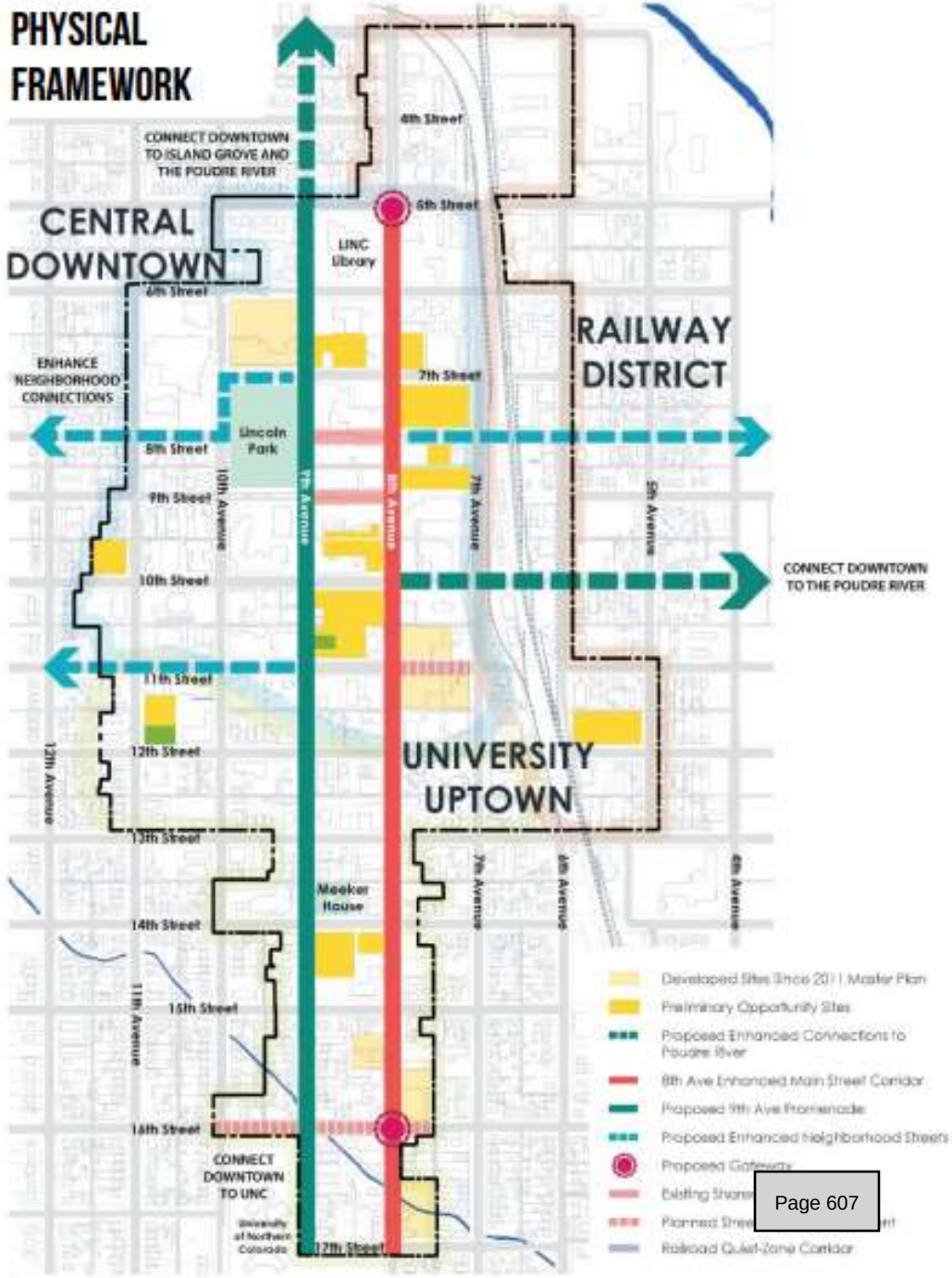
Community Engagement

- **Inclusive and broad engagement** was key to the Plan's development that incorporated over **1,250 inputs** and included:
  - Downtown Advisory Committee
  - City Technical Working Group
  - DDA Board
  - Topic-based Focus Groups
  - Community Open House
  - Focused Outreach
  - On-line survey (over 1,100 responses in both English/Spanish)

- **Top priorities** from the on-line survey:
  - Physical improvements: repurposing underutilized parking lots, maintaining the area's historic character and more beautification
  - Services and programs more retail and restaurants, public safety, offering more services to address the unhoused

Area Context





Key Strategies: Summary

ECONOMY:

1. Continue to stimulate infill development and redevelopment of underutilized sites
2. Encourage diverse, vibrant storefront uses
3. Continue to diversify the housing base
4. Sustain and attract more primary employers and jobs
5. Cultivate a Downtown economy that is relevant and welcoming to an array of community members

City of Greeley Colorado

ENVIRONMENT

1. Enhance connections to the Poudre Trail

2. Improve connections to the UNC campus

3. Create new public spaces with inviting outdoor spaces distinctive to each sub-area

4. Unify Downtown's public realm with consistent standards that promote a quality setting

5. Enhance the connections to adjacent neighborhoods

EXPERIENCE

1. Promote local arts and creative experiences in Downtown

2. Ensure Downtown is clean, safe and welcoming

3. Celebrate historic character, charm and distinctive environment in Downtown

4. Continue to activate Downtown through programming and events that are relevant and inclusive of Greeley's diverse population

5. Market existing Downtown assets and amenities to locals and visitors

ACTION PLAN – CORE VALUES & VISION

OVERARCHING CORE VALUES

- Welcoming & Inclusive
- Prosperous & Vibrant
- A Complete Neighborhood
- Accessible & Connected

VISION

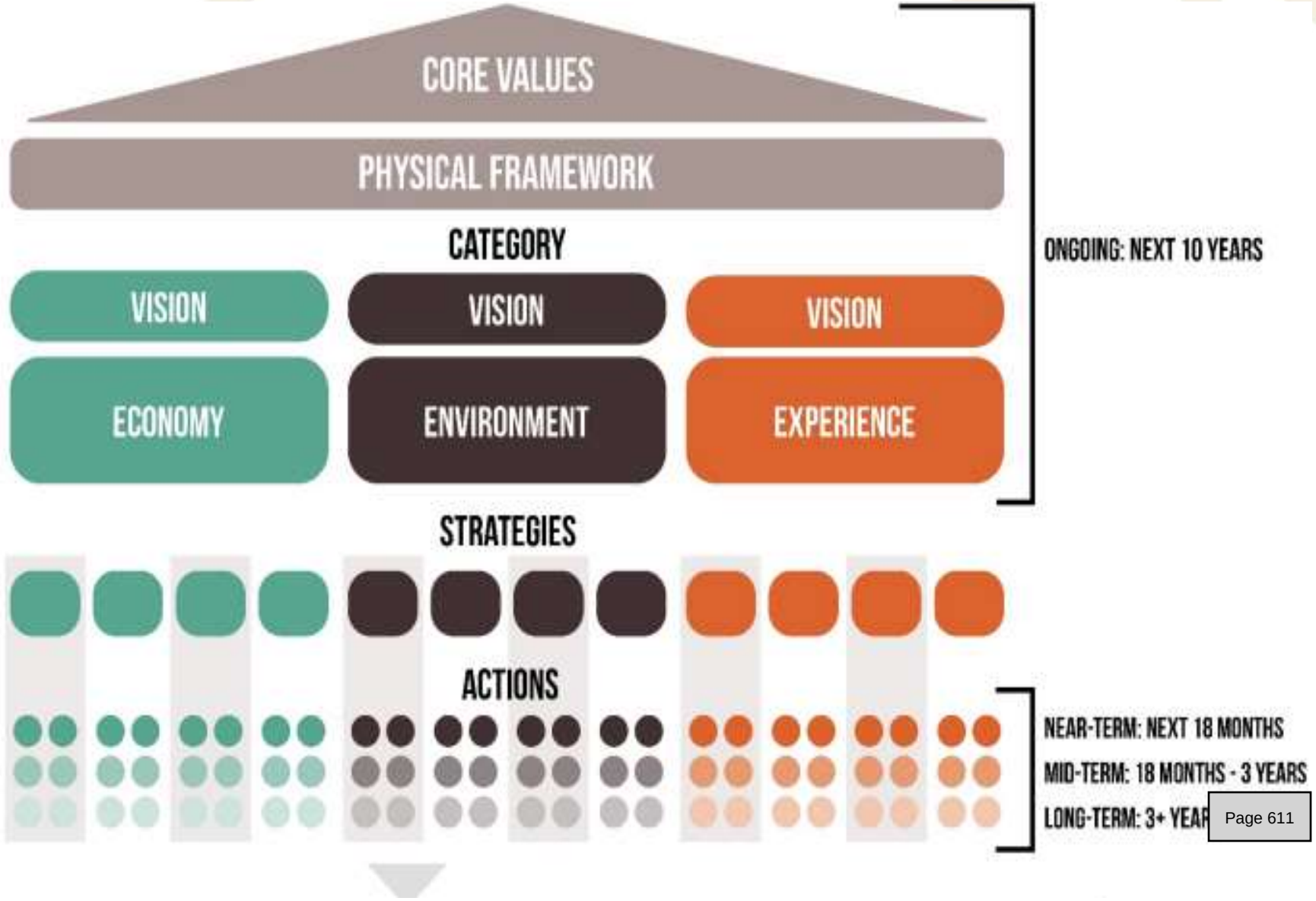
In 2032..

- Downtown Greeley's **ECONOMY** will be robust and diverse, offering residents, employees, students, patrons, and visitors a range of options for jobs, housing, shopping, and dining.
- The Downtown physical **ENVIRONMENT** and public realm will be inviting and accessible for people walking or using mobility devices, biking, riding transit, or driving.
- The Downtown **EXPERIENCE** will be vibrant, fun, welcoming, and inclusive.

Actions/Recommendations

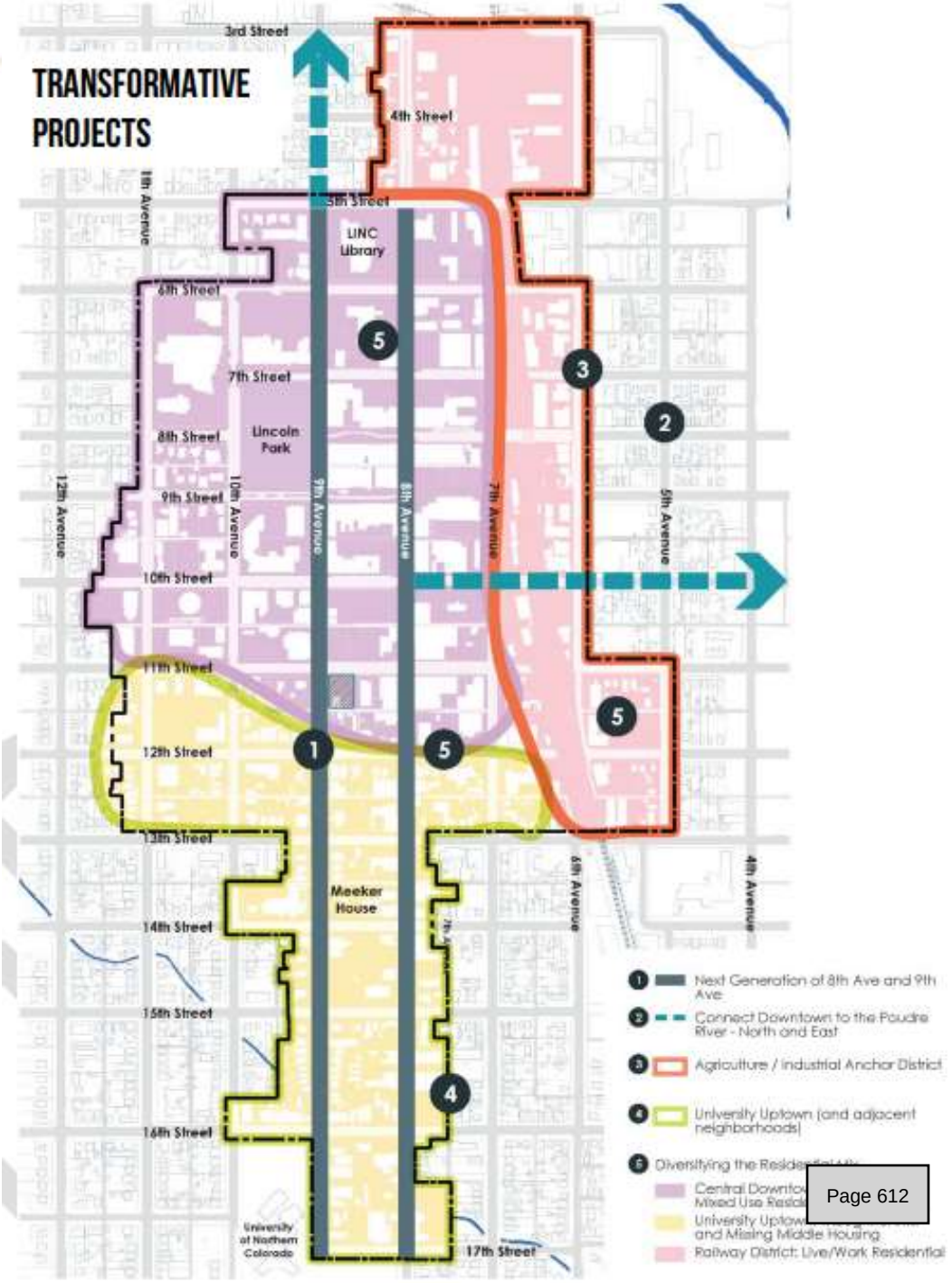
91 specific recommended actions are categorized within three overarching categories.

Key or lead parties for each action are suggested as well as a conceptual cost and general time frame.



Focused Opportunities

- The Plan also invites special focus on actions that have opportunity to be “force multipliers” with broad appeal, return on investment and expanded brand imaging for the greater Downtown area.



Consider the opportunity to activate and brand the Railway District in a distinctive way

Another way to image the multi-use 9th Avenue Corridor connecting Downtown with soft commercial and residential uses via a variety of mobility modes

Key Implementation Action

- While a multitude of interests will each contribute to the success of the 2032 Downtown Plan, it is important to establish who will “own” and orchestrate the key objectives for the success of the recommendations

- Staff recommendation is to incorporate this Plan into the City’s Strategic Work Program and formalize a working relationship with the three ‘anchor’ institutions as the **City. DDA. UNC Partnership**

Review Entities: Recommendations

- **Downtown Development Authority**
  - Reviewed Plan: December 15th
- **Planning Commission**
  - Reviewed Plan/Public Hearing: January 10th
- **City Council Work Session**
  - Reviewed on January 10th

Questions/Discussion

Council Agenda Summary

January 17, 2023

Key Staff Contact: Becky Safarik, Interim Community Development Director

Meg Oren, Planner II

Title:

Public hearing and second reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from Holding-Agriculture (H-A) to Residential-High Density (R-H), changing the underlying land use designations for approximately 31.19 acres of property located north of and adjacent to 13th Street and the Fox Run Neighborhood, approximately 500' west of 59th Avenue, and approximately 580' south of 10th Street (ZON2021-0016)

Summary:

The property owner, Bear Rock, LLC, requests a rezone of the subject property to allow for residential development options. The applicant is looking to incorporate residential density in the area to support existing and future commercial properties located adjacent to the property to the north along 10th Street and to the east along 59th Avenue.

The Planning Commission considered this request on September 27, 2022, conducted a public hearing, and voted to recommend approval to rezone the property by a vote of 5-0. City Council introduced this ordinance at its October 18, 2022, meeting and, at the applicant's request, continued the public hearing and consideration of this item to its November 15, 2022 meeting and again, upon the property owner's request, approved a second continuation of this matter to the January 17, 2023 City Council meeting.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
Is there grant funding for this item?	N/A

Legal Issues:

Consideration of this matter is a quasi-judicial process which includes the following public hearing steps:

1) City staff presentation
2) Council questions of staff
3) Applicant presentation
4) Council questions of applicant
5) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
6) Rebuttal, if requested
7) Council discussion
8) Council decision

Other Issues and Considerations:

None

Strategic Focus Area:
Conformance with the policies of the City of Greeley Comprehensive Plan

Decision Options:
1) Adopt the ordinance as presented; or
2) Amend the ordinance and adopt as amended; or
3) Deny the ordinance; or
4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:
Two motions are necessary o approve this request:
1) A motion that, based on the application received, the preceding analysis and Planning Commission recommendation, the proposed rezoning from Holding-Agriculture (H-A) to Residential-High Density (R-H) is found to be in compliance with Title 24-204(b) and therefore approve the request.
2) A motion to adopt the Ordinance and publish with reference to title only.

Attachments:
Ordinance
Planning Commission Minutes (September 27, 2022)
Planning Commission Summary (Staff Report, September 27, 2022)
Staff PowerPoint presentation
Applicant PowerPoint presentation
Neighbor Letters

CITY OF GREELEY, COLORADO
ORDINANCE NO. 43, 2022
CASE NO. ZON2021-0016

AN ORDINANCE CHANGING THE OFFICIAL ZONING MAP OF THE CITY OF GREELEY, COLORADO, FROM HOLDING AGRICULTURE (H-A) TO RESIDENTIAL HIGH DENSITY (R-H) CHANGING THE UNDERLYING LAND USE DESIGNATIONS FOR APPROXIMATELY 31.19 ACRES OF PROPERTY LOCATED NORTH OF AND ADJACENT TO 13TH STREET AND THE FOX RUN NEIGHBORHOOD, APPROXIMATELY FIVE HUNDRED FEET (500') WEST OF 59TH AVENUE AND APPROXIMATELY FIVE HUNDRED AND EIGHTY FEET (580') SOUTH OF 10TH STREET.

BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. The following described property located in the City of Greeley is hereby changed from the zoning district referred to as Residential Estate (R-E) and Commercial Low Intensity (C-L) TO Residential High Density (R-H), in the City of Greeley, County of Weld, State of Colorado:

Legal Description

MULTIPLE PARCELS OF LAND FOR REZONING PURPOSES ALL SITUATE WITHIN THE NORTH HALF OF THE NORTHEAST QUARTER (N1/2NE1/4) OF SECTION NINE (9), TOWNSHIP FIVE NORTH (T.5N.), RANGE SIXTY-SIX WEST (R.66W.), OF THE SIXTH PRINCIPAL MERIDIAN (6TH P.M.), CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTH QUARTER CORNER OF SECTION 9 AND ASSUMING THE NORTH LINE OF THE NORTHEAST QUARTER OF SAID SECTION 9 TO BEAR SOUTH 89°24'44" EAST A DISTANCE OF 2658.31 FEET WITH ALL OTHER BEARINGS CONTAINED HEREIN RELATIVE THERETO:

THENCE SOUTH 00° 03' 21" EAST ALONG THE WEST LINE OF THE NORTH HALF OF THE NORTH HALF OF THE NORTHEAST QUARTER (N1/2N1/2NE1/4) OF SAID SECTION 9 A DISTANCE OF 659.27 FEET TO THE NORTH SIXTY-FOURTH CORNER OF SECTION 9 AND TO THE **POINT OF BEGINNING**.

THENCE SOUTH 89° 26' 43" EAST ALONG THE SOUTH LINE OF THE N1/2N1/2NE1/4 OF SAID SECTION 9 A DISTANCE OF 500.03 FEET TO THE EASTERLY LINE OF THE WEST 500.00 FEET OF THE N1/2N1/2NE1/4 SECTION 9.
THENCE SOUTH 89° 26' 43" EAST ALONG SAID SOUTH LINE OF THE N1/2N1/2NE1/4 OF SECTION 9 A DISTANCE OF 268.63 FEET TO THE NORTHEAST CORNER OF PARCEL NO. 2 AS DESCRIBED IN QUIET TITLE DECREE RECORDED MARCH 11, 2022 AS RECEPTION NO. 4809527 OF THE RECORDS OF WELD COUNTY.
THENCE SOUTH 00° 22' 29" EAST ALONG THE EASTERLY LINE OF SAID PARCEL NO. 2 AS DESCRIBED IN QUIET TITLE DECREE A DISTANCE OF 4.49 FEET TO THE NORTHWEST CORNER OF TRACT A, BEAR ROCK SUBDIVISION RECORDED SEPTEMBER 10, 2020 AS RECEPTION NO. 4628668 OF THE RECORDS OF WELD COUNTY.

THENCE SOUTH 89° 38' 14" EAST ALONG THE NORTHERLY LINE OF SAID TRACT A, BEAR ROCK SUBDIVISION A DISTANCE OF 1291.92 FEET TO THE NORTHEAST CORNER OF TRACT A, BEAR ROCK SUBDIVISION.
THENCE SOUTH 00° 22' 29" EAST ALONG THE EASTERLY LINE OF SAID TRACT A, BEAR ROCK SUBDIVISION A DISTANCE OF 501.80 FEET;
THENCE SOUTH 89° 24' 44" EAST A DISTANCE OF 20.41 FEET TO THE WESTERLY LINE OF TRACT 1, SHOPS AT SUNSET RIDGE SUBDIVISION RECORDED AUGUST 13, 2007 AS RECEPTION NO. 3496647 OF THE RECORDS OF WELD COUNTY.
THENCE SOUTH 00° 22' 58" EAST ALONG THE WESTERLY LINE OF SAID TRACT 1 A DISTANCE OF 156.14 FEET TO THE SOUTH LINE OF THE NORTH HALF OF THE NORTHEAST QUARTER (N1/2NE1/4) OF SAID SECTION 9.
THENCE NORTH 89° 28' 35" WEST ALONG SAID SOUTH LINE OF THE N1/2NE1/4 OF SECTION 9 A DISTANCE OF 2084.73 FEET TO THE CENTER-NORTH SIXTEENTH (C-N1/16) CORNER OF SAID SECTION 9.
THENCE NORTH 00° 03' 21" WEST ALONG THE WEST LINE OF THE NORTH HALF OF THE NORTHEAST QUARTER OF SAID SECTION 9 A DISTANCE OF 659.20 FEET TO THE NORTH SIXTY-FOURTH CORNER OF SECTION 9 AND TO THE **POINT OF BEGINNING.**

SAID DESCRIBED PARCELS OF LAND CONTAIN 31.19 ACRES, MORE OR LESS.

Section 2. The boundaries of the pertinent zoning districts as shown on the official zoning map are hereby changed so as to accomplish the above-described zoning changes, and the Mayor and City Clerk are hereby authorized and directed to sign and attest an entry which shall be made on the official zoning map to reflect this change.

Section 3. This ordinance shall become effective five (5) days after its final publication as provided by the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED, THIS _____ DAY OF JANUARY, 2023.

ATTEST: **THE CITY OF GREELEY**

_____ _____

City Clerk **Mayor**

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City of Greeley, Colorado
PLANNING COMMISSION PROCEEDINGS
September 27, 2022

1. Call to Order

Chair Yeater called the meeting to order at 1:16 PM.

2. Roll Call

The hearing clerk called the roll.

PRESENT
Chair Justin Yeater
Commissioner Louisa Andersen
Commissioner Erik Briscoe
Commissioner Jeff Carlson
Commissioner Larry Modlin
Commissioner Christian Schulte

ABSENT
Commissioner Brian Franzen

3. Approval of Agenda

There were no corrections or additions to the agenda. It was approved as presented.

4. Approval of September 13, 2022, Minutes

Commissioner Briscoe moved to approve the minutes dated September 13, 2022. Commissioner Modlin seconded the motion. Motion carried 5-0. (Commissioner Franzen absent.)

5. A Public Hearing to consider a rezone from H-A (Holding Agricultural) to the R-H (Residential High Density) zone district. The properties consist of approximately 31.19 acres of property and are located south of 10th Street, north of 13th Street and west of 59th Avenue (ZON2021-0016).

Meg Oren, Planner II, explained the property and described the nearby zoning and land uses. She gave the historic timeline of the site, noting past annexations and a special use review for an oil and gas facility. Ms. Oren discussed the reason for requesting a rezone on this property and what the applicant is proposing. She then stated that the proposed residential high rezoning would have the potential to create a transition between nearby residential neighborhoods, along with commercial activity on 10th Street. Ms. Oren stated that the developer of the site would be required to construct the 63rd / 65th Avenue, from 13th Street to 10th Street , widen portions of 13th Street, and construct 11th Street through the property. She said that as part of the review process, a neighborhood meeting was virtually held on January 5th of this year. A total of 388 notice letters were sent to surrounding property owners

within 1000 feet of the subject site. In response to the letters, she received three phone calls from nearby citizens, who shared concerns regarding traffic, congestion, and a curiosity of what was being proposed.

Commissioner Schulte asked if anyone still has a right to put the use by special review for drilling into effect. Ms. Oren stated that she believed it was expired but wanted to confirm with Becky Safarik, Community Development Director.

Ms. Safarik said that the special use had expired and would no longer be able to drill on the site unless they could meet certain setback requirements and obtain approval by the Planning Commission.

Commissioner Schulte was curious if a past RV park request in the area was still a concern. Ms. Oren said that it was not. .

Chair Yeater stated he knew they are only considering rezoning at this point but wondered if any building on the property would require further construction of 63rd and 65th avenue, and then 11th and 13th street development. Ms. Oren stated that if any future development occurs then it would indeed require the roadway construction.

Commissioner Modlin asked if the intersection of10th Street and 63rd Avenue would warrant a traffic light with the change in zoning. Ms. Oren stated that Thomas Gilbert, Engineer III, would be able to answer that question.

Mr. Gilbert specified that CDOT and the City's Transportation Planner reviewed the project and had no concerns. He told Commissioner Modlin that a traffic light would definitely need to add to that location with future development.

Commissioner Modlin asked if there will be a signal by 13th Street and 59th Avenue. Mr. Gilbert stated that in the short term it does not warrant adding a signal, but there is some concern about it failing with or without the development in the long term. The applicant should address the specific uses in the long-range site plan when that happens.

Clara Russo, 419 Canyon Avenue, Ft. Collins, presented on behalf of Ripley Design Inc. along with Stephanie Thomas with Northern Engineering. She stated a preliminary application was submitted in 2021 and a neighborhood meeting was held in 2022. She also explained how rezoning would align with the intent of the Comprehensive Plan to provide horizontal mixed use in that area. Ms. Russo said that it would provide a nice transition from the commercial uses to the north and single-family residences to the south. She wrapped up but explaining a market study was completed for this proposal, which outlined the need for additional high-density housing within the next three years, which would not impact the existing properties.

Chair Yeater opened the public hearing at 1:32 PM.

Roger Richman, 6120 West 15th Street, spoke on behalf of the Fox Run Homeowner's Association. He stated they are already surrounded by problems that come with high-density residential properties and adding more high density would only add to the existing problems. Mr. Richman also spoke about the traffic concerns and the high

school students' speeding issues.

Commissioner Andersen joined the meeting.

Suzanne Mall, 6319 13th Street Road, stated that 13th Street is directly behind her home. She said that the noise is already too much and hopes the city will add a noise abatement in the area. Ms. Mall is also concerned about the congestion this will cause, due to the large number of apartments and additional vehicles.

Heather Boss, 633913th Street Road, believes that she will lose privacy due to the tenants being able to view her home and backyard from the tall apartments. She said that the traffic and noise concern is already a huge problem. Ms. Boss reiterated that point, by sharing a recent story of a truck that crashed into her neighbor's yard. She feels the road has become a racetrack and shared her concern for the high school students' safety since they frequently jog along that road.

Donna Richman, 6120 15th Street, voiced her concern regarding property values going down. Previous buildings have been built in the area but were set too close to Fox Run development. Consequently, many people sold their homes. Ms. Richman requested that an adequate buffer be placed between the existing single-family homes and the apartments.

Chair Yeater closed the public hearing at 1:42 PM.

Ms. Russo noted that at this time, they do not yet have a site plan since they are in the first phase of their land use approval request. She said however, when they get a site plan that it will meet the code as outlined in the R-H zone district. The connection of 63rd / 65th Avenue (from 13th Street to 10th Street) will be developed in the future.

Commissioner Briscoe specified the Planning Commission hearing is only for the rezone request, moving from C-H to R-H to R-L seems like the proper transition. He noted that the R-H zone district would allow for three-story apartments He also believes that a signalized intersection at 63rd /65th Avenue at 10th Street will alleviate some of the traffic concerns.

Commissioner Briscoe moved that, based on the application received and the preceding analysis, the Planning Commission find that the request to rezone from Holding Agriculture to Residential High Density is in compliance with Development Code section 24-204b; and therefore, recommends approval. Commissioner Schulte seconded the motion.

Commissioner Schulte wanted to make sure it was clear to the public that there are more steps between today's decision and the project being built. Before the applicants breaks ground, they will have to approach the city again with a completed site plan. He stated there will be another opportunity for the public to give their feedback.

Chair Yeater said that this will be a nice transition and will open up possibilities for what could be situated there. He also believes that with the addition of roads a lot of traffic concerns could be mitigated.

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Commissioner Schulte believes that new developments should help the open country roads feel more like city roads thus reducing the temptation to drive haphazardly.

Commissioner Modlin stated the developer is also using some alternative dwellings in that same zone. He believes it is already very wise in terms of spreading the noise and buffering the high density on the north side.

Motion carried 6-0. (Commissioner Franzen absent).

6. Staff Report

Ms. Safarik stated that there were no business items to report but reintroduced the returning Planner on staff, Caleb Jackson, Planner III.

7. Adjournment

With no further business before the Commission, Chair Yeater adjourned the meeting at 1:50 PM.

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Justin Yeater
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Justin Yeater, Chair

DocuSigned by:
Becky Safarik
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Becky Safarik, Secretary

PLANNING COMMISSION SUMMARY

ITEMS: Rezoning

FILE NUMBER: ZON2021-0016

PROJECT: 13th Street Apartments Rezone

LOCATION: North of and adjacent to 13th Street, west of 59th Avenue and south of the commercial properties along 10th Street

APPLICANT: Sam Coutts, Ripley Design, on behalf of the Owner, Bear Rock LLC

CASE PLANNER: Meg Simonds, Planner II

PLANNING COMMISSION HEARING DATE: September 27, 2022

PLANNING COMMISSION FUNCTION:
The Planning Commission shall consider the staff report, along with testimony and comments made by the applicant and the public and shall then make a recommendation to the City Council regarding the application in the form of a finding based on the review criteria in Section 24-204(b) of the 2021 Development Code.

EXECUTIVE SUMMARY
The City of Greeley is considering a request by the property owner, Bear Rock LLC, represented by Sam Coutts and Klara Rossouw of Ripley Design, to rezone an approximately 31.19-acre property from Holdings Agricultural (H-A) to Residential High Density (R-H). The property is located north of and adjacent to 13th Street and the Fox Run neighborhood, approximately five hundred feet (500') west of 59th Avenue and approximately five hundred and eighty feet (580') south of 10th Street. Please reference the enclosed Vicinity Map.

A. REQUEST
The proposed request is for an approval to rezone 31.19 acres from H-A to R-H zone district. The applicant is looking to incorporate residential density in the area to support existing and future commercial properties located adjacent to the property to the north along 10th Street and to the east along 59th Avenue. The property is located within walking distance of the Funplex recreation facility, Twin Rivers Community Park and the Sheep Draw Trail system. The R-H zone district allows for single-family detached, single-family attached and multi-family dwelling units.

B. STAFF RECOMMENDATION
Approval

C. LOCATION
Abutting Zoning/Land Use:
North: C-H (Commercial High Intensity) / existing commercial uses

South: R-L (Residential Low Density) / residential development
East: C-H / undeveloped, future commercial uses
West: H-A / open space (City owned)

Site Characteristics:
The site is predominately undeveloped with an older home and sheds placed near the eastern edge of the property. The overall topography follows that of 13th Street and is higher at the eastern end and falls from the west towards the Sheep Draw.

D. BACKGROUND

The subject property was annexed into the city as part of the West 10th Street Annexation (*Rec. No. 0003430086*) [Case No. A 5:06; Ordinance No. 51:06] on October 25, 2006. Prior to that, the property had been an enclave since 2001.

Establishment of zoning for the subject site with the West 10th Street Annexation [Case No. Z 8:06; Ordinance No. 52:06] was also approved by the City Council on October 25, 2006. The subject property was designated as C-H (Commercial High Intensity) along 10th Street and H-A (Holding Agriculture) zoning along 13th Street.

The subject property had a proposed Use by Special Review for oil and gas wells, known as the Sheep Draw Directional Project USR (*Case No. 0003959996*) [Case No. USR 2:13]. The application was reviewed by the Planning Commission on March 12, 2013, continued to March 26, 2013, and was approved by Planning Commission on May 7, 2013. The Final Approval Document was recorded on August 29, 2013. The approved project was never implemented, and the subject site remains vacant to today.

APPROVAL CRITERIA

Standards for Rezoning (ZON2021-0016):
In reaching recommendations and decisions as to rezoning land, the Planning Commission and the City Council shall apply the review criteria established in Section 24-204(b) of the Development Code:

1. **The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan.**

   Staff Comment: The subject property is identified in the Comprehensive Plan as part of a Mixed-Use High Intensity area that extends from 10th Street to 13th Street and from 59th Avenue to the Sheep Draw Trail corridor. The R-H zone district encourage a variety of densities and range of housing options.

The proposal to add higher residential density adjacent to the existing commercial property along 10th Street and 59th Avenue should help support existing businesses and the expansion of new businesses and redevelopment along the 10th Street corridor. Additional residential density on the subject property would also provide a transition between the single-family detached residences in the Fox Run neighborhood to the south and the commercial properties to the north (along 10th Street). Future residents, generated by the development of the site, would be located within walking distance of recreational facilities, amenities, and local and regional commercial centers.

The request complies with this criterion.

2. **The proposal can fulfill the intent of the zoning district considering the relationship to surrounding areas.**

   Staff Comment: The proposed rezone would provide opportunities to add residential densities adjacent to and within walking distance of current and future commercial uses along 10th Street and 59th Avenue. The future development of this property has the potential to create a transition between the Fox Run neighborhood to the south and the commercial activity along 10th Street to the north.

   The request complies with this criterion.

3. **Whether the area changed or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area.**

   Staff Comment: The rezone request would help support current commercial businesses within the area and encourage redevelopment of properties along the 10th Street corridor. As part of the future development of the site, the developer would be required to construct the 63rd and 65th Avenue connections, widen areas of 13th Street and construct 11th Street through the property.

   This request complies with this criterion.

4. **Whether the existing zoning has been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity.**

Staff Comment: The existing H-A zone district is intended to serve as a "pre-development" district to hold areas until a coordinated development plan is in place. The R-H district provides transitions between lower-density neighborhoods (such as the Fox Run neighborhood to the south) and non-residential uses (such as the commercial district along 10th Street).

The request complies with this criterion.

5. **The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces, and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development.**

Staff Comment: The applicant noted in their narrative that the future development would include the construction of additional roadway infrastructure to serve the property, completing missing segments of the urban street grid in this area. Higher density residential development in this area could also serve as an appropriate transition between the Fox Run neighborhood to the south and the commercial uses along 10th Street to the north. Site plan details including buffering and on-site transitions, as well as architectural character would be reviewed in greater detail as part of a formal site development plan application.

The request complies with this criterion.

6. **The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district.**

Staff Comment: Staff and referral agencies have reviewed the proposal and have no concerns at this time. At the time of subdivision, the applicant would need to provide final reports and analysis that conform with City and agency requirements. There are existing water and sewer utilities adjacent to the property that would be extended to serve the future development.

The request complies with this criterion.

7. **The change will serve a community need, provide an amenity, or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning.**

Staff Comment: The proposed rezoning would not allow the applicant to develop the property as it is currently zoned H-A, which is intended as a "pre-

development" district. The rezoning request to Residential-High Density is consistent with the goals and intent of the zoning regulations and Comprehensive Plan to provide a transition between residential densities and commercial districts. A market study was commissioned for this rezone by the developer and is included for reference and review. Additional details would be reviewed as part of the subdivision and applicable site plan processes, consistent with the Development Code design criteria.

The request complies with this criterion.

8. **Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community.**

   Staff Comment: Any development proposal will be required to meet Development Code, Subdivision and Design criteria and will be evaluated against those criteria as part of the review process. The applicant did complete a preliminary traffic analysis as part of the rezoning request. The proposed roadway improvements and connections are intended to mitigate congestion and will be reviewed in greater detail as part of the subdivision and site plan processes.

   The request generally complies with this criterion and will be evaluated in greater detail with formal development plans.

9. **The recommendations of professional staff or advisory review bodies.**

   Staff Comment: Staff and referral agencies have reviewed the rezoning request and have no concerns at this time. Further analysis would be conducted at the time of subdivision and site planning, as applicable. Development plans must meet the subdivision and design criteria established under the Development Code.

   The request generally complies with this criterion and will be evaluated in greater detail with formal development plans.

Consistency with the Land Use Chapter of the Comprehensive Plan. *A rezoning proposal shall be found to be in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan.*

The following Comprehensive Plan goals are met with this PUD proposal:

- GC-1: Manage growth effectively.
  - The proposed development is located adjacent to existing developed areas within the city and is adjacent to existing utility infrastructure that can serve the proposal.

- GC-2: Promote a balanced mix and distribution of land uses.
    - The proposed rezoning and future development provide a mix of land uses in the area and transitions between land uses of varying intensities and densities.
- GC-4: Prioritize infill and redevelopment
    - The property serves as an infill site surrounded by existing developments. Adding additional residential densities in the area could promote the redevelopment and development of vacant or underutilized commercial properties adjacent to the site.
- HO-2: Encourage a broad diversity of housing options.
    - The rezoning request and future development could provide a variety of housing options to the area adjacent to existing single-family detached residences.

F. PHYSICAL SITE CHARACTERISTICS

HAZARDS

The site's proximity to the Sheep Draw, wetlands and open space corridor will require careful final design and construction of adjacent infrastructure to mitigate any impacts to these natural areas.

WILDLIFE

A current biologist report would be required with the subdivision application to identify wildlife observed on-site and in the vicinity of the property.

FLOODPLAIN

The intended development area is not located within the l00-year floodplain, according to the adopted Federal Emergency Management Administration (FEMA) flood data.

DRAINAGE AND EROSION

The applicant will be required to submit final engineering reports and design the site to meet City criteria. Once construction documents are created, the applicant would be required to meet the City's current MS4 permit requirements as well as the City of Greeley Design Criteria and Construction Specifications.

TRANSPORTATION

The applicant's narrative describes the construction of 63rd/65th Avenue, widening of 13th Street and the construction of 11th Street as part of the future development of the site. The City of Greeley Transportation Planner and Engineering Development Review have reviewed the Traffic Study and have no significant concerns at this point. Further traffic analysis would occur at time of Subdivision.

G. SERVICES

WATER

The City of Greeley provides water services to the area. Water lines would need to be extended and looped from the existing 12" and 10" water lines located along 13th Street. Water

provisions, including non-potable, within the development would be reviewed at time of Subdivision.

SANITATION
The City of Greeley would provide sanitary services to the area. Additional infrastructure will be required to serve this property to connect to the existing infrastructure.

Sanitary Sewer and any applicable agreements would be reviewed at time of Subdivision.

EMERGENCY SERVICES
The property is served by the City of Greeley's Police and Fire Departments. Fire Stations #7 is located approximately 0.25 miles west of the site and north of 10th Street.

PARKS AND OPEN SPACES
Parks and Open Space details have not been provided for at this time. Final details will be provided at the time of Subdivision.

SCHOOLS
The subject property is located within the Greeley-Evans School District. A school site is not required to be dedicated with this project; however, the applicant will be required to pay cash-in-lieu to the district for school land dedication requirements at time of Subdivision.

METROPOLITAN DISTRICT
The subject property is not associated with a Metropolitan District.

H. NEIGHBORHOOD IMPACTS

VISUAL
Visual impacts will be reviewed for at time of subdivision against landscape and buffer requirements set forth in Code.

NOISE
Any potential noise created by future development will be regulated by the Municipal Code.

I. PUBLIC NOTICE AND COMMENT

A neighborhood meeting was held virtually via Zoom on January 5, 2022. Notice for the meeting was mailed to addresses within 500’ of the subject site on December 22, 2021. Nine individuals from the public attended the meeting and no concerns were communicated.

Notice for the Planning Commission meeting was mailed as per 24-201. f.3 of Greeley Municipal Code on September 12, 2022, to addresses within 1,000’ of the subject site, and a notice was published on the City’s website per Development Code requirements. Two signs were posted on the site on September 09, 2022, by the applicant as per City requirements.

As of the finalization of this report no written comments have been received and one phone call from a neighbor with concerns for the potential of increased traffic due to future development that could occur with the proposed rezoning.

J. PLANNING COMMISSION RECOMMENDED MOTIONS

Based on the application received and the preceding analysis, the Planning Commission finds that the request to rezone from Holding-Agriculture (H-A) to Residential High Density (R-H) is in compliance with Development Code Section 24-204(b) and therefore recommends approval.

ALTERNATIVE MOTION

Based on the application received and the preceding analysis, the Planning Commission finds that the request to rezone from Holding-Agriculture (H-A) to Residential High Density (R-H) is not in compliance with Development Code Section 24-204(b) and therefore recommends denial.

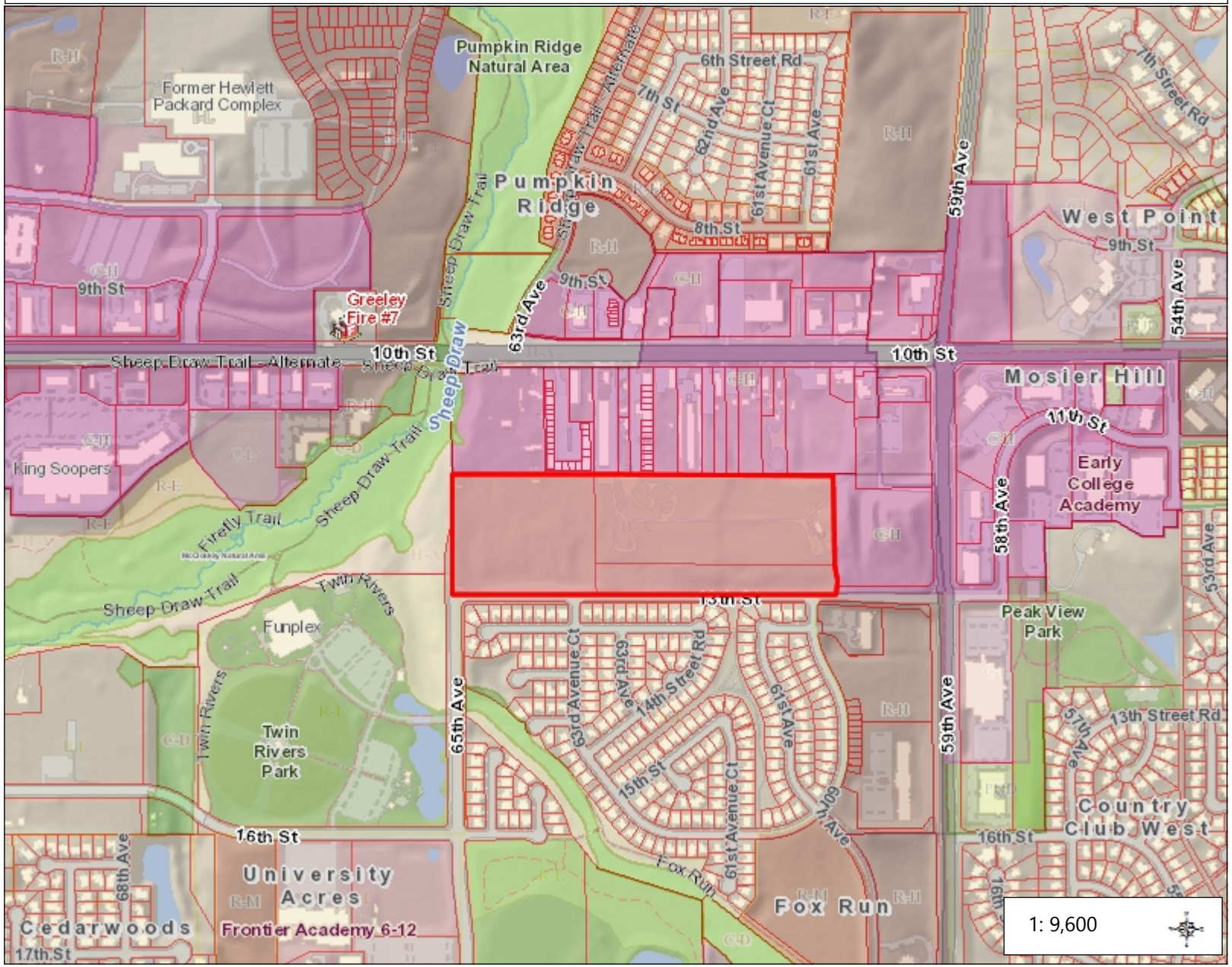
ATTACHMENTS

Attachment A – Zoning/Vicinity Map
Attachment B – Application
Attachment C – Project Narrative
Attachment D – Market Study
Attachment E – Rezoning Plat

ZON2021-0016 Staff Report
Attachment A: Zoning/Vicinity Map

CITY OF GREELEY ORIGIN

13th Street Apartments Rezone Vicinity Map



Legend

- City Voting Wards
- GreeleyBaseData.DBO.FIRMn
- Greeley Fire Response Areas
- Weld Subdivisions
- Zoning
  - Conservation District (C-D)
  - Commercial Low Intensity (C-L)
  - Commercial High Intensity (C-H)
  - Holding Agriculture (H-A)
  - Industrial Low Intensity (I-L)
  - Industrial Medium Intensity (I-M)
  - Industrial High Intensity (I-H)
  - Planned Unit Development (PUD)
  - Residential Estate (R-E)
  - Residential Low Density (R-L)
  - Residential Medium Density (R-M)
  - Residential High Density (R-H)
  - Residential Mobile Home (RMH)
- Colorado School Districts
- High School Attendance Areas
- Middle School Attendance Are
- Elementary School Attendance
- GreeleyBaseData.DBO.Parcel
- Greeley City Outline
- Other City Outlines
- Fire Stations

Notes

0.3 0 0.15 0.3 Miles

NAD_1983_HARN_StatePlane_Colorado_North_FIPS_0501_Feet

© City of Greeley GIS 8/31/2022

This map is a user generated static output from an Internet mapping site and is for reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable.

THIS MAP IS NOT TO BE USED FOR NAVIGATION OR SURVEY PURPOSES

ZON2021-0016 Staff Report
Attachment B: Application

Land Use Application

1 Please print or type all required information. This form is **NOT** the complete submittal. The application fee and all associated materials are to be provided with this form. Staff will review the submittal and advise you of its completeness for processing.

2

Project Name: Apartments on 13th Street Rezone

Land Use Request: Rezone

Address/Location: 6450 W 10th Street; 6314 W 10th Street

	Existing		**Proposed** *(if different)*	
Zoning	H-A and C-H		MU-H	
Site Use	Vacant		Determined at Site Plan Review	
Site Area	Acres: 38.99	Sq. Ft.: 1,698,229	Acres: 38.99	Sq. Ft.: 1,698,229

3

	Owner	**Submittal Contact** *(if different)*
Name	Bear Rock, LLC; Jannis Mitchell	Sam Coutts
Business	See owner's authorization form	Ripley Design Inc
Address	See owner's authorization form	419 Canyon Ave, Suite 200
Phone #	See owner's authorization form	970.224.5828
Fax #	See owner's authorization form	
E-Mail	See owner's authorization form	sam.coutts@ripleydesigninc.com

4 This application must be signed by **all owner(s)** of record or the authorized officer, if a corporation; current proof of ownership, such as a warranty deed, is to be submitted with this application. A letter of authorization should be submitted if the authorized representative will be acting on the owner's behalf.

I/We, the owner(s), depose and state under penalties of perjury that the application and support materials provided to the City of Greeley for the identified request(s) are true and accurate. I/We am/are fully aware of all requests being made to the City of Greeley and authorize individuals or firms to represent our interest in this/these request(s).

Name: Jack Schrager	Name:
Signature: Jack Schrager	Signature:
Date: 10/29/21	Date:

ZON2021-0016 Staff Report
Attachment C: Project Narrative

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13th Street Apartments Rezone

Rezoning Analysis | 11-12-2021

Project Narrative and Relationship to Surrounding Uses

This memo is being provided for the purpose of showing compliance with Greeley Development Code criteria for rezoning the property from C-H (Commercial High Intensity) and H-A (Holding Agriculture) to R-H (Residential High Density) per Sec. 24-204(b). The R-H district *"provides multi-family residential living in a moderate-density pattern in suburban neighborhoods **or** higher-density, and larger scale projects in strategic locations for walkable and urban neighborhoods."* The R-H intent is for the zoning to be *"located in areas that have transitions between lower-density neighborhoods or more intense non-residential uses **and** where a high level of accessibility, public amenity and support services are immediately available."* The subject parcels of this application total roughly 37 acres located south of 10th Street, north of 13th Street and east of 65th Avenue. Residential zoning such as R-L (Residential Low Density), R-H (Residential High Density), and R-M (Residential Medium Density) exist to the South and West while the adjacent areas to the North and East of the site are zoned C-H (Commercial High Intensity). The site proposed to be rezoned is located perfectly in between these differing zoning districts and can serve as a transitional buffer between vehicle intensive C-H and lower density residential zoning.

This transitional buffering can be done while adding a variety of higher density housing developments to the rezoned parcel. The R-H district is intended for higher density residential, such as multi-family dwellings, row house dwellings, and mixed-use dwellings (when granted use by special review). Increasing land use intensity from the existing single-family communities to the commercial developments along a major arterial provides excellent buffering from commercial zoning. Additionally, the rezone opens the land to a variety of housing options to ensure that the land is primed for the type of development that Greeley needs as it grows.

The Greeley MSA ranked as the No. 3 fastest growing nationwide from July 2018 to June 2019 and the No. 6 fastest growing in the country from 2010-2019 per data from the U.S. Census Bureau. Greeley also currently ranks No. 6 in Jobs & Economy and No. 48 overall on Wallethub's Fastest-Growing Cities in the U.S., ranking ahead of all other Colorado MSA's except for Denver. The applicant is currently commissioning a complete market study to better analyze this site specifically as it relates to the supply and demand of high density housing. The study will be provided for Staff's review upon its completion.

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The proximity to the Sheep Draw Trail allows for the opportunity that future development be a multi-modal community. With AIMS Community College in close proximity, added rentable housing stock to the area would increase the ability for students to live close to campus and not be reliant on vehicular transportation to attend classes. The Sheep Draw Trail also continues north from this site and eventually connects to the Poudre River Regional Trail. This connection to a regional trail that currently spans 21.8 miles East/ West from East Greely to West Windsor will provide a viable alternative commuting route and recreation options for users of a future development. Lastly, the parcel part of this rezone is adjacent to Twin Rivers Community Park and the Greeley Family FunPlex. These existing public amenities would immediately support residents of the future development and provide space for recreation.

The applicant team believes the parcels part of this rezoning application fit the intent of the R-H zoning district and the rezoning will have beneficial impacts to development on site and the Greeley community.

Vehicular and Pedestrian Connectivity

A traffic study has been included with this application which studies a potential residential development for the site in order to assess what the highest traffic demand for the site could be in the R-H zone district. Numerous connectivity improvements are proposed with this application. This piece of ground completes a key connection between 10th Street and 13th Street by linking 63rd Avenue and 65th Avenue along the western portion of the site. The entirety of 11th Street right-of-way is dedicated along the northern boundary and will connect to future developments to the east. 11th Street will act as the primary entrance to the development, as well as future access to commercial developments along 10th Street as it redevelops. While this project will not be responsible for the construction of 11th Street past the access point on the western portion, the right-of-way dedication provides a mechanism for the rest of the road to be built as redevelopment occurs along 10th Street. Other connections to local infrastructure include adding accessory access points to the property along 13th Street, which will have additional right-of-way dedicated and improvements installed. The public street sections include pedestrian facilities which will complete the pedestrian framework in the area and increase pedestrian circulation between communities. Sidewalk connections within the interior of the site to connect buildings/ amenities will also be required at the time of site development.

In addition to access and circulation on site, the parcels are also adjacent to the Sheep Draw Trail. This trail would connect the site to Twin Rivers Community Park and the Greeley Family FunPlex (1/4mile to the southwest). The Sheep Draw Trail also connects to the regional Poudre River Trail which would

allow the end users of this site to have an accessible east-west connection from Island Grove Regional Park in East Greeley to River Bluffs Open Space in West Windsor.

Rezone Review Criteria *24-204(b)*

1. *The proposal is in accordance with the goals and objectives the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan*
    - The proposed rezone follows the framework outlined in the Imagine Greeley Comprehensive Plan and is supported by many Goals and Principles of the plan. Rezoning this property to R-H district will allow future developers to better accomplish objectives of the Comprehensive Plan. The following Imagine Greeley objectives support the rezoning of these properties: ***ED-2.2*** *Assets and Amenities*, ***EH-2.3*** *Active Living*, ***EH-2.4*** *Land Use*, ***EH-2.5*** *Walkability & Bikability*, ***EH-2.6*** *Built Environment*, ***GC-1.2*** *Form of Growth*, ***GC-1.6*** *Transitions to Parks and Open Lands*, ***GC-2.1*** *Land Use Guidance Map*, ***GC-2.2*** *Jobs/Housing Balance*, ***GC-2.3*** *Pedestrian and Bicycle Oriented Development*, ***GC-4.1*** *Infill/ Redevelopment Areas*, ***GC-4.3*** *Infill Compatibility*, ***GC-5.4*** *Residential Development*, ***HO-2.1*** *Diversity in New Development*, ***HO-2.2*** *Rental Housing*, ***NR-2.7*** *Stormwater Management, and* ***TM-2.2*** *Bikeway System.*
2. *The proposal can fulfill the intent of the zoning district considering the relationship to the surrounding areas*
    - As stated above, this site exemplifies the intent of the R-H zoning district considering the relationship to adjacent land uses, opportunity to transition from and buffer existing residential uses and ability to connect to surrounding infrastructure.
3. *Whether the area changed, or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area*
    - Between the final build out of the Fox Run Subdivision to the south occurring within the last five years, CDOT's access plan for 10th Street, and the new development proposal expected along 59th Avenue, has changed substantially and is expected to continue to change. With the rapid growth of the Greeley community and need for a variety of housing types within City limits and the Front Range, rezoning the infill parcels from the limited C-H and H-A zone districts to the more inclusive R-H zone district will encourage development that will set up the community for success regardless of market conditions and trends.

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4. *Whether the existing zoning has been in place for a substantial time without development or redevelopment, and if this indicates the existing zoning is appropriate given the development trends of the area*
    - The existing zoning has been in place for a substantial time without redevelopment that follows the objectives outlined in the Comprehensive Plan. This is likely due to the large infrastructure burden the property carries. The combination of the acreage left for agricultural uses and the small portion of commercial zoning do not support land uses that drive enough revenue to fund such a large infrastructure burden. A denser or more intense use or mix of uses is required to justify the development of three new public roads.
5. *The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development.*
    - The requested zoning will allow for a mix of uses and housing types which allows for development to transition from lower density residential zoning districts to high vehicle use commercial zoning while adding amenities that both surrounding districts will be able to use. Any development that occurs within this zone will be required to meet zone specific and general standards regarding open space, street design, and architectural compatibility.
6. *The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district*
    - Since the subject properties are bounded on nearly all sides by existing development, there are no issues providing services to the proposed district. A utility and drainage study have been submitted with this application to further study the public services.
7. *The change will serve a community need, provide an amenity or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning.*
    - The change of zoning will provide additional housing stock for the Greeley community with the R-H zoning. Outdoor amenity areas will also be part of the development. These types of improvements serving the Greeley community needs are not permitted within the current H-A zoning. In addition, numerous public infrastructure projects will be completed by developing this property, which serves a community need.

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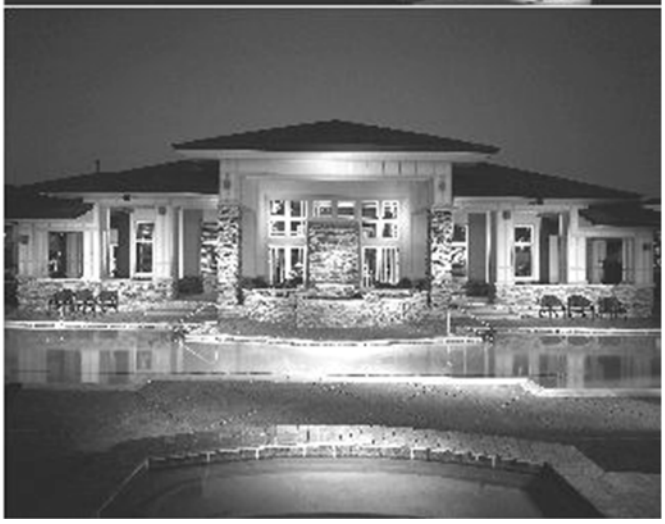
8. *Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community.*
    - While the site plan is still being designed, the applicant team is considering best practices for the site that utilizes sound planning, design, and engineering. It is not the intent of this rezone to negatively affect the surrounding land and its uses rather complement and improve those uses with this new zoning district.

ZON2021-0016 Staff Report
Attachment D: Market Study



Apartment Appraisers & Consultants, Inc.

MARKET STUDY

Proposed 13th Street Phase I Apartments
NE corner W. 13th St. & 65th Ave.
Greeley, Colorado 80634

EFFECTIVE DATE OF ANALYSIS

February 8, 2022

DATE OF REPORT

February 10, 2022

Mr. Jack Schrager
Loge Properties
Aspen, CO

PREPARED BY

Apartment Appraisers & Consultants, Inc.
1660 South Albion Street, Suite 1002
Denver, Colorado 80222
303.722.4222

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1660 South Albion Street, Suite 1002 • Denver, Colorado 80222 • 303.722.4222
www.ApartmentAppraisers.com

February 10, 2022

Mr. Jack Schrager
Loge Properties
414 AABC, Unit A
Aspen, CO 81611

Re: Proposed 13th Street Phase I Apartments
NE corner W. 13th St. & 65th Ave.
Greeley, Colorado 80634
Our File No. 222012

Dear Mr. Schrager:

At your request, we have completed a market study for the real property named above. The subject site is currently vacant land in the western part of Greeley, Colorado. Various existing uses are found in the surrounding blocks. In this market study, we have examined the potential of the site for rental apartment development only.

The purpose of this market study was to analyze market conditions, including metropolitan and submarket rents, vacancy, new supply, and demand. Based on our analysis, the Greeley market is not expected to experience oversupply during the next 3 years, and the anticipated new supply is not expected to impact existing apartment properties in the market area.

The intended users of the market study include the addressee above, design consultants engaged for this property, and interested equity investors and/or construction lenders. The intended use of the market study is to provide guidance to the developer and other interested parties. No other use of this report is intended or permitted. This market study is subject to the Assumptions and Limiting Conditions described in the accompanying report.

The scope of work included an analysis of the subject's location as well as supply and demand conditions in the northern Colorado region and in the Greeley submarket. The primary market area is considered to be the cities of Greeley and Evans. The secondary market is considered to be the northern Colorado region. This market study is based on existing and anticipated real estate activity. The scope of the analysis does not include user surveys or other consumer oriented research, which could also be performed to further identify renter preferences.

The analyses, opinions, and conclusions were developed, and this report has been prepared in conformance with the requirements of the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, the Uniform Standards of Professional Appraisal Practice (USPAP) as adopted by The Appraisal Foundation, and with the requirements of the State of Colorado for State Certified Appraisers.

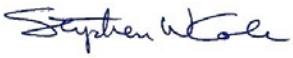
USPAP requires that an appraiser must have the knowledge and experience necessary to complete an assignment competently. The appraisers have extensive experience appraising and performing market studies of this type and size of property in this geographic area as described in the qualifications and shown in the list of selected assignments at the end of this report. Therefore, no additional steps were necessary to comply with this USPAP provision.

Engagement in this assignment and compensation for completing the assignment were not contingent upon developing or reporting predetermined results. We certify that we have no present or prospective interest in the property, and we have no personal interest with respect to the parties involved. The appraisers have performed no services, as appraisers or in any other capacity, regarding the property that is the subject of this report within the 3-year period immediately preceding acceptance of this assignment.

This report contains a total of 23 pages. All pertinent data we have gathered and our methods of estimating supply and demand are summarized in the report.

Respectfully submitted,
Apartment Appraisers & Consultants, Inc.

Cary W. Bruteig, MAI
Colorado State Certified General Appraiser
License No. CG1313164



Stephen W. Cole, MAI
Colorado State Certified General Appraiser
License No. CG1313502

APARTMENT MARKET OVERVIEW

In our analysis of the northern Colorado apartment market, we have relied primarily on the *Apartment Insights* survey (AI). It is prepared by Colorado Apartment Insights LLC, a joint effort between AA&C and RealData, which began surveying every property over 50 units in northern Colorado in the 3rd quarter of 2006. The 170+ properties surveyed each quarter contain over 25,000 units and provide the most accurate and consistent statistics for rents and vacancies for large apartment properties. All recent rents and vacancy rates presented in this report are quoted from this source.

Impact of the COVID-19 Pandemic

In the United States, the economy and real estate markets are recovering from the COVID-19 pandemic, though it remains a serious public health threat. Nevertheless, employment has not yet returned to pre-pandemic levels, and there are backlogs in the production of many construction materials and services. There are still delays in government and private investment functions.

The Coronavirus Aid, Relief, and Economic Security Act (CARES Act) has addressed economic impacts of the pandemic, replacing lost wages for many unemployed renters in the short term, allowing them to continue to pay rent. Increased unemployment benefits have also helped limit deterioration in the multifamily market. An eviction moratorium first issued by the Centers for Disease Control and Prevention (CDC) in September 2020, and later extended, has been declared unconstitutional and is no longer in effect. We cannot predict with any certainty how the rental market will be impacted as the CDC eviction moratorium and other similar policies expire.

On March 11, 2021, President Biden signed the American Rescue Plan Act of 2021, also called the COVID-19 Stimulus Package. It is a $1.9 trillion economic stimulus bill intended to speed up the country's recovery from the economic and health effects of the pandemic and the ongoing recession. The stimulus package includes numerous provisions that should continue to assist renters.

Renter payment statistics indicate that these programs and regulations have been effective. According to the National Multifamily Housing Council (NMHC) and the Colorado Apartment Association (CAA), rent collections nationally and in Colorado have been stronger than anticipated. The most recent data from the NMHC indicate that 92.0% of apartment households nationally made a full or partial rent payment as of the end of December 2021, down from 93.1% of renters who had paid by the end of November 2021. There has been a slight trend of decline during the last 3 months, which appears to reflect reductions in renter and business subsidies.

The CAA reported that 96.3% of Colorado renters made their payments in August 2021 (the most recent data available), which was well above the national average in August 2021. According to the CAA, Colorado collections have outperformed national collections in every month since tracking the numbers began in April 2020. In addition to government assistance, the statistics reflect the willingness of renters to prioritize their rent obligations and continue making payments.

The CAA also reported that eviction filings in Colorado remained at record lows in September 2021, reaching only 66.3% of September 2019 levels (pre-COVID). "Rent payments have remained strong and steady, and eviction filings have been abnormally low throughout the pandemic," said Drew Hamrick, senior vice president and general counsel at the Colorado Apartment Association. "The expiration of the eviction moratorium allowed our housing markets to return to normal, and that return hasn't brought a surge in eviction filings. Colorado's numbers remain well below pre-pandemic levels."

APARTMENT MARKET OVERVIEW - Continued

It appears that job growth and economic recovery are occurring just as government support is reaching its limits and eviction moratoriums are coming to an end. We are continually monitoring the situation, as well as relevant market data, and our estimates throughout this report reflect the best data and analysis currently available.

Northern Colorado Region

During the 1990s, the Fort Collins-Loveland-Greeley apartment market benefited from an expanding local economy with several years of low vacancy, increasing rents, and only limited new supply. However, the local supply increased significantly in the early 2000s, just as the economy slowed, resulting in high vacancy and minimal rent growth for 4 years. The local economy improved from the 2nd half of 2004 through the 1st half of 2008, and there was little new apartment supply, resulting in declining vacancy and increasing rents. In 2009, vacancy increased and effective rents declined in response to the national economic downturn beginning in late 2008. Strong market recovery occurred after mid-2010, with vacancy dropping to a record low 2.1% in late 2014 and early 2015 and rent growth exceeding 11% during this time period. Since then, vacancy has been moderately higher as new supply was delivered.

During the pandemic (2nd quarter of 2020 to present) vacancy peaked at 6.0% in the 1st quarter of 2021, but it has averaged only 4.6% during this 7-quarter period. Rents changed little during the early quarters of the pandemic, but they increased sharply during the 2nd half of 2021.

According to the *Apartment Insights* (AI) survey, the average vacancy rate for the Fort Collins-Loveland-Greeley region is 4.1% in the most recent 4th quarter 2021 survey, down from a rate of 4.6% in the same period a year earlier. Even during the pandemic year of 2020, regional vacancy averaged only 4.6%. During the last 5 years, vacancy has averaged only 4.3%, well below a stabilized 5% to 6% and indicating chronic pent-up demand.

The region's average gross rent of $1,536 is a substantial increase of 15.3% over the same period a year ago. The current average concession in the region is just $1, or 0.1% of the gross rent. The resulting average effective rent (net of concessions) is $1,535, an even higher increase of 17.9% over the same period a year ago. Both the gross and effective average rents are at record high levels.

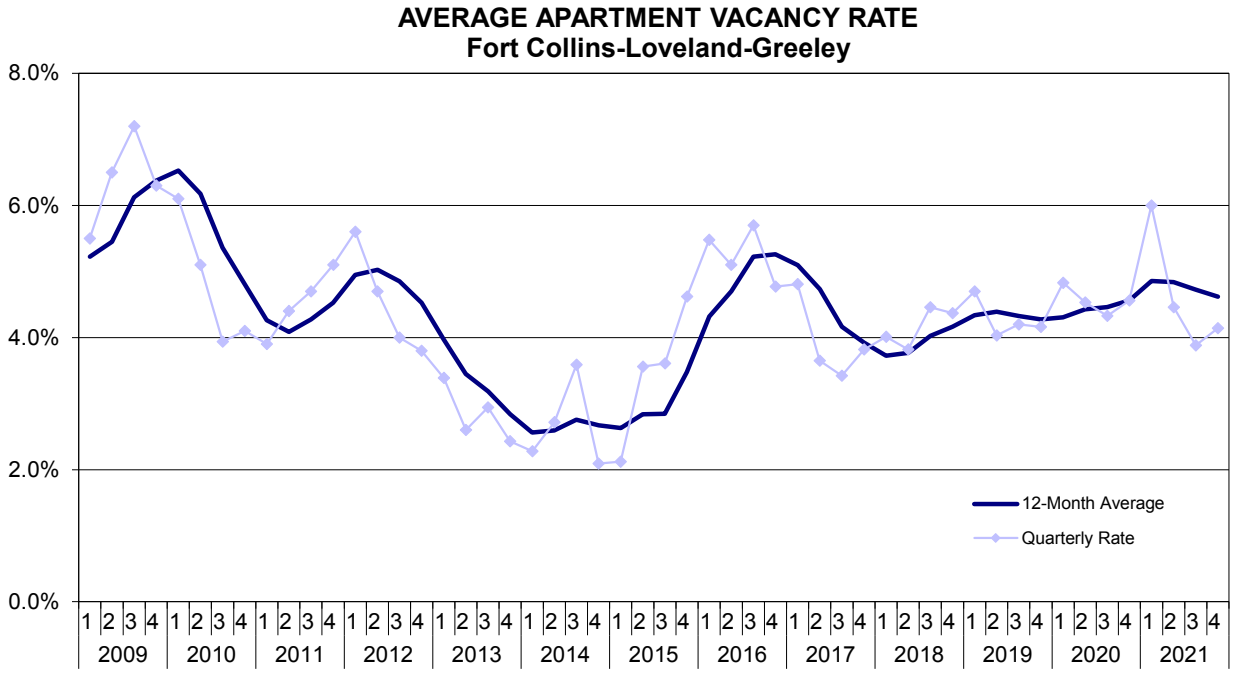
While the downturn in the oil and gas industry in Weld County was an influence several years ago, recent market fluctuations mostly reflect the increase in new supply, with recovery occurring as it has been absorbed. The pandemic was a minor influence in 2020 and the 1st quarter of 2021. Please refer to the table and graphs on the following pages for trends in vacancy and rents.

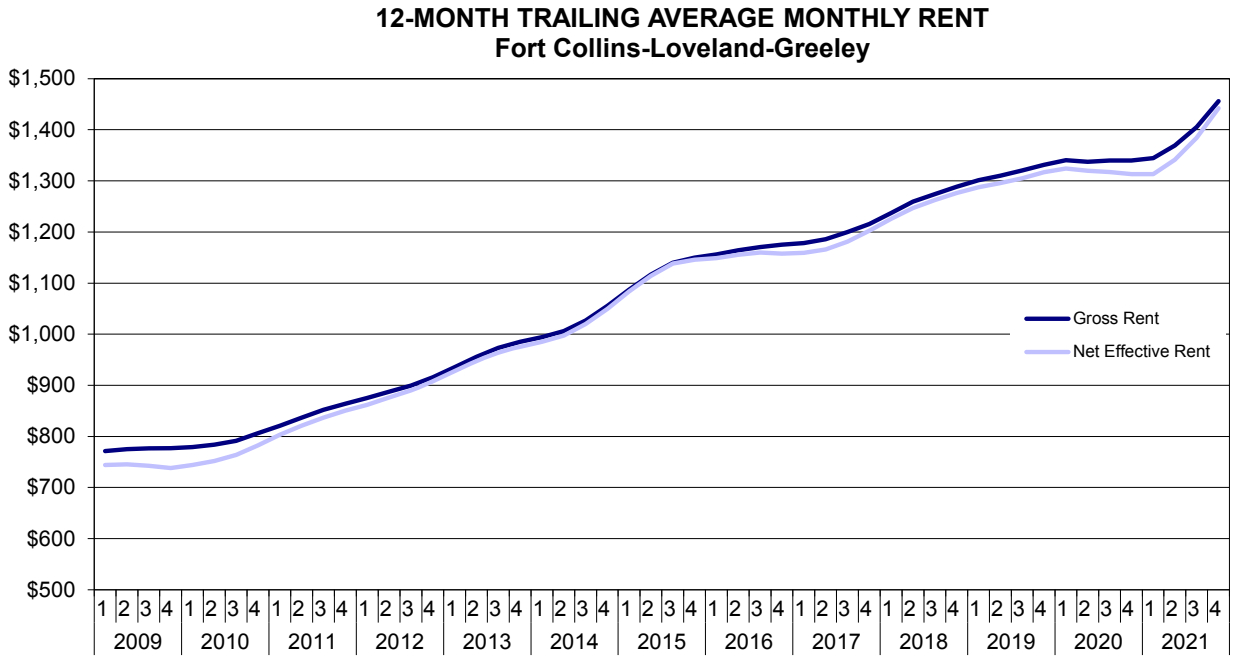
APARTMENT MARKET OVERVIEW - Continued

VACANCY AND RENTS
Fort Collins-Loveland-Greeley

		Average Monthly Rents*					Overall Avg. Rent		Con-	Vacancy
Year	Quarter	Studio	1BD/1BA	2BD/1BA	2BD/2BA	3BD/2BA	Gross	Net	cession	Rate
2010	1	$547	$670	$677	$855	$936	$784	$747	($37)	6.1%
	2	$550	$694	$702	$881	$980	$793	$770	($23)	5.1%
	3	$565	$717	$717	$927	$1,014	$813	$799	($14)	3.9%
	4	$572	$720	$719	$947	$1,046	$835	$815	($20)	4.1%
2011	1	$575	$733	$741	$956	$1,052	$842	$828	($14)	3.9%
	2	$591	$741	$741	$982	$1,067	$857	$842	($15)	4.4%
	3	$593	$765	$750	$1,014	$1,079	$875	$862	($13)	4.7%
	4	$610	$772	$775	$1,004	$1,092	$881	$870	($11)	5.1%
2012	1	$614	$771	$788	$997	$1,110	$887	$872	($15)	5.6%
	2	$635	$792	$801	$1,044	$1,131	$907	$900	($7)	4.7%
	3	$663	$808	$815	$1,055	$1,164	$921	$917	($4)	4.0%
	4	$683	$821	$833	$1,072	$1,254	$948	$940	($8)	3.8%
2013	1	$703	$836	$845	$1,088	$1,265	$965	$954	($11)	3.4%
	2	$722	$856	$859	$1,132	$1,269	$989	$979	($10)	2.6%
	3	$712	$858	$870	$1,120	$1,285	$991	$980	($11)	2.9%
	4	$717	$859	$875	$1,141	$1,276	$994	$987	($7)	2.4%
2014	1	$732	$866	$878	$1,144	$1,315	$1,003	$994	($9)	2.3%
	2	$756	$915	$903	$1,177	$1,333	$1,036	$1,029	($7)	2.7%
	3	$777	$945	$929	$1,236	$1,386	$1,074	$1,069	($5)	3.6%
	4	$804	$982	$958	$1,281	$1,417	$1,108	$1,107	($1)	2.1%
2015	1	$843	$1,008	$973	$1,296	$1,463	$1,131	$1,130	($1)	2.1%
	2	$861	$1,032	$1,003	$1,292	$1,504	$1,152	$1,149	($3)	3.6%
	3	$905	$1,051	$999	$1,326	$1,507	$1,168	$1,166	($2)	3.6%
	4	$916	$1,022	$998	$1,278	$1,486	$1,149	$1,138	($11)	4.6%
2016	1	$896	$1,037	$1,004	$1,275	$1,460	$1,156	$1,143	($13)	5.5%
	2	$913	$1,073	$1,031	$1,332	$1,510	$1,184	$1,176	($8)	5.1%
	3	$951	$1,081	$1,024	$1,325	$1,469	$1,193	$1,181	($12)	5.7%
	4	$889	$1,015	$1,023	$1,246	$1,458	$1,168	$1,131	($37)	4.8%
2017	1	$934	$1,045	$1,034	$1,256	$1,464	$1,168	$1,149	($19)	4.8%
	2	$975	$1,096	$1,054	$1,343	$1,495	$1,214	$1,203	($11)	3.7%
	3	$1,026	$1,143	$1,100	$1,364	$1,542	$1,249	$1,241	($8)	3.4%
	4	$966	$1,101	$1,101	$1,336	$1,526	$1,232	$1,216	($16)	3.8%
2018	1	$1,008	$1,139	$1,123	$1,363	$1,525	$1,253	$1,244	($9)	4.0%
	2	$1,048	$1,179	$1,122	$1,422	$1,607	$1,302	$1,287	($15)	3.8%
	3	$1,072	$1,184	$1,155	$1,434	$1,649	$1,310	$1,303	($7)	4.5%
	4	$1,041	$1,163	$1,162	$1,374	$1,590	$1,289	$1,271	($18)	4.4%
2019	1	$1,063	$1,180	$1,176	$1,397	$1,604	$1,304	$1,289	($15)	4.7%
	2	$1,135	$1,192	$1,195	$1,445	$1,645	$1,337	$1,320	($17)	4.0%
	3	$1,191	$1,223	$1,200	$1,460	$1,673	$1,352	$1,339	($13)	4.2%
	4	$1,170	$1,211	$1,196	$1,429	$1,639	$1,332	$1,319	($13)	4.2%
2020	1	$1,177	$1,204	$1,161	$1,444	$1,655	$1,340	$1,318	($22)	4.8%
	2	$1,143	$1,185	$1,162	$1,430	$1,650	$1,326	$1,304	($22)	4.5%
	3	$1,176	$1,217	$1,154	$1,463	$1,670	$1,361	$1,329	($32)	4.3%
	4	$1,161	$1,185	$1,184	$1,410	$1,643	$1,332	$1,302	($30)	4.6%
2021	1	$1,132	$1,205	$1,178	$1,424	$1,692	$1,358	$1,318	($40)	6.0%
	2	$1,229	$1,276	$1,620	$1,564	$1,821	$1,425	$1,416	($9)	4.5%
	3	$1,309	$1,365	$1,620	$1,667	$1,881	$1,505	$1,500	($5)	3.9%
	4	$1,355	$1,400	$1,341	$1,685	$1,939	$1,536	$1,535	($1)	4.1%

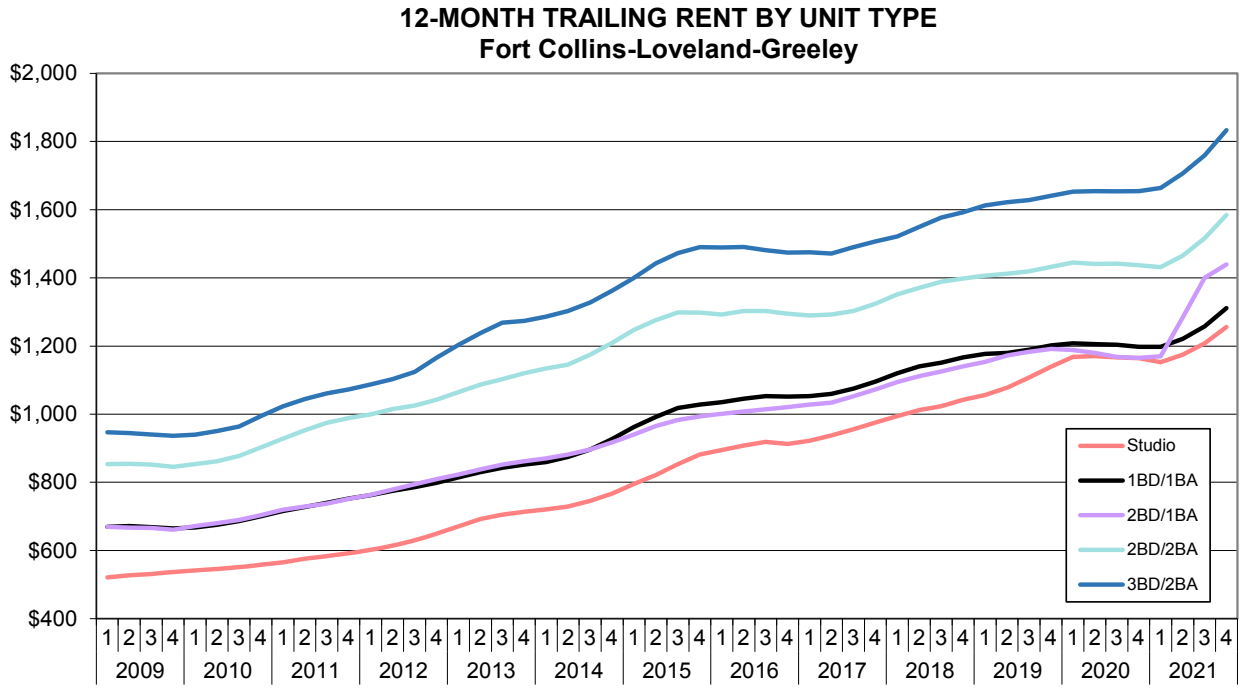
APARTMENT MARKET OVERVIEW - Continued





A graph of effective rents by unit type, based on 12-month trailing averages, is shown below. There is minimal difference in the total monthly rents between the 1-bedroom and 2-bedroom/1-bathroom units because the 2-bedroom/1-bathroom type was mostly found in older, lower quality properties, until recent quarters when it was provided in new developments.

APARTMENT MARKET OVERVIEW - Continued



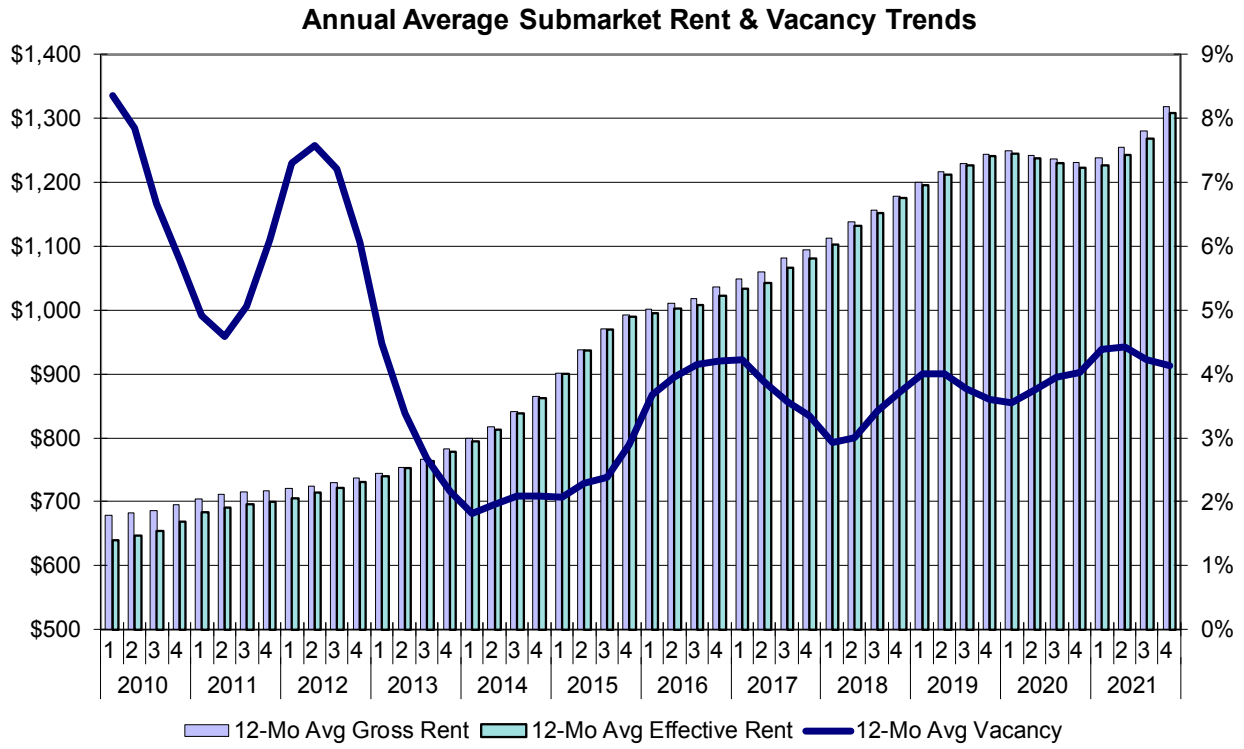
Submarket

In the *Apartment Insights* survey, the subject property is located in the Greeley submarket. The subject property is located in the northwestern part of the submarket. The historical trends in vacancy rates and rents in this submarket have generally followed the regional trends.

According to *Apartment Insights*, the 4th quarter 2021 vacancy rate in the Greeley submarket is 3.5%, down from the rate a year before of 3.8%. During the last 5 years, vacancy has averaged only 3.8%, indicating chronic pent-up demand. Submarket vacancy is even lower than the northern Colorado regional average for this time period.

The survey reports a monthly average gross rent for the submarket of $1,389 with just $1 (0.1%) in concessions, resulting in an effective rent of $1,388 per month. The average effective submarket rent has increased by 13.0% during the past 12 months. Both the gross and effective submarket rents are at record highs. The trends in vacancy and effective rents are shown in the following graph and table.

APARTMENT MARKET OVERVIEW - Continued



APARTMENT MARKET OVERVIEW - Continued

RENT AND VACANCY TABLE
Greeley

		Average Monthly Rents					Overall Avg. Rent		Con-	Vacancy
Year	Qtr.	Studio	1BD/1BA	2BD/1BA	2BD/2BA	3BD	Gross	Net	cession	Rate
2010	1	$433	$571	$598	$730	$818	$680	$637	($43)	7.9%
	2	$433	$599	$597	$773	$819	$691	$662	($29)	6.3%
	3	$433	$624	$608	$798	$872	$698	$685	($13)	4.6%
	4	$436	$622	$589	$831	$900	$710	$691	($19)	4.4%
2011	1	$444	$632	$625	$811	$869	$717	$696	($21)	4.4%
	2	$444	$611	$613	$827	$902	$719	$692	($27)	5.0%
	3	$444	$626	$646	$837	$891	$716	$708	($8)	6.5%
	4	$438	$623	$648	$830	$890	$718	$705	($13)	8.5%
2012	1	$442	$640	$648	$847	$907	$728	$717	($11)	9.3%
	2	$451	$649	$667	$852	$921	$735	$728	($7)	6.1%
	3	$454	$655	$671	$860	$931	$740	$735	($5)	5.0%
	4	$433	$663	$679	$878	$948	$746	$746	$0	3.9%
2013	1	$436	$660	$687	$902	$947	$754	$753	($1)	2.9%
	2	$446	$674	$709	$937	$989	$778	$777	($1)	1.7%
	3	$449	$683	$727	$915	$999	$787	$780	($7)	2.2%
	4	$488	$723	$741	$942	$1,024	$810	$806	($4)	1.8%
2014	1	$494	$723	$770	$951	$1,050	$823	$819	($4)	1.6%
	2	$529	$747	$791	$991	$1,079	$849	$847	($2)	2.3%
	3	$541	$777	$834	$1,017	$1,135	$883	$882	($1)	2.7%
	4	$579	$791	$839	$1,037	$1,186	$904	$903	($1)	1.8%
2015	1	$602	$842	$865	$1,138	$1,235	$969	$969	$0	1.5%
	2	$595	$869	$890	$1,153	$1,304	$995	$995	$0	3.2%
	3	$592	$874	$904	$1,179	$1,298	$1,012	$1,008	($4)	3.1%
	4	$576	$850	$911	$1,138	$1,259	$991	$985	($6)	3.8%
2016	1	$588	$858	$904	$1,150	$1,242	$1,009	$992	($17)	4.7%
	2	$606	$914	$899	$1,183	$1,299	$1,031	$1,025	($6)	4.3%
	3	$601	$926	$910	$1,174	$1,276	$1,044	$1,030	($14)	3.8%
	4	$603	$918	$936	$1,187	$1,316	$1,059	$1,045	($14)	4.0%
2017	1	$601	$918	$936	$1,161	$1,288	$1,062	$1,036	($26)	4.8%
	2	$641	$952	$944	$1,188	$1,310	$1,078	$1,061	($17)	2.9%
	3	$684	$1,009	$986	$1,264	$1,399	$1,129	$1,125	($4)	2.7%
	4	$654	$940	$997	$1,257	$1,390	$1,108	$1,101	($7)	3.1%
2018	1	$654	$1,015	$1,008	$1,255	$1,390	$1,134	$1,127	($7)	3.1%
	2	$752	$1,055	$1,042	$1,313	$1,427	$1,180	$1,174	($6)	3.2%
	3	$760	$1,079	$1,070	$1,353	$1,441	$1,204	$1,204	$0	4.4%
	4	$760	$1,074	$1,075	$1,334	$1,412	$1,198	$1,194	($4)	4.2%
2019	1	$785	$1,107	$1,106	$1,328	$1,478	$1,216	$1,214	($2)	4.3%
	2	$982	$1,093	$1,099	$1,380	$1,541	$1,245	$1,238	($7)	3.2%
	3	$1,025	$1,136	$1,103	$1,389	$1,556	$1,259	$1,259	$0	3.4%
	4	$1,032	$1,148	$1,102	$1,377	$1,503	$1,259	$1,255	($4)	3.5%
2020	1	$1,016	$1,089	$1,076	$1,358	$1,522	$1,232	$1,224	($8)	4.1%
	2	$971	$1,078	$1,093	$1,333	$1,488	$1,221	$1,210	($11)	3.9%
	3	$992	$1,103	$1,094	$1,355	$1,536	$1,238	$1,230	($8)	4.2%
	4	$998	$1,085	$1,119	$1,352	$1,506	$1,234	$1,228	($6)	3.8%
2021	1	$987	$1,116	$1,099	$1,358	$1,557	$1,259	$1,240	($19)	5.6%
	2	$991	$1,129	$1,127	$1,412	$1,606	$1,287	$1,274	($13)	4.1%
	3	$989	$1,200	$1,171	$1,470	$1,628	$1,340	$1,330	($10)	3.5%
	4	$1,091	$1,266	$1,206	$1,530	$1,703	$1,389	$1,388	($1)	3.5%

APARTMENT MARKET OVERVIEW - Continued

A search of 8-unit and larger communities within the subject property's submarket, as defined by the *Apartment Insights* survey, shows there are 75 communities with a total of 8,888 apartments, including all of the units in 6 properties still under construction. The breakdown by decade of construction is summarized as follows:

YEAR BUILT	NO. OF PROPERTIES	NO. OF UNITS
1960s	5	207
1970s	23	2,475
1980s	6	655
1990s	4	277
2000s	8	1,143
2010s	14	1,861
2020s	15	2,218
Total	75	8,888

Demand Analysis – Primary Market Area (PMA)

The primary market for the subject property consists of the adjacent cities of Greeley and Evans. Virtually all developed areas of the PMA are within 6 miles of the subject site, so residents have convenient access to employment, shopping, services, and entertainment throughout the area.

The ESRI report projects average population growth of 1.59% annually, or 2,250 persons per year within the primary market during the next 5 years. This projection does not accurately reflect actual long-term growth. From 2014 through 2017, growth averaged 2.4% per year, or an average of 2,947 new residents per year. Slower growth from 2018 through 2020 apparently resulted from limited new housing supply, since job growth was strong prior to the pandemic. Weld County is projected by the Colorado Demography Office to grow at rates of 2.3% to 4.9% during the next 3 years, though Greeley/Evans is expected to grow at a lower rate. Based on this information, we have projected annual PMA growth during the next 3 years of 1.8%, which equates to an average of **2,551 persons** per year, below the actual annual growth from 2014 through 2017.

Information from the most recent 2015-2019 American Community Survey (ACS) 5-year estimates indicates that the ratio of multifamily renters to the total population is 21.6%, as shown in the table below.

TOTAL POPULATION IN OCCUPIED HOUSING UNITS BY TENURE BY UNITS IN STRUCTURE	
Renter Occupied - Structure	Total
1, detached or attached	18,703
2 to 4	9,579
5 or more	16,409
Mobile home	3,024
Boat, RV, van, etc.	0
Total population	120,181
Total renter population	47,715
Total renter population in 2+ unit structures	25,988
Ratio renter to total population	39.7%
Ratio multifamily renter to total population	21.6%
Source: 2019 American Community Survey 5-year estimates	

APARTMENT MARKET OVERVIEW - Continued

The allocation of renter households by structure type from the 2019 ACS is shown below. The data indicate the average multifamily renter household size is 2.28, calculated by dividing the 25,988 multifamily renter population in 2+ structures by the 11,387 multifamily renter households. According to the 2019 ACS, the average multifamily renter household size for all of Weld County was 2.16 persons, which supports the PMA statistics. After considering the indicators from these sources, we have used an average multifamily renter household size of 2.28 in this analysis.

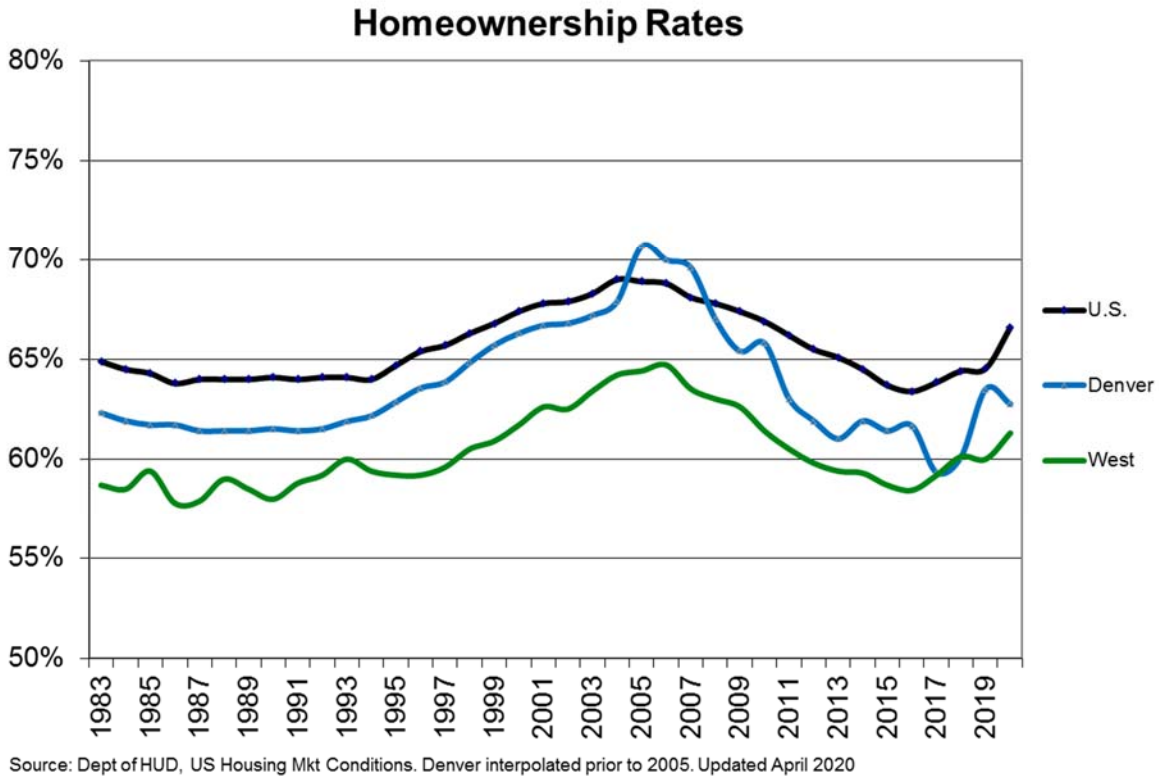
TENURE BY UNITS IN STRUCTURE	
Renter Occupied - Structure	Total
1, detached	4,230
1, attached	973
2	1,387
3 or 4	2,103
5 to 9	2,656
10 to 19	2,359
20 to 49	1,684
50 or more	1,198
Mobile home	758
Boat, RV, van, etc.	0
Total households	43,314
Total renter households	17,348
Total renter households in 2+ unit structures	11,387
Ratio renter to total households	40.1%
Ratio multifamily renter to total renter households	65.6%
Source: 2018 American Community Survey 5-year estimates	

As noted above, the ratio of multifamily renters to the total population was estimated at 21.6% in the 2019 ACS, which reflects existing households, rather than the proportion of new households choosing multifamily rental units. If households in single family homes are included, the total renter population is 39.7% of the PMA total population. Because of the subject's suburban location and recommended ratio of 3-bedroom units, it is expected to attract households that might otherwise choose to rent single family homes.

In addition, the supply of new single family homes has been constrained in recent years. In the City of Greeley, permits for multifamily residences, including condominiums, have exceeded permits for single family homes from 2013 through 2020, except for 2018, and the ratio has been particularly high during the last 3 years. From 2019 through 2021, multifamily unit permits ranged from 67% to 82%, and they averaged 75% of all permits during this period.

The overall decline in homeownership rates since 2005 has benefitted the apartment market, although the trend has reversed recently. The following chart shows homeownership rate trends both locally and nationally based on data from the U.S. Department of Housing and Urban Development. Figures for the Greeley MSA are not available, but they would most likely be similar to the statistics for the West.

APARTMENT MARKET OVERVIEW - Continued



Source: Dept of HUD, US Housing Mkt Conditions. Denver interpolated prior to 2005. Updated April 2020

Several additional trends further support demand for apartments. These factors, listed below, include both demographic trends toward smaller households that prefer to rent and economic conditions that limit the ability of households to purchase homes.

- Increasing number of persons aged 20 to 35, the most common renter age. In the PMA, this Millennial group now outnumbers Baby Boomers.
- Generally tight credit conditions for 1st time home buyers.
- Increasing student debt, which limits the ability of the renter age demographic to purchase a home.
- High current percentage of adult children living with parents, creating pent up demand.
- The declining fertility rate and later female age of 1st birth support rental, since growing families are a major motivation to purchase for persons under 35.
- Increasing percentage of unmarried and divorced mothers of small children who prefer the simplicity of renting to owning.
- Home prices increasing faster than personal income, plus limited condominium and detached home construction starts, which normally provide affordable entry into homeownership.

Based on these various sources, we have projected that 50% of the new population will choose multifamily rental apartments during the next 3 years. Using this projection, the forecasted population growth of 2,551 persons per year, and assuming that the average apartment household

APARTMENT MARKET OVERVIEW - Continued

size remains at approximately 2.28 persons, the annual demand for apartments is calculated to average **559 units per year**. The calculations are shown below.

PMA: 2,551 x 50% ÷ 2.28 = 559 units per year

As a second methodology, we have reviewed actual new supply and absorption in the PMA during the last 7 years. Absorption is defined as the change in the number of occupied units. Absorption has fluctuated due both to economic changes and to the availability of new supply, as shown in the following table.

ANNUAL NEW SUPPLY AND ABSORPTION HISTORY
Primary Market Area (Greeley and Evans)

Time Period	Total Units	Total Units Annual Change	Occupied Units	Annual Absorption	Overall Vacancy Rate *	Overall Vacant Units
4th Quarter 2015	5,355	548	5,034	320	5.99%	321
4th Quarter 2016	5,648	293	5,328	294	5.67%	320
4th Quarter 2017	5,748	100	5,569	241	3.11%	179
4th Quarter 2018	5,854	106	5,470	-99	6.56%	384
4th Quarter 2019	5,895	41	5,662	192	3.95%	233
4th Quarter 2020	6,870	975	6,060	398	11.79%	810
4th Quarter 2021	7,062	192	6,815	755	3.50%	247
Total 2015Q4 - 2021Q4		2,255		2,101		
Avg. Absorption 2015Q4 - 2021Q4				300		
Avg. Absorption 2020Q4 - 2021Q4				577		

* Includes subsidized/affordable properties and properties still in lease-up

The highest absorption occurred during the last 2 years, despite pandemic conditions, because a large number of new units were delivered to the market. The 3rd highest absorption amount occurred in 2015, again due to new supply becoming available. Low absorption occurred during years with little new supply.

Overall, the PMA is able to absorb substantial new supply, as demonstrated by an occupancy increase of 755 units during 2021. Based on these methodologies, we project demand for **600 units per year** during the next 3 years.

Supply Analysis – Primary Market Area

At the present time, there are 5 properties under construction that will deliver a total of 892 units. One of these properties (Wildhorse at Tuscany) has completed buildings, with 48 units already occupied. There are also 17 developments proposed within the PMA, with a total of 3,604 units that could begin adding new units to the area within the next 1 to 2 years, including 282 units in the subject Phase I. One of the properties under construction is market rate age restricted (senior), and 1 of the proposed developments is affordable.

New developments typically face a wide range of issues regarding municipal approvals, financing, and construction, so not all proposed communities proceed. Historically, about half of the developments proposed at any given time were actually completed within 3 years. With increasing construction costs and other issues, this figure in metropolitan Denver dropped to 37% in 2019 and to just 28% in 2020. Preliminary information indicates that it increased to about 40%

APARTMENT MARKET OVERVIEW - Continued

in 2021. In Greeley, there were 2,778 proposed units during the 4th quarter of 2020. A year later, only 1,060 units were under construction, indicating a developer success rate of 38%. Rapidly escalating construction costs, as well as labor a material shortages caused by the pandemic, are expected to create even more challenges to proposed developments.

Based on this information, we have assigned a probability of 30% to most of the proposed developments. Reserve at Crescent Cove and Copper Platte are reportedly about to break ground, so they are included in the analysis at 100%. The subject is also included in the analysis at a 100% probability.

Combining the developments in earlier and later stages of planning, the blended probability of the proposed supply is 45%, consistent with recent developer success rates in the market. The table below summarizes the apartment developments that are now under construction and proposed in the PMA.

APARTMENT MARKET OVERVIEW - Continued

NEW SUPPLY - UNDER CONSTRUCTION AND PROPOSED
Primary Market Area (Greeley and Evans)

Name	Type	Status	Developer	Miles	Direction	Total Units	Completion Date	Units to Absorb
Trails at Sheep Draw II	Market	Under Const.	Journey Homes, LLC	2.2	W	252	Sep-22	252
Centerplace	Market	Under Const.	McWhinney	2.4	SE	304	Dec-23	304
Poudre Trails II	Market	Under Const.	Hargrave Construction Inc.	2.9	E	80	Aug-22	80
Wildhorse at Tuscany	Market	Under Const.	Mountain Regions RE Services	2.9	SE	171	Apr-22	123
55 Resort at the Maddie	Mkt./Age Restr.	Under Const.	L3 Communities	4.8	E	85	Jul-22	85
Subtotal Under Construction						**892**		**844**

Name	Type	Status	Developer	Miles	Direction	Total Units	Probability	Probable Units
13th Street Phase I	*Market*	*Proposed*	*Loge Properties LLC*	--	--	*282*	*100%*	*282*
Fox Run	Market	Proposed	Schuman Companies Inc.	0.3	SE	118	30%	35
City Center West	Market	Proposed	Hensel Phelps	0.9	NW	200	30%	60
Alpine Flats	Market	Proposed	Richmark Holdings, Inc.	1.3	SE	200	30%	60
Westgate	Market	Proposed	Continental Properties	1.7	SW	288	30%	86
Westgate SFR	Market	Proposed	Continental Properties	1.8	SW	191	30%	57
Rock Ridge PH I & II	Market	Proposed	Edward Rose & Sons	1.9	S	288	30%	86
Reserve at West T-Bone III	Market	Proposed	Ancon II Constructors Inc.	2.0	S	120	30%	36
Trails at Sheep Draw III	Market	Proposed	Journey Homes, LLC	2.1	W	84	30%	25
Watermark at Centerplace	Market	Proposed	Watermark Residential	2.6	SE	336	30%	101
Wildhorse at Tuscany II	Market	Proposed	Mountain Regions RE Services	2.9	SE	263	30%	79
Promontory PH I	Market	Proposed	Journey Homes, LLC	3.4	W	261	30%	78
Promontory PH II	Market	Proposed	Journey Homes, LLC	3.5	W	219	30%	66
Reserve at Crescent Cove	Market	Proposed	M. Timm Development	3.8	SE	288	100%	288
Rockies	Market	Proposed	E&T Electric	3.8	E	50	30%	15
Copper Platte	Affordable	Proposed	Inland Group	4.3	SE	224	100%	224
Confidential	Market	Proposed	Confidential	--	--	192	30%	58
Subtotal Proposed						**3,604**		**1,637**
Total New & Proposed Construction In PMA						**4,496**		**2,481**
Stabilized Occupancy (95%)								2,357
Estimated Demand								600
Years Supply in the PMA								**3.9**

APARTMENT MARKET OVERVIEW - Continued

The probable new supply in the PMA totals about 2,481 units. After deducting stabilized vacancy, approximately 2,357 new apartments must be absorbed. Demand has been estimated to average 600 units per year, indicating 3.9 years of supply in the pipeline during the next 3 years. After deducting affordable and age restricted developments, which are less dependent for demand on normal population growth, there are 3.4 years of supply in the pipeline during the next 3 years.

The anticipated supply is moderately in excess of the projected demand. However, the Greeley submarket currently has a vacancy rate of only 3.5%, well below a stabilized vacancy level of 5% to 6%. Vacancy has averaged only 3.8% for the last 5 years, indicating chronic pent-up demand. Pent-up demand is further indicated by the current record high rents. With minimal concessions, effective rents have increased 13.0% during the last year.

The new supply in the PMA is expected to ease pent-up demand, slowing the record rent growth, as vacancy increases slightly toward a stabilized level of 5% to 6%. The market is expected to remain in balance during the next 3 years, and the new supply is not expected to impact existing apartment properties in the market area.

CERTIFICATION

We certify that, to the best of our knowledge and belief:

- The statements of fact contained in this report are true and correct.
- The reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are our personal, impartial, unbiased professional analyses, opinions, and conclusions.
- We have no present or prospective interest in the property that is the subject of this report, and we have no personal interest with respect to the parties involved.
- The appraisers have performed no services, as appraisers or in any other capacity, regarding the property that is the subject of this report within the 3-year period immediately preceding acceptance of this assignment.
- We have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
- Our engagement in this assignment was not contingent upon developing or reporting predetermined results.
- Our compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the intended use of this appraisal.
- The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Appraisal Institute's Code of Professional Ethics and the Standards of Professional Appraisal Practice, which include the Uniform Standards of Professional Appraisal Practice.
- Stephen W. Cole made a personal inspection of the property that is the subject of this report. Cary W. Bruteig did not inspect the property.
- No one provided significant real property appraisal assistance to the persons signing this certification.
- The use of this report is subject to the requirements of the Appraisal Institute relating to review by its duly authorized representatives.
- As of the date of this report, Cary W. Bruteig and Stephen W. Cole have completed the continuing education program of the Appraisal Institute.
- The appraisal assignment was not based on a requested minimum valuation, a specific valuation, or the approval of a loan.

Stephen W. Cole, MAI
Colorado State Certified General Appraiser
License No. CG1313502

Cary W. Bruteig, MAI
Colorado State Certified General Appraiser
License No. CG1313164

ASSUMPTIONS AND LIMITING CONDITIONS

The certification of the appraiser appearing in this appraisal report is subject to the following conditions and to such other specific and limiting conditions as are set forth in the report.

1. The appraiser assumes no responsibility for matters of a legal nature affecting the property appraised or the title thereto, nor does the appraiser render an opinion as to the title, which is assumed to be good and marketable. The property is appraised as if free and clear of any and all liens or encumbrances unless otherwise specified. The property is appraised as though under responsible ownership and management.

2. The appraiser is not required to give testimony or appear in court because of having made this appraisal with reference to the property in question, unless arrangements have been made previously.

3. Plats, maps, and exhibits included herein are for illustration only, as an aid in visualizing matters discussed within the report. They should not be relied upon for any other purpose. Any sketch in this report may show approximate dimensions and is included to assist the reader in visualizing the property. The appraiser has made no survey of the property.

4. The appraiser assumes there are no hidden or unapparent conditions of the property, subsoil, or structures that would render it more or less valuable. The appraiser assumes no responsibility for such conditions or for engineering that might be required to discover such factors. No opinion is expressed as to the value of subsurface oil, gas, or mineral rights and the property is not subject to surface entry for the exploration or removal of such materials except as is expressly stated.

5. Information, estimates, financial statements, rent rolls, construction budgets, and opinions furnished to the appraiser, and contained in this report, were obtained from sources considered reliable and believed to be true and correct. However, no responsibility for accuracy of such items furnished the appraiser can be assumed by the appraiser. The appraiser assumes no responsibility for independently verifying this information.

6. The appraiser assumes no responsibility for economic or physical factors occurring after the date of the estimate of value. The appraiser has no obligation to update the report or revise it in any manner because of events or transactions occurring subsequent to the date of this report.

7. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraiser, the MAI designation, or the firm with which the appraiser is connected), shall be disseminated to the public through advertising, public relations, news, sales or other media, without the written consent and approval of the appraiser. Further, the appraiser or firm assumes no obligation, liability, or accountability to any third party.

8. Possession of this report, or a copy thereof, does not carry with it the right of publication. It may not be used for any purpose by any person other than the party to whom it is addressed without the written consent of the appraiser and, in any event, only with proper written qualification, and only in its entirety. The appraiser or firm assumes no obligation, liability, or accountability to any third party.

9. It is assumed that there is full compliance with all applicable federal, state, and local environmental regulations and laws unless noncompliance is stated, defined, and considered in the appraisal report.

10. It is assumed that all applicable zoning and use regulations and restrictions have been complied with unless a nonconformity has been stated, defined, and considered in the appraisal report.

11. It is assumed that all required licenses, certificates of occupancy, consents, or other legislative or administrative authority from any local, state, or national government or private entity or

ASSUMPTIONS AND LIMITING CONDITIONS - Continued

organization have been or can be obtained or renewed for any use on which the value estimate contained in this report is based.

12. The appraiser has made no investigation into the existence of hazardous materials such as asbestos, PCBs, urea-formaldehyde foam insulation, lead based paint, or other potentially hazardous materials. The appraiser is not qualified to detect such materials. The presence of hazardous materials may affect the value of the property. The value estimate is predicated on the assumption that there is no such materials on, in, or nearby the property that would cause a loss in value. No responsibility is assumed for such conditions, or for any expertise or engineering knowledge required to discover them. The client is urged to retain an expert in this field, if desired.

13. The Americans with Disabilities Act (ADA) became effective January 26, 1992 and the Fair Housing Act's accessibility requirements apply to properties built for first occupancy after March 13, 1991. The appraiser has not made a specific compliance survey and analysis of this property to determine whether or not it is in conformity with the various detailed requirements of the ADA or FHA. It is possible that a compliance survey of the property together with a detailed analysis of the requirements of the ADA and FHA could reveal that the property is not in compliance with one or more of the requirements of these acts. If so, this fact could have a negative effect upon the value of the property. Since the appraiser has no direct evidence relating to this issue, possible noncompliance with the requirements of ADA or FHA was not considered in estimating the value of the property. Generally, ADA applies only to the clubhouse and amenities, while Fair Housing laws control the apartment units.

14. Loss or removal of any portion of this report invalidates the entire report.

15. Other Assumptions and Limiting Conditions may be specified in the report.

QUALIFICATIONS

CARY W. BRUTEIG, MAI

EMPLOYMENT HISTORY

1992 - Present	Apartment Appraisers & Consultants, Inc. Denver, Colorado Founder & President Emeritus (2021 - Present); Founder & President (1992 - 2021)
1986 - 1991	Joseph Farber and Company, Inc. Denver, Colorado Associate Appraiser
1985 - 1986	Willman & Associates Colorado Springs, Colorado Real Estate Appraiser

PROFESSIONAL EXPERIENCE

Cary W. Bruteig has experience in the valuation of a wide variety of of property types, from regional malls to office buildings, but has specialized exclusively in the valuation and evaluation of apartments since 1992. He has analyzed over 600,000 apartment units in 2,700 communities with a combined value in excess of $40 billion.

PROFESSIONAL ASSOCIATIONS

Designated Member of the Appraisal Institute (MAI), Member #8360. Presently has completed the requirements of the continuing education program of the Appraisal Institute.

Member of the Apartment Association of Metro Denver, past board member 7/2013 – 6/2015. Interviewed by 9 News, 7 News, Channel 31, Channel 2, and Fox News as an industry expert.

STATE LICENSING

State of Colorado, Certified General Appraiser,
License No. CG1313164, expires December 31, 2023

ADVANCED EDUCATION

Degrees

1985 Bachelor of Science Degree
Business Administration, Major - Finance
University of Wyoming, Laramie, Wyoming

Courses - Appraisal Institute

2021	National USPAP - Update Course
2019	National USPAP - Update Course
2017	National USPAP - Update Course
2015	National USPAP - Update Course
2013	National USPAP - Update Course
2012	Appraisal Curriculum Overview - General & Residential
2011	National USPAP - Update Course
2011	Online Analyzing Distressed Real Estate
2010	An Introduction to Valuing Commercial Green Buildings

QUALIFICATIONS - Continued

ADVANCED EDUCATION - Continued

Seminars

2022	AAMD ECON 2022: Economic Livestream Event, Speaker
2021	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2020	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2019	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2018	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2018	IREM Economic Forecast Breakfast, Speaker
2017	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2016	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2015	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2014	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2014	Changing Dynamics in the Multifamily Market, Speaker – A.I.
2013	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2012	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2011	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2011	Winter Economic Conference - Apt. Assoc. of Metro Denver
2010	Economic Overview & Forecast – Appraisal Institute
2010	CREJ Multifamily Conference, Speaker - Colo R.E. Journal
2009	Valuing High Performance Residential Prop. – Appraisal Institute
2009	Summer Economic Conference - Apt. Assoc. of Metro Denver
2008	Winter Economic Conference - Apt. Assoc. of Metro Denver
2007	2007 Economic Conference – Apt. Assoc. of Metro Denver
2007	Apartment Realty Advisors Investor Symposium - Speaker
2006	Apartment Realty Advisors Investor Symposium - Speaker
2006	2006 Economic Conference–Apt. Assoc. of Metro Denver
2005	2005 Economic Conference–Apt. Assoc. of Metro Denver
2004	Transit Oriented Development –Appraisal Institute
2004	Summer Economic Conference–Apt. Assoc. of Metro Denver
2004	Winter Economic Conference–Apt. Assoc. of Metro Denver
2003	Economic Overview & Forecast in Colorado
2003	Economic Conference–Apartment Assoc. of Metro Denver
2003	Dichotomy or Dementia - The Apartment Market in 2003
2003	Easements for High Tension Lines

COURT EXPERIENCE

State of Utah, Salt Lake County, Third Judicial District Court
Deposed on March 5, 2015 as an expert witness
Thomas D. Williamson, et al vs. David Farrell, et al

QUALIFICATIONS

STEPHEN W. COLE, MAI

EMPLOYMENT HISTORY

1996 - Present	Apartment Appraisers & Consultants, Inc. Denver, Colorado Appraiser
1990-1995	Cushman & Wakefield Denver, Colorado Associate Director
1988-1990	Joseph Farber and Company, Inc. Denver, Colorado Associate Appraiser
1976-1988	Several architecture/planning firms in Denver, Colorado and Chicago, Illinois

PROFESSIONAL EXPERIENCE

Stephen W. Cole has experience as both an architect and a commercial real estate appraiser. He has designed and appraised a wide variety of residential, office, retail, industrial, and institutional property types and has emphasized multi-family residential work in both professions.

PROFESSIONAL ASSOCIATIONS

Designated Member of the Appraisal Institute (MAI), Member #10363. Presently has completed the requirements of the continuing education program of the Appraisal Institute.

STATE LICENSING

State of Colorado, Certified General Appraiser,
License No. CG1313502, expires December 31, 2023
State of Colorado, Licensed Architect, License No. B-1924

ADVANCED EDUCATION

Degrees

1988	MBA in Real Estate and Finance University of Denver, Denver, Colorado
1978	Bachelor of Architecture Rice University Houston, Texas
1976	BA in Architecture and Fine Arts Rice University Houston, Texas

Courses – Appraisal Institute (partial list)

2020	7-Hour National USPAP Update Course (also previous years)
2019	Business Practices and Ethics (also previous years)
1994	Standards of Professional Practice, Part A
	Standards of Professional Practice, Part B
1992	Course 2-2, Report Writing
1991	Course 2-1, Case Studies

QUALIFICATIONS - Continued

ADVANCED EDUCATION - Continued

Courses - American Institute of Real Estate Appraisers

1988 Course 1B-A Capitalization Theory and Techniques Part A
Course 1B-B Capitalization Theory and Techniques Part B
Course 1A-2 Basic Valuation Procedures
Course 1A-1 Real Estate Appraisal Principles

Seminars (partial list)

2021 Colorado Economic & Real Estate Update (also previous years)
2021 Colorado Annual Demography Summit (also previous years)
2021 Emerging Trends in Alternative Lodging in 2021
2021 2021 Colorado Litigation Seminar
2021 RTD, TOD, and the Pandemic
2020 Colorado Post-COVID Submarket Update
2019 Artificial Intelligence, AVMs, and Blockchain
2019 Introduction to Green Buildings: Principles & Concepts
2019 Valuation Resources for Solar Photovoltaic Systems
2018 Slots, Cars, Green Roofs!
2018 High Performance Homes
2018 Nice House-Who Can Afford It?
2017 CDOT Reports
2017 Impacts of Tax Reform on Real Estate and Appraisal
2017 Retail 2020
2017 Update from the Division of Real Estate
2017 Real Estate Valuation Policy Update
2016 Challenges Appraising Resort and Mountain Properties
2016 Hot Topics and Myths in Appraiser Liability
2016 Drone Technology and Its Impact on the Appraisal Industry
2016 It's A Small World After All – Alternative Housing
2015 Metropolitan Denver Development and Construction Summit
2014 The Real Estate Valuation Side of Marijuana
2013 HOAs, What Appraisers Need to Know
2013 Oil and Gas Fracking and its Effect on Property Values

COURT EXPERIENCE

Arapahoe County, Colorado, District Court
Deposed on May 15, 2019 as an expert witness
Trial testimony on June 26-27, 2019 as an expert witness
Stephen A. Grove, et al. vs. Centennial Leased Housing Assoc., et al.

Cary W Bruteig
1660 S. Albion Street
Suite 1002
Denver, CO 80222

State of Colorado
Department of Regulatory Agencies
Division of Real Estate

Board of Real Estate Appraisers

Cary W Bruteig

Certified General Appraiser

Director: Marcia Waters

License #: CG1313164
Status: Active
Expires: 12/31/2023

COPY

For the most up to date information regarding this credential, visit http://dora.colorado.gov/dre

Stephen Cole
1660 S. Albion St., Suite 1002
Denver, CO 80222

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COPY

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SELECTED ASSIGNMENTS

Proposed Construction

Client	Property
Bank of America	Horizons at Rock Creek II & III, 946 units
Bank United	Stonebridge, 172 units
Berkadia (Capmark, GMAC)	Legacy at Highlands Ranch, 422 units
Compass Bank	Talon Hill, 276 units
Guaranty Bank	Briargate on Main, 325 units
JP Morgan Chase	The Renaissance, 560 units
KeyBank	Jefferson Estates at Lowry, 414 units
Regions Bank	Pinnacle Station at Diamond Hill, 340 units
US Bank	Jefferson at Meridian, 652 units
Wachovia Bank	The Boulevard, 290 units
Wells Fargo	Crest at Lone Tree, 400 units

Fannie Mae/Freddie Mac/HUD

Client	Property
AmeriSphere	Crestmoor Downs, 710 units
ARBOR National Commercial Mortgage	Overlook at the Shores, 210 units
AMI Capital	Castle Highlands, 358 units
ARCS Commercial Mortgage	Riata at Bel Mar Park, 1,120 units
Capmark (GMAC)	The Fairways, 956 units
Deutsche Bank Berkshire Mortgage	Quincy Ridge, 424 units
EF&A	Western Terrace, 216 units
Green Park Financial	Glenlake, 206 units
Greystone Servicing Corporation, Inc.	The Traditions, 96 units
Johnson Capital/Huntoon Hastings	Sterling Point, 143 units
KeyCommercial Mortgage	Zuni Square, 131 units
Love Funding	Camelot, 216 units
Red Mortgage Capital	Sterling Pointe, 496 units
Prudential Mortgage Capital Company	Woodstream Village, 318 units
PW Funding	Partridge Court, 90 Units

Bond Financing/Tax Credits

Client	Property
Bank of America	Autumn Creek, 187 units
Capmark (GMAC)	Broadway Plaza Lofts, 223 units
Capri Capital	Brittany Downs, 464 units
Colorado Housing & Finance Authority	South Oneida Club, 112 units
KeyBank	Globeville Townhomes, 41 units
US Bank	Terrace Park, 179 units
Wells Fargo	Sunset Park Senior Housing, 242 units

Sales/Refinancing

Client	Property
AEGON USA Realty Advisors, Inc.	The Breakers, 1,523 units
AMRESCO	Peppercorn, 317 units
Associated Bank	Bradburn Row, 310 units
Berkadia (Capmark, GMAC)	Crestmoor Downs, 710 units
CitiBank	Highland Square Lofts, 10 units
Guaranty Bank	Promenade Place, 387 units
Holliday Fenoglio Fowler, LP	Champions at Norwood, 332, units
IDS Life Insurance Co.	The Orchards, 360 units
John Hancock Real Estate	Alexan Castle Pines, 356 units
JP Morgan Chase	Cloverhill, 108 units
Merrill Lynch	Commons at Briargate, 194 units
Metlife Real Estate Investments	The Metro, 415 units
National City Bank	Estates at Mira Vista, 240 units
Washington Mutual	Bella Springs, 354 units
Wells Fargo	Spyglass Hill, 573 units

ZON2021-0016 Staff Report
Attachment E: Rezoning Plat

13TH STREET APARTMENTS REZONE MAP

MULTIPLE TRACTS OF LAND LOCATED IN THE NORTH HALF OF THE NORTHEAST QUARTER OF SECTION 9, TOWNSHIP 5 NORTH, RANGE 66 WEST OF THE 6TH P.M., CITY OF GREELEY, COUNTY OF WELD, STATE OF COLORADO (6450 10TH STREET)

TOTAL ACREAGE: 31.19 ACRES. PROJECT NO. ZON2021-0016

PROPERTY DESCRIPTION:

Multiple parcels of land for rezoning purposes all situate within the North Half of the Northeast Quarter (N1/2NE1/4) of Section Nine (9), Township Five North (T.5N.), Range Sixty-six West (R.66W.), of the Sixth Principal Meridian (6th P.M.), City of Greeley, County of Weld, State of Colorado, more particularly described as follows:

COMMENCING at the North Quarter Corner of Section 9 and assuming the North line of the Northeast Quarter of said Section 9 to bear South 89°24'44" East a distance of 2658.31 feet with all other bearings contained herein relative thereto:

THENCE South 00° 03' 21" East along the West line of the North Half of the North Half of the Northeast Quarter (N1/2N1/2NE1/4) of said Section 9 a distance of 659.27 feet to the North Sixty-fourth Corner of Section 9 and to the POINT OF BEGINNING.

THENCE South 89° 26' 43" East along the South line of the N1/2N1/2NE1/4 of said Section 9 a distance of 500.03 feet to the Easterly line of the West 500.00 feet of the N1/2N1/2NE1/4 of Section 9.
THENCE South 89° 26' 43" East along said South line of the N1/2N1/2NE1/4 of Section 9 a distance of 268.63 feet to the Northeast corner of Parcel No. 2 as described in Quiet Title Decree recorded March 11, 2022 as Reception No. 4809527 of the Records of Weld County.
THENCE South 00° 22' 29" East along the Easterly line of said Parcel No. 2 as described in Quiet Title Decree a distance of 4.49 feet to the Northwest corner of Tract A, Bear Rock Subdivision recorded September 10, 2020 as Reception No. 4628668 of the Records of Weld County.
THENCE South 89° 38' 14" East along the Northerly line of said Tract A, Bear Rock Subdivision a distance of 1291.92 feet to the Northeast corner of Tract A, Bear Rock Subdivision.
THENCE South 00° 22' 29" East along the Easterly line of said Tract A, Bear Rock Subdivision a distance of 501.80 feet;
THENCE South 89° 24' 44" East a distance of 20.41 feet to the Westerly line of Tract 1, Shops at Sunset Ridge Subdivision recorded August 13, 2007 as reception No. 3496647 of the Records of Weld County.
THENCE South 00° 22' 58" East along the Westerly line of said Tract 1 a distance of 156.14 feet to the South line of the North Half of the Northeast Quarter (N1/2NE1/4) of said Section 9.
THENCE North 89° 28' 35" West along said South line of the N1/2NE1/4 of Section 9 a distance of 2084.73 feet to the Center-North Sixteenth (C-N1/16) corner of said Section 9.
THENCE North 00° 03' 21" West along the West line of the North Half of the Northeast Quarter of said Section 9 a distance of 659.20 feet to the North Sixty-fourth Corner of Section 9 and to the POINT OF BEGINNING.

Said described parcels of land contain 31.19 acres, more or less.

ACKNOWLEDGEMENT OF OWNERSHIP INTEREST

Know all men by these presents that the undersigned, being all the owners, lienholders, and holders of any ownership interest as defined by the City of Greeley, of the land described hereon, have caused such land to be rezoned as indicated on this plat. The within rezoning plat is submitted in accordance with the Greeley Municipal Code. It is hereby acknowledged that all construction, use and development of this property will be in strict accordance with this rezoning plat. It is further acknowledged that deviation from this rezoning plat without the express written consent of the City of Greeley may result in revocation of the City's approval of the rezoning plat, denial of building permits, refusal to issue certificates of occupancy, injunctive relief prohibiting use of the property and other remedies available to the City under the Greeley Municipal Code and other applicable laws of the State of Colorado. Know all men by these presents that the undersigned have caused said land to be laid out and rezoned under the name of 13TH STREET APARTMENTS REZONE MAP.

In witness whereof, we have hereunto set our hands and seals this the _____ day of _____, 20____.

_____
BEAR ROCK LLC

_____
JANIS I. MITCHELL, TRUSTEE OF THE JANIS I. MITCHELL TRUST DATED OCTOBER 20, 2003

NOTARIAL CERTIFICATE

STATE OF COLORADO)
ss.
COUNTY OF WELD)

The foregoing instrument was acknowledged before me by _____, this _____day of _____, 20_____.

My commission expires: _____

_____
Notary Public

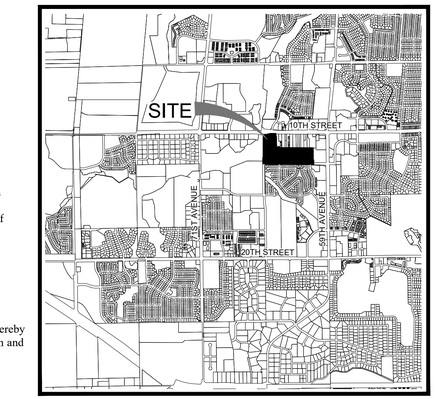
(SEAL)

SURVEYING CERTIFICATE

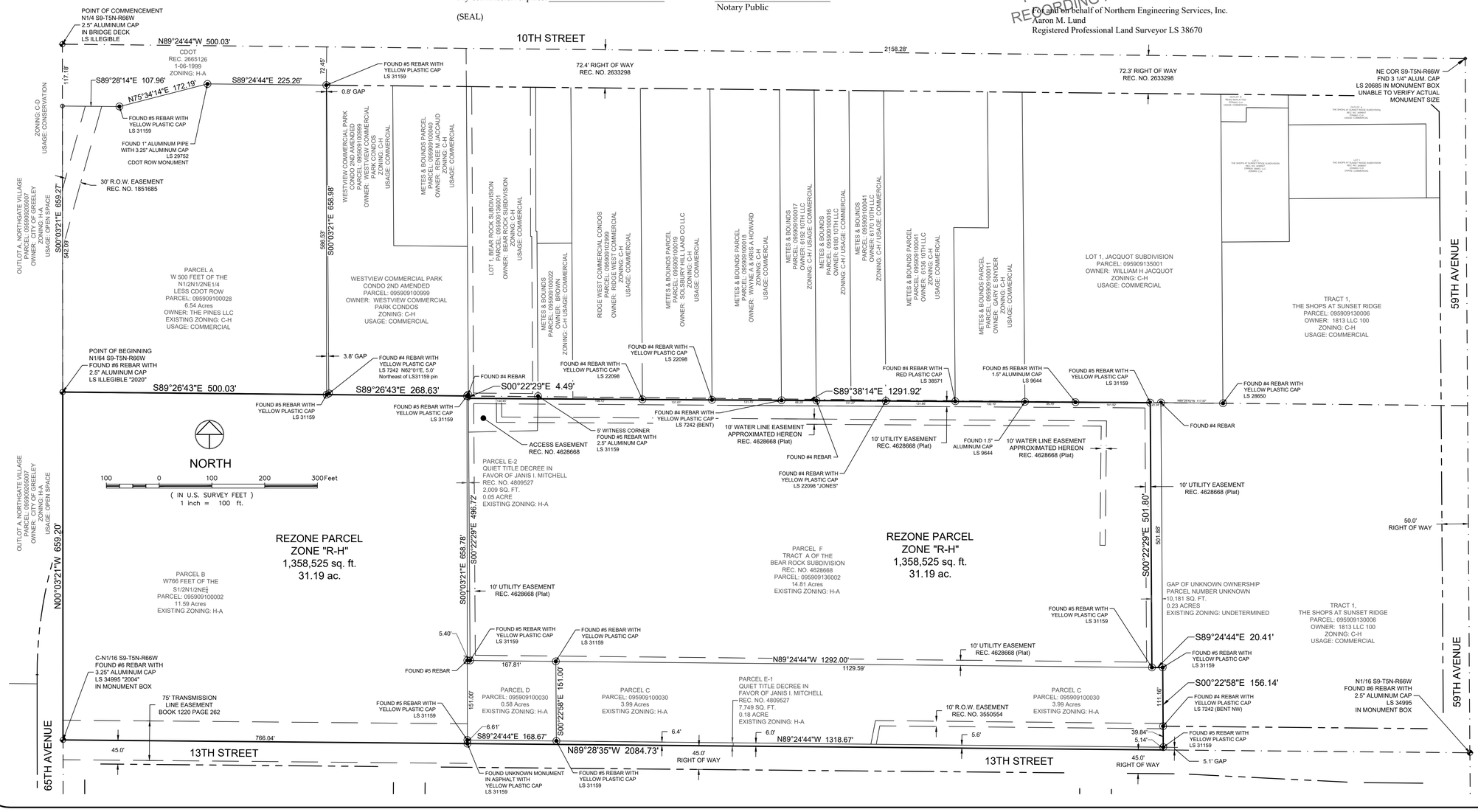
I, Aaron M. Lund, a Registered Professional Land Surveyor in the State of Colorado, do hereby state that this PROPERTY BOUNDARY MAP was prepared under my personal supervision and checking, and that it is true and correct to the best of my knowledge and belief.

DRAFT
08-11-2022
PRELIMINARY - NOT FOR CONSTRUCTION, RECORDING PURPOSES OR IMPLEMENTATION

For and on behalf of Northern Engineering Services, Inc.
Aaron M. Lund
Registered Professional Land Surveyor LS 38670



VICINITY MAP
1" = 3000'



COMMUNITY DEVELOPMENT DIRECTOR

_____
Director of Community Development

_____
Date

PLANNING COMMISSION APPROVAL

Recommended for approval this _____ day of _____, 20____.

_____
Chairman,
Greeley Planning Commision

CITY COUNCIL APPROVAL

Approved by the Greeley City Council on this _____ day of _____, 20____.

_____
Greeley City Council

NOTES:

1) The lineal unit of measurement for this survey is U. S. Survey Feet.

2) The Basis of Bearings is the North line of the Northeast Quarter of Section 9 as bearing South 89°24'44" East, and monumented as shown on drawing.

3) The intent of this map is to rezone several parcels of land to Zone "R-H" (Residential High Intensity).

4) Horizontal Datum: Coordinate system is a Northern Engineering local coordinate system based on NGS "RULLI" (400000,800000). Known internally as "greeley local".

5) Approval of site construction plans by the City of Greeley shall be required (as applicable) prior to issuance of building permits.

6) All existing and proposed utilities shall be installed underground.

7) No building permit shall be issued for the construction of a new building or structure unless the property has been platted in accordance with the City's Subdivision Regulations (Chapter 3).

8) All elevations on these plans are tied to NAVD 88 datum.

SYMBOL LEGEND

◉	FOUND PROPERTY MONUMENT
◔	SECTION CORNER
○	CALCULATED POSITION

LINE LEGEND

- SECTION LINE
- RIGHT OF WAY LINE
- BOUNDARY LINE
- PROPERTY LINE
- EASEMENT LINE

NOTICE:
According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years after the date of the certificate shown hereon.

SECTION: 9
TOWNSHIP: 5 N
RANGE: 66 W of the 6th PM

NORTHERN ENGINEERING
SURVEY | MUNICIPAL | LAND DEVELOPMENT
FORT COLLINS | GREELEY 970.221.4158 NORTHERNENGINEERING.COM

DATE: 08/11/2022
SCALE: 1" = 100'
REVIEWED BY: A. LUND
PROJECT: 1844-001
CLIENT:
DRAWN BY: A. Ferdinandson

13TH STREET APARTMENTS REZONE MAP
MULTIPLE PARCELS OF LAND
GREELEY, COLORADO

Sheet 1
Of 1 Sheets

13th Street Apartments Rezone ZON2021-0016

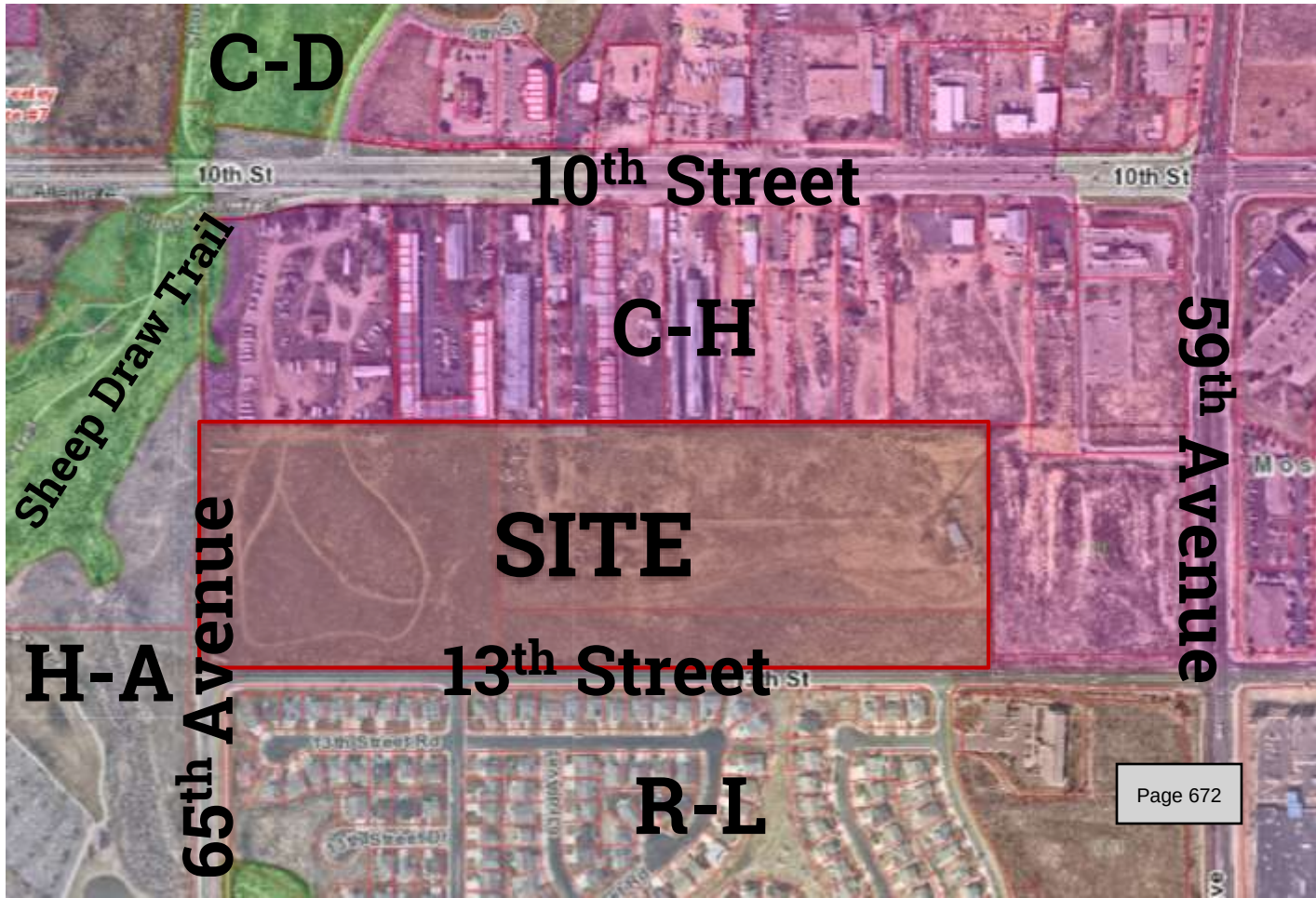
City Council

January 17, 2023

Meg Oren, Planner II

Location

- North of and adjacent to 13th Street, west of 59th Avenue, and south of the commercial properties along 10th Street
- **Surrounding Zoning and Land uses:**
  - North: C-H – existing commercial uses.
  - East: C-H – undeveloped, future commercial uses.
  - South: R-L – residential development.
  - West: H-A – open space (City owned).



City of Greeley Colorado

Site Background & Request

- **Background:**
  - In 2006, the property was annexed and zoned Holding-Agriculture (H-A).
  - In 2013, the site had a proposed Use by Special Review (USR 2:13) for oil and gas wells. It was approved by the Planning Commission. The approved project was never implemented, and the subject site remains vacant to today.
- **Request:**
  - Rezone 31.19 acres from Holding-Agriculture (H-A) to Residential-High Density (R-H).
  - Applicant is looking to incorporate residential density in the area to support existing and future commercial properties located adjacent to the property to the north and to the east.

City of Greeley Colorado

Site Analysis Map

Existing Conditions:

- Predominately undeveloped
- Topography is higher on the eastern end and falls towards the Sheep Draw to the west

N

City of Greeley Colorado

Zone District Land Use Comparison

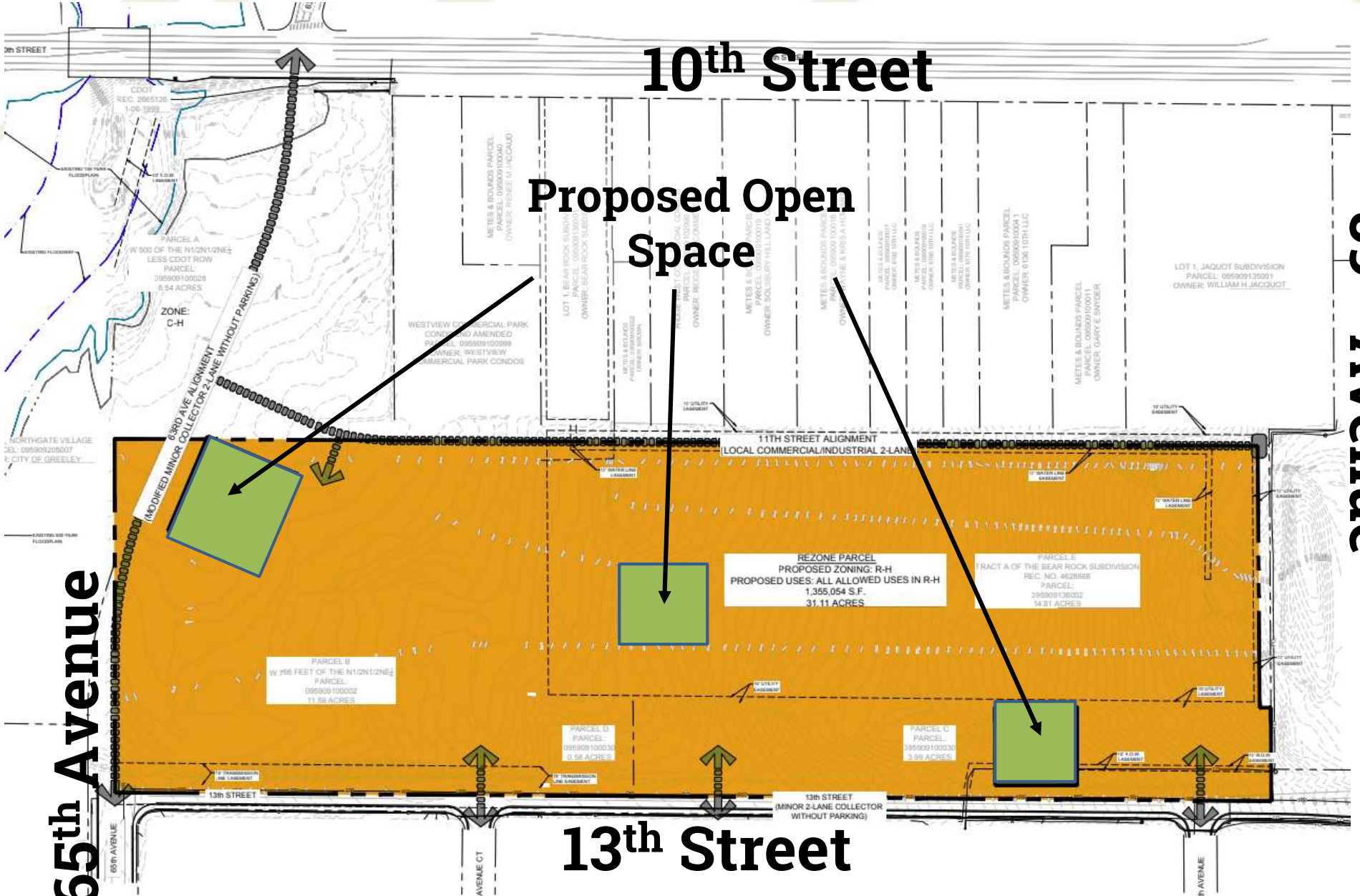
- **Holding – Agriculture Zone District (H-A):**
  - Farming

- **Residential – High Density Zone District (R-H):**
  - Single-family
  - Two-family
  - Row House
  - Multi-family

N

City of Greeley Colorado

Zoning Suitability Map



City of Greeley Colorado

Approval Criteria

Rezone Criteria – 24-204(b): Nine Criteria Used to Evaluate Rezone applications

- The proposed Rezone is consistent with the criteria as outlined in your Summary

Notification

- Neighborhood Meeting was held virtually via Zoom on January 5, 2022
- A total of 388 notice letters were mailed to property owners within 1,000 feet
- Two signs posted on the property
- Seven phone calls received – wanted to know what was being proposed, concerns about traffic and opposition to having apartments
- Two letters were emailed with concerns pertaining to traffic congestion, safety and opposition to apartments

City of Greeley Colorado

Recommendation

- Complies with Section 24-204(b) 1-9
- Planning Commission reviewed the request and conducted a public hearing on September 27, 2022, voted unanimously to recommend approval (5-0)
  - Four individuals spoke in opposition at the public hearing
    - Traffic, density, noise, privacy and safety concerns

City of Greeley Colorado

Zone District H-A

Table 24-4-1: Zoning Districts and Intent	
District & Intent	Relationship to Comprehensive Plan
H-A — Holding-Agriculture. The H-A district is intended for properties which have been annexed to the City and are either being used for agricultural purposes or have little or no immediate development potential. Due to the development patterns and inefficiency of providing City services, this area receives only limited infrastructure investment and is therefore used as a "pre-development" district to either preserve open and rural lands and agriculture uses, or hold areas until more coordinated planning for infrastructure, land uses, and design can occur.	Limited application as a pre-development area or for agriculture uses in Rural Neighborhoods.

Zone District R-H

Table 24-4-1: Zoning Districts and Intent	
District & Intent	Relationship to Comprehensive Plan
R-H — Residential High Density. The R-H district provides multi-family residential living in a moderate-density pattern in suburban neighborhoods or higher-density, and larger-scale projects in strategic locations for walkable and urban neighborhoods. It is located in areas that have transitions between lower-density neighborhoods or more intense non-residential uses and where a high level of accessibility, public amenity and support services are immediately available.	General application the Mixed-use, Legacy Urban, and Downtown Neighborhoods; Multi-modal Corridors; and Mixed-use High-intensity Areas. Limited Application in Suburban Neighborhoods, as part of housing mix or creating walkable neighborhoods.

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
1)	**The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan.**
	• *Subject site identified in the Comprehensive Plan as part of a Mixed-Use High Intensity area* • *R-H zone district encourages a variety of densities and range of housing options* • *R-H zone provides a transition between single-family residences to the south and commercial properties to the north*
2)	**The proposal can fulfill the intent of the zoning district considering the relationship to surrounding areas.**
	• *Proposed rezone would provide opportunities to add residential densities adjacent to and within walking distance of current and future commercial uses* • *Future development of this property has potential to create a transition between neighborhood to the south and commercial activity to the north*

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
3)	**Whether the area changed or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area.**
	• *Rezone request would help support current commercial businesses within the area and encourage redevelopment of properties along 10th Street corridor* • *Developer would be required with future development of the site to construct the 63rd and 65th Avenue connections, widen areas of 13th Street and construct 11th Street through the property*
4)	**Whether the existing zoning has been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity.**
	• *Existing H-A zone district is intended to serve as a "pre-development" district to hold areas until a coordinated development plan is in place* • *R-H zone district provides transition between lower-density neighborhoods (Fox Run to the south) and non-residential uses (commercial district along 10th Street)*

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
5)	**The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces, and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development.**
	• *Applicant narrative noted future development would include construction of additional roadway infrastructure to serve the property; completing missing segments of the urban street grid* • *Site plan details, including buffering and on-site transitions, as well as architectural character, would be reviewed in greater detail as part of a formal site development plan application*
6)	**The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district.**
	• *Staff and referral agencies have reviewed the proposal and have no concerns at this time* • *At the time of Subdivision, the applicant would need to provide final reports and analysis that conform with City and agency requirements* • *There are existing water and sewer utilities adjacent to the property that would be extended to future development*

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
7)	**The change will serve a community need, provide an amenity, or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning.**
	• *Current zoning as Holding Agriculture would not allow the applicant to develop the property* • *H-A zone district is intended as a "pre-development" district* • *Rezone request is consistent with the goals and intent of the zoning regulations and Comprehensive Plan to provide a transition between residential densities and commercial districts* • *Market study was commissioned by the developer and included for review*
8)	**Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community.**
	• *Any development proposal will be required to meet Development Code, Subdivision and Design criteria and will be evaluated against those criteria as part of the review process* • *Applicant did complete a preliminary traffic analysis as part of the rezoning request* • *Proposed roadway improvements and connections are intended to mitigate congestion and will be reviewed in greater detail as part of the subdivision and site plan processes*

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
9)	**The recommendations of professional staff or advisory review bodies.**
	• *Staff and referral agencies have reviewed the rezoning request and have no concerns at this time. Further analysis would be conducted at the time of subdivision and site planning, as applicable. Development plans must meet the subdivision and design criteria established under the Development Code.*

13TH STREET APARTMENTS REZONE

CITY COUNCIL

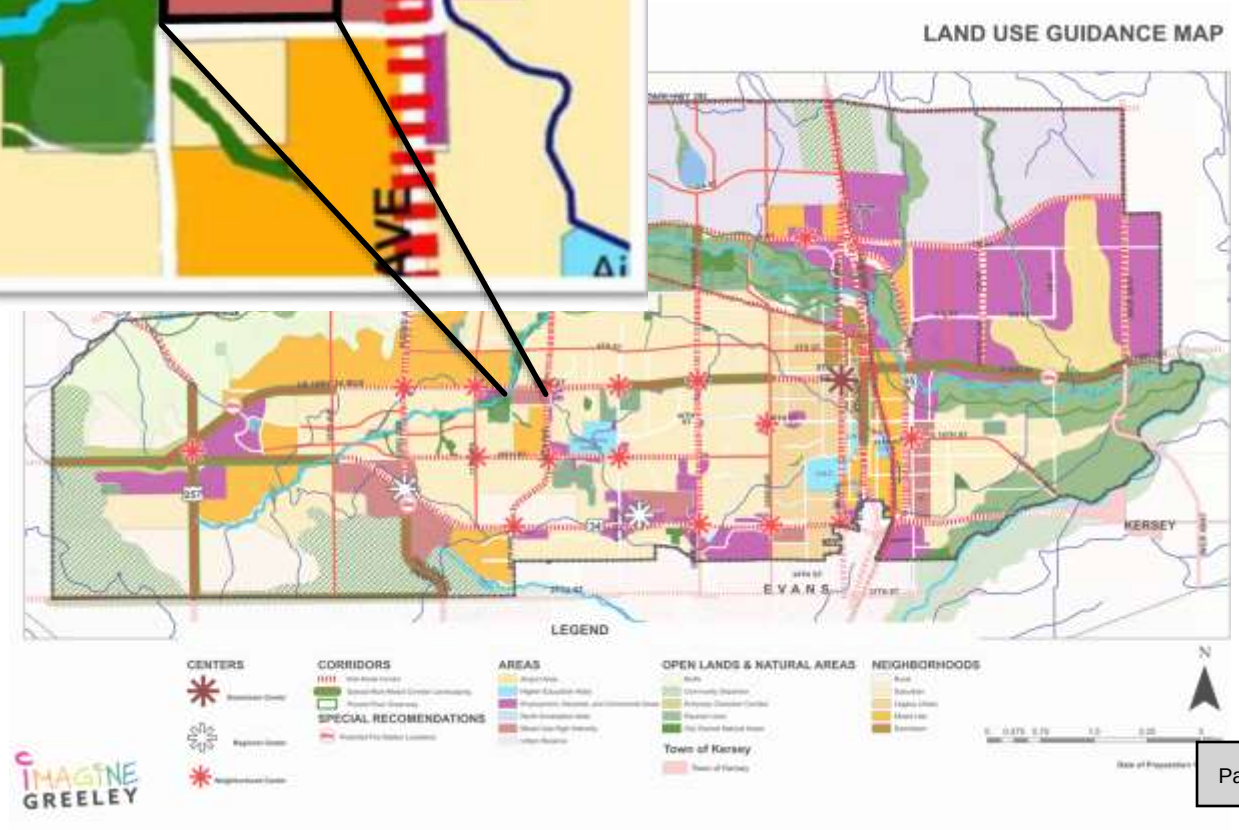
JANUARY 17TH , 2022

ripley design
LANDSCAPE ARCHITECTURE, LAND

WHY DO WE NEED TO REZONE?

- Allows future development to better accomplish objectives of the Imagine Greeley Comprehensive Plan (2018).

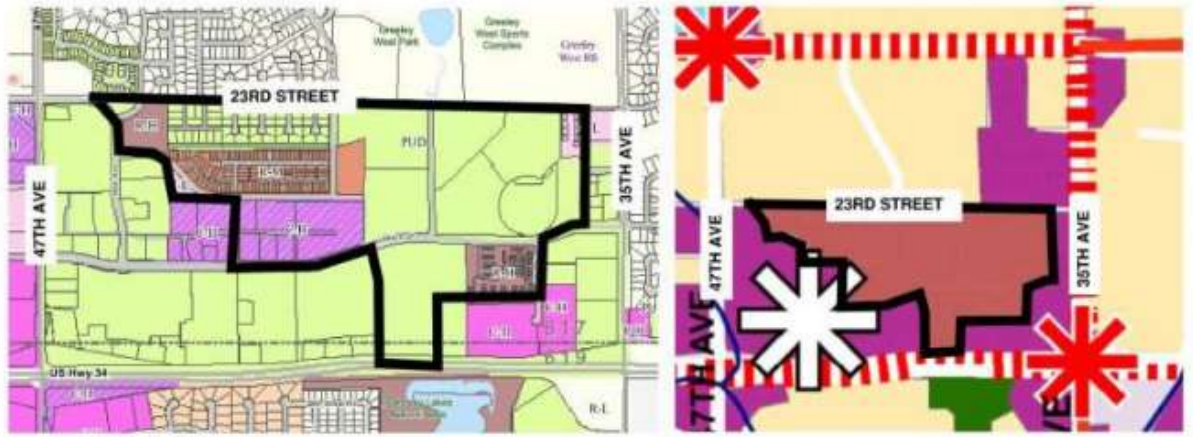
MIXED-USE HIGH INTENSITY



REZONE REQUEST FOLLOWS A TYPICAL PATH

- Examples shown are of other existing R-H zoning within the M-UH Districts.

Example A.



Example B.

R-H (Residential High Density) - Zoning

M-UH (Mixed Use High Intensity) - Land Use Guidance Map Designation

MIXED-USE HIGH INTENSITY

Outlined in the ‘Special Considerations’ for the Mixed-use High Intensity Area:

“Existing development within mixed-use high intensity areas are likely to contain a single use or a narrow range of uses (such as a mall or strip commercial center). As such, redevelopment of these areas should be encouraged to include a wider range of uses, particularly when these areas are located along existing transit lines. Introducing residential uses in such areas should be a particular focus, either as stand-alone uses, or as part of a mixed-use building (e.g., ground-floor retail uses with apartments above). “

R-H ALLOWED USES

- Residential Uses
  - Single-family Dwelling
  - Two-family dwellings
  - Row House dwellings
  - Multi-family Dwellings
  - Mixed-use dwelling
  - Accessory Dwelling Units
  - Boarding Houses
  - Residential Care
- Public & Civic Uses
  - Assembly
  - Golf Course & Country Clubs (no lights)
  - Libraries, Museums, Public or Quasi-public
  - Police, Fire Stations, Ambulance Dispatch & Storage
  - Parks, Open Spaces & Common Areas
  - Schools
  - Public Transportation
  - Utilities
- Commercial Uses
  - Childcare
  - Short-term rental
  - Bed & Breakfast

BENEFITS OF A REZONE

- Rezoning will allow a use that can support the construction of a connection of 65th Avenue to 10th Street and improvements to 13th Street.
- Provides a transition and buffer between single-family homes located to the south and C-H uses along 10th Street.

MARKET ANALYSIS – MULTIFAMILY RESIDENTIAL

The 2022 Apartment Appraisers & Consultants, Inc Report provides:

"During the last 5 years, vacancy has averaged only 4.3%, well below a stabilized 5% to 6% and indicating chronic pent-up demand".

"The Greeley market is not expected to experience oversupply during the next 3 years, and the anticipated new supply is not expected to impact existing apartment properties in the market area".

REZONING REVIEW CRITERIA:

Staff has found this proposal satisfies all nine (9) criteria set forth in Greeley Development Code Section 24-204:

1. The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan.
2. The proposal can fulfill the intent of the zoning district considering the relationship to surrounding areas.
3. The area has changed, or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area.
4. The existing zoning been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity.
5. The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development.
6. The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district.
7. The change will serve a community need, provide an amenity or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning.
8. Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community.
9. The recommendations of professional staff or advisory review bodies.

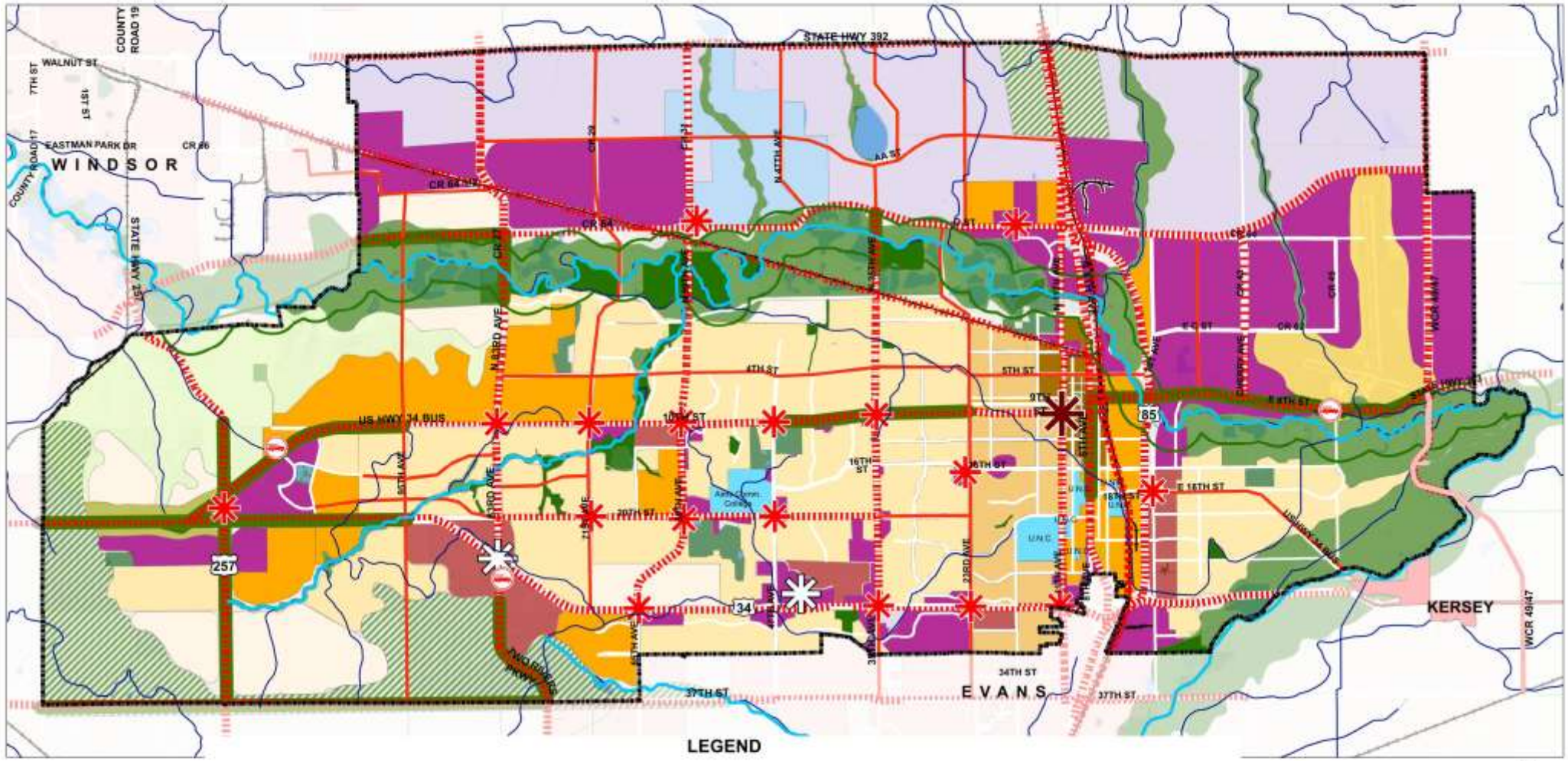
13TH STREET APARTMENTS REZONE

CITY COUNCIL

JANUARY 17TH , 2022

ripley design
LANDSCAPE ARCHITECTURE, LAND

LAND USE GUIDANCE MAP



IMAGINE GREELEY

R-H DISTRICT
(RESIDENTIAL HIGH DENSITY)

R-H – Residential High Density.

“The R-H district provides multi-family residential living in a moderate-density pattern in suburban neighborhoods or higher-density, and larger-scale projects in strategic locations for walkable and urban neighborhoods. It is located in areas that have transitions between lower-density neighborhoods or more intense non-residential uses and where a high level of accessibility, public amenity and support services are immediately available”

Relationship to Comprehensive Plan

- General application the Mixed-use, Legacy Urban, and Downtown Neighborhoods; Multi-modal Corridors; and Mixed-use High-intensity Areas

REZONE MAP

13TH STREET APARTMENTS REZONE MAP

MULTIPLE TRACTS OF LAND LOCATED IN THE NORTH HALF
OF THE NORTHEAST QUARTER OF SECTION 9, TOWNSHIP 5 NORTH,
RANGE 66 WEST OF THE 6TH P.M., CITY OF GREELEY,
COUNTY OF WELD, STATE OF COLORADO
(6450 WEST 10TH STREET)

PROPERTY DESCRIPTION

Multiple parcels of land for rezoning purposes all situate within the North Half of the Northeast Quarter (N1/2NE1/4) of Section Nine (9), Township Five North (T.5N.), Range Sixty-six West (R.66W.), of the Sixth Principal Meridian (6th P.M.), City of Greeley, County of Weld, State of Colorado, more particularly described as follows:

BEGINNING at the North Quarter Corner of Section 9 and assuming the North line of Northeast Quarter of said Section 9 to bear South 89°28'56" East a distance of 2659.31 feet with all other bearings contained herein relative thereto;

THENCE South 89° 28' 48" East along the North line of the Northeast Quarter of said Section 9 a distance of 380.03 feet to the Northerly prolongation of the East line of the Westerly 380.00 feet of the North Half of the North Half of the Northeast Quarter (N1/2N1/2NE1/4) of said Section 9;
THENCE South 00° 43' 21" East along said Easterly line of the Westerly 380.00 feet of the N1/2N1/2NE1/4 of Section 9 a distance of 659.80 feet to the South line of the North Half of the North Half of the Northeast Quarter (N1/2N1/2NE1/4) of Section 9;
THENCE South 89° 26' 43" East along said South line of the N1/2N1/2NE1/4 of a Section 9 a distance of 266.02 feet to the Easterly line of the West 946.00 feet of the South Half of the North Half of the Northeast Quarter (S1/2N1/2NE1/4) of said Section 9;
THENCE South 00° 43' 21" East along the West 946.00 feet of the S1/2N1/2NE1/4 of Section 9 a distance of 4.50 feet to the Northwest corner of Tract A, Bear Rock Subdivision recorded September 10, 2020 as Reception No. 4620666 of the Records of Weld County;
THENCE South 89° 38' 14" East along the Northerly line of said Tract A, Bear Rock Subdivision a distance of 1314.98 feet to the Westerly line of Tract 1, Shops at Sunset Ridge Subdivision recorded August 13, 2007 as Reception No. 3406447 of the Records of Weld County;
THENCE South 00° 22' 58" East along the Westerly line of said Tract 1 a distance of 659.82 feet to the South line of the North Half of the Northeast Quarter (N1/2NE1/4) of said Section 9;
THENCE South 89° 28' 35" West along said South line of the N1/2NE1/4 of Section 9 a distance of 2664.73 feet to the Center-North Sixteenth (C-N1/16) corner of said Section 9;
THENCE North 00° 53' 44" West along the West line of the North Half of the Northeast Quarter of said Section 9 a distance of 1318.47 feet to the North Quarter Corner of Section 9 and to the POINT OF BEGINNING;
Said described parcels of land contain 34.99 acres, more or less.

SURVEYING CERTIFICATE

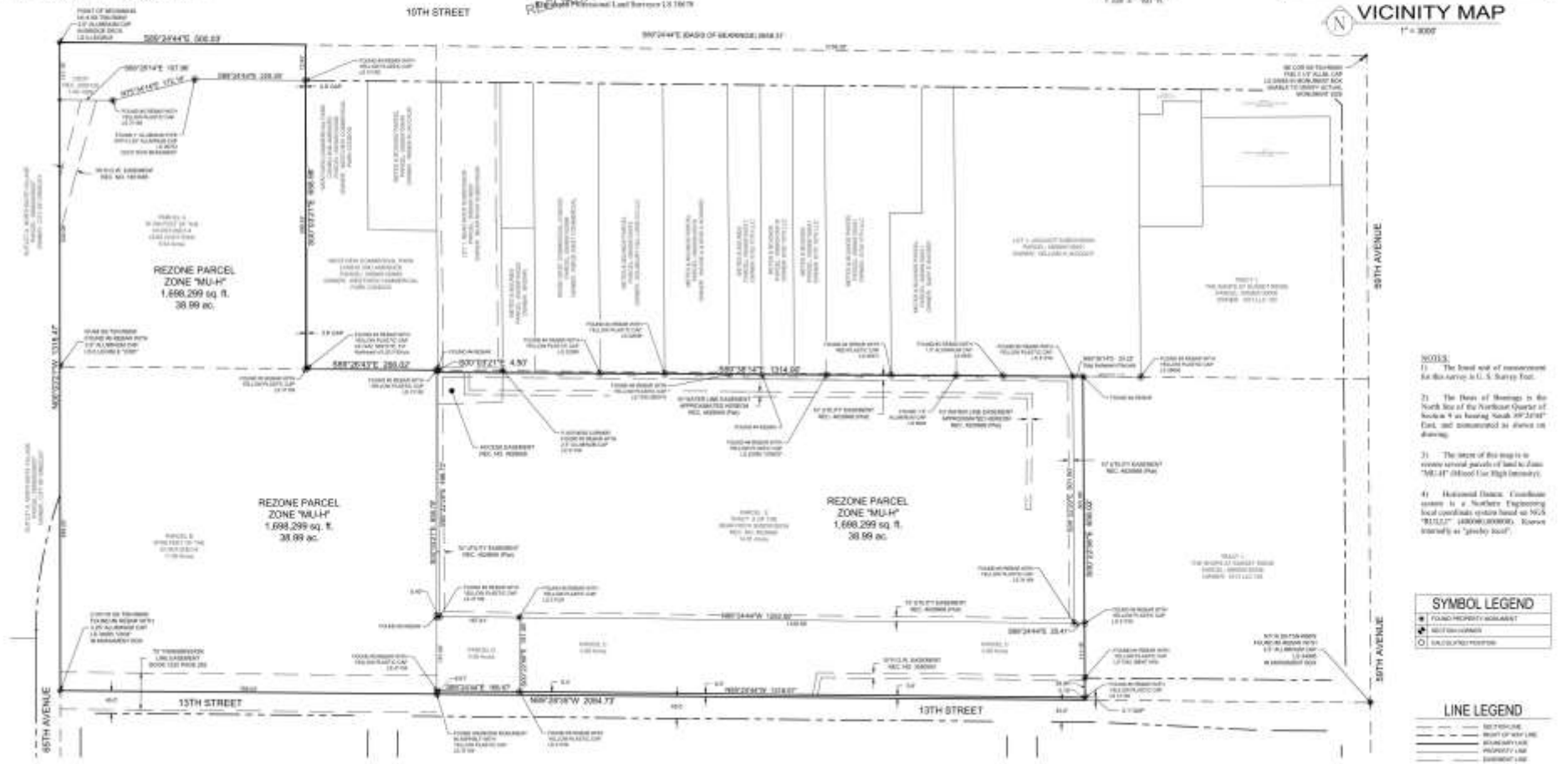
I, Aaron M. Lunt, a Registered Professional Land Surveyor in the State of Colorado, do hereby state that this PROPERTY BOUNDARY MAP was prepared under my personal supervision and checking and that it is true and correct to the best of my knowledge and belief.

DRAFT
10-27-2021
PRELIMINARY - NOT FOR CONSTRUCTION, RECORDING, SALES OR IMPLEMENTATION

Aaron M. Lunt, Professional Land Surveyor LS 38678

NORTH

VICINITY MAP
1" = 3000'



NOTES:

1) The found end of measurement for this survey is U. S. Survey Feet.

2) The Basis of Bearings is the North line of the Northeast Quarter of Section 9 as bearing South 89°28'56" East, and monumented as shown on drawing.

3) The intent of this map is to rezone several parcels of land to Zone "MU-H" (Mixed Use High Intensity).

4) Horizontal Datum: Coordinate system is a Northern Engineering local coordinate system based on NGS "B1312.0" (400000.000000). Reserve internally as "greeley local".

SYMBOL LEGEND

●	FOUND PROPERTY MONUMENT
⊕	SECTION CORNER
○	CALCULATED POSITION

LINE LEGEND

	SECTION LINE
	RIGHT-OF-WAY LINE
	BOUNDARY LINE
	PROPERTY LINE
	EASEMENT LINE

NOTICE:
According to Colorado law you must commence any legal action based upon any defect in this survey within three years after you discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon.

NORTHERN ENGINEERING

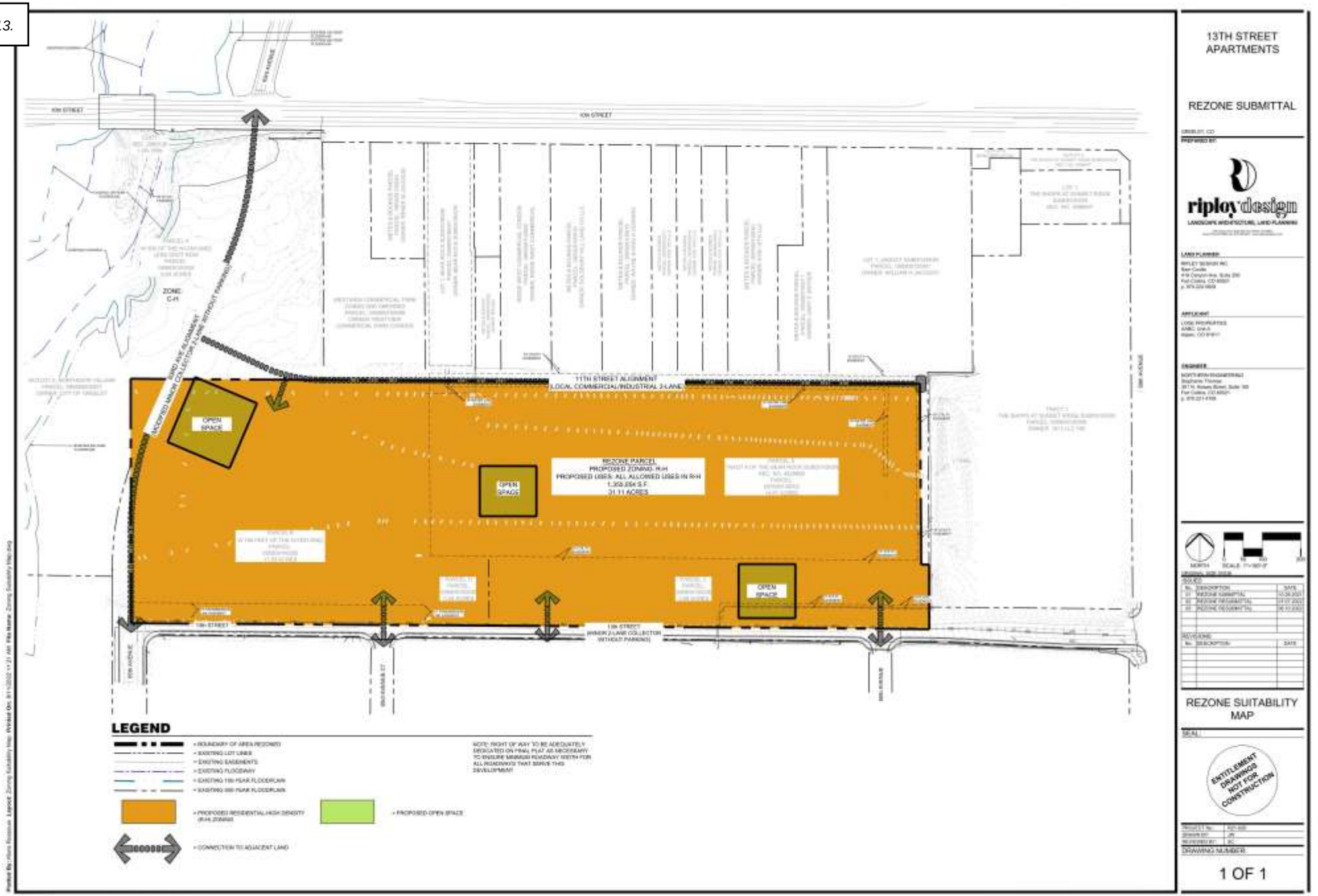
DATE	BY
10/27/2021	

PROJECT MANAGER:
DESIGNER:
DRAWN BY: S. FIELDS
SCALE: 1" = 100'
APPROVED BY: A. LUNT

13TH STREET APARTMENTS REZONE MAP
MULTIPLE PARCELS OF LAND
GREELEY, COLORADO

Sheet
1
Of 1 Sheets

REZONE MAP



13TH STREET APARTMENTS

REZONE SUBMITTAL

riplo design

REZONE SUITABILITY MAP

ENTITLEMENT DRAWINGS NOT FOR CONSTRUCTION

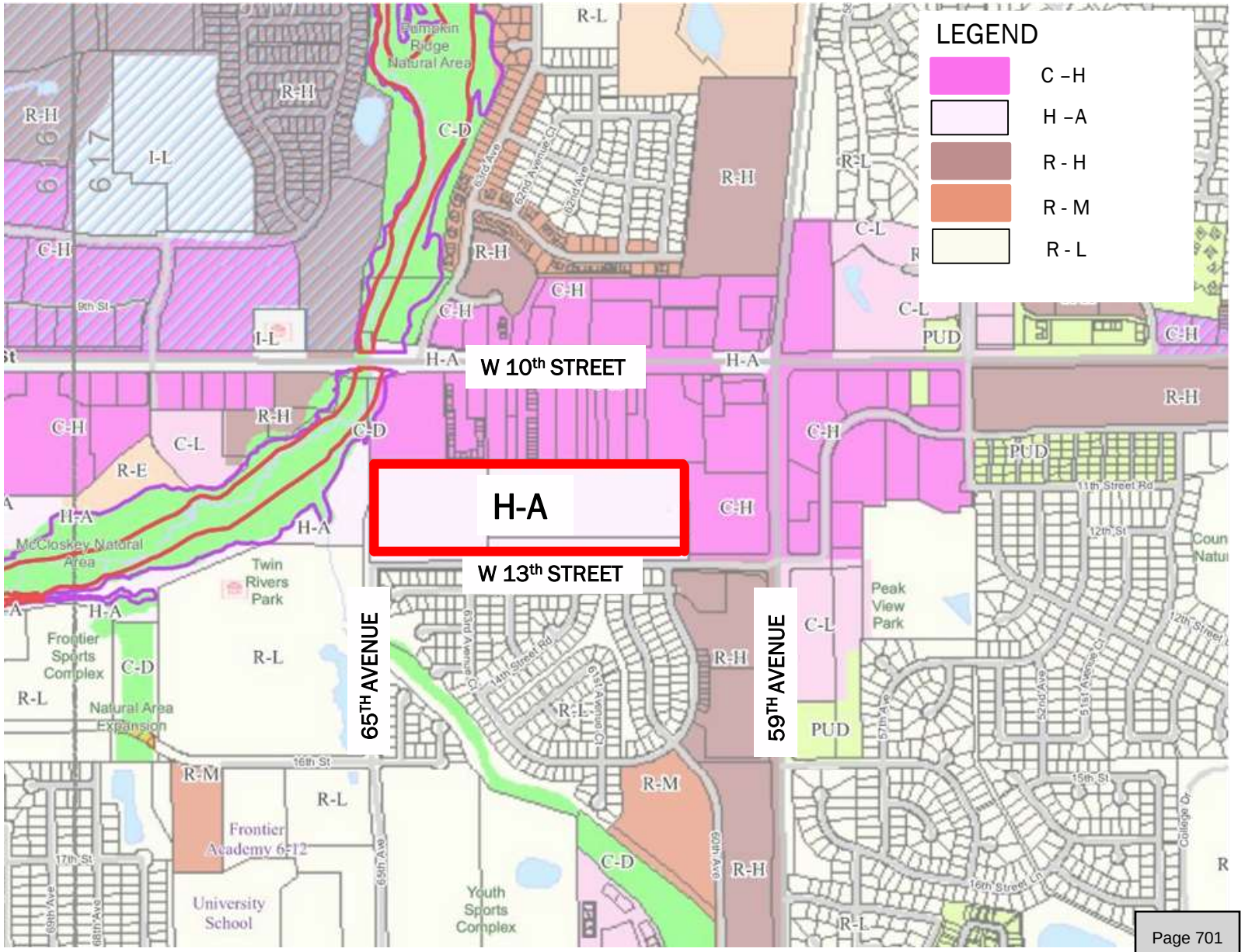
DRAWING NUMBER

1 OF 1

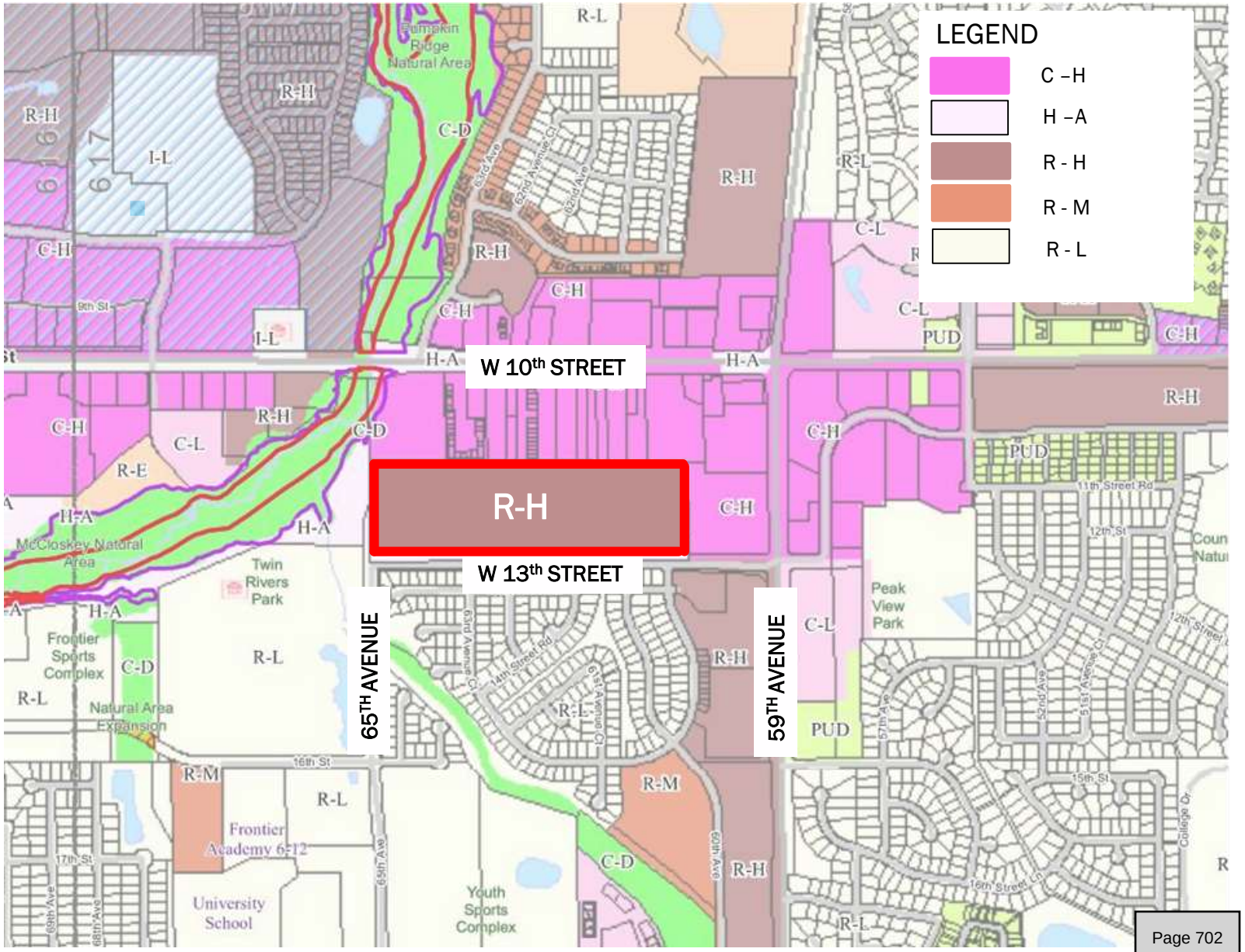
SITE LOCATION

EXISTING ZONING

- Current zoning is H-A *(Holdings Agriculture)*
- *Surrounding zoning:*
  - *C-H (Commercial High Intensity)*
  - *R-H (Residential High Density)*
  - *R-M (Residential Medium Density)*
  - *R-L (Residential Low Density)*



PROPOSED ZONING



Sherri & Mike Zuhlke
1317 60th Avenue
Greeley, CO

September 22, 2022

RE: Case # ZON2021-0016

Resident of Fox Run – Concerns for Development of Apartments

Our Subdivision was developed as a single-family home subdivision not a multi-use high density populated subdivision with transition apartments, 55 + apartments, and modern industrial homes all built on 13th street. We have lived here since 2005 and the traffic has gotten worse over the last 5 years. The City should do a speed and traffic assessment to see for themselves.

There is a major blind spot where the road curves in front of our home, constant speeders, city route with bus traffic, now people use it as a through the street. Used by those not even living in our subdivision. Zoning this for apartment living is pure asinine and greed. Greeley doesn't need more apartments, just look around, they are being built everywhere in our communities.

Young children can't even play on our street. It's really sad.

I know money talks, so the developers have already sealed the deal, but I would hope you consider using this forum as a way of understanding community concerns. This was never written into our HOA and the congestion is already out of control on 60th street. This will magnify the issue.

Do the right thing… I was born and raised in Greeley Colorado… 51 years later and yes growth has happened… it's inevitable, but too much growth and apartments popping up all over the city is not the answer.

Thank you for your time.

Mike and Sherri Zuhlke
970-302-3001

From: Heather <heather.88@comcast.net>
Sent: Tuesday, November 15, 2022 1:21 PM
To: CityClerks <CityClerk@Greeleygov.com>
Subject: [EXTERNAL] City Council meeting tonight ZON2021-0016

Re: ZON2021-0016

Resident of Fox Run - Concerns with zoning change for Residential High Density (apartments)

The Fox Run Subdivision was developed as single-family. Since living in this subdivision, I have witnessed many changes. Initially this was a very stagnant area a good number of the lots were vacant. Thankfully, Fox Run is now fully developed. Many residents chose this location, as I did, because it was close to University Schools and Frontier Academy affording the the option of a “neighborhood school” while having their children attend a charter school. Walking trails, the Fun Plex, access to Baseball and Softball fields and Twin Rivers Park were all big draws. These were also mentioned as benefits when the proposal went before the Planing Commission in September.

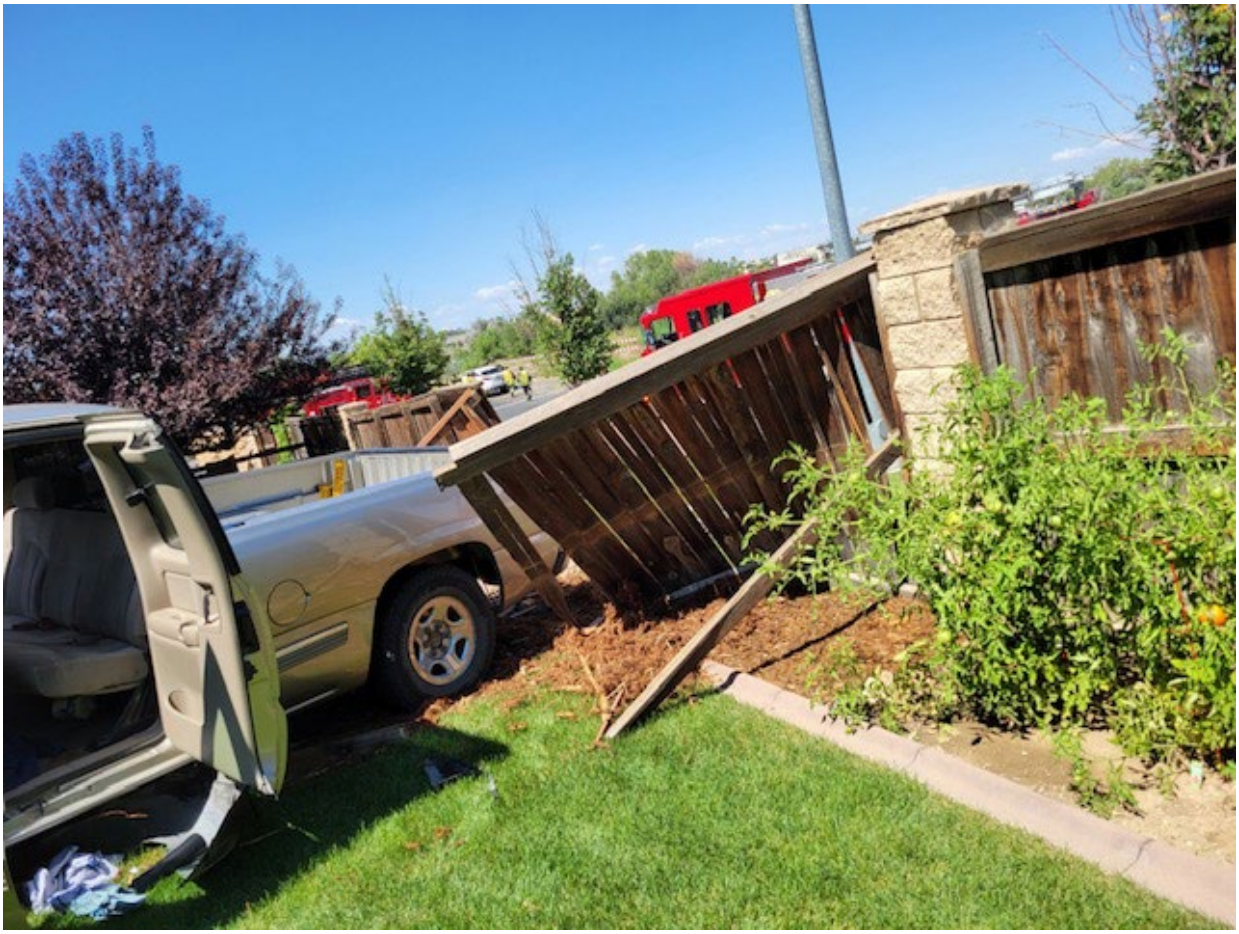
With the Subdivision now full and the amenities near by, the traffic has exponentially increased creating issues around and within Fox Run. 13th Street has become a heavily traveled road, many traveling at speeds far exceeding the posted limit. The Noise from loud vehicles and motor cycles that race up the hill from 65th Avenue to 59th Avenue is exceptionally disruptive preventing conversation at the dinner table, enjoying TV or a movie in your living room, and waking residents from a sound sleep. Accessing 13th Street from 60th Avenue and 63rd Avenue Court is dangerous with limited visibility compounded by speed and volume of traffic on 13th Street. The thought of having access to an apartment complex from 13th Street is only going to increase the danger. I've included photos showing a pickup truck that when thorough the fence into the backyard of my neighbor, thank goodness they were not in the back yard at the time and the vehicle did not hit their home.

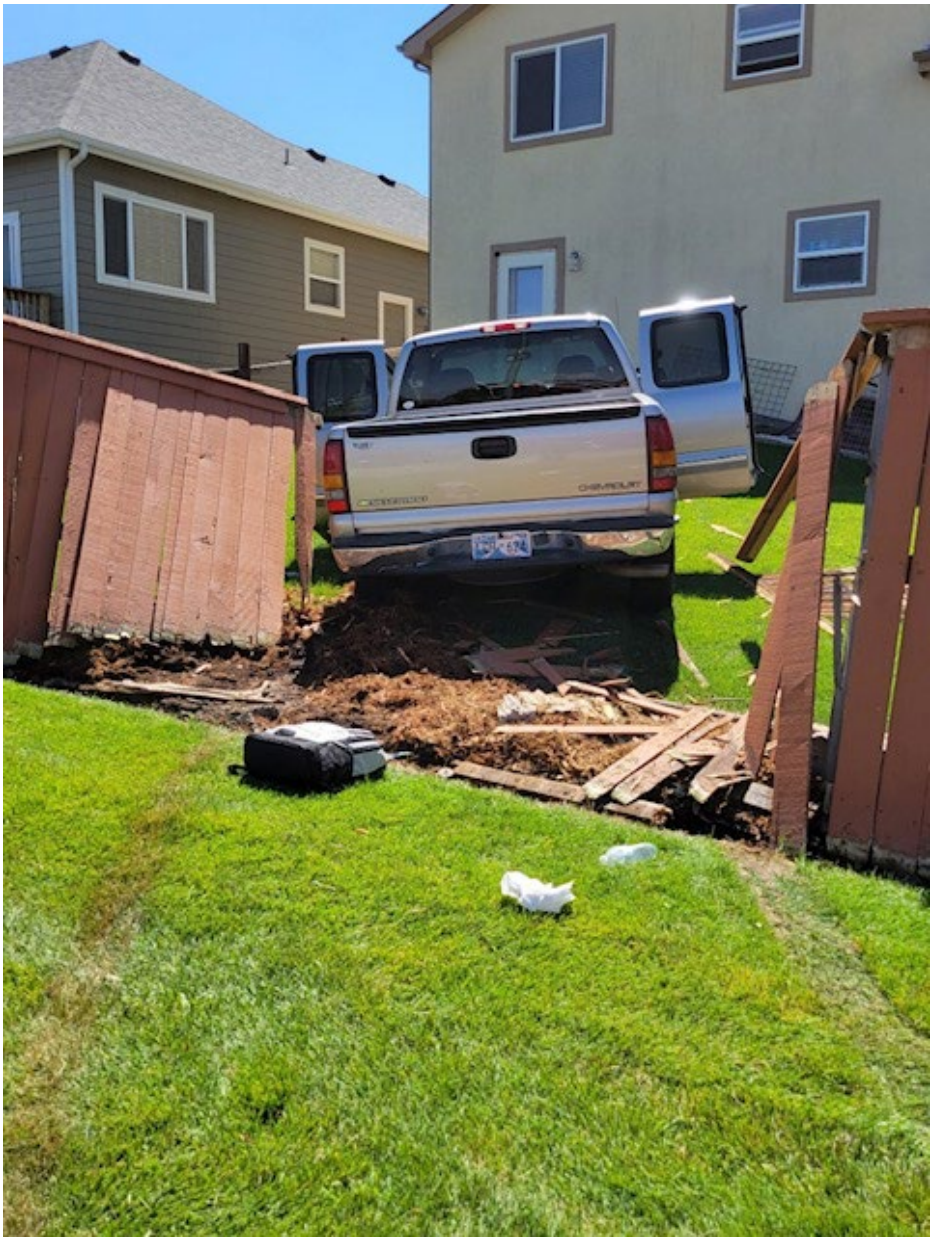
Safety and privacy is important for all residents and homeowners. Having three story apartments looming over your residence is a huge concern and has consequence. How would you feel knowing your privacy and the sanctity of your home was to be violated with others having direct line of sight into your home and yard? Additionally this poses a huge impact on property values and ability to sell our homes. We have invested in our homes as all of you in the council have invested in yours. To have this thrown at residents just as the neighborhood has finally been fully developed is a disgrace.

We have concerns we are sharing with you regarding traffic, privacy, property values, and safety just to name a few these were also brought before the Planning Commission in September. That discussion demonstrated that the money a zoning change could bring to the city far outweighs the concerns of the citizens. My hope is that Council Members have not already decided the revenue potential is too good to pass on. Please consider the impact on the residents already in the area. There are other options. The location could be very well served as residential, just not high density.

Thank you for your time and consideration.

Heather Vaas
6339 W 13th Street Road
Greeley CO





CAUTION: This email is from an **external** source. Ensure you trust this sender before clicking on any links or attachments.

From: ROGER Richman
To: CityClerks; Dale Hall; Brian Condray; pgroom@witwerlaw.com
Subject: [EXTERNAL] 13th Street Rezone
Date: Saturday, January 14, 2023 11:52:09 AM
Attachments: RogerRichman.vcf

Members of Greeley City Council:
Herein is an attempt to persuade this Council to modify the rezoning of the purposed 13th Street project. The 13th Street project as proposed will have multiple negative effects. High density housing will increase the traffic and noise level, create safety issues and lower the value of Fox Run homes.
1. increased traffic with increased noise on 13th, will directly affecting those Fox Run homes bordering the street
2. increased traffic presents a hazard for residents seeking to exit Fox Run with a left turn onto 13th Street, directly affecting those with Fun Plex or University School destinations.
3. Fox Run residents will be exposed to increased risk of crime, as apartment parking lots are prime targets for the growing number of Greeley car thefts. This will eventually bring that higher risk into the subdivision by proximity to the apartment complex.
4. lowering of home values within Fox Run.

Of all the above, I urge consideration of the last. Members of the Planning Commission and Council have already delivered a blow to property values in Fox Run with the erection of the shared homes on miniscule lots in the 1400 block of 60th Avenue. If members are unaware of this area directly across from Fox Run homes, perhaps a drive by would be eye opening. During the Planning Commission meeting, The Pines did not present a site plan. Will

the complex look like Sheep Draw with huge buildings close to the street connected by row upon row of cars on concrete slabs?

I am disappointed with the timing of this reading before the Council. Last week this project was not on the agenda and the posting was not made on the site. Therefore, many residents have not been allotted adequate time to present before the Council.

When speaking to fellow residents, many express the opinion that Greeley has become a mecca of apartment complexes. Also, no one has been able to persuade the Council to consider how a new complex affects the existing area. "First, do no harm" does not seem to apply. Winners in this deal are the city with more revenue, and both the land owner and the developers as they collect their profit. The residents of Fox Run are the losers.

Since the passing of the rezoning for the 13th Street Project is a forgone conclusion, I urge the Council to modify the rezoning. Apartment complex, no, and again I say no. Paired homes, condos (with increased set backs from roads and extensive landscaping) coupled with retail will do the least harm to the existing area. Please consider concessions to the existing rezone to soften the economic impact on my home.

Thank you for your consideration of this proposal. Kind regards. Donna Richman, Fox Run resident

---

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Full Name: Roger Richman
Last Name: Richman
First Name: ROGER

Email: rdrichman1@comcast.net
Email Display As: Roger Richman (rdrichman1@comcast.net)

PUBLIC HEARING NOTICE
CITY COUNCIL
REZONE (ZON2021-0016)
JAN. 17, 2023 AT 6:00 PM
Council Chambers – 1001 11th Avenue
For additional information call:
970-350-9780
or go to:
greeleygov.com/services/cd
City of
Greeley

From: Cindy C
To: CityClerks
Subject: [EXTERNAL] Fwd: Public Hearing Notice - Rezone (ZON2021-0016)
Date: Sunday, January 15, 2023 11:36:47 AM

I would like to be noted as objecting to the rezoning of this parcel. I am a home owner in Fox Run and I am very concerned about having high density buildings along 13th St. The amount of traffic along 13th St. would increase as well as greater opportunity for crime in the area. I feel that the city has disregarded the concern of it's citizens by continuing to allow high density developments without looking at how it effects the home owners of the area.

Has a traffic impact study been done for this development? May I get a copy of it? Has an infrastructure impact study been done? May I get a copy of it?

Please keep me informed of the outcome of this meeting.

Cynthia Carter
6139 W 16th St.
Greeley, CO 80634

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From: gejohammer@aol.com
To: CityClerks
Subject: Re: [EXTERNAL] Rezoning Greeley for more apartments
Date: Tuesday, January 17, 2023 1:34:53 PM

I was referring to the Fox Run rezoning--tonight's meeting, but also against any more apartments being built in Greeley.

-----Original Message-----
From: CityClerks <CityClerk@Greeleygov.com>
To: gejohammer@aol.com <gejohammer@aol.com>
Cc: Laura Clark <Laura.Clark@Greeleygov.com>
Sent: Tue, Jan 17, 2023 11:55 am
Subject: RE: [EXTERNAL] Rezoning Greeley for more apartments

Hello:
It would be greatly appreciated, if you could provide our office with further information regarding what rezoning you are referring to.
Here is the link for tonight's Council Meeting for your reference:
https://mccmeetings.blob.core.usgovcloudapi.net/greeley-pubu/MEET-Agenda-2f5c93a050b044bfb9ad8de77fe06615.pdf
Thank you.

Naomi Gonzales
Administrative Assistant I
City Clerk's Office
1000 10th Street
Greeley, CO 80631
o: 970-350-9740|naomi.gonzales@greeleygov.com
www.greeleygov.com

From: gejohammer@aol.com <gejohammer@aol.com>
Sent: Monday, January 16, 2023 10:42 AM
To: CityClerks <CityClerk@Greeleygov.com>
Subject: [EXTERNAL] Rezoning Greeley for more apartments

STOP with all the building of apartments!! All of the utility bills (water, electric, gas) are increasing their rates so as to improve infrastructure.
In other words, WE are paying for improvements so the developers can pocket the profits. Traffic and crime are horrible and will only get
worse with more apartments.

STOP STOP STOP

CAUTION: This email is from an **external** source. Ensure you trust this sender before clicking on any links or attachments.

Council Agenda Summary

January 17, 2023

Key Staff Contact: Becky Safarik, Interim Community Development Director

Darrell Gesick, Planner III

Title:

Public hearing and second reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from R-H (Residential High Density) to MU-H (Mixed Use High Intensity), changing the underlying land use designations for approximately 1.722 acres of property located at 1603, 1611, 1613, and 1619 7th Avenue, located at the southwest corner of 16th Street and 7th Avenue (ZON2022-0008)

Summary:

The property owners, Jeff and Kelly Cook, request a rezone of the subject property to allow for mixed-use development options. The applicant intends to provide a variety of uses that would provide services to the surrounding residential uses in the area. Some of the anticipated uses may be office, therapeutic massage, counseling services, hair salon, and art studio.

The Planning Commission considered this request on December 13, 2022, conducted a public hearing, and voted to recommend approval to rezone the property by a vote of 7-0. City Council introduced this ordinance at its January 3, 2023 meeting.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
Is there grant funding for this item?	N/A

Legal Issues:

Consideration of this matter is a quasi-judicial process which includes the following public hearing steps:

1) City staff presentation
2) Council questions of staff
3) Applicant presentation
4) Council questions of applicant
5) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
6) Rebuttal, if requested
7) Council discussion
8) Council decision

Other Issues and Considerations:

None

Strategic Focus Area:

Conformance with the policies of the City of Greeley Comprehensive Plan

Decision Options:

1) Adopt the ordinance as presented; or
2) Amend the ordinance and adopt as amended; or
3) Deny the ordinance; or
4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:

Two motions are necessary to approve this request:

1) A motion that, based on the application received, the preceding analysis and Planning Commission recommendation, the proposed rezoning R-H (Residential High Density) Zone District to the MU-H (Mixed-Use High Intensity) Zone District is found to be in compliance with Title 24-204(b) and therefore approve the request.
2) A motion to adopt the Ordinance and publish with reference to title only.

Attachments:

Ordinance
Planning Commission Minutes (December 13, 2022, draft)
Planning Commission Summary (Staff Report, December 13, 2022)
Staff Slide Presentation

CITY OF GREELEY, COLORADO
ORDINANCE NO. 4, 2023
CASE NO. ZON2022-0008

AN ORDINANCE CHANGING THE OFFICIAL ZONING MAP OF THE CITY OF GREELEY, COLORADO, FROM RESIDENTIAL HIGH DENSITY (R-H) TO MIXED-USE HIGH (MU-H) CHANGING THE UNDERLYING LAND USE DESIGNATIONS FOR APPROXIMATELY 1.722 ACRES OF PROPERTY LOCATED AT 1603, 1611, 1613, 1619 7TH AVENUE, AT THE SOUTHWEST CORNER OF 16TH STREET AND 7TH AVENUE.

BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. The following described property located in the City of Greeley is hereby changed from the zoning district referred to as Residential High Density (R-H) TO Mixed-Use High (MU-H), in the City of Greeley, County of Weld, State of Colorado:

Legal Description

A parcel of land, being inclusive of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, Block 2 of Arlington Heights, recorded July 15, 1887 in Book 2 at Page 19 as Reception No. 25765 of the Records of Weld County, and a portion of 16th Street Right of Way, 7th Avenue Right of Way and 20' Alley Right of Way, located in the Southwest Quarter of Section 8, Township Five North (T.5N.), Range Sixty-five West (R.65W.) of the Sixth Principal Meridian (6th P.M.), City of Greeley, County of Weld, State of Colorado and being more particularly described as follows:

BEGINNING at the Southeast corner of said Lot 10 of Block 2, Arlington Heights and assuming the East line of said Block 2 of Arlington Heights as bearing South 00°02'24" East being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, with all other bearings contained herein relative thereto;

THENCE South 89°57'36" West along the South line of said Lot 10 a distance of 200.00 feet to the centerline of said 20' Alley Right of Way;
THENCE North 00°02'24" West along said centerline a distance of 300.00 feet to the centerline of said 16th Street, 100' Right of Way;
THENCE North 89°57'36" East along said centerline a distance of 250.00 feet to the centerline of said 7th Avenue, 100' Right of Way;
THENCE South 00°02'24" East along said centerline a distance of 300.00 feet to the extended line of the South line of said Lot 10;
THENCE South 89°57'36" West along said line a distance of 50.00 feet to the POINT OF BEGINNING.

Said described parcel of land contains 75,000 Square Feet or 1.722 Acres, more or less (±) and is subject to any rights-of-way or other easements of record or as now existing on said described parcel of land.

Section 2. The boundaries of the pertinent zoning districts as shown on the official zoning map are hereby changed so as to accomplish the above-described zoning changes, and the Mayor and

City Clerk are hereby authorized and directed to sign and attest an entry which shall be made on the official zoning map to reflect this change.

Section 3. This ordinance shall become effective five (5) days after its final publication as provided by the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED, THIS _____ DAY OF _____, 2023.

ATTEST: **THE CITY OF GREELEY**

_____ _____

City Clerk **Mayor**

City of Greeley, Colorado
PLANNING COMMISSION PROCEEDINGS
December 13, 2022

1. Call to Order

Chair Yeater called the meeting to order at 1:15 PM.

2. Roll Call

The hearing clerk called the roll.

PRESENT
Chair Justin Yeater
Commissioner Louisa Andersen
Commissioner Erik Briscoe
Commissioner Jeff Carlson
Commissioner Brian Franzen
Commissioner Larry Modlin
Commissioner Christian Schulte

ABSENT
None

3. Approval of Agenda

There were no corrections or additions to the agenda. It was approved as presented.

EXPEDITED AGENDA

---

4. A public hearing to consider a request from DCP Midstream for a natural gas compressor station with various compression equipment on approximately 15.38 acres in the Holding Agriculture zoning district (USR2022-0011).

The Commission had no questions of staff or requested a staff presentation of the application. The Chair invited comment from this applicant, if desired.

Patrick Groom, attorney representative for the applicant at DCP Operating Company, stated that the compressor station for the project is designed to collect and compress gas in that area. Mr. Groom said that in order to get the gas to a natural processing plant the proposed facility will need to house one compressor station. The plan is to construct that station within a steel insulated building. This will reduce sound and impact on surrounding property areas. It was also noted that this station will be designed to upgrade to two compressors at some point.

Chair Yeater opened the public hearing at 1:18 PM. Seeing no one present who wished to address the Commission on this item, the hearing was closed at 1:18 PM.

Commissioner Andersen moved that, based on the application received and the preceding analysis, the Planning Commission find that the proposed Use by Special Review for compressor station with associated facility equipment in the H-A (Holding

Agriculture) zoning district is consistent with the Development Code criteria of Section 24-206 (Items 1-8) and the proposed operation meets the provisions contained in Section 24-1102, Oil and Gas; and therefore, approve the Use by Special Review. Commissioner Schulte seconded the motion.

Motion carried 7-0.

5. A public hearing to consider a request from Jeff and Kelly Cook, to rezone approximately 1.722 acres of land located at 1603, 1611, 1613, and 1619 7th Avenue from R-H (Residential High Density) to MU-H (Mixed Use High Intensity) zone district (ZON2022-0008).

The Commission had no questions of staff or requested a staff presentation of the application. The Chair invited comment from this applicant, if desired.

The applicant, Kelly Cook, stated that she and her husband recently purchased the subject property that consisted of church building, parking lot and accessory buildings. Their intent is to convert the building to house a mix of commercial uses. At the time of purchase, they were not informed the area was zoned as residential low, which would not allow their proposed commercial uses. Because of this, they are looking to rezone the area to mixed-use. Ms. Cook noted that the building is in ill repair at the moment, but they would like to fix it up with some small spaces that would coordinate nicely with the new apartment buildings in the area.

Chair Yeater opened the public hearing at 1:22 PM. Seeing no one present who wished to address the Commission on this item, the hearing was closed at 1:22 PM

Commissioner Franzen commented that this project is a great way to increase complementary uses in this district and he is happy there will be more activity in the downtown area.

Commissioner Schulte agreed.

Commissioner Franzen moved that, based on the application received and the preceding analysis, the Planning Commission find that the proposed rezoning from R-H (Residential High Density) Zone District to the MU-H (Mixed-Use High Intensity) Zone District meets the Development Code criteria, Sections 24-204 and therefore, recommends approval of the rezone to the City Council. Commissioner Carlson seconded the motion.

Motion carried 7-0.

END OF EXPEDITED AGENDA

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6. Consideration of the 2022 Water Efficiency Plan Update

Dena Egenhoff, City of Greeley Water Conservation Manager, explained that for the City of Greeley to qualify for funding from the State of Colorado the City needs to have a water efficiency plan in place, which must be updated at least every seven years. Ms. Egenhoff described a variety of approaches that were used to formulate the updated plan. She also described the due diligence outreach with the community, on social

media, via open houses and with focused efforts targeted to local businesses and communities.

Ms. Egenhoff proposed that this water efficiency plan be approved and incorporated into the City of Greeley Imagine Greeley Comprehensive Plan.

Commissioner Briscoe moved that the Planning Commission endorse the adoption of the 2022 Water Efficiency Plan and recommend its incorporation by reference into the City's 2018 Comprehensive Plan motion. Commissioner Andersen seconded.

Motion carried 7-0.

7. Consideration of proposed Water and Sewer Design Criteria and Construction Specifications.

Adam Prior, Chief Water and Sewer Engineer, explained the process used to obtain input to formulate the proposed Water and Sewer Design Criteria, which included incorporating input from developers, planners, departments, and the Commission. He noted the goal is to have a comprehensive set of standards for water and sewer, non-potable, landscape, and irrigation. He stated there are six sections in the plan. The first section covers general requirements, the second describes submittal requirements, the third section relates to potable water distribution requirements, the fourth section refers to sanitary sewer collection system design, the fifth section covers non-potable water irrigation system design, and the sixth section contains landscape and irrigation criteria, which would be further discussed by Ms. Egenhoff.

Ms. Egenhoff explained that section six is dealing with landscaping irrigation which has a new criteria, that pertains more to commercial properties. She noted that the goal is to provide for a viable community with healthy landscapes and tree canopy for current and future Greeley residents. They are also focusing on protecting the Colorado River capacity which has about 40% of the water demands originating in Greeley.

She noted section six also mentions four hydrazones that support different types of vegetation. Ms. Egenhoff stated that a water budget chart was created to illustrate pipe sizes, tap fees, etc. This guide helps calculate how much demand is needed for those plants and for the landscape to remain healthy. She stated they are also doing irrigation maintenance to support compliance, best management practices, and annual checkups as far as repairing leaks.

Ms. Egenhoff stated that since the last meeting they have made many corrections, refinements, and adjustments to the criteria via one-on-one meetings with Chair Yeater, who gave valuable guidance.

Commissioner Modlin asked if the new metering system applies to non-potable water and if the no-leaks detector works effectively as a measuring tool and alert system.
Mr. Prior said that the meter replacement project will include non-potable water. The meter will be like most others that have the same online connection that helps monitor use. He said this will help with real time use if there is a leak. This system also looks at use in a 24-hour period which are dependent on the individual's personal settings.

Commissioner Modlin asked how the system notifies owners and if there is an audit trail.

Ms. Egenhoff stated that they usually notify customers through e-mail or a text message. They also complete an internal weekly review to ensure everyone has been notified if

necessary. If they discover that a large user hasn't been notified, then they send out a letter.

Chair Yeater suggested that the Water and Sewer department add all of that into section six for future reference.
Ms. Egenhoff stated that one of the changes was for an automatic notification to go out in order to get things solved in a quicker fashion.

Chair Yeater opened the public hearing at 1:47PM. Seeing no one present who wished to address the Commission on this item, the hearing was closed at 1:47 PM

Commissioner Anderson moved that the Planning Commission recommend to the City Council the adoption of the January 2023 Water and Sewer Design Criteria and Construction Specifications. Modlin seconded the motion.

Chair Yeater commended the Water and Sewer department for putting this together and hearing the voice of the community. He stated he's excited to see how the new code will help lead Northern Colorado into the future. Mr. Yeater also noted that he will speak to the City Council about the Water and Sewer Design Criteria and Construction Specifications in detail.

Motion carried 7-0.

8. Staff Report

Ms. Safarik introduced the new Interim Planning Manager, Don Threewitt. Mr. Threewitt gave a little background about his experience and stated he was happy to be a part of this team and looks forward to the future with the City of Greeley.

9. Adjournment

With no further business before the Commission, Chair Yeater adjourned the meeting at 1:51 PM.

_____
Justin Yeater, Chair

_____

Becky Safarik, Secretary

PLANNING COMMISSION SUMMARY

ITEMS: Rezone property from R-H (Residential High Density) to MU-H (Mixed-Use High Intensity)

FILE NUMBER: ZON2022-0008

PROJECT: 1603, 1611, 1613, and 1619 7th Avenue Rezone

LOCATION: 1603, 1611, 1613, and 1619 7th Avenue

APPLICANTS: Jeff and Kelly Cook

CASE PLANNER: Darrell Gesick, Planner III

PLANNING COMMISSION HEARING DATE: December 13, 2022

PLANNING COMMISSION FUNCTION:
The Planning Commission shall consider the staff report, along with testimony and comments made by the applicant and the public and shall then make a recommendation to the City Council regarding the application in the form of a finding based on the review criteria in Section 24-204 of the Development Code.

EXECUTIVE SUMMARY
The City of Greeley is considering a request from Jeff and Kelly Cook to rezone 1.722 acres of land located at 1603, 1611, 1613, and 1619 7th Avenue from R-H (Residential High Density) to MU-H (Mixed-Use High Intensity) zone district (see Attachments A, C, and D).

A. REQUEST
The applicants are requesting approval of a rezone (see Attachment C).

B. STAFF RECOMMENDATION
Approval

C. LOCATION

Abutting Zoning:
North: C-H (Commercial High Intensity)
South: R-H (Residential High Density)
East: R-H (Residential High Density)
West: C-H (Commercial High Intensity)

Surrounding Land Uses:
North: 16th Street/Coffee Shop/Residential
South: Residential
East: 7th Avenue/Residential
West: Commercial/Residential

Site Characteristics:
The site consists of a former church use, residential lot, and two lots that are undeveloped dirt area that was used for parking by the former church user. The property is relatively flat land and has a large, landscaped parkway area with some street trees along both 7th Avenue and 16th Street.

D. BACKGROUND

The subject site was developed in the 1920's. From the 1920's until recently the subject site was used as a church, with one single-family dwelling on a lot to the south. Recently, the applicants purchased the property from the church and intends to develop the site with a variety of uses that would serve the surrounding neighborhood.

E. APPROVAL CRITERIA

Development Code Section 24-204 Rezoning Procedures

The review criteria found in Section 24-204(b) of the Development Code shall be used to evaluate the zoning amendment application.

1. **The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan.**

   The Imagine Greeley Comprehensive Plan's Land Use Guidance Map designates the subject property as a Mixed-Use area. Supported uses include residential, commercial, office, retail, personal service, and institutional. A mix of uses, either vertical or across multiple sites, are encouraged.

   Goal 4 – Prioritize Infill and Redevelopment

   Objective GC-4.2 Reinvestment/Adaptive Reuse - Encourage reinvestment in established areas of Greeley to maximize the use of existing public infrastructure. Support the use of creative strategies to revitalize vacant, blighted, or otherwise underutilized structures and buildings through adaptive reuse.

   Objective GC-4.3 Infill Compatibility - Promote the use of site design and building architecture that is sympathetic to the surrounding area and enhances the desirable character and form of the neighborhood or area.

   Staff Comment: This proposal is in accordance with Goal 4, Prioritize Infill and Redevelopment, of the Imagine Greeley Comprehensive Land Use Plan. The rezoning request for this site would encourage reinvestment of an existing structure that is using existing public infrastructure.

   The proposal complies with this criterion.

Additionally, the following specific goals and objectives of the Imagine Greeley Comprehensive Plan support the proposed rezone:

Growth and City Form:

- GC-1.2 Form of Growth: Encourage compact urban form over sprawl development.
- CG-2.2 Jobs/Housing Balance: Support zoning and development patterns that expand opportunities for people who live in Greeley to also work in Greeley (and vice-versa).
- GC-2.3 Pedestrian and Bicycle-Oriented Development: Encourage development pattens that encourage walking and bicycling whenever possible – by locating employment, shopping, and other services within a quarter mile of residential areas.

Economic Health and Human Services:

- EH-2.4 Land Use: Promote land use decisions that support walkability and improve access to basic needs.
- EH-2.5 Walkability and "Bikability": Plan and design neighborhoods so employment, schools, shopping, parks, transit, and other facilities are within a 10-minute safe walk of housing.
- EH-2.6 Built Environment: Encourage construction of built environments that support health and active living, such as mixed-use centers and neighborhoods, that support walkability and provide safe options for active transportation.

2. The proposal can fulfill the intent of the zoning district considering the relationship to surrounding areas.

Staff Comment: The proposed rezone would allow for more development options, which fulfills the intent of the proposed zoning district of MU-H and is consistent with other uses in the surrounding area. The mixed-use district encourages a mix of uses in a walkable setting that complements higher density areas. The surrounding area currently consists of residential, coffee shop, and restaurants. The applicant is proposing a multi-tenant use building that could range from personal service, such as, therapeutic massage, counseling, and hair salon. With more development options, there is more potential to provide services to the surrounding area.

The proposal complies with this criterion.

3. Whether the area changed, or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area

Staff Comment: The majority of this area has been developed out for many years, which includes commercial and residential to the north, residential to the east and south, and commercial and residential to the west. Recently, a multi-family project developed to the northwest of the subject site.

Under the current zoning, which limits uses to high density residential uses, would limit redevelopment opportunities for the sites. Typically, only single-family, two-family, and multi-family uses, with a few very low intensities commercial uses, would be allowed in the R-H zone district. The proposed MU-H zone district would allow for more flexibility in development options, including a variety of uses, such as, residential, assembly, food and beverage, lodging, personal services, and retail. Planning staff concludes that it is in the public's interest to rezone the subject site to allow for more options.

The proposal complies with this criterion.

4. **Whether the existing zoning been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity.**

Staff Comment: The existing zoning has been in place since the 1920's, with the church being built in 1920. The existing zoning is not necessarily inappropriate; however, most of the uses the applicant has proposed for the site tend to be allowed in the C-L zone. Instead of rezoning to a traditional commercial zoning district, where some uses could be impactful to the surrounding residential uses, it would be more appropriate to rezone to the proposed MU-H zone, where service type uses could be provided. Rezoning the site would provide more development opportunities.

The proposal complies with this criterion.

5. **The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development.**

Staff Comment: The proposed rezoning would provide complementary development options to the surrounding zoning and existing uses by creating a reasonable transition between residential and higher intensity commercial uses to the west.

The proposal complies with this criterion.

6. **The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district.**

Staff Comment: The subject site is served by the City of Greeley. Any proposed development or redevelopment of the subject site would be reviewed for compliance with City standards and improvement to infrastructure

may be required at that time. Additional information regarding City services can be found in this report in Sections F, G, and H.

The proposal complies with this criterion.

7. **The change will serve a community need, provide an amenity or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning.**

   Staff Comment: The proposed rezoning would allow more development options if the site were rezoned to MU-H, allowing for more potential services for the community, making the rezone more appropriate than the current zoning district.

   The proposal complies with this criterion.

8. **Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community.**

   Staff Comment: Any reasonably anticipated negative impacts on this area resulting from this rezoning would be mitigated as part of the development review process by the consistent enforcement of Municipal Code and Development Code requirements regarding landscaping buffers, architectural features, setbacks, and other relevant codes and policies. A conceptual traffic study and drainage report were provided with this application, and the final drainage and traffic needs would be further evaluated at the time of site plan or plat, as necessary.

   The proposal complies with this criterion.

9. **The recommendations of professional staff or advisory review bodies.**

   Staff Comment: City staff recommends approval of this rezoning request.

F. SITE CHARACTERISTICS

1. SUBDIVISION HISTORY

The property is currently platted as part of the Arlington Heights Subdivision, which was done in 1887. The applicant has indicated that they would combine all the lots into one large lot in the near future through a minor subdivision process. Minor subdivisions are reviewed and approved administratively by City staff.

2. HAZARDS

Staff is unaware of any potential hazards that presently exist on the subject site.

3. **WILDLIFE**
   The subject site is not located in an area identified for moderate or high wildlife impacts. There are no known impacts that would occur to wildlife if the site were rezoned.

4. **FLOODPLAIN**
   The proposed rezone is not located within the 100-year floodplain or floodway, according to the adopted Federal Emergency Management Administration (FEMA) flood data.

5. **DRAINAGE AND EROSION**
   This rezone will not affect the existing drainage for the site. Any proposed development of the site would require the documentation and review by City staff of all drainage, detention, water quality, and erosion mitigation as a condition of the development of the site.

6. **TRANSPORTATION**
   The City's Transportation Planner and Engineering Development Review staff have reviewed the traffic impact analysis with the proposed concept plan and found that additional traffic would not create a significant impact on existing roadway systems.

   No additional improvements were warranted based on projected traffic. Further analysis would be conducted at time of site plan review once exact layouts and densities are confirmed.

G. SERVICES

1. **WATER**
   Current water services adequately serve the subject property with additional capacity available if needed.

2. **SANITATION SEWER**
   Current sewer services adequately serve the subject property with additional capacity available if needed.

3. **EMERGENCY SERVICES**
   Emergency services are available and can adequately serve the subject property.

4. **PARKS/OPEN SPACES**
   No public parks or public open space areas are proposed with this request and the request would not create any private parks or open space. The proposed rezone should have little to no impact on parks or open space in the community.

5. **SCHOOLS**
   No schools are proposed or located within the site.

H. NEIGHBORHOOD IMPACTS

1. VISUAL

No visual impacts are anticipated with the rezone request. Any development plan application for the property would be reviewed for compliance with the City's Development Code requirements regarding visual impacts.

2. NOISE

No noise impacts are anticipated with the rezone request. Any potential noise created by future development will be regulated by the Municipal Code.

I. PUBLIC NOTICE AND COMMENT

Neighborhood notices for this meeting were mailed to surrounding property owners on November 14, 2022, per Development Code requirements. A sign was also posted on the site on November 14, 2022. The public hearing notice was placed on the City of Greeley's website on November 14, 2022.

J. MINERAL ESTATE OWNER NOTIFICATION

Mineral notice is not required for a rezone request.

K. PLANNING COMMISSION RECOMMENDED MOTION

Approval (Staff recommendation) -

Based on the application received and the preceding analysis, the Planning Commission finds that the proposed rezoning from R-H (Residential High Density) Zone District to the MU-H (Mixed-Use High Intensity) Zone District **meets** the Development Code criteria, Sections 24-204 and therefore, recommends approval of the rezone to the City Council.

Denial-

Based on the application received and the preceding analysis, the Planning Commission finds that the proposed rezoning from R-H (Residential High Density) Zone District to the MU-H (Mixed-Use High Intensity) Zone District **does not** meet the Development Code criteria, Sections 24-204 and therefore, recommends denial of the rezone to the City Council.

ATTACHMENTS

Attachment A – Zoning & Vicinity Map
Attachment B – Photo Aerial Map
Attachment C – Project Narrative
Attachment D – Rezone Boundary Map
Attachment E – Site Analysis Map
Attachment F – Zoning Suitability Map
Attachment G – Neighborhood Notification Boundary Map

Item No. 14.

Zoning/Vicinity Map
1603, 1611,1613, and 1619 7th Avenue Rezone

City of Greeley Colorado

ZON2022-0008

Legend

- Structure
- FEATURE_SUBTYPE
- Water Body
- Weld Parcels
- Road Centerline
- Roads

0 100 200 Feet

Item No. 14.

Photo Aerial Map
1603, 1611,1613,
and 1619 7th Avenue Rezone

City of Greeley Colorado

ZON2022-0008

Legend

- Road Centerline

FEATURE_SUBTYPE

- Water Body
- Weld Parcels
- Origin Cache Mask

0 50 100 Feet

Rezoning Request for the Ambry Building
Lots 1,2,3,4,5,6,7,8,9,10
1603, 1611, 1613, 1619 7th Avenue 716 16th Street 80631
Arlington Heights subdivision
City of Greeley, County of Weld, State of Colorado
1.09 Acres
Project Number ZON2022-xxxx

July 11, 2022

Submitted by Jeff Cook and Kelly Langley Cook
Surveying by King Surveyors
Civil Engineering by Permits & Engineering Co.

Rezoning Request for the Ambry Building
Lots 1,2,3,4,5,6,7,8,9,10
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1.09 Acres
ZON2022-XXXX

Table of Contents

2	Request abstract
3	Existing Conditions and Site Analysis Map
4	Zoning Suitability Map
5	Project Boundary Map
6	Full legal description of project boundary (in word document)
7	General Layout - Arrangement and Character of streets and open spaces - Anticipated scale, intensity, and character of the proposal - Public and community facilities
8	Phasing or Implementation Plan - Not Applicable At This Time
9	Detail Plans - Not Applicable At This Time
10	Project Narrative
	Additional documentation - Available if Requested

Rezoning Request for the Ambry Building
Lots 1,2,3,4,5,6,7,8,9,10
1603, 1611, 1613, 1619 7th Avenue 716 16th Street 80631
Arlington Heights subdivision
City of Greeley, County of Weld, State of Colorado
1.09 Acres
ZON2022-XXXX

Request Abstract

We are requesting a rezoning of the property bloc 1603, 1611, 1613, 1619 7th Avenue 716 16th Street from residential to mixed use. The following documentation will explain the plan for use, phasing, environmental upgrade, neighborhood improvement plans, and the benefit to the city and community of the rezoning this property to mixed use.

Jeff and Kelly Cook

Residing at: 1215 18th Street, Greeley, Colorado 80631
DBA: Bad Plan LLC.

970-232-5898
970-576-6050

Jeff: whatisatlas@gmail.com
Kelly: kelly.langleycook@unco.edu

Rezoning Request for the Ambry Building
Lots 1,2,3,4,5,6,7,8,9,10
1603, 1611, 1613, 1619 7th Avenue 716 16th Street 80631
Arlington Heights subdivision
City of Greeley, County of Weld, State of Colorado
1.09 Acres
ZON2022-XXXX

See Attached Plan Set for Existing Conditions and Site Analysis Map

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City of Greeley, County of Weld, State of Colorado
1.09 Acres
ZON2022-XXXX

See Attached Plan Set for Zoning Suitability Map

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ZON2022-XXXX

See Attached Plan Set for Project Boundary Map

Rezoning Request for the Ambry Building
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1.09 Acres
ZON2022-XXXX

PROPERTY DESCRIPTION

A parcel of land, being inclusive of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, Block 2 of Arlington Heights, recorded July 15, 1887 in Book 2 at Page 19 as Reception No. 25765 of the Records of Weld County, and a portion of 16th Street Right of Way, 7th Avenue Right of Way and 20' Alley Right of Way, located in the Southwest Quarter of Section 8, Township Five North (T.5N.), Range Sixty-five West (R.65W.) of the Sixth Principal Meridian (6th P.M.), City of Greeley, County of Weld, State of Colorado and being more particularly described as follows:
BEGINNING at the Southeast corner of said Lot 10 of Block 2, Arlington Heights and assuming the East line of said Block 2 of Arlington Heights as bearing South 00°02'24” East being a Grid Bearing East being a Grid Bearing of the Colorado State Plane Coordinate System, North Zone, North American Datum 1983/2011, with all other bearings contained herein relative thereto; THENCE South 89°57'36” West along the South line of said Lot 10 a distance of 200.00 feet to the West along the South line of said Lot 10 a distance of 200.00 feet to the centerline of said 20' Alley Right of Way; THENCE North 00°02'24” West along said centerline a distance of 300.00 feet to the centerline of West along said centerline a distance of 300.00 feet to the centerline of said 16th Street, 100' Right of Way; THENCE North 89°57'36” East along said centerline a distance of 250.00 feet to the centerline of East along said centerline a distance of 250.00 feet to the centerline of said 7th Avenue, 100' Right of Way; THENCE South 00°02'24” East along said centerline a distance of 300.00 feet to the extended line of East along said centerline a distance of 300.00 feet to the extended line of the South line of said Lot 10; THENCE South 89°57'36” West along said line a distance of 50.00 feet to the POINT OF BEGINNING. West along said line a distance of 50.00 feet to the POINT OF BEGINNING.

Said described parcel of land contains 75,000 Square Feet or 1.722 Acres, more or less (±) and is subject to any rights-of-way or other easements of record or as now existing on said described parcel of land.

See Attached FULL LEGAL DESCRIPTION OF PROJECT BOUNDARIES (Word doc)

Rezoning Request for the Ambry Building
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Arlington Heights subdivision
City of Greeley, County of Weld, State of Colorado
1.09 Acres
ZON2022-XXXX

See Attached Plan Set for General Layout Plan

Rezoning Request for the Ambry Building
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ZON2022-XXXX

PHASING IMPLEMENTATION PLAN
NOT APPLICABLE AT THIS TIME

Rezoning Request for the Ambry Building
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1.09 Acres
ZON2022-XXXX

DETAIL PLANS
NOT APPLICABLE AT THIS TIME

Rezoning Request for the Ambry Building
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ZON2022-XXXX

THE AMBRY

Narrative Prospectus:

Jeff: In 1994 I set off for college. Everything I owned was sandwiched in a small blue Hyundai and as I entered town the first place I stopped was Margie's Java Joint. This was my first experience of Greeley, Colorado.

Since that moment, most of the last 30 years of my life has revolved around the rhythms on 16th Street. From doing schoolwork at the coffee shop and throwing performances on Central campus, to graduating and renovating the Beetle (now the "Taste of Philly"), to starting the Block Party, seeing it grow and move downtown, to teaching philosophy for 15 years at UNC. Kelly and I first met and were married in our neighborhood, and in Cranford we bought a house that we built into a home with our two kids.

Kelly: When Jeff was in graduate school it seemed like we drove to Greeley every weekend. Denver was a big adventure, but Greeley was home. We moved back as quickly as we could. In 2003, I started teaching at Frontier Academy. We joined a tiny church, we bought our first home, our kids were born at NCMC, we bought a second home closer to downtown so we could walk the campus and Glenmere Park. Now our coffee dates are at Margie's and the Blue Mug (and John Galt, of course!), and our nights out at the Rio. We take all of our friends to Patrick's when they come to town. We spend anniversaries going to the Greeley Phil. Birthdays in our house mean a special trip to the Nerd Store and Blush Boutique. We don't just want to reside in Greeley, we want to be a part of Greeley. When we bought the Atlas building it began our life-long love of restoring what was broken and abandoned and making it into the type of Greeley we had seen and known all along. Fifteen years later you can enter the Atlas at any time and you will find it packed with friends catching up over coffee, students studying late in to the night, a quinceñera and someone on a zoom meeting… all at the same time!

Jeff: Our neighborhood has been the hub of my closest relationships. The community grounded in the Atlas Theater has been a source of life for me and for our area. We have always had as our central calling an investment in (what we affectionately call) "16th Street Culture". In 2008, we took an old mechanic's garage that had been cast off by a Denver based investor and we made it one of the more beautiful spaces in our city.

In the Theater, we have watched friends envision and launch businesses like Luna's, John Galt Coffee Company, the Maddie and the Moxi. In our spaces we have celebrated weddings, high holy days, first birthdays, 40th anniversaries and the funerals of those we have lost. We have housed a church that for many years has been a stabilizing point on the east side of 8th, and in the Theater we continue to create a hub for our city's amazing artists. From gallery shows to regular jazz music to

local theater productions, ours is a space of artists and we would like the life seen in the Atlas Theater to begin to spread to the rest of the corridor we love.

Kelly: Among the many community events at the Atlas, we've hosted town hall meetings, "coffee with a cop," fundraisers for schools, the District 6 gallery hop, first Friday art openings, fundraisers for Alzheimer's research, UNC concerts of every variety and fourteen Indie Arts Winter Markets. Thousands of folks have found and built lasting community through the Atlas theater. We even hung in there through COVID and the yearlong renovation of our street with no awards of public monies despite the fact our business is getting lots of people packed in the same room to hug and celebrate life. Since the reopening of our state, our primary question has been: "How do we contribute to the vibrant, growing, artist-driven improvements to the town that we love?" When the owner of the church on 7th Ave and 16th asked if we were interested in purchasing the property we jumped.

Jeff and Kelly:

We have changed the name of the space to **The Ambry**, and we believe it will be one of the most desirable spaces for housing a small business in our city.

Three years ago Charlotte and Dell Stolte, stewards of the church on 7th , died and much of the life they brought to their space passed with them. Last year, the remaining church leadership found they could no longer afford the space, had in fact allowed the space to fall into neglect and disrepair, and offered the property to us. We purchased it with great hope in its possibilities. We believe The Ambry is one of the most beautiful buildings in our city. Built in 1920, it has housed and loved the people of East Greeley, fed thousands and stands as the first impression of many driving into Greeley on 16th toward Downtown and the University.

But The Ambry has not been loved in return for many years. For those who live nearby, the space is known for being either empty and in ill-repair, a lot for cars and garbage, or an unsafe place of unsavory activities. We will change this. The Cook family is energized and ready to make major investments in this property that will not only support our work across the street, but The Ambry will be a true gateway for the wonderful homes to the south and all the future potential we see commercially to the north on 7th Avenue.

Proposed usage and vision

The Ambry building will maintain its original aesthetic and exterior features, but we will transform the interior into a home for small local businesses and a co-working spaces, housing upward of 12 independent designers, artists, and contractors. The goal is for the Ambry to become a multi-use, symbiotic space with positive impact on the surrounding businesses and residential neighbors. It will provide overlapping services such as therapeutic massage, counseling and hair styling as well as quiet tailored workspaces for Greeley's arts workforce.

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All the historic elements of the Ambry building will be kept intact. Much needed updates will be done within (upgrades to electric, plumbing, solar and HVAC) as well as accessibility (ramp for wheel chair access) and necessary upgrades to fire safety. But we also see the large lot to the south as a canvas. We will fill it with trees and vines and showcase how the rest of Greeley can accommodate cars while at the same time making their parking spaces beautiful.

Market for the proposed project

The market for the Ambry is two-fold. The Ambry will house small offices in the main Cathedral space and basement and small businesses in the annex and former parsonage. We have pre-rental agreements with EK salon (hair), The Lavender Archive (tattoo), Earth Roots Massage Therapy, Mirasol Collective (natural healing arts), Around the Circle Coaching (counseling) and the Serpentine Lines Design Company (furniture restoration). We envision the businesses we add not only having similar hearts but working in over lapping ways. In short, we want to create the types of spaces where we would want to go to work and the types of businesses we would want to enjoy next to our coffee shop.

This building will be a dynamic space, built to modify over the years. The plan for the coworking space is being developed with input from current contractors in Greeley who do website design and computer programming. Using their needs as a guide (quiet single workspace, places to hold small meetings, a sound proof booth for Zoom meetings, and yet a shared community) we are creating spaces within The Ambry. As different business owners work with us, we will “retool” overtime to meet their needs and adapt to the future of our economy.

Thanks to the variety of businesses, we anticipate The Ambry will draw a large and diverse cross-section of folks from across Northern Colorado. We anticipate that patrons of all ages, genders, socio-economic and cultural backgrounds will access the retail and service spaces. For the Co-working space we feel this demographic is exactly the same as the folks the Maddie projects are hoping to attract: Professionals and entrepreneurs ages 25-50.

Our projected numbers for the project have our rents at below market value in order to attract and support business upstarts, but we have a significant cushion in order to ensure we can pay the mortgage, utilities, and upkeep costs. Renting multiple spaces to multiple types of business owners allows us to have variety and flexibility, as well as steady income to achieve all our goals.

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Narrative on Greeley Development Code (October 1, 2021 by goudlevans)

We have reviewed the Greeley Development Code (GDC) and our plans for The Ambry (1603, 1611, 1613, 1619 7th Avenue and 716 16th Street - here after referred to as "The Ambry") meet or exceed compliance in all areas for development of our project. Along with the plans created by P & E we would like to submit the following highlights to our commitment to that plan and the further development of Greeley under the vision of city planners:

Further development of The Ambry (meets all rules of construction (GCD 24-102 a. 1-10). Furthermore we believe the businesses within The Ambry will solve issues of public health, safety, and welfare (GCD 24-102 b.) as the previous owners' care and keep of the building and adjoining lots created several problems for the city and surrounding community as detailed below.

The Ambry is currently non-conforming but we will bring it up to date on several civil codes such as handicap accessibility, fire safety, water retention and drainage on the property. Under the "Rules of construction" (GCD 24-105 g.1.) we request to update the building under the *benign nonconformity* usage clause. The plans demonstrate that not only will the updates to The Ambry have no "negative effect on the long-term development within the district," they are indeed "compatible with the intent and design objective for future development in the immediate surroundings." Two examples of this are the need for better parking for the entire neighborhood which will be done at our expense using environmentally sound parking lot materials (GCD 24-207 b.3.b) as well as creating safer pedestrians walkways by clearly marking and lighting entrance and exits to the redesigned parking structure (GCD 24-207 b.2.a, GCD 24-207 b.2.b).

For the Minor Subdivision change The Ambry plans meet all review criteria (GCD 24-202 b. 1-7). In addition, The Ambry will enhance the neighborhood, community, and city in the following ways:

Minor Subdivision (GCD 24-202)

In accordance with GCD 24-202 b. 5. the current state of the Ambry does not conform to compatibility requirements to maintain the peace and autonomy of nearby property owners (GCD 24-202 b. 6). The previous owners let the parking lot fall into a state of deep disrepair which we believe harms the safety and value of surrounding homes. By improving the parking lot, landscaping, entrances and exits of this space, as well as a plan to build single family homes on the existing lots that match the current building standards and aesthetics of existing properties, The Ambry improvement plan will enhance the neighborhood and property values for surrounding owners or (GCD 24-501 a. 1-6*[1]).

**** Our comments on the code are in bold.***

Review Criteria:

[1] Subpoint 7 is not applicable for this plan

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1. No new streets or other public land dedication is needed. If additional right-of-way for existing streets is included with a minor subdivision, acceptance of the dedication by City Council is required. **** Correct***
2. No significant increase in service requirements (utilities, schools, traffic control, streets, etc.) or impact on the ability to maintain existing service levels will result. **** Correct, in fact, we believe the new plan will actually help with traffic and parking congestion in the downtown area as well as create visibility and safer pedestrian and biking spaces. Furthermore, we are taking a residential building designed to host up to 700 people with a gravel parking lot and dropping both the occupancy of the building and improving the look and performance of the lot.***
3. The application does not alter the interpretation of any zoning district boundaries due to adjustments to any lots. ****No, we are requesting a change to zoning as well***
4. All resulting lots meet the legal standards of the subdivision regulations and applicable zoning districts. **** Correct***
5. The lot patterns meet all eligibility requirements for minor subdivisions, and are otherwise compatible with the surrounding area and any previously approved preliminary or final plat for the subject property. In determining compatibility, the size and dimension of lots, the layout and design of existing subdivisions and rights-of-way, the degree of change to the character and pattern of buildings, and potential impact on surrounding property shall be considered. **** Correct in addition, the changes and impact to surrounding property will be positive in so much as the changes to The Ambry will create safer and more aesthetically pleasing living and working spaces for all surrounding neighbors both commercial and residential. Additionally, the businesses and activity in The Ambry building will further the vision set by the DDA, Greeley Arts District and Downtown Greeley Business District. By shifting from what has been a near abandoned and heavily neglected building over the past decade into a vibrant space for small business created by underrepresented communities as well as workspaces for designers and artisans, The Ambry is in perfect alignment with the goals of downtown development.***

6. No other significant issues exist with potential development enabled by the plat that could impact planning policies in the area or adjacent property owners. ****Correct, see above. All anticipated changes are positive for property owners and folks who utilize neighborhood spaces and services of all kinds.***

One should think of our commercial work having a symbiotic relationship with the neighborhood we love east of 8th and the Maddie Buildings. One might think of it in the same light as a commercial space in the Stapleton

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neighborhood in Denver or St Michal's out west. The Ambry will likewise enhance everything we presently do at the Atlas Theater.

Rezoning (GCD 24-204)

The present zoning seems a strange clerical error. The Ambry is not a residence. It is a 13,000 square foot building with 80 parking spots, squarely housed downtown. To the North across 16th Street all zoning is high commercial and across the alley *on the same block* to the west is high commercial zoning along 8th. The Ambry sits on one of few commercial arteries running through the center of Greeley. When changed, the Ambry will not be a strange outlier in the middle of residential housing; it will elevate the commercial space presently there and make it better.

The rezoning we propose is not only in line with neighborhood standards and precedent, we believe it will improve the lives and spaces of all surrounding business owners and residents.

Review Criteria

1. The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan. **** Correct***

2 The proposal can fulfill the intent of the zoning district considering the relationship to surrounding areas. **** Correct, as stated above, the surrounding area is commercial, and the building (established in 1920) is designed to host hundreds of people at a time. The proposed usage of the Ambry as a co-working space along with small retail stores and services (massage therapy, hair salon, etc.) strikes a fine balance for everyone involved. The owners of the Ambry are able to invest in business owners who need small, affordable spaces to do work vital to the community, the other business owners on the surrounding blocks (Romas, the Maddie, Daruma, Sammie's Chicken, John Galt Coffee, etc.) will see more draw to their businesses as patrons take advantage of what the region has to offer. New patrons will be drawn to East Greeley and the downtown corridor through this opening as they come to patronize their favorite businesses. Folks in the new apartment buildings built by the Maddie, as well as homeowners and other renters in the area will not only enjoy new work spaces but will also see an enhancement in safety as an occupied, well-lit and well maintained building and parking lot will make walking and living safer. Lastly, because the occupancy is minimal (small office spaces, single owner retail shops) the traffic and congestion will be minimal, and we do not anticipate homeowners will see a marked increase in traffic.***

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3. Whether the area changed, or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area **** Correct. Before the remodel and opening of the Atlas, Roma was the only regional business on our side of the 16th street and 8th avenue intersection that was able to sustain a meaningful presence for the past two decades. Because of the work of the City paired with the Atlas improvements, investors like the Maddie (and soon, Sammie's Chicken) have seen more potential on this street. We are helping to build a safer, lovelier, more enjoyable space that matches the needs of our growing city and encouraging communal life to the East.***

4 Whether the existing zoning has been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity. **** Correct. Once again it is our contention that the zoning is inaccurate for the usage of a space like ours and the precedent set by surrounding businesses for some time.***

5. The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development. **** Correct, see above***

6. The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district. **** Correct.***

7. The change will serve a community need, provide an amenity or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning. **** Correct we have already been very compliant with city needs (even at the expense of our lawn and landscaping as the city is currently installing fiber and the trucks that drive up on the grass have ruined the lawn and broken parts of the newly install sprinkler system). From the slowdown/ shutdown of our other business for weeks at a time as the utilities and streets were being improved for the Maddie to this current inconvenience we have demonstrated a self-sacrificial posture and have not failed to work with the city to serve the greater good.***

8. Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community. **** Correct, indeed, the property in it's current state (as left by previous owners) is a blight on our neighborhood. We are taking the***

time and personal expense to assure that not only is The Ambry a benefit, but one of the most desirable spaces to do business in Northern Colorado.

9. The recommendations of professional staff or advisory review bodies.
**** Correct***

Site plan (GCD 24-207)

With the reemergence of Romas, the fantastic success of the Atlas Theater and the addition of the Maddie, as well as all the other empty spaces coming to life along 8th, the corner of 7th and 16th is a space of immense importance. It is a gateway to arguably the most undervalued commercial spaces in Greeley along 7th Ave to the North, and the beautiful homes that line 7th Ave to the south. Changing this one intersection with life will have major effects in both directions bringing economic value and potential to an underutilized artery.

Review Criteria:

1. The alternative shall not alter any use standard, and deviation from any dimension or quantity standard shall be limited to 10%, except where specific sections authorize greater deviations. The Redevelopment Area established in Section 24-1007, shall not be limited in the extent of alternative compliance that may be considered.
****Correct***

2. The alternative shall be based on specific conditions of the site that make the applicable standard impractical, or where compliance with the standard would not clearly advance the intent and design objective of the standard. ****Correct. As stated before, the current state of The Ambry and surrounding properties does not meet the standards or potential of the existing neighborhood. It has been an undesirable eyesore. The changes proposed will enhance the intent and design objective of this standard by creating better living, working, and traveling spaces as well as an aesthetic upgrade which will further open East Greeley and folks arriving into Greeley via HWY 85 into through this corollary.***

Review Criteria.

In general, any site plan in compliance with all applicable standards of this code shall be approved. In making a determination of compliance with the standards applied to particular site, or exercising any discretion under the standards, a site plan shall be reviewed according to the following criteria:

1. ***Generally.***
(a) The plan meets all applicable standards or the criteria for any discretionary approvals. **** Correct***

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(b) The plan does not substantially undermine any goals or objectives of the Comprehensive Plan that are applicable to the area or to the specific project. **** Correct. This plan will enhance the goals and objectives of the comprehensive plan and the development plans being made by the City of Greeley to create better pedestrian access and over-all safety to the downtown area. We hope our project is an extra infusion of energy for the great work already started.***

(c) The plan does not present any other apparent risks to the public health, safety or welfare of the community. **** Correct. Again, the building in it's present condition as left by previous owners allows for risks to public health and safety. Our plans will help to mitigate those risks.***

2. ***Site Design and Engineering***.

(a) The plan provides safe access and internal circulation considering the site, the block and other surrounding connections, and appropriately balances vehicle, bicycle and pedestrian needs for the context. **** Correct***

(b) The plan provides or has existing capacity for utilities and other required improvements to serve the proposed development. **** Correct***

(c) The plan provides adequate management of storm water runoff. **** Correct***

(d) The plan provides proper grading considering prevailing grades and the relationship to adjacent sites. **** Correct***

3. ***Landscape and Open Space Design.***

(a) The plan creates an attractive aesthetic environment and improves relationships to the streetscape or other nearby public, civic or common spaces. **** Correct. We are working with local legend Jerry Nelson to design sustainable and Colorado specific landscapes that will enhance 16th street and the entire neighborhood. As said above, our parking lot is one of the few blank canvases in our area. If you have seen what Jeff has done with the back of the Atlas Theater, do not be surprised when we make this parking space the bar by which future developments ought to be judged both for beauty and environmental regard.***

(b) The plan enhances the environmental and ecological functions of un-built portions of the site, and makes effective use and conservation of water resources. **** Correct, The Ambry parking lot design allows water to drain back through the ground. Eliminating***

the use of asphalt when ever possible and reducing summertime temperatures is a highlight of our process! We will plant no less than 20 trees on our lot, and mark parking spaces with vegetation, grape vines and rocks instead of spray paint.

(c) The plan reduces the exposure and adverse impact of more intense activities or components of the site or building on the streetscape and on adjacent properties. **** Correct. Upon execution our plan will create safer physical spaces on site and in the surrounding area.***

In addition to the required review criteria, we have created our plan to enhance the community in the following ways:

Residential Development Standards (GCD 24-501), Non Residential Development standards (GCD 24-601) such as frontage design, landscaping, parking, exterior lighting, and (GCD) Access and Parking Standards.

The Ambry Plan demonstrates full compliance with each of these sections. In addition, here are some highlights from each of these sections in which the Ambry plan will enhance living standards for the neighborhood:

GCD 24-5 – Residential Development Standards

Intent and Applicability

In so much as The Ambry property is situated within a mix usage space we want to honor all residential needs as if we lived next door! Therefore our plan is designed to "improve the appearance and livability of the neighborhood using good civic design and reinforce the distinct character of the existing neighborhood" (GCD 24-501 a.1.) Additionally, we will design and maintain a more walkable streetscape and sidewalk area along with the regular maintenance of shade-producing trees (note we have been caring for these trees by having trimmed and sprayed for over a year at our expense even before we owned the building because we know that health trees are a public good) (GCD 24-501 a.3.). Lastly, we will "promote lasting and sustained investment in neighborhoods with quality design" by improving on the property in high quality and sustainable ways (GCD 24-501 a.7).

The Frontage Design will enhance the neighborhood image, coordinate with the streetscape and current investment in lighting and improvement by the city (GCD 24-503 1. a., GCD 24-504 1.b.) As well as "provide livable outdoor spaces that activate the streetscape (and)… reinforce neighborhood character… (GCD 24-503 1.f., GCD 24-503 1.g.).

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The plan specifically the front of building landscaping will implement natural features with "aesthetic and ecological value" and serve a civic space for informal public outdoor seating and gathering (GCD 24-504 a.1, GCD 24-504 a.2, GCD 24-504 a.7.)

GCD 24-6 – Nonresidential Development Standards

Intent and Applicability

The Nonresidential Development Standards have the following intent:
1. Promote good civic design and improve the appearance and vibrancy of commercial districts, employment centers, civic spaces, and other public places. **** Correct. At present The Ambry building has the potential to create and enhance a vibrant commercial district that marries well with the surrounding businesses and residential area. Our proposed plan will move this from potential to reality.***

2. Design and locate open spaces as an extension of the public realm, and emphasize the different contexts of places throughout the City***. * Correct. Because the space will serve the Wedding and Events of the Atlas Theater, we will spend heavily on exterior improvements, making the building and parking area an backdrop for photographs. This will not only serve our guests, but elevate our entire area East of 7th with beauty.***

3. Improve the accessibility of centers and districts throughout the City by arranging development within multi-modal networks, and coordinating site access and internal circulation systems with these networks. **** Correct. Currently this end of the city is at best dead and at worst, dangerous. We are a perfect path to businesses on 16th street and 8th avenue for folks traveling by car, bike, or on foot. Furthermore, the folks the Ambry will draw to the space to work or find services will find themselves more connected to the other amenities downtown Greeley has to offer.***

4. Use buildings to shape streetscapes and public spaces, and design building facades and lot frontages to relate to these spaces. **** Correct. See notes above on landscaping and other improvements.***

5. Refine the design, scale, and details of buildings based on the relationship to the public realm and make distinctions in design based on the context of development. **** Correct.***

6. Improve the value of places, strengthen the economic potential of commercial districts and employment centers, and promote lasting and sustained investment in nonresidential development through good design. **** Correct. We bring calm and economic stability to an area that has been unsafe. Having a multi-use building with committed small companies and independent***

contractors utilizing the space is an ideal use of this beautiful building and will be a boon to the community.

GCD 24-6 Access and Parking

Although there is currently a flat dirt lot that has been used for parking, to call this area a parking lot is a bit of a stretch. It is not marked, not finished, and poorly lit. By creating clear entry and exit points, well marked and well lit parking spaces, and safe access to surrounding businesses, our parking plan we will take a "junk lot" and instead create additional parking spaces for the use of our businesses and open to public parking (GDC 24-701 b. 2.) resurface the area using environmentally friendly technologies that also meet the space and access requirements (GDC 24 701 b.4).

We will also provide bicycle parking and handicap ramp access to a space that has previously lacked these accommodations (GDC 24-703. d., GDC 24 703 e.). Lastly, our plan utilizes all parking landscaping guidelines in order to ensure environmental sustainability and regulations (GDC 24 704 a.).

GC 24-801 Landscape Standards

A goal both personal and corporate for all businesses and properties owned by the Cook family is that of sustainability and commitment to local vegetation. In the Atlas building we use exclusively wind power for electricity. The Amby will be developed along the same ethic and standards.

Intent & Applicability

a. Intent. The intent of the landscape standards is to:

1. Protect natural landscapes, Greeley's agriculture traditions, and "Tree City USA" designation to strengthen the City's identity as growth occurs. **** Correct we will design and maintain a more walkable streetscape and sidewalk area along with the regular maintenance of shade-producing trees (note we have been caring for these trees by having trimmed and sprayed for over a year at our expense even before we owned the building because we know that health trees are a public good) (GCD 24-501 a.3.). Lastly, we will "promote lasting and sustained investment in neighborhoods with quality design" by improving on the property in high quality and sustainable ways (GCD 24-501 a.7).***

2. Improve City's image and build value with a well-designed public realm, coordinating landscape design for streetscapes, open spaces, civic places. **** Correct, please see plan above.***

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3. Promote quality private investment that corresponds with investments in the public realm, and emphasize distinct areas throughout the City with natural landscape materials. **** Correct, please see plan above.***

4. Coordinate landscape and design amenities across multiple sites with special attention to the relationship of public and private frontages. **** Correct, please see plan above.***

5. Encourage site and landscape design that allows spaces to serve multiple aesthetic, screening, environmental, recreational, or social functions. **** Correct, please see plan above.***

6. Provide comfort, spatial definition, and visual interest to active spaces including streetscapes, walkways, civic spaces, parks, trails, or other similar outdoor gathering places. **** Correct, the overall development of the neighborhood and community is paramount to our plan, and much of this will be met in how we honor the exterior spaces.***
7. Conserve energy and limited resources through landscape design, and protect and integrate established natural amenities rather than plant or design new ones. **** Correct, please see plan above particularly as it pertains to tree maintenance and parking lot.***

8. Screen and mitigate the visual, noise, or other impacts of high-intensity areas of sites and buildings, or where the scale and pattern of development changes. **** Correct, we anticipate no visual, audio, or other neighborhood impacts of any kind.***

9. Implement the City's Landscape Policy Plan for Water Efficiency, conserve water, and shift to water–conscious landscape design that is regionally appropriate and specific to the arid Front Range climate. **** Correct, please see plan above particularly as it pertains to tree maintenance and parking lot.***

Project Timeline

Development Review and Opportunities to improve designs and/or coordinate with public and private investments.

This document is a large part of our review process, and we will use the notes and meetings created with this process to follow all city and state guidelines as well as take into consideration any requests by the DDA or city of Greeley that will better allow us to maintain and bolster the over-all vision for Greeley development. We have carefully studied the Greeley Comprehensive Plan and made significant changes to The Ambry project based on that document. We feel we meet or exceed every requirement and we hope to make our city and the neighborhood we have loved for three decades proud.

We welcome any suggestions for changes or collaboration from others, both public and private, making improvements to this community and we will continue to have an open door for further development and ideas in the future.

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At this time, we do not anticipate any community reviews or special public information necessary, but we are happy to add that to our process if the committee deems it necessary.

Conclusion

The Ambry project is a continuation of our love for this community and our desire to watch it grow in meaningful, connected, sustainable ways. Although the assignment of approval for shifting usage and zoning is a technical one, our hearts are too deeply invested to have this document merely reflect code requirements. The development of the code was certainly part of a desire that everyone who loves this community holds dear to be good stewards of this beautiful city. We hope that our plans reflect that intent, and we welcome your comments and feedback as we work through this process together.

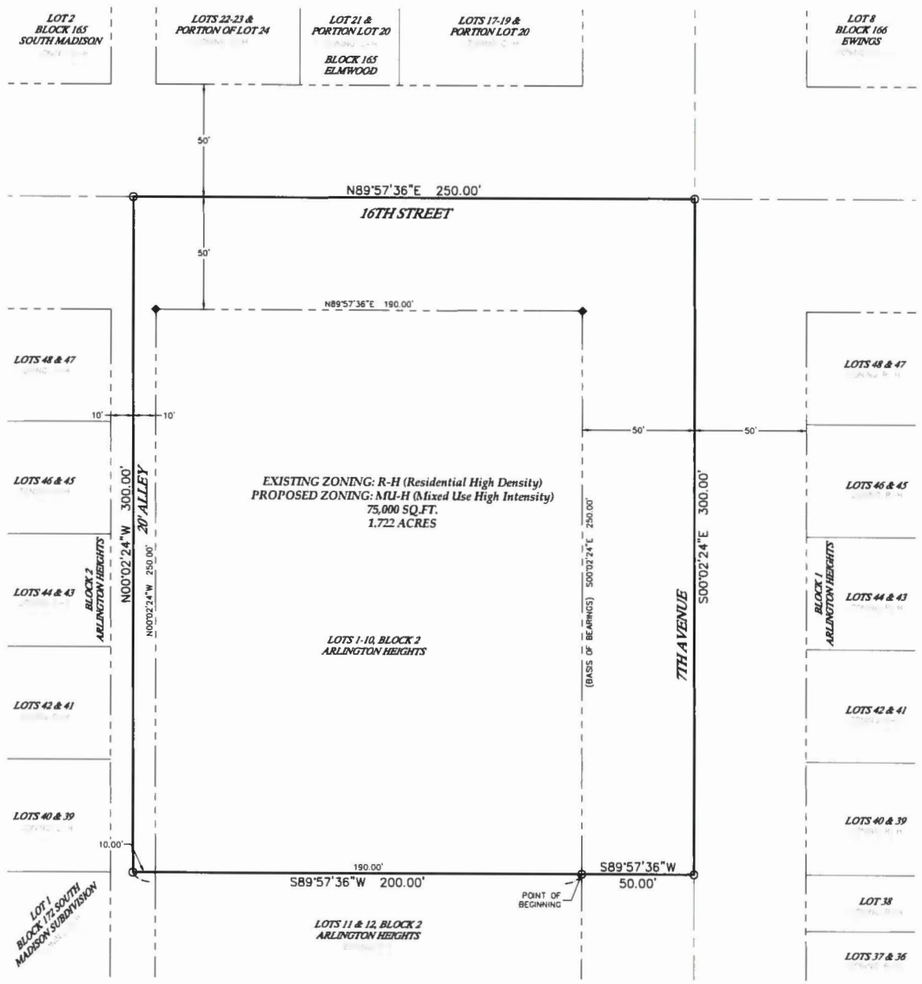
Thank you for your time and consideration,

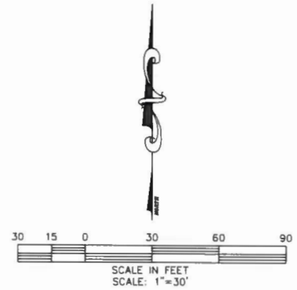
Jeff and Kelly Cook

1603,1611,1613 & 1619 REZONING

Of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, Block 2, Arlington Heights,
and a portion of 16th Street Right of Way, 7th Avenue Right of Way and 20' Alley Right of Way,
Situate in the Southwest Quarter of Section 8, Township 5 North, Range 65 West of the 6th P.M.,
City of Greeley, County of Weld, State of Colorado
1.722 Acres
Project Number: ZON2022-0008

PROJECT BOUNDARY MAP





LEGEND

- CENTERLINE
- RIGHT OF WAY LINE
- BOUNDARY LINE
- CALCULATED POSITION

PRELIMINARY

Paul B. Groves – On Behalf Of King Surveyors
Colorado Licensed Professional
Land Surveyor #38209

KING SURVEYORS
650 E. Garden Drive | Windsor, Colorado 80550
phone: (970) 686-5011 | email: contact@KingSurveyors.com

DATE: 7/5/2022
FILE NAME: 20220183-RZN
SCALE: 1"=30'
DRAWN BY: CSK
CHECKED BY: PG

REVISIONS: DATE:

1603,1611,1613 & 1619 REZONING
FOR
JEFF COOK
716 16TH STREET
GREELEY, CO 80631

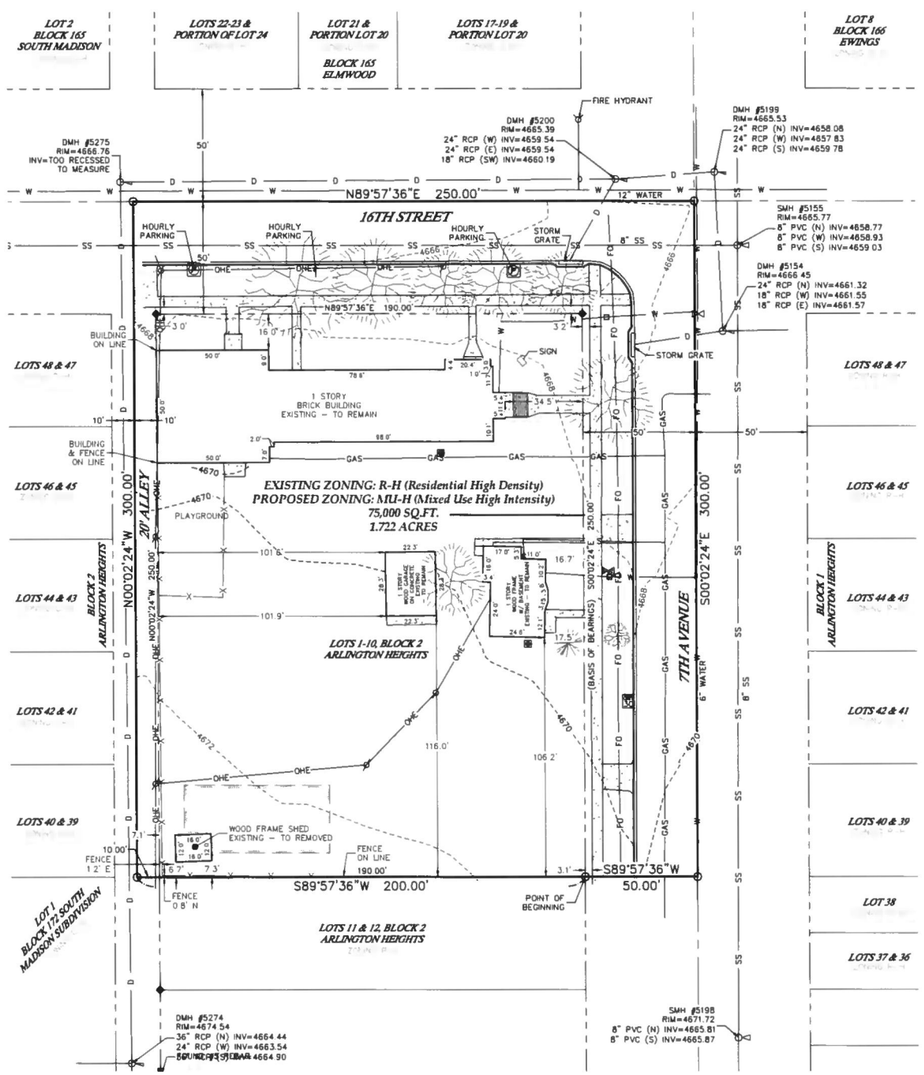
PROJECT #: 20220183

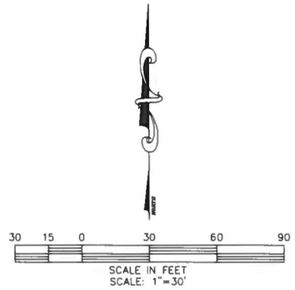
SHEET 4

1603,1611,1613 & 1619 REZONING

Of Lots 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10, Block 2, Arlington Heights,
and a portion of 16th Street Right of Way, 7th Avenue Right of Way and 20' Alley Right of Way,
Situate in the Southwest Quarter of Section 8, Township 5 North, Range 65 West of the 6th P.M.,
City of Greeley, County of Weld, State of Colorado
1.722 Acres
Project Number: ZON2022-0008

EXISTING CONDITIONS MAP





LEGEND

EDGE OF ASPHALT	FOUND MONUMENT AS DESCRIBED
EDGE OF LANDSCAPING	FOUND #4 REBAR WITH ORANGE PLASTIC CAP LS 34995
FENCE LINE	SET 24" OF #4 REBAR WITH A RED PLASTIC CAP STAMPED KS, LS 38105
FIBER OPTIC LINE	AIR CONDITIONER UNIT
GAS LINE	POWER POLE
WATER LINE	GAS METER
OVERHEAD POWER LINE	IRRIGATION VALVE
DRAINAGE LINE	WATER VALVE
SANITARY LINE	WATER METER
CENTER LINE	SIGN
EASEMENT LINE	DRAINAGE MANHOLE
RIGHT-OF-WAY LINE	SANITARY MANHOLE
PROPERTY LINE	
PINE TREE	
DECIDUOUS TREE	
FIRE HYDRANT	

FLOOD PLAIN NOTE

The subject property is in flood zone 'X', "areas determined to be outside the 0.2% annual chance of floodplain" per FEMA flood map 08123C1537E revised January 20, 2016.

PRELIMINARY

Paul B. Groves – On Behalf Of King Surveyors
Colorado Licensed Professional
Land Surveyor #38209

DATE: 7/5/2022
FILE NAME: 20220183-RZN
SCALE: 1"=30'
DRAWN BY: CSK
CHECKED BY: PG

KING SURVEYORS
650 E. Garden Drive | Windsor, Colorado 80550
phone: (970) 686-5011 | email: contact@KingSurveyors.com

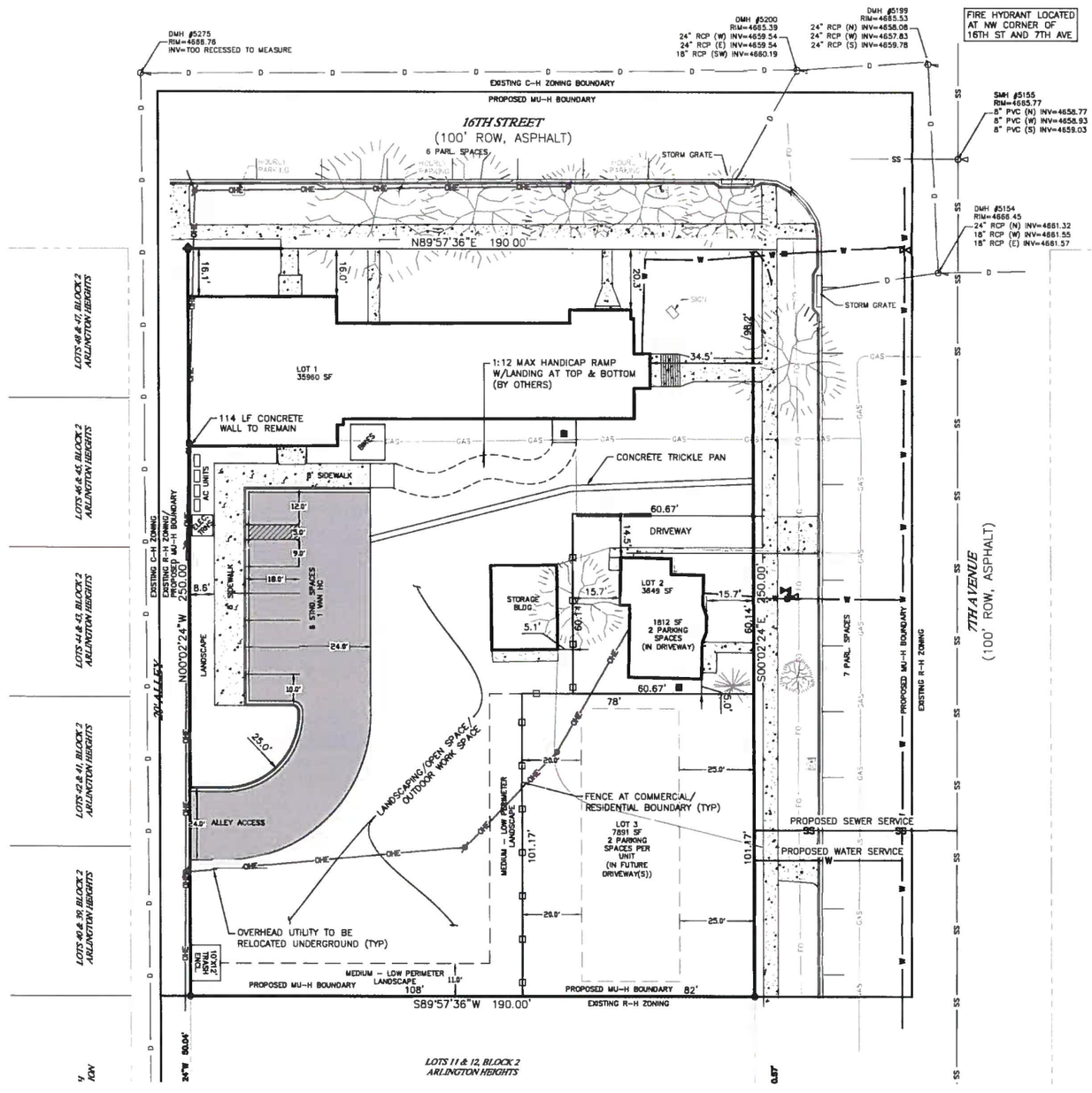
DATE:
REVISIONS:

1603,1611,1613 & 1619 REZONING
FOR
JEFF COOK
716 16TH STREET
GREELEY, CO 80631

PROJECT #: 20220183

SHEET 2

SITE PLAN REVIEW



LOT DETAILS:
1. LOT 1:
   1.1. COMMERCIAL LOT
2. LOT 2:
   2.1. DETACHED HOUSE – SMALL LOT
   2.2. OPEN SPACE REQUIRED – 20%
   2.3. OPEN SPACE PROVIDED – 49%
3. LOT 3:
   3.1. MULTI-UNIT HOUSE – STANDARD LOT
   3.2. ALLOWS FOR 2 TO 4 PRIMARY UNITS
   3.3. 25% OPEN SPACE REQUIRED

PARKING SUMMARY:
LOT 1 REQUIRED PARKING: 24 SPACES
PARKING REDUCTION AVAILABLE:
- ADJACENT PARKING: 13 SPACES X 0.75 FACTOR = 10 ADJACENT SPACES
- PARKING WITHIN 300': 87 SPACES X 0.25 FACTOR = 22 SPACES WITHIN 300'
- TOTAL PARKING AVAILABLE TO REDUCE ONSITE PARKING = 32 SPACES

PARKING PROPOSED ON SITE = 7 SPACES

PHASING PLAN:
1. PHASE 1: OCCUPY LOT 1 COMMERCIAL BUILDING UTILIZING ADJACENT PARKING SPACES.
2. PHASE 2: CONSTRUCT ON SITE PARKING LOT AND LANDSCAPING IMPROVEMENTS WITHIN 3 YEARS OF SITE PLAN APPROVAL.

LEGEND

- EDGE OF ASPHALT
- EDGE OF LANDSCAPING
- FENCE LINE
- FIBER OPTIC LINE
- GAS LINE
- WATER LINE
- OVERHEAD POWER LINE
- DRAINAGE LINE
- SANITARY LINE
- EASEMENT LINE
- RIGHT-OF-WAY LINE
- PROPERTY BOUNDARY
- INTERIOR PROPERTY LINE
- PINE TREE
- DECIDUOUS TREE
- FOUND MONUMENT AS DESCRIBED
- FOUND #4 REBAR WITH ORANGE PLASTIC CAP LS 34665
- SET 24" OF #4 REBAR WITH A RED PLASTIC CAP STAMPED KS, LS 38105
- AIR CONDITIONER UNIT
- POWER POLE
- GAS METER
- IRRIGATION VALVE
- WATER VALVE
- WATER METER
- SIGN
- DRAINAGE MANHOLE
- SANITARY MANHOLE

PARKING LOT PAVING

CONCRETE SIDEWALK

P&E Co. PERMITS & ENGINEERING
WWW.PERMITSANDENGCO.COM PH: (970) 978-1627

JEFF AND KELLY COOK

THE AMBREY
716 16TH STREET
PRELIMINARY SITE PLAN

DATE

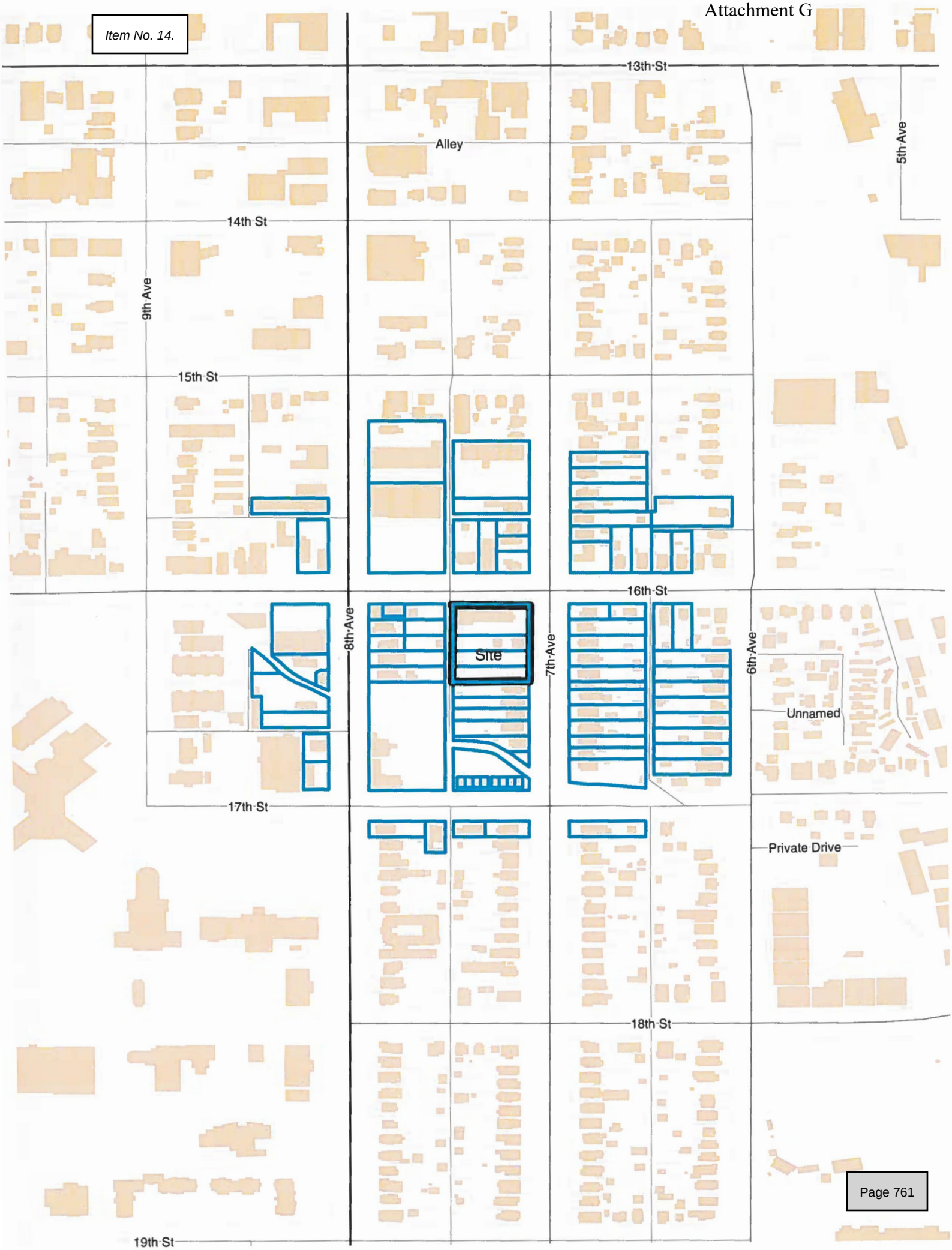
REVISION DESCRIPTION

SEAL AREA

PRELMINARY

SURVEY INFO 8/13/2022
KING
DRAWING NAME
CIVIL
DRAWING SIZE 22" X 34"
SHEET 5 OF 5

S1


13th St
Alley
5th Ave
14th St
9th Ave
15th St
16th St
8th Ave
Site
7th Ave
6th Ave
Unnamed
17th St
Private Drive
18th St
19th St

1603, 1611, 1613 & 1619 7th Avenue Rezone ZON2022-0008

City Council

January 17, 2023

Darrell Gesick, Planner III

Location

- Southwest corner of 16th Street and 7th Avenue – Consists of 1603, 1611, 1613, and 1619 7th Avenue
- Surrounding Zoning and Land Uses:
  - North: C-H – Commercial Use/Coffee Shop/Residential
  - East: R-H – Residential
  - South: R-H – Residential
  - West: C-H – Commercial Restaurant/Residential

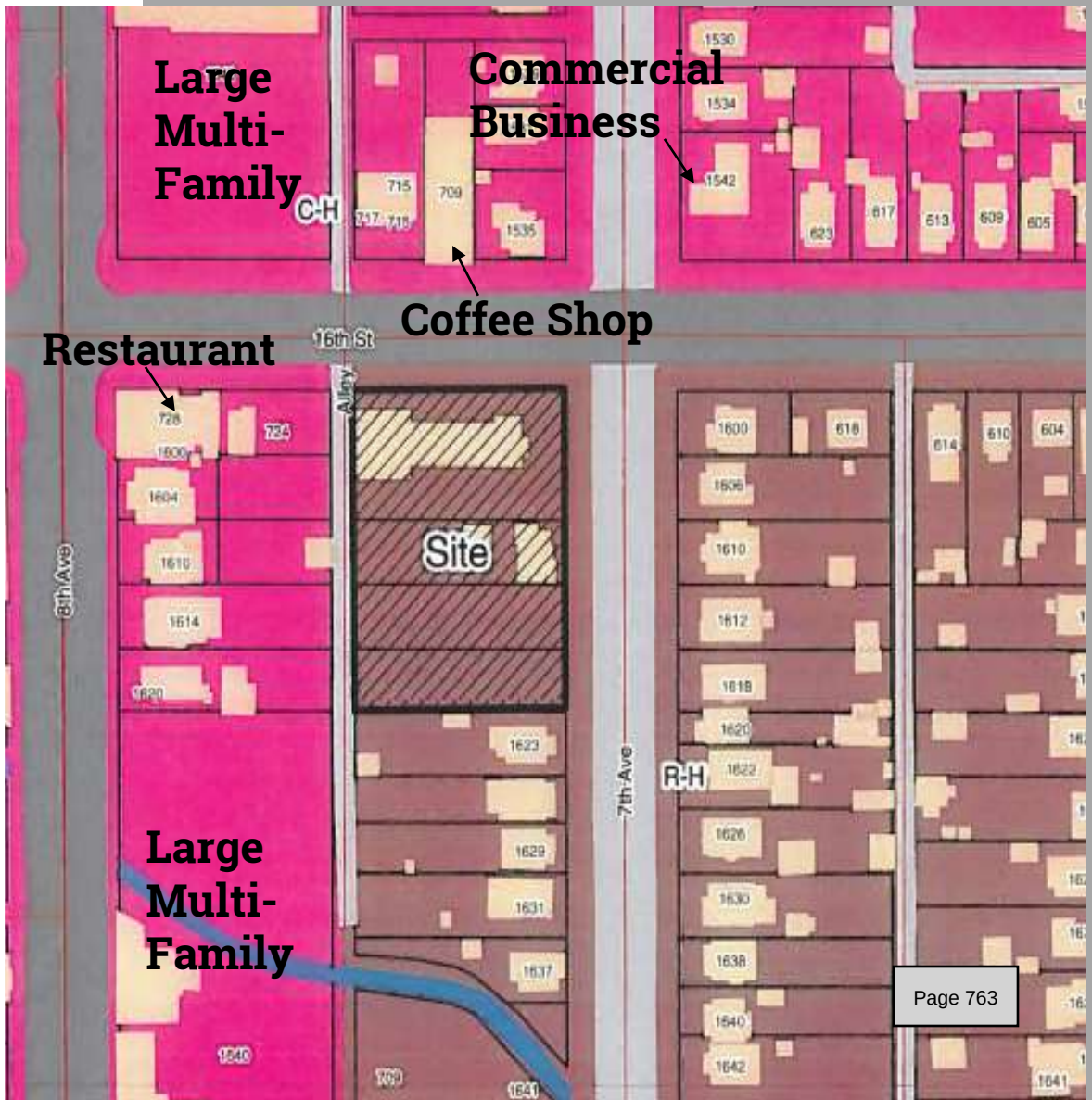


Photo Aerial

- **Former Church Building**
- **Consists of four lots**
- **One lot has a single-family dwelling with a detached garage**
- **Dirt parking area that the church used**

City of Greeley Colorado

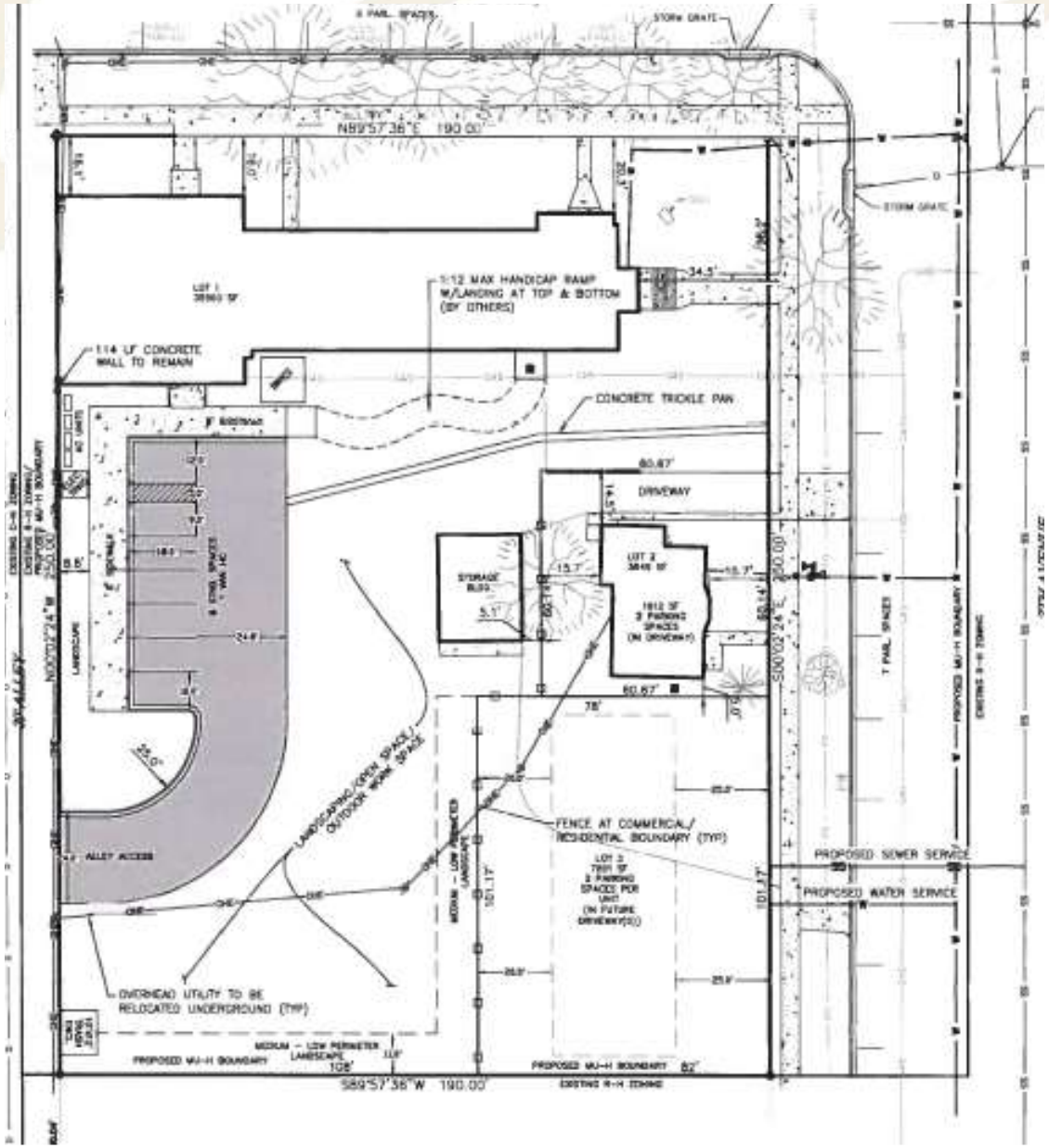
Request & Site Background

- **Request:**
  - **Rezone 1.722 acres from R-H (Residential High Density) to MU-H (Mixed Use High Intensity)**
- **Background:**
  - **Subject site was developed as a church in the 1920's and remained as a church until recently**
  - **Recently purchased by the applicant**
  - **Applicant is proposed to provide service type uses for the surrounding area, such as, hair salon, counseling, and therapeutic massage**
  - **Future Minor Subdivision**
  - **Future Site Plan Application**

Zoning Suitability Map

Proposed Conditions:

- Conceptual Plan
- All existing structures to remain
- Add parking area
- Landscaping upgrade



Use Comparison

R-H Zone:

- Residential
- Residential Care – Group Home
- Assembly (Up to 499 people)
- Schools
- Child Care
- Lodging – Short Term Rental
- Lodging – Bed and Breakfast

Mixed Use High Intensity:

- Same as the R-H zone:
- Animal Care – Boarding
- Food and Beverage – Restaurant
- Medical
- Office
- Personal Service
- Retail – Limited

City of Greeley Colorado

Approval Criteria

Rezone Criteria – 24-204 – Nine Criteria Used to Evaluate Rezone applications

- **The proposed Rezone is consistent with the criteria as outlined in your Summary**

Notification

- **A total of 114 notice letters were mailed to property owners within the general vicinity**
- **Signs posted on the property**
- **Received one phone call – General questions about the intent of the rezone**

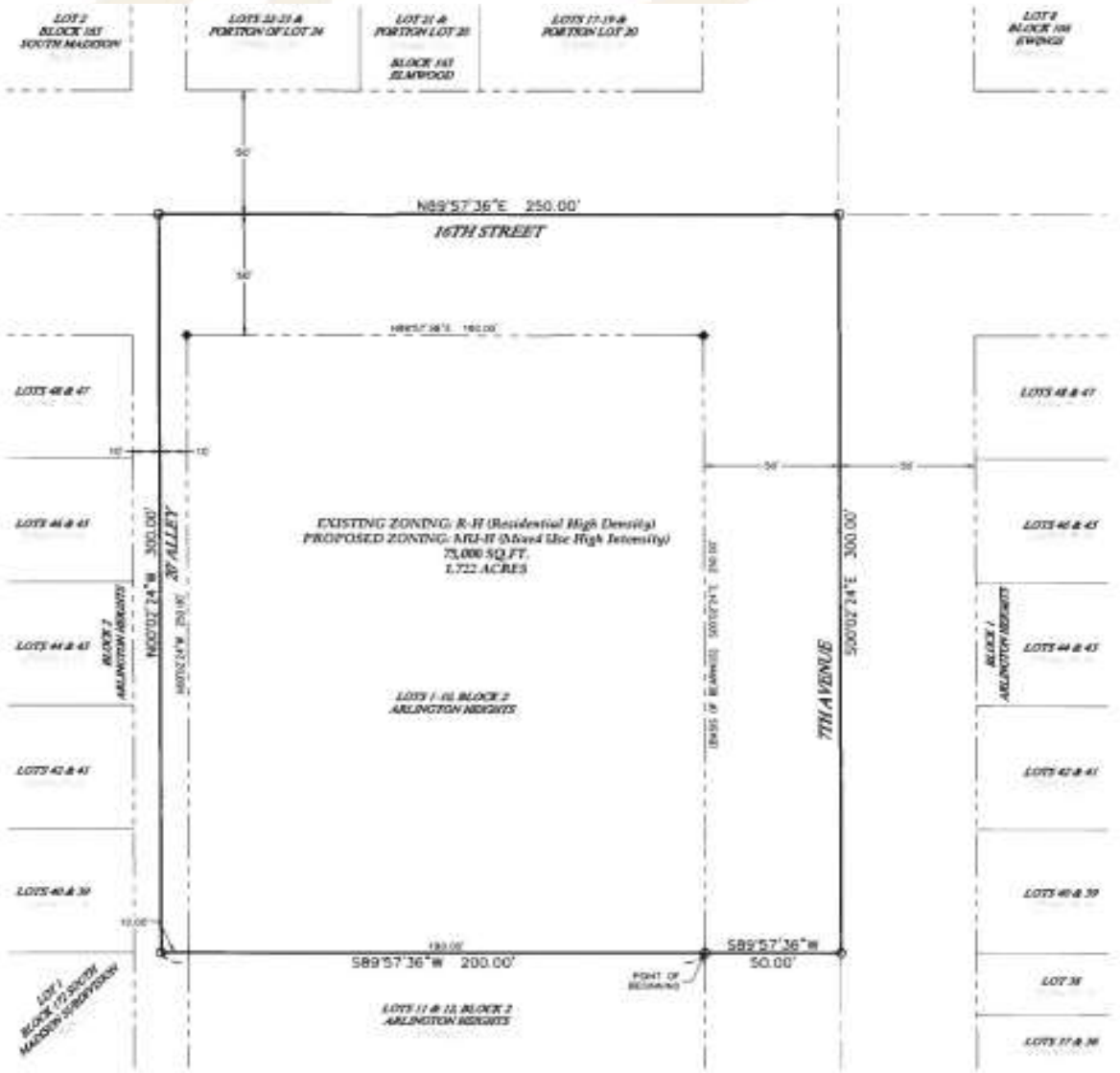
Recommendation

- **Complies with Section 24-204(b) 1-9**
- **Planning Commission reviewed the request and conducted a public hearing on December 13, 2022, and voted 7-0 to recommend approval of the request**

City of Greeley Colorado

Rezone Boundary Map

- **Rezone 1.722 acres**



Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
1)	**The proposal is in <u>accordance</u> with the <u>goals and objectives</u> of the <u>Comprehensive Plan</u> and any other plan, policy, or guidance adopted pursuant to that plan**
	• ***Comprehensive Plan GC-4.2 (Reinvestment/Adaptive Reuse)*** • ***Comprehensive Plan GC- 4.3 (Infill Compatibility)*** • ***In addition- GC-1.2, GC-2.2, GC-2.3, EH-2.4, EH-2.5, EH-2.6 (Compact Development, Jobs/Housing Balance, Pedestrian Oriented Development, Walkable Neighborhood)*** • ***Rezoning would encourage reinvestment of an existing structure***
2)	**The proposal can <u>fulfill the intent</u> of the <u>zoning district</u> considering the relationship to the surrounding areas**
	• ***Rezoning would allow for more development options***
3)	**The <u>area changed</u> or is it changing to such a degree that it is in the public interest to rezone the subject property to <u>encourage development or redevelopment</u> of the area?**
	• ***Surrounding area has been developed out for many years*** • ***Current zoning limits development options – Limits types of uses in the area*** • ***Rezoning allows for more development options*** • ***It is in the public interest to rezone the site***

Approval Criteria

Rezone Criteria – Section 24-625(c)(3)	
4)	**The existing zoning has been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity**
	• ***Current zoning and use has been in place since 1920's*** • ***Small addition to the southern side of the building*** • ***Current zoning not necessarily inappropriate, but the uses proposed for the site would only be allowed in C-L and C-H zone, which would impact the neighborhood*** • ***Rezoning to MU-H would allow for more development options without impact***
5)	**The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces, and other open space; the pattern, scale and format of buildings and site; and the compatibility and transitions with other complimentary uses and development**
	• ***Would provide complimentary development to surrounding land uses*** • ***This would be a reasonable transition of zoning*** • ***Any new development application would be reviewed for compliance with the City's Development Code.***

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
6)	**The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district**
	• ***Greeley provides services to the site*** • ***Any new development application would be reviewed for compliance with the City's Development Code.***
7)	**The change will serve a community need, provide an amenity, or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning or the property, making the proposed zoning more appropriate that the current zoning.**
	• ***The proposed zoning would allow for more development options*** • ***Allows for more potential services for the community***
8)	**Any reasonable anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community**
	• ***Any impacts resulting from the rezone would be mitigated as part of the development review process*** • ***Traffic and drainage would be further evaluated at the time of a site plan application***

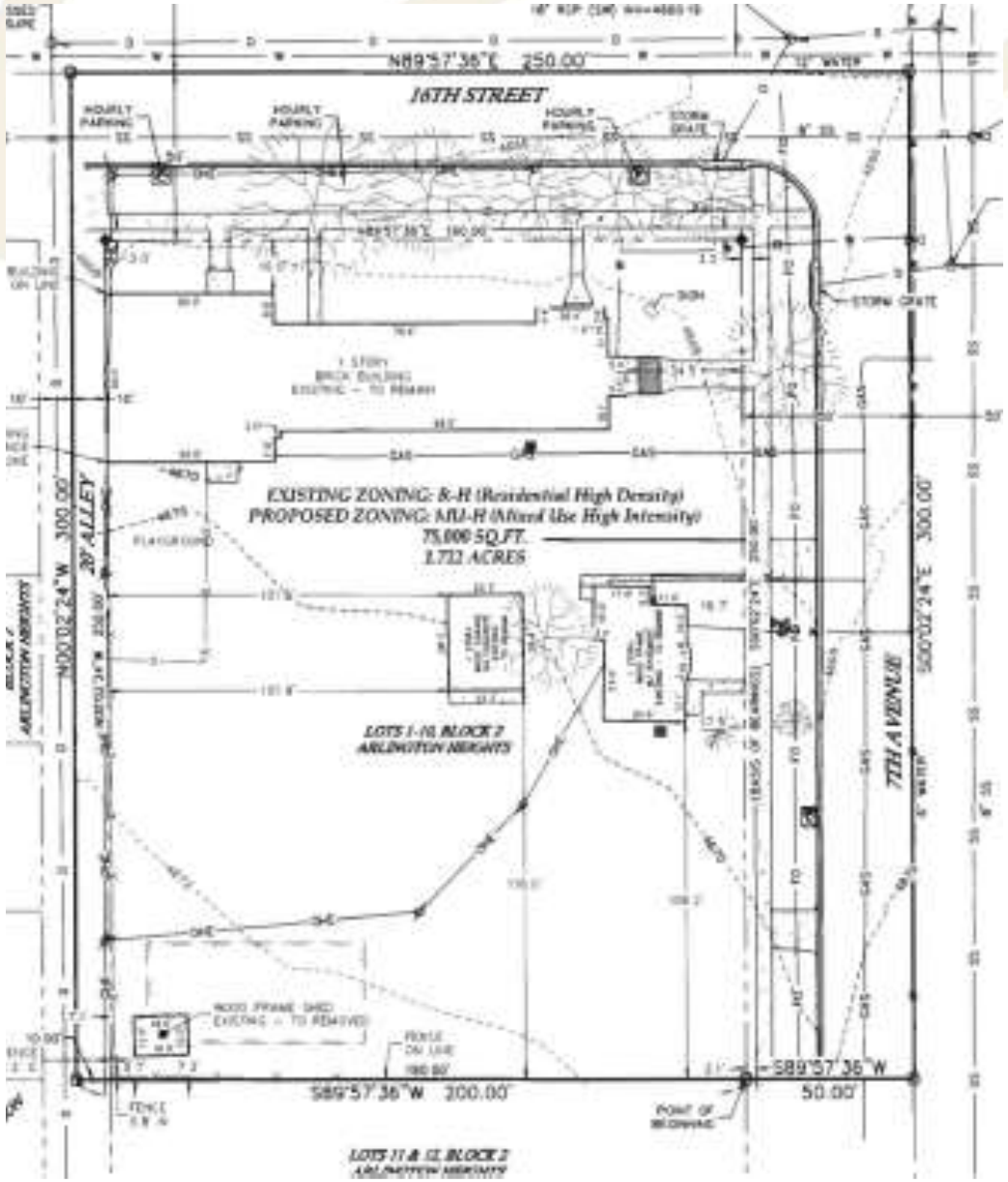
Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
9)	**The <u>recommendations</u> of professional staff or advisory review bodies**
	• ***Staff recommends approval of this rezoning request***

Site Analysis Map

Existing Conditions:

- Existing building used as a church
- One Single-Family Dwelling
- One detached garage
- Large gravel parking area



Council Agenda Summary

January 17, 2023

Key Staff Contact: Becky Safarik, Interim Community Development Director

Caleb Jackson, Planner III

Title:

Public hearing and second reading of an Ordinance changing the official zoning map of the City of Greeley, Colorado, from I-L (Industrial Low Intensity) to MU-H (Mixed Use High Intensity) for 7.8 acres located at 123 9th Avenue (ZON2022-0012)

Summary:

The applicant, Jodi Hartmann on behalf of High Plains Housing Development Corporation, requests a rezone of approximately 7.8 acres of land located at 123 9th Avenue from I-L (Industrial Low Intensity) to MU-H (Mixed Use High Intensity) zoning district. The applicant intends to repurpose the site with a mix of uses, including an initial phase of multi-family units.

The Planning Commission is scheduled to consider this request on January 10, 2023. Planning Commission's recommendation will be presented at the City Council meeting on January 17, 2023.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
Is there grant funding for this item?	N/A

Legal Issues:

Consideration of this matter is a quasi-judicial process which includes the following public hearing steps:

1) City staff presentation
2) Council questions of staff
3) Applicant presentation
4) Council questions of applicant
5) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
6) Rebuttal, if requested
7) Council discussion
8) Council decision

Other Issues and Considerations:

None

Strategic Focus Area:

Conformance with the policies of the City of Greeley Comprehensive Plan

Decision Options:

1) Adopt the ordinance as presented; or
2) Amend the ordinance and adopt as amended; or
3) Deny the ordinance; or
4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:

Two motions are necessary to approve this request:

1) A motion that, based on the application received, the preceding analysis, and Planning Commission recommendation, the proposed rezoning from I-L (Industrial Low Intensity) to MU-H (Mixed Use High Intensity) is found to be in compliance with Title 24-204(b) and therefore approve the request.
2) A motion to adopt the Ordinance and publish with reference to title only.

Attachments:

Ordinance
Planning Commission Minutes (January 10, 2023, draft)
Planning Commission Summary (Staff Report) (January 10, 2023)
Staff Slide Presentation
Applicant Slide Presentation

CITY OF GREELEY, COLORADO
ORDINANCE NO. 5, 2023
CASE NO. ZON2022-0012

AN ORDINANCE CHANGING THE OFFICIAL ZONING MAP OF THE CITY OF GREELEY, COLORADO, FROM INDUSTRIAL LOW INTENSITY (I-L) TO MIXED-USE HIGH INTENSITY (MU-H) FOR 7.8 ACRES LOCATED AT 123 9TH AVENUE.

BE IT ORDAINED BY THE CITY COUNCIL OF GREELEY, COLORADO:

Section 1. The following described property located in the City of Greeley is hereby changed from the zoning district referred to as Industrial Low Intensity (I-L) TO Mixed-Use High Intensity (MU-H), in the City of Greeley, County of Weld, State of Colorado:

Legal Description

Lot 1 GURA-Miller Minor Subdivision in the Northwest 1/4 of Section 5, Township 5 North, Range 65 West of the 6th Principal Meridian, City of Greeley, County of Weld, State of Colorado.

TOGETHER WITH:

The East half (33 feet) of 10TH Avenue adjacent to said Lot 1, and
The South half (33 feet) of 1ST Street adjacent to said Lot 1, and
The West half (50 feet) of 9TH Avenue adjacent to said Lot 1.

Section 2. The boundaries of the pertinent zoning districts as shown on the official zoning map are hereby changed so as to accomplish the above-described zoning changes, and the Mayor and City Clerk are hereby authorized and directed to sign and attest an entry which shall be made on the official zoning map to reflect this change.

Section 3. This ordinance shall become effective five (5) days after its final publication as provided by the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED, THIS _____ DAY OF JANUARY, 2023.

ATTEST: **THE CITY OF GREELEY**

_____ _____

City Clerk **Mayor**

City of Greeley, Colorado
PLANNING COMMISSION PROCEEDINGS
January 10, 2023

(Excerpted)

6. A public hearing to consider a request from Jodi Hartmann, on behalf of High Plains Housing Development Corporation, to rezone approximately 7.8 acres of land located at 123 9th Avenue from I-L (Industrial Low Intensity) to MU-H (Mixed Use High Intensity) zoning district (ZON2022-0012).

Commissioner Carlson recused himself from this portion of the meeting, citing a potential conflict of interest.

Caleb Jackson, Planner III, summarized the proposed rezoning and the intended ultimate use. He discussed area context, surrounding zoning, and the proposal's conformance with the Development Code. Mr. Jackson then explained the purpose of the project and provided an overview of the development plan. He confirmed that all public notice requirements had been met, and that staff had received no community input expressing concerns or opposition for the project.

Commissioner Briscoe questioned whether the three brick structures on the site are required to remain as part of the proposed development. Mr. Jackson stated that with this land use action it is not possible to require them to remain, but it is the applicant's expressed intent to repurpose the structures.

Chair Yeater invited comment from the applicant.

Jodi Hartmann, Executive Director of High Plains Housing Development Corporation at 3104 69th Avenue Court, reiterated that the three existing brick buildings will be kept in place, but the rest of the metal structures and one of the oldest brick buildings will be demolished. She discussed the site's previous uses, which included produce assembly, manufacturing, and storage. Ms. Hartmann then described High Plains Housing Development Corporation and its mission as a nonprofit affordable housing developer and identified two apartment complexes her company has successfully been operating locally.

Ms. Hartmann explained that the intent is a phased development approach and described each phase which includes a variety of affordable housing options, explaining the need for and collective benefits of providing such housing.

Ms. Hartmann closed by saying that phase one of this project will involve a $26 million dollar infrastructure investment, bringing 58 new units of housing. Phase two will be a $30 million dollar infrastructure investment that will bring 90 additional units to the housing stock. She explained that phases three and four haven't explored far enough to know the investment impacts but indicated it would include an additional 30 housing units. Ms. Hartmann touched on the fact that there are a number of local stakeholders and partners who have been working with High Plains on this project in order to show the scope of the community's support.

Chair Yeater asked if the financing is currently in place for phases one and two. Ms. Hartmann stated that they are working on phase one right now but most of the funding

for that project will come from housing tax credits, and if successful they anticipate construction to start in the spring of 2024. They hope to have people living on the campus by 2025.

Chair Yeater then asked what the ultimate goal for a final build out of the remaining phases will be. Ms. Hartmann stated that phase two is hoped to be completed around 2026 to 2027. She then explained that they are hoping for phases three and four to be developed simultaneously with phase two because they won't be looking for tax credits but will instead be seeking other resources at that time.

Commissioner Franzen asked for clarity regarding the timeline of the funding. Ms. Hartmann explained that they could apply for funding on the second phase when they near completion of the first phase.

Chair Yeater opened the public hearing at 1:37 PM.

Rick Hoagland, who owns property east of the proposed rezone, expressed his concern regarding potential traffic impacts, especially at peak hours, and adequacy of parking spots on the site.

Chair Yeater closed the public hearing at 1:40 PM.

Commissioner Briscoe moved that based on the application received and the preceding analysis, the Planning Commission find that the proposed rezoning from I-L (Industrial Low Intensity) Zone District to the MU-H (Mixed-Use High Intensity) Zone District meets the Development Code criteria, Sections 24-204 and therefore, recommend approval of the rezone to the City Council. Commissioner Franzen seconded the motion.

Commissioner Schulte commented that parking is always a legitimate concern for any development but wanted to remind the applicant and public that the Commissioner's job today is limited to consideration of the rezone request, not the possible project. If the rezoning is approved the project would ultimately have to go through approvals and meet code requirements, such as with respect to parking. Chair Yeater agreed and then called for the motion.

Motion carried 6-0 (Commissioner Carlson recused from this vote).

Commissioner Carlson stepped back into the chambers to be present for the remainder of the Commission meeting.

DRAFT

PLANNING COMMISSION SUMMARY

ITEMS: Rezoning

FILE NUMBER: ZON2022-0012

PROJECT: 123 9th Avenue Rezoning

LOCATION: Southwest corner of 1st Street and 9th Avenue

APPLICANT: Jodi Hartmann of High Plains Housing Development Corp.

CASE PLANNER: Caleb Jackson, AICP | Planner III

PLANNING COMMISSION HEARING DATE: January 10, 2023

PLANNING COMMISSION FUNCTION:
The Planning Commission shall consider the staff report, along with testimony and comments made by the applicant and the public and shall then make a recommendation to the City Council regarding the application in the form of a finding based on the review criteria in Section 24-204(b) of the Development Code.

EXECUTIVE SUMMARY
High Plains Housing Development Corp. petitions to rezone 7.8 acres of land located at 123 9th Avenue (southwest corner of 1st Street and 9th Avenue) from I-L (Industrial Low Intensity) to MU-H (Mixed-Use High Intensity) zone district.

A. REQUEST
The applicant requests approval of a rezone from I-L to the MU-H zone district.

B. STAFF RECOMMENDATION
Approval

C. LOCATION

Abutting Zoning:
North: R-H (Residential High Intensity) and I-L (Industrial Low Intensity)
South: I-L (Industrial Low Intensity) and I-M (Industrial Medium Intensity)
East: R-H (Residential High Density) and I-L (Industrial Low Intensity)
West: C-H (Commercial High Intensity) and R-H (Residential High Intensity)

Surrounding Land Uses:
North: Community Center and Neighborhood Park
South: Railroad and Industrial Users
East: Residential and Vacant
West: Residential and Commercial

Site Characteristics:

The site consists of four primary building structures of approximately 120,000 square feet and include a combination of original brick building structures and steel add-ons built in the last fifty years. Various industrial users have occupied the property and structures over the years. Parallel Products currently occupies one of the structures and will remain in place until a later phase of development for the overall site, as outlined in the applicant's narrative. Parallel Products provides recycling options for unsaleable beverage products.

D. BACKGROUND

The subject site was initially developed in the 1930's and has experienced building expansions throughout the 1970's and 1980's. The property has remained in industrial operations throughout this timeframe. In 2020, the applicant, as a member of 123 Property, LLC, were gifted the property from Dennis Hoshiko and North Weld Produce Company with the intent of providing permanent low-income housing opportunities for the community.

E. APPROVAL CRITERIA

Development Code Section 24-204 Rezoning Procedures

The review criteria found in Section 24-204(b) of the Development Code shall be used to evaluate the zoning amendment application.

1. **The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy or guidance adopted pursuant to that plan.**

   The Imagine Greeley Comprehensive Plan's Land Use Guidance Map designates the subject property and surrounding area as both Downtown and Employment, Industrial, and Commercial Areas. Supported uses include a mix of residential product types and employment uses including but not limited to research and development, office parks, industrial, manufacturing, and commercial. A mix of uses, either vertical or across multiple sites, are encouraged.

   Goal 4 – Prioritize Infill and Redevelopment

   Objective GC-4.2 Reinvestment/Adaptive Reuse - Encourage reinvestment in established areas of Greeley to maximize the use of existing public infrastructure. Support the use of creative strategies to revitalize vacant, blighted, or otherwise underutilized structures and buildings through adaptive reuse.

   Objective GC-4.3 Infill Compatibility - Promote the use of site design and building architecture that is sympathetic to the surrounding area and enhances the desirable character and form of the neighborhood or area.

   Staff Comment: This proposal is in accordance with Goal 4, Prioritize Infill and

Redevelopment, of the Imagine Greeley Comprehensive Land Use Plan. The rezoning request for this site would encourage reinvestment in a part of the community with existing public infrastructure.

The proposal complies with this criterion.

Additionally, the following specific goals and objectives of the Imagine Greeley Comprehensive Plan support the proposed rezone:

Growth and City Form:

- GC-1.2 Form of Growth: Encourage compact urban form over sprawl development.
- CG-2.2 Jobs/Housing Balance: Support zoning and development patterns that expand opportunities for people who live in Greeley to also work in Greeley (and vice-versa).
- GC-2.3 Pedestrian and Bicycle-Oriented Development: Encourage development pattens that encourage walking and bicycling whenever possible – by locating employment, shopping, and other services within a quarter mile of residential areas.

Economic Health and Human Services:

- EH-2.4 Land Use: Promote land use decisions that support walkability and improve access to basic needs.
- EH-2.6 Built Environment: Encourage construction of built environments that support health and active living, such as mixed-use centers and neighborhoods, that support walkability and provide safe options for active transportation.

2. The proposal can fulfill the intent of the zoning district considering the relationship to surrounding areas.

Staff Comment: The proposed rezone would allow for more development options, which fulfills the intent of the proposed zoning district of MU-H and could compliment other uses in the surrounding area. The mixed-use district encourages a mix of uses in a walkable setting that complements higher density areas. The surrounding area currently consists of a park, community center, residential, commercial, and industrial uses. The applicant is proposing a development that includes a mix of housing types, services, and a mix of uses for residents in the area.

The proposal complies with this criterion.

3. Whether the area changed, or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area

Staff Comment: This project could serve as a catalyst for redevelopment and reinvestment into this part of the city, located a few blocks north of the downtown area. The proposed MU-H zone district would allow for more flexibility in

development options, including a variety of residential, service, and employment uses. Planning staff concludes that it is in the public's interest to rezone the subject site to allow for more options.

The proposal complies with this criterion.

4. **Whether the existing zoning been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity.**

   Staff Comment: The existing zoning and use of the property has been in place since the 1930's. The existing zoning is not necessarily inappropriate; however, the uses proposed by the applicant and nature of the concept proposal align with the rezoning request to MU-H. Rezoning the site provides more development opportunities for the site to redevelop.

   The proposal complies with this criterion.

5. **The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces and other open space; the pattern, scale and format of buildings and sites; and the compatibility and transitions with other complimentary uses and development.**

   Staff Comment: The proposed rezoning would provide additional options and opportunities to redevelop the site with residential and supporting uses that compliment nearby commercial and industrial employment uses and provide additional housing options within this area of the community.

   The proposal complies with this criterion.

6. **The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district.**

   Staff Comment: The subject site is served by the City of Greeley. Any proposed development or redevelopment of the subject site would be reviewed for compliance with city standards and improvements to existing infrastructure may be required at that time.

   The proposal complies with this criterion.

7. **The change will serve a community need, provide an amenity or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning of the property, making the proposed zoning more appropriate than the current zoning.**

Staff Comment: The proposed rezoning would allow more development options if the site were rezoned to MU-H, allowing for more potential services for the community, making the rezone more appropriate than the current zoning district.

The proposal complies with this criterion

8. **Any reasonably anticipated negative impacts on the area or adjacent property either are mitigated by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community.**

Staff Comment: Any reasonably anticipated negative impacts on this area resulting from this rezoning would be mitigated as part of the development review process by the consistent enforcement of Municipal Code and Development Code requirements regarding landscaping buffers, architectural features, setbacks, and other relevant codes and policies. Conceptual engineering studies were provided with this application, and the final studies will need to be further evaluated at the time of platting or site planning, as necessary.

The proposal complies with this criterion.

9. **The recommendations of professional staff or advisory review bodies.**

Staff Comment: City staff recommends approval of this rezoning request.

F. SITE CHARACTERISTICS

1. SUBDIVISION HISTORY

The property was replatted in 2010 as part of the 2010 GURA-Miller Minor Subdivision, and was previously platted in 1907 as part of Clayton's First Subdivision.

2. HAZARDS

As part of the formal development proposal, the applicant will be required to assess the site and building conditions to identify and mitigate any hazards. Due to the nature of the historical use of the site and proximity to the railroad, there may be hazards that need to be mitigated by the applicant prior to redevelopment of the site.

3. WILDLIFE

The subject site is not located in an area identified for moderate or high wildlife impacts. There are no known impacts that would occur to wildlife if the site were rezoned.

4. FLOODPLAIN

The site is located within the AE Flood Zone, which is within the 100-year floodplain and requires all structures to be at least one foot above the Base Flood Elevation, according to the adopted Federal Emergency Management Administration (FEMA) flood data.

5. **DRAINAGE AND EROSION**
   Any proposed development of the site would require the documentation and review by City staff of all drainage, detention, water quality, and erosion mitigation as a condition of the development of the site.

6. **TRANSPORTATION**
   Any proposed development of the site would require the applicant to submit a Traffic Impact Study for review by City staff. This will occur during the platting or site plan processes, as appropriate.

G. SERVICES

1. **WATER**
   Current water services will be evaluated in greater detail as part of the formal development application for a subdivision plat and/or the site development plan, as appropriate. The applicant will be required to make necessary improvements to serve the property.

2. **SANITATION SEWER**
   Current sewer services will be evaluated in greater detail as part of the formal development application for a subdivision plat and/or the site development plan, as appropriate. The applicant will be required to make necessary improvements to serve the property.

3. **EMERGENCY SERVICES**
   Emergency services are available and can adequately serve the subject property.

4. **PARKS/OPEN SPACES**
   No public parks or public open space areas are proposed with this request and the request would not create any private parks.

5. **SCHOOLS**
   No schools are proposed or located within the site.

H. NEIGHBORHOOD IMPACTS

1. **VISUAL**
   No visual impacts are anticipated with the rezone request. Any development plan application for the property would be reviewed for compliance with the City's Development Code requirements regarding visual impacts. The development of multi-story buildings, as shown in the applicant's narrative, will change the visual characteristics of the area while the redevelopment of the site will improve the overall visual aesthetics of the area.

2. **NOISE**
   No noise impacts are anticipated with the rezone request. Any potential noise created by future development will be regulated by the Municipal Code.

I. PUBLIC NOTICE AND COMMENT

Public notices were completed as follows:

- Notice was placed on the City of Greeley's website on December 16, 2022.
- Signs were posted on the property on December 17, 2022.
- Notice was mailed to 98 property owners on December 20, 2022.

J. MINERAL ESTATE OWNER NOTIFICATION

Mineral notice is not required for a rezone request.

K. PLANNING COMMISSION RECOMMENDED MOTION

Approval -

Based on the application received and the preceding analysis, the Planning Commission finds that the proposed rezoning from I-L (Industrial Low Intensity) Zone District to the MU-H (Mixed-Use High Intensity) Zone District meets the Development Code criteria, Sections 24-204 and therefore, recommends approval of the rezone to the City Council.

Denial-

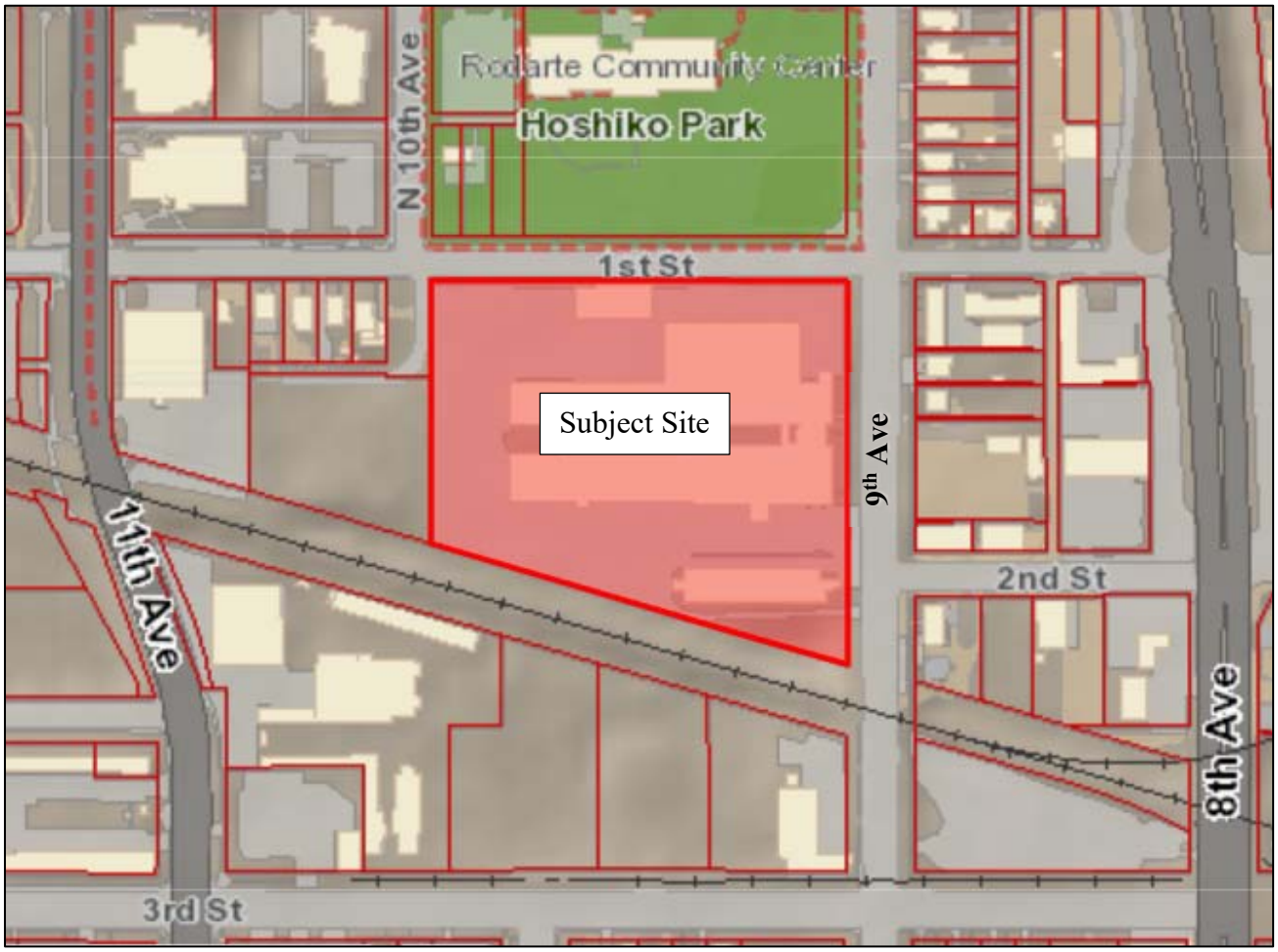
Based on the application received and the preceding analysis, the Planning Commission finds that the proposed rezoning from I-L (Industrial Low Intensity) Zone District to the MU-H (Mixed-Use High Intensity) Zone District meets the Development Code criteria, Sections 24-204 and therefore, recommends denial of the rezone to the City Council.

ATTACHMENTS

Attachment A – Vicinity Map
Attachment B – Project Narrative
Attachment C – Rezoning Plan Set
Attachment D – Neighborhood Notification Boundary Map

ATTACHMENT A

VICINITY MAP



ZON2022-0012

PROJECT NARRATIVE - REVISION 1
ATTACHMENT B

NORTH WELD VILLAGE

SUBMITTED TO
City of Greeley

ISSUED BY
WORKSHOP8 INC
Joseph Vigil, Architect

HIGH PLAINS HOUSING DEVELOPMENT CORPORATION

High Plains Housing Development Corp. (High Plains) was established in 1994 by community leaders from the City of Greeley, Weld County, and United Way of Weld County, to prevent community deterioration in low income areas, and to assist low-to-moderate income individuals and families through affordable housing development strategies. The organization is a 501(c)(3) nonprofit corporation and is governed by a nine member volunteer board of directors with representation from low income households or neighborhoods, the business community, and affordable housing advocates. High Plains is a designated Community Housing Development Organization (CHDO) by the Colorado Department of Local Affairs, Division of Housing.

In its early years under the umbrella of the Greeley/Weld Housing Authority (GWHA), High Plains developed three tax credit properties with 64 total housing units serving very low income seniors and families. These properties continue to provide stable housing more than 20 years later, and are managed by the GWHA. As a mission-driven, local, nonprofit developer that intends to develop locally-owned permanent affordable housing projects, the niche that High Plains is strategically best aligned to address are those projects/populations/needs that larger for-profit affordable housing developers are not meeting: small-scale Permanent Supportive Housing projects and workforce housing designed to target extremely low income households (30%-50%) and vulnerable, chronically-homeless individuals.

REQUEST FOR EXPEDITED REZONING REVIEW

This project represents the culmination of several years of community needs assessment and planning as High Plains and a number of community partners have worked to identify a property suitable for the development of affordable housing for Greeley's most vulnerable populations. We believe this property will ultimately fulfill important community goals and rezoning is a crucial step.

The Development Team is working on applications to the Colorado Division of Housing, the Greeley Urban Development Authority, the Weld Trust, and the Colorado Housing Finance Authority (CHFA) for Low Income Tax Credits (LIHTC) — all vital financing for the Project. Having Rezoning in place is critical to receive LIHTC funding. Our goal is to apply for LIHTC during CHFA's once-per-year application deadline on February 1, 2023. If we fail to meet this application date, we will need to wait a full year to re-apply; thereby postponing this project by another year. CHFA has a number of requirements that we must meet in order to submit a competitive application; having local approval of zoning completed is one of those requirements.

There is an urgency in fulfilling a community-wide goal to develop housing for our chronically homeless population. As the City identified in its Strategic Housing Plan for developing affordable housing (Strategy 2, Page 11), priority processing is identified as a strategy to encourage and minimize the cost of affordable housing development. We respectfully request that this Project be given priority processing in order to help us meet our complex funding timelines.

THE PROPERTY

The 6.5-acre industrial property owned by 123 Property, LLC — in which High Plains Housing Development Corporation is a single member — is located at 123 9th Avenue in Greeley. High Plains became owners of this property in 2020 through a generous donation of the 6.5 acre site from Dennis Hoshiko and North Weld Produce Co. High Plains seeks to fulfill the philanthropic desire of Dennis Hoshiko to redevelop the North Weld Produce Company site to provide a permanent housing solution for very low-income households in our community. The property provides a tremendous opportunity to create a mixed-use, mixed-income, multi-building development providing job opportunities; attainable housing for essential workers; and a safe, supportive community for formerly homeless individuals and families.

The property, located in the Gura-Miller Minor Subdivision and Mercado-District, consists of four buildings as shown in **FIGURE 1**, asphalt paving, a make-shift fence of wood pallets, and "native" vegetation.

The site is bounded by 1st Street, the Rodarte Park (aka Hoskiko Park), and Rodarte Community Center to the north; 9th Avenue to the east; railroad tracks to the south; and on the west side of the property is a single family home. A little farther to west is the Monfort Children's Clinic and the Greeley Evans Transit Center and Greyhound Bus Station on 11th Avenue.

High Plains Housing Development Corporation

123 N. 9TH AVE, GREELEY COLORADO

FIGURE 1

Existing Conditions

		119,189 SF TOTAL	CONSTRUCTION	BUILT
	BUILDING 3	4,992 SF	METAL	1978
	BUILDING 2 : SECTION A, B, C	19,600 SF	METAL	1970
	BUILDING 2 : SECTION D	5,520 SF	BRICK	1934
	BUILDING 2 : SECTION E	6,900 SF	METAL	1970
	BUILDING 2 : SECTION F	9,540 SF	BRICK	1934
	BUILDING 2 : SECTION G	7,680 SF	METAL	1978
	BUILDING 1 : SECTION A	34,333 SF	BRICK - 3 STORIES	1908
	BUILDING 1 : SECTION B	11,440 SF	METAL	1981
	BUILDING 1 : SECTION C	9,184 SF	METAL	1982
	BUILDING 4	10,000 SF	BRICK	1949
	ACREAGE	6.54 AC		

Terracon 7/17/19

- The property includes four buildings (approx. 120,000 SF) that are a combination of original brick structures (built in the early 20th Century) and steel warehouse add-ons (built in the 1970s/1980s).
- The property has some historic value, having been built as one of the original employers in the area as the Kuner-Epson Cannery.
- North Weld Produce purchased the property from Kuner in the early 1960s and operated and expanded the buildings for its large onion storage operations for more than 50 years.

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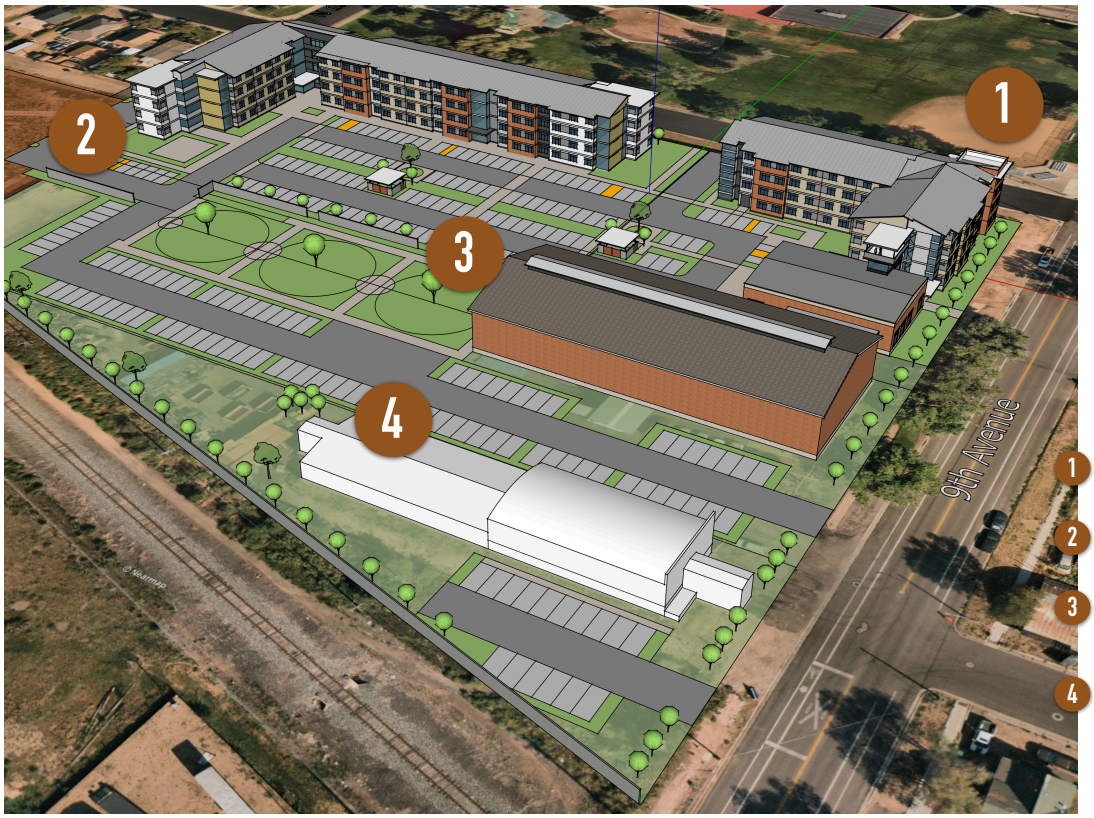
NORTH WELD VILLAGE CAMPUS VISION

We are planning to construct two 4-story apartment buildings along the western and northern portion of the property. Phase 1 will be a PSH project incorporating Building 2 for use as community space for residents. Phase 2 will be a 4-story apartment for income-qualified families. We intend to retain Building 1 for future development into multifamily housing or possibly retail as Phase 3. Building 4 will be used as workforce training in Phase 4 of the redevelopment.

High Plains' vision for the property is to build supportive housing and mixed-income affordable units utilizing the original brick canning buildings. The remaining steel storage buildings will be demolished and recycled in order to utilize the land for the construction of new housing units as shown in **FIGURE 2**. The project will be branded during the design effort with each phase of the project having a unique name.

We estimate the property has the capacity to support 180 units of housing – 60 units of supportive housing (Phase 1), 90 units of mixed, family-oriented, low-income affordable units (Phase 2), as well an additional 30 units of market-rate or affordable housing as part of Building-1 adaptive reuse development (Phase 3). The final phase (Phase 4) will bring commercial and job training opportunities to the campus.

High Plains intends to demolish existing buildings, as shown in **FIGURE 3**, while keeping the two existing brick buildings, known as Building 1 and Building 2. They also intend to remove existing make-shift fencing in the area of construction as well as existing asphalt and concrete.



High Plains Housing Development Corp.

PHASING
123 9TH AVE. GREELEY CO

1 Permanently Supportive Housing

2 Multifamily Housing

3 Multifamily Housing & Healing Garden

4 Commercial / Work Training

FIGURE 2

EXISTING USE, DEMOLITION & NEW USE BY PHASE

			BUILT	SQUARE FEET	CONSTRUCTION	EXISTING USE	PROPOSED USE
Phase 1 : 2023 - 2025							
	MAINTAIN	BUILDING 2 : SECTION D	1934	7,020 SF	BRICK + CMU : 1 STORY	WAREHOUSE	MULTI-FAMILY
	DEMOLISH	BUILDING 2 : SECTION A, B, C	1970	19,600 SF	METAL : 1 STORY	WAREHOUSE	
	DEMOLISH	BUILDING 2 : SECTION E	1970	6,900 SF	METAL : 1 STORY	WAREHOUSE	
	DEMOLISH	BUILDING 2 : SECTION F	1934	9,540 SF	BRICK : 1 STORY	WAREHOUSE	
	DEMOLISH	BUILDING 2 : SECTION G	1978	7,680 SF	METAL : 1 STORY	WAREHOUSE	
Phase 2 : 2025 - 2027							
	DEMOLISH	BUILDING 3	1978	4,992 SF	METAL : 1 STORY	WAREHOUSE	
Phase 3 : 2027 - 2029							
	MAINTAIN	BUILDING 1 : SECTION A	1908	51,660 SF	BRICK : 2 STORIES + BASEMENT	WASTE MANAGEMENT	TBD
	DEMOLISH	BUILDING 1 : SECTION B	1981	11,440 SF	METAL : 1 STORY	WAREHOUSE	
	DEMOLISH	BUILDING 1 : SECTION C	1982	9,184 SF	METAL : 1 STORY	WAREHOUSE	
Phase 4 : TBD							
	MAINTAIN	BUILDING 4	1949	10,574 SF	BRICK : 1 STORY	WAREHOUSE	COMMERCIAL
				138,590			

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FIGURE 3

REZONING FROM I-L TO MU-H

The Property is currently zoned as I-L (Industrial Low Intensity). We propose to rezone the entire site to MU-H (Mixed Use High Intensity) to allow for the construction of two, new, 4-story multi-family projects.

MU-H — MIXED USE HIGH INTENSITY

The MU-H district provides a mix of retail, services, employment, entertainment and civic uses in a walkable setting the complements hight-density neighborhoods or serves as the center of a more intense, multi-modal community or regional destination.

The MU-H is the appropriate zoning as the Permitted uses include the following. These uses offer a great deal of flexibility to High Plains as the exact uses of Phase 3 and Phase 4 are finalized:

- Multi-family Dwellings
- Mixed-use Dwellings
- Residential Care - Group Home
- Assembly - Limited up to 499 occupancy
- Food & Beverage - Brewery / Winery; Bar General
- Food & Beverage - Restaurant Limited (<5K GLS; <100 seats)
- Medial - Limited (<5K GLA; no emergency service)
- Office - General (<20K GLA)
- Personal Service - General (5K+ GLA; 1.0+ acre)
- Retail - limited (<3K GLA)
- Retail - general (3K - 20K GLA)
- Manufacturing - Limited / Artisan (<5K GLA)
- Manufacturing - Food & Beverage Minor (up to 3 acres)
- Waste Management - Recycling Collection Small

ZONING INFORMATION - GREELEY CO

PARCEL - 096105240001	EXISTING	PROPOSED
ZONING	**I-L (Industrial Low Intensity)**	**MU-H (Mixed Used High Intensity)**
PROJECT NAME	**123 Property**	**North Weld Village**
SITE AREA	6.52 ACRES	284,159 SF
FLOOR AREA RATIO	0.49 FAR	0.73 FAR
NUMBER OF DWELLING UNITS	0	180 TBD
DENSITY (DWELLING UNITS / ACRE)	0 / ACRE	27.6 / ACRE
BUILDING SQUARE FOOTAGE	138,590 SF	207,636 SF

EXISTING TENANT – PARALLEL PRODUCTS LOCATED IN BUILDING 1

The intent of the Applicant's Rezoning application is to rezone the entire 6.5-acre lot from I-L to MU-H.

Parallel Products is the tenant of Building 1. Parallel Products offers recycling options for unsaleable alcoholic and non-alcoholic beverage products. From their facility located in Building 1, packaging materials are dropped off, stored and recycled to their base commodity form before they are provided to end-users and producers of recycled-content packaging another products. Recovered liquid materials are utilized to create energy via anaerobic digestion / biogas conversion.

The longterm goal is to redevelop Building 1 to meet the Permitted Uses of MU-H. As MU-H allows for *Waste Management - Recycling Collection Small*, we request that the current beverage waste recycling tenant — Parallel Products — be allowed to continue uninterrupted operation until the Applicant is ready to redevelop Building 1. High Plains relies on the income this generated by Parallel Products.

However, if Staff believes that Parallel Products operations are a non-conforming use, then we request Staff approve the non-conforming use until such time the Applicant is prepared to redevelop Building 1.

2021

NORTH WELD PRODUCE COMPANY

123 N. 9th Ave. Greeley Colorado
Light-Industrial (L-1)

WORKSHOP8

FIGURE 4

PROPOSED REDEVELOPMENT / PRELIMINARY PHASING

THE PROJECT WILL BE DEVELOPED IN FOUR PHASES (FIGURE 5)

Phase 1 : Permanently Supportive Housing

Permitted Use in MU-H (Table 24-4-2) : Multi-family Dwelling
new construction, 60-units, 4-story, 49,000 SF with 5,000 SF of resident services located in existing Building 2

Compatibility with the City of Greeley Comprehensive Plan:

- IMP HO-1.1 - Affordable Housing
- IMP TM-3.3 - TOD - less than 1/4 mile from Greeley Evans Transit center
- IMP HC-1.3 - Adaptive Reuse (Building 2)

Phase 2 : Affordable Family Housing

Permitted Use in MU-H (Table 24-4-2) : Multi-family Dwelling
new construction, 90-units (mix of 1, 2 and 3 bedroom rental units), 4-story, 90,000 SF

Compatibility with the City of Greeley Comprehensive Plan:

- IMP HO-1.1 - Affordable Housing
- IMP TM-3.3 - TOD - less than 1/4 mile from Greeley Evans Transit center

Phase 3 : TBD

Permitted Use in MU-H (Table 24-4-2) : Multi-family Dwelling / Mixed-use Dwelling / Food & Beverage / Office / Personal Service / Retail
adaptive reuse, 0 to 30-units, 2-story, 34,000 SF

Compatibility with the City of Greeley Comprehensive Plan:

- IMP HO-2.1 - Housing Diversity and affordability
- IMP TM-3.3 - TOD - less than 1/4 mile from Greeley Evans Transit center
- IMP HC-1.3 - Adaptive Reuse (Building 1)

Phase 4 : TBD

Permitted Use in MU-H (Table 24-4-2) : Assembly / Food & Beverage / Office / Personal Service / Retail / Manufacturing / Warehousing
adaptive reuse, 1-story, 10,000 SF

Compatibility with the City of Greeley Comprehensive Plan:

- IMP ED-1.6 - Enterprise Zone, Urban Renewal, Economic Development
- IMP ED-3.3 - Emerging Employment Needs
- IMP TM-3.3 - TOD - less than 1/4 mile from Greeley Evans Transit center
- IMP HC-1.3 - Adaptive Reuse (Building 4)

High Plains Housing Development Corporation

NORTHWELD VILLAGE, GREELEY COLORADO – PROPOSED PHASING

FIGURE 5

Please see the Exhibit titled, 123N_Concept Implementation for additional illustrative information on Phase 1 and Phase 2.

INTENT OF ZONING AND COMPREHENSIVE PLAN GOALS

As listed above in the Proposed Development Phases, we believe the site will meet the Comp. Plan's Action goals in terms of:

IMP ED-1.6 Identify areas where the use of Enterprise Zones, Urban Renewal Areas, and other similar tools to encourage business use and development in established areas. Pursue the use or adoption of these tools as needed.

IMP ED-3.3 Develop and maintain an inventory of emerging employment needs and skills necessary to successfully perform such jobs in order to cultivate education and training programs for students and/or workers.

IMP HC-1.3 Catalogue and promote places in the community which have special significance to the development of the area, such as the Cache la Poudre River, the Union Pacific Railroad, irrigation ditches and improvements, and similar features which provide an important context of community identity. Seek grants and other resources to provide markers, plaques and other identification, as appropriate.

IMP HO-1.1 Conduct and maintain an inventory of public, deed-restricted, subsidized, Section 8 or other types of designated affordable housing units in Greeley. Include if the units are rental or ownership units, the size (including number of bedrooms and bathrooms), and the population/income range to which the unit is affordable. Monitor to understand how the supply of affordable housing in the city is changing over time.

IMP HO-2.1 Monitor the local housing market in order to evaluate trends, identify gaps in types of housing or price-points, adjust housing-related programs and policies, and understand the effectiveness and impact of the City's housing strategy, once determined. Trends to be monitored should include:

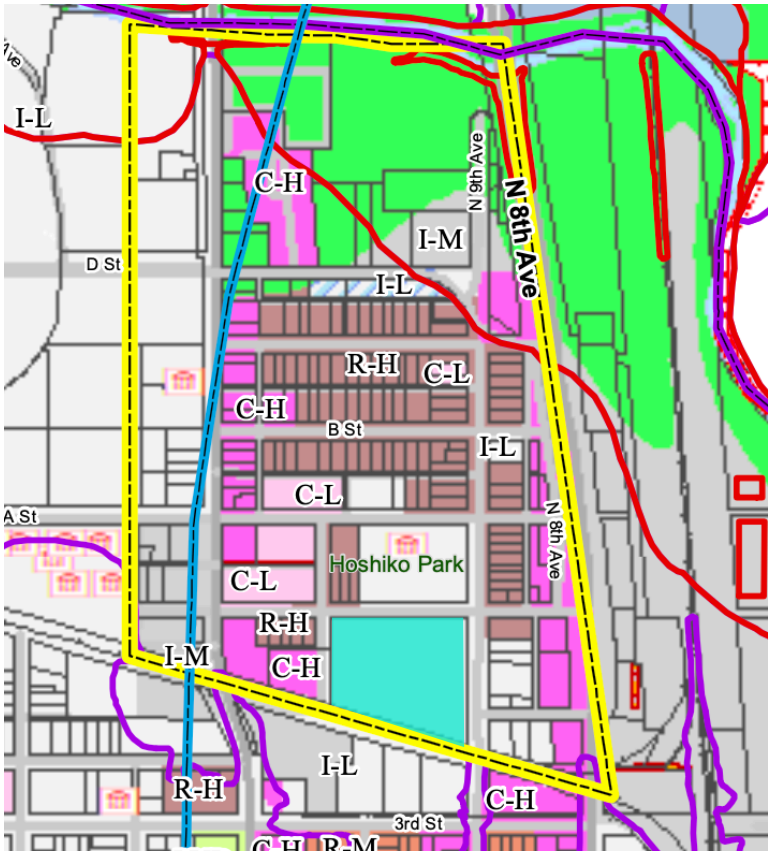
- The types of housing units built in the city each (including tenure and housing type);
- Number of public, subsidized, or deed restricted (for purposes of affordable housing) housing units;
- The composition (by tenure and housing type) of the city's housing stock;
- The cost of housing, home sales prices and rents;
- Vacancy rates; and
- Area median income and the housing affordable to varying AMI levels (e.g., 80% AMI, 60% AMI, etc.).

IMP TM-3.3 Identify TOD corridors in City maps and through the Development Code to alert developers and landowners to the desired intensity of development in these areas.

- We believe we meet the intent of the zoning district (specifically Table 24-5-3, Category III) in that the major surrounding Zoning (R-H) allows for a similar use as we are proposing (as per 24-4-1 they have almost the same descriptions).
- We would anticipate housing growth in the adjacent Downtown Corridor and it would follow that much of the housing in this area could become more dense in the future.
- The current Industrial Use has become incompatible as more and more multi-family residential is developed in the are. This indicates the existing zoning is inappropriate given development trends in the vicinity.
- The proposed zoning will enable development in character with existing or anticipated development (Residential-High Density) in the area considering the design of streets, civic spaces and other open space.
- We believe there is a huge need within the City for affordable, workforce housing and and even great er need for Permanently Supportive Housing with will greatly aid the the City's efforts in dealing with the homeless population. We believe this will make the entire City safer and allow business to flourish.
- We believe that once the site is redeveloped any flooding issues will be alleviated because up to this point no engineering has been performed. Once implemented this should make the surrounding area safer.
- Over the last year or so we have had many discussion with Planning, flood and Economic Development staff a feel that they have generally supported the redevelopment of the site.

3014 BLUFF STREET #200 BOULDER CO 80302 | 303 442 3700 | WORKSHOP8.US

CONSISTENCY WITH THE SURROUNDING ZONING



This property is currently an island in terms of zoning as it is zoned Industrial Low Intensity (I-L) while to the west is Residential High Density (R-H) and Commercial Low Intensity (C-L). To the north is a small pocket of R-H and Hoshiko Park, and to the east is R-H and I-L. To the south there is a barrier created by the spur-line train tracks, but beyond that is I-L and a small bit of I-M.

The proposed rezoning request to Mixed Use High Intensity (MU-H) is compatible with R-H, C-H, and C-L. Our feeling is that the the R-H that surrounds Hoshiko Park will be complimented by the proposed MU-H we are proposing for the site and allow for future development of the south portion of the site to have a commercial use (retail, restaurant, brewery, job training, etc.).

2021 ZONING MAP – GREELEY CO

	Northeast Greeley Mercado District	Character Overlay District
	Industrial Low Intensity (I-L)	Current Zoning
	Industrial Medium Intensity (I-M)	Adjacent Zoning
	Mixed Use High Intensity (MU-H)	Proposed Zoning
	Commercial High Intensity (C-H)	Adjacent Zoning
	Residential High Density (R-H)	Adjacent Zoning
	Commercial Low Intensity (C-L)	Adjacent Zoning

FIRE PROTECTION PLAN

We anticipate Fire Department Access using either 1st Street and/or 9th Avenue. The new construction, multi-family buildings will be equipped with automatic sprinkler systems. The Fire Riser Rooms will be located as required by the Fire Department and the knox boxes will be located in the same vicinity as the fire riser rooms.

FIRE CODE AND FIRE HYDRANTS

The current fire code is International Fire Code (IFC) 2018, and there are no amendments. As of January 1, 2023 the IFC 2021 will become effective.

Ladder access is typically from the street, when required.

Existing fire hydrants are located in right of way of adjacent 1st Street and 9th Avenue. There is one (1) fire hydrant internal to the campus, which will be relocated onsite.

For the proposed redevelopment, it is anticipated that one (1) fire hydrant will be added in right of way at 1st Street at the intersection of 10th Avenue. It is also anticipated that two (2) fire hydrants will be added in 9th Avenue; one (1) at the northeast side of Phase 1 building and one (1) at the southeast side of the Phase 4 building.

An internal water main loop may be required, with up to four (4) fire hydrants (including the relocated onsite hydrant), depending upon final configuration of the campus. Review by the Fire Department will be required to determine final placement and number of fire hydrants.

The maximum FH spacing is 500-ft. Hose pull length is 150 feet from the engine (drivable surface) to any point on a building.

ENVIRONMENTAL ASSESSMENT

A Phase-I Environmental Site Assessment and Phase-II Limited Site Investigation by Terracon Engineering have been completed and no adverse environmental conditions exist on the site. Terracon also completed two studies to assess the structural integrity and viability of the existing brick structures (Buildings 1 and 2). The buildings are in “fair to good condition” with no major structural problems.

TRAFFIC CONSIDERATIONS

A Traffic Memo has been prepared by Galloway.

SURVEY AND CIVIL ENGINEERING

Survey and Civil Engineering requirements have been prepared by Topographic.

WATER CREDITS

City staff have indicated there are 19+ acre feet of water credits available to the site, which the City staff indicated is estimated to be enough for about 180 units of multi-family housing. At this time, a total of 180 multi-family housing units are anticipated, and a 10,000 SF commercial building is also planned.

POTABLE WATER DESIGN CRITERIA

Water and sanitary sewer service sizes have been estimated utilizing City of Greeley Design Criteria and Construction Specifications, Potable Water Distribution, Sanitary Sewer Collection, and Non-Potable Irrigation Systems, Volume III dated June 2008, here after referred to as Greeley WS 2008 DCCS Manual.

These criteria are expected to be updated in the near future and the new criteria will be utilized when they become effective.

POTABLE WATER MAIN SYSTEM AND EASEMENTS

Existing potable water mains are located in the adjacent streets. An 8" water main runs in the 1st Street ROW on the north side of the site, and an 8" water main runs in the 9th Avenue ROW, on the east of the site. It is anticipated that a new 8" water main will be required during a later phase when needed for fire protection, to be routed through the site within the proposed campus drives. Easements will be provided as needed for any new onsite water mains and onsite fire hydrants. See the Concept Utility Report for a further discussion of the potable water system.

POTABLE WATER SERVICES AND SPRINKLER LINES – PROPOSED BUILDINGS

Proposed apartment buildings Phase 1 and Phase 2 will require new water taps. The new domestic and fire water services will connect to the proposed internal water main loop.

Domestic water service line sizes have been estimated in accordance with Table 3-4 in Section 3.17. See the Concept Utility Report for anticipated average day and peak domestic water demand calculations and tap sizing for each building.

Both buildings will be sprinklered for fire protection, and the fire services will be connected to the proposed 8" main internal to the campus.

POTABLE WATER SERVICES AND SPRINKLER LINES – EXISTING BUILDINGS

Existing Buildings Building 1 (Phase 3) and Building 4 (Phase 4) are scheduled to remain. They currently have domestic water services that are connected to the existing 8" public water main in 9th Ave.

- Building 1 (Phase 3) has a 3" water tap, reducing to 1" at the meter vault.
- Building 4 (Phase 4) has an existing ¾" water tap. Neither existing building is currently sprinklered.
- The existing water services are adequate to serve the current uses of these buildings. No changes are proposed for the sanitary sewer services for these buildings until a change in use occurs.

Existing Buildings Adaptive Reuse (Future): Building 1 (Phase 3) and Building 4 (Phase 4) will be adapted for reuse at some time in the future. New domestic and fire supply water service lines will be connected to the existing 8" water main in 9th Avenue.

See the Concept Utility Report for anticipated average day and peak domestic water demand calculations and tap sizing for each building.

SANITARY SEWER DEMAND – PROPOSED BUILDINGS

Proposed apartment buildings Phase 1 and Phase 2 require new sewer taps that are proposed to connect to the existing sanitary sewer main in adjacent 1st Street. Sanitary sewer service design flows have been estimated in accordance with Table 4-1 in Section 4.03. Per Table 401, the average day wastewater flow per capita is 100 gpcd. It is believed that the new standards will be adopted prior to the submittal of development plans for these building. Therefore, analysis in the Concept Utility Report utilizes the average day wastewater flow per capita of 60 gpcd from the proposed City Standards.

- Phase 1 building demand will have 60 units and a total of 68 residents. Using 60 gpcd, the wastewater demand will be 4,080 gpd (68 residents x 60 gpcd). The anticipated service outfall will be a 6" PVC outfall connected to the existing sewer manhole located midway between 10th Ave and 9th Ave, with 16" RCP main flowing to the east.
- Phase 2 building will have 90 units. The anticipated service outfall will be a 6" PVC outfall connected to the existing sewer manhole in 9th Ave with 16" steel main flowing to the east.
- The sanitary sewer service lines will need to cross an existing 36" steel sanitary sewer trunk line in 1st Ave. in order to connect to the manholes on the existing 16" sewer main.

SANITARY SEWER SERVICES – EXISTING BUILDINGS

Existing Building 1 (Phase 3) and Building 4 (Phase 4) are scheduled to remain for several years. They currently have sanitary sewer services that are connected to the existing public sanitary sewer main in 2nd Street. The existing sanitary sewer services are adequate to serve the current uses of these buildings. However, the exact size and configuration of those sanitary sewer services are not known. No changes are proposed for the sanitary sewer services for these buildings until a change in use occurs.

Existing Buildings Adaptive Reuse (Future): Building 1 (Phase 3) and Building 4 (Phase 4) will be adapted for reuse at some time in the future. When the uses for Phase 3 and Phase 4 are changed, it is anticipated that a public 8" sanitary sewer main extension may be required to be constructed in 9th Avenue. The new main will connect to the existing 16" sewer main manhole in 1st Street. Two (2) additional manholes may be required.

See the Concept Utility Report for anticipated average day and peak sewer flow generation calculations for each building.

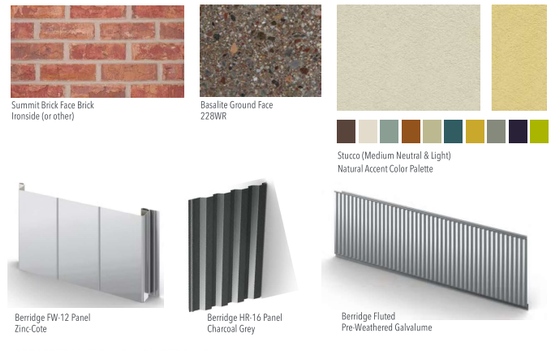
NORTHWELD VILLAGE - PHASES 1 & 2 : CONCEPT IMPLEMENTATION

WORKSHOP8
ARCHITECTURE INTERIORS GRAPHICS

CONCEPTUAL MASTER SITE PLAN

REZONING FROM I-L TO MU-H

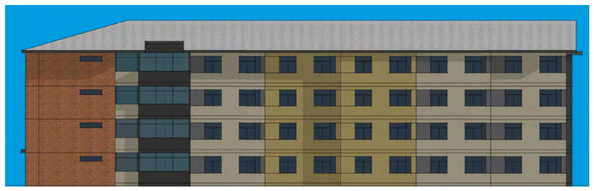
CONCEPTUAL LOT LINES / MINOR SUBDIVISION



PROPOSED MATERIALS - PHASES 1 & 2

CONCEPTUAL DESIGN — PERMANENTLY SUPPORTIVE HOUSING : PHASE-1

EAST VIEW - 9TH STREET FACE / FRONT ENTRY



NORTH VIEW - 1ST STREET FACE

SITE PLAN - PHASE 1

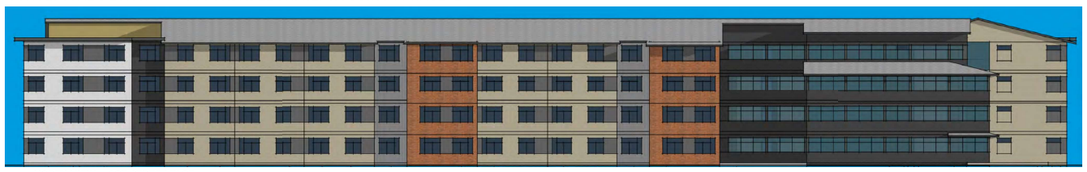
WEST VIEW - INTERIOR FACE / RESIDENT ENTRY

SOUTH VIEW - INTERIOR FACE

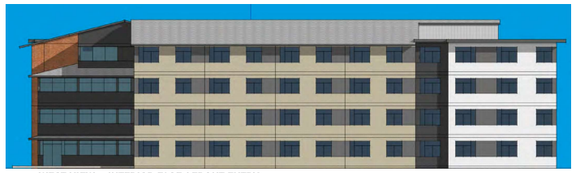
AERIAL VIEW - PHASE 1

CORNER VIEW - PHASE 1

CONCEPTUAL DESIGN — AFFORDABLE FAMILY HOUSING : PHASE-2



NORTH VIEW - 1ST STREET FACE

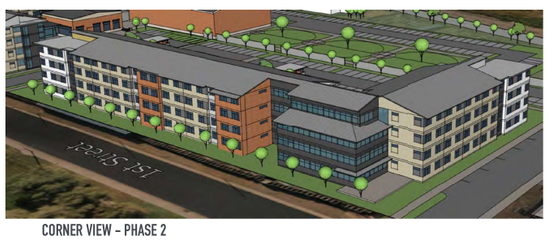


WEST VIEW - INTERIOR FACE / FRONT ENTRY

SITE PLAN - PHASE 2

EAST VIEW - INTERIOR FACE / RESIDENT ENTRY

SOUTH VIEW - INTERIOR FACE



CORNER VIEW - PHASE 2

ATTACHMENT C

WORKSHOP8
ARCHITECTURE INTERIORS GRAPHICS

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY

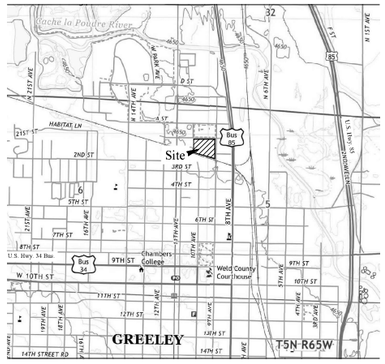
123 9th Avenue Rezoning

Lot 1 GURA-Miller Minor Subdivision in the Northwest 1/4 of Section 5, Township 5 North, Range 65 West of the 6th Principal Meridian
City of Greeley, County of Weld, State of Colorado
6.52 Acres
Project Number: ZON2022-0012

STATEMENT OF INTENT

The Applicant requests to rezone an industrial property from I-L to MU-H to allow for the development of new Multi-family Dwellings, Mixed-use Dwellings, and the adaptive-reuse of select existing building for other Permitted Uses as described in Table 24-4-2: Zoning Districts & Uses.

VICINITY MAP



Vicinity Map
1"= 1000'

INDEX

SHEET 1	COVER
SHEET 2	EXISTING CONDITIONS MAP
SHEET 3	ZONING SUITABILITY MAP
SHEET 4	PROJECT BOUNDARY MAP
SHEET 5	GENERAL CONCEPT LAYOUT
SHEET 6	PHASING CONCEPT

SURVEYOR CERTIFICATE

I, Joel T. Vogt, a Professional Land Surveyor licensed in the State of Colorado, do hereby state, for and on behalf of Topographic, Co., that the Existing Conditions Map, Zoning Suitability Map and Project Boundary Map was made by me or under my direct supervision, and is true to the best of my knowledge, information, and belief. This drawing does not represent a Monumented Land Survey, Land Survey Plat, nor Improvement Location Certificate and any monuments or boundary lines shown are for rezoning the property only. The notes are made a part of this statement.

Joel T. Vogt, PLS 38099 _____ Date

123 9TH AVENUE – OWNER'S CERTIFICATE

123 Property LLC, being the sole Owner of the land herein, have caused said land to be rezoned as shown herein.

Jodi Hartmann, Manager

WITNESS

State of Colorado)
County of Weld)

The foregoing instrument was acknowledged before me by Jodi Hartmann as Manager of 123 Property LLC.

_____ day of _____, 20____.

Notary Public

Commission Expiration

LEGAL DESCRIPTION

Provided by Westcor Land Title Insurance Company COMMITMENT FOR TITLE INSURANCE File No: 20069UTG Amendment No: 1 Effective Date: July 2, 2020

The land referred to in this Commitment is described as follows:

Lot 1 GURA-Miller Minor Subdivision in the Northwest 1/4 of Section 5, Township 5 North, Range 65 West of the 6th Principal Meridian, City of Greeley, County of Weld, State of Colorado.

For Informational Purposes Only: 123 9th Avenue, Greeley, CO 80631

TOGETHER WITH:

The East half (33 feet) of 10TH Avenue adjacent to said Lot 1, and

The South half (33 feet) of 1ST Street adjacent to said Lot 1, and

The West half (50 feet) of 9TH Avenue adjacent to said Lot 1.

REZONING DEVELOPMENT NOTES – CITY OF GREELEY

1. Approval of site construction plans by the City of Greeley shall be required (as applicable) prior to issuance of building permits.
2. All existing and proposed utilities shall be installed underground.
3. No building permit shall be issued for the construction of a new building or structure unless the property has been platted in accordance with the City's Subdivision Regulations (Chapter 3).
4. All elevations shown on these plans are tied to NAVD 88 datum.

COMMUNITY DEVELOPMENT DIRECTOR

Director of Community Development _____ Date

PLANNING COMMISSION RECOMMENDATION

Recommended / not recommended by the City of Greeley Planning Commission on this _____ day of _____, 20____.

CITY COUNCIL APPROVAL

Approved by the Greeley City Council on this _____ day of _____, 20____.

DEVELOPMENT ENTITIES

APPLICANT
High Plains Housing Development Corp.
Jodi Hartmann
Executive Director
-
970 535 7437
hphousingdev@gmail.com
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Greeley CO 80631 / 80632

LEGAL PROPERTY OWNER
123 Property LLC
Jodi Hartmann
Manager
-
970 535 7437
hphousingdev@gmail.com
814 9th Street / PO Box 1053
Greeley CO 80631 / 80632

OWNER'S CONSULTANT
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Owner's Representative
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Architect Principal
Colorado Architect : 400321
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Joe Prinster
Senior Project Engineer
Colorado PE # 19292
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SURVEYOR
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Survey Project Manager
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TRANSPORTATION ENGINEER
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Brian Horan
Transportation Team Manager
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Johnston CO 80534

GEOTECHNICAL / ENVIRONMENTAL
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Maia Griswold Hayes, P.E.
Senior Staff Engineer
58337
970 351 0460
maia.Hayes@terracon.com
1510 44th Street, Unit 1
Evans CO 80620

2022-10-18

COVER

Sheet 1 of 6

PREPARATION DATE

2022-08-23	Rezoning
2022-10-26	Revision
2022-12-02	Revision

ZON2022-0012

Item No. 15.

WORKSHOP8
ARCHITECTURE INTERIORS GRAPHICS

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY

123 9th Avenue Rezoning

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City of Greeley, County of Weld, State of Colorado
6.52 Acres
Project Number: ZON2022-0012

Survey Notes:

1. Topographic, Co. relied on Westcor Land Title Insurance Company COMMITMENT FOR TITLE INSURANCE File No: 20069UTG Amendment No: 1 Effective Date: July 2, 2020 for the preparation of this survey. This survey does not constitute a title search by this surveyor of the property shown and described hereon to determine:
   a.) ownership of the tract of land.
   b.) compatibility of this description with those of adjacent tracts of land.
   c.) rights of way, easements and encumbrances of record affecting this tract of land.

2. This property is located in ZONE AE a special flood hazard area (SFHA) subject to inundation by the 1% anual chance of flood according to the National Flood Insurance Program Flood Insurance Rate Map number 08123C1537E Panel 1537E effective date January 20, 2016.

3. This property is zoned Industrial Low Intensity (I-L) according to the City of Greeley Official 2021 Zoning Map.

4. Underground utilities as shown hereon are based on surveyed locations of physical and visible evidence and markings by Diversified Underground Div. Job #22I.-96901CK.

5. Basis of Bearings is the east line of Lot 1 GURA-Miller Minor Subdivision as monumented with 1 inch yellow plastic caps PLS 11399 at each end with a measured grid bearing of S 00°02'03" W (Platted record bearing is S 00°00'08" E).

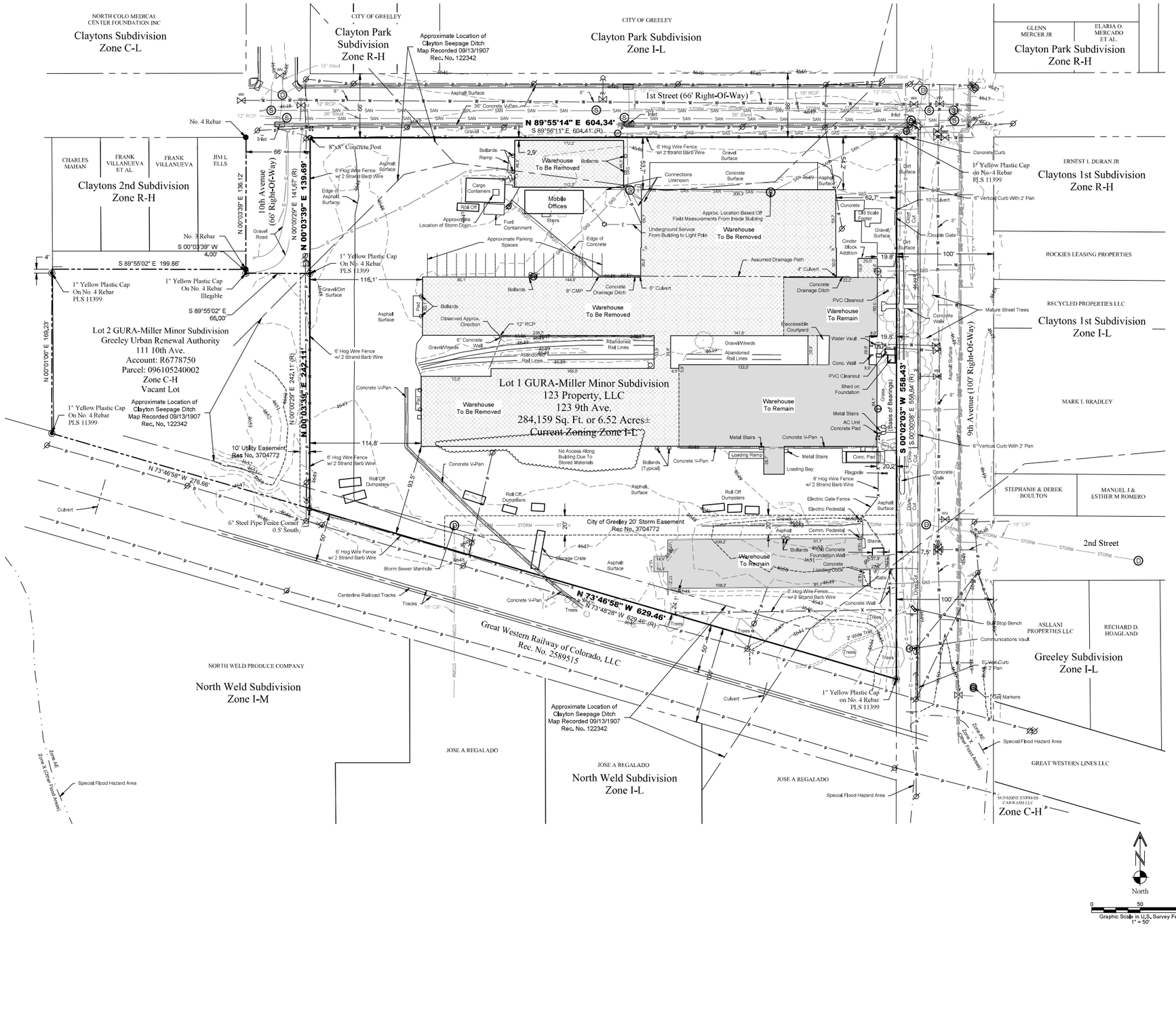
6. All directions, distances and dimensions are based on modified coordinates from the Colorado coordinate system of 1983 north zone (C.R.S. 38-52-102). CSF=1.000255708 Origin 0,0. The lineal unit of measurement is the U.S. Survey Foot.

7. According to Colorado Law you must commence any legal action based upon any defect in this survey within three years after you first discover such defect. In no event may any action based upon any defect in this survey be commenced more than ten years from the date of the certification shown hereon.

8. Any person who knowingly removes, alters or defaces any public land survey monument or land boundary monument or accessory commits a Class Two (2) Misdemeanor pursuant to State Statute 18-4-508, C.R.S.

9. Snow and ice at the time of fieldwork obscured marked parking spaces. Only parking spaces that can be seen on recent aerial images are shown hereon and may not be accurate or complete.

10. Much of the perimeter of this parcel is lined with pallet like containers presumed to function as screening. Due to the movable nature of said containers, they at not shown hereon.



LEGEND

- Utility Pole
- Guy Wire
- Electric Transformer
- Utility Pedestal
- Marker Post
- Fire Hydrant
- Water Valve
- Sanitary Sewer Manhole
- Storm Sewer Manhole
- Water Vault Manhole
- Communications Vault Manhole
- Electrical Vault Manhole
- Unknown Manhole
- Light
- Street Sign
- Gas Meter / Water Meter
- Mailbox
- Deciduous Tree
- Coniferous Tree
- Flowline / Drainage
- Fence
- Overhead Power
- Electric
- Communication
- Gas
- Sanitary Sewer
- Storm / Drain Sewer
- Water
- Index Contour
- Standard Contour
- Easement Line

EXISTING CONDITIONS MAP

Sheet 2 of 6

PREPARATION DATE

2022-08-23	Rezoning
2022-10-26	Revision
2022-12-02	Revision

ZON2022-0012

WORKSHOP8
ARCHITECTURE INTERIORS GRAPHICS

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LOYALTY INNOVATION LEGACY

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City of Greeley, County of Weld, State of Colorado
6.52 Acres

Rezone Parcel Description:

Provided by Westcor Land Title Insurance Company COMMITMENT FOR TITLE INSURANCE File No: 20069UTG Amendment No: 1 Effective Date: July 2, 2020

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For Informational Purposes Only: 123 9th Avenue, Greeley, CO 80631

TOGETHER WITH:

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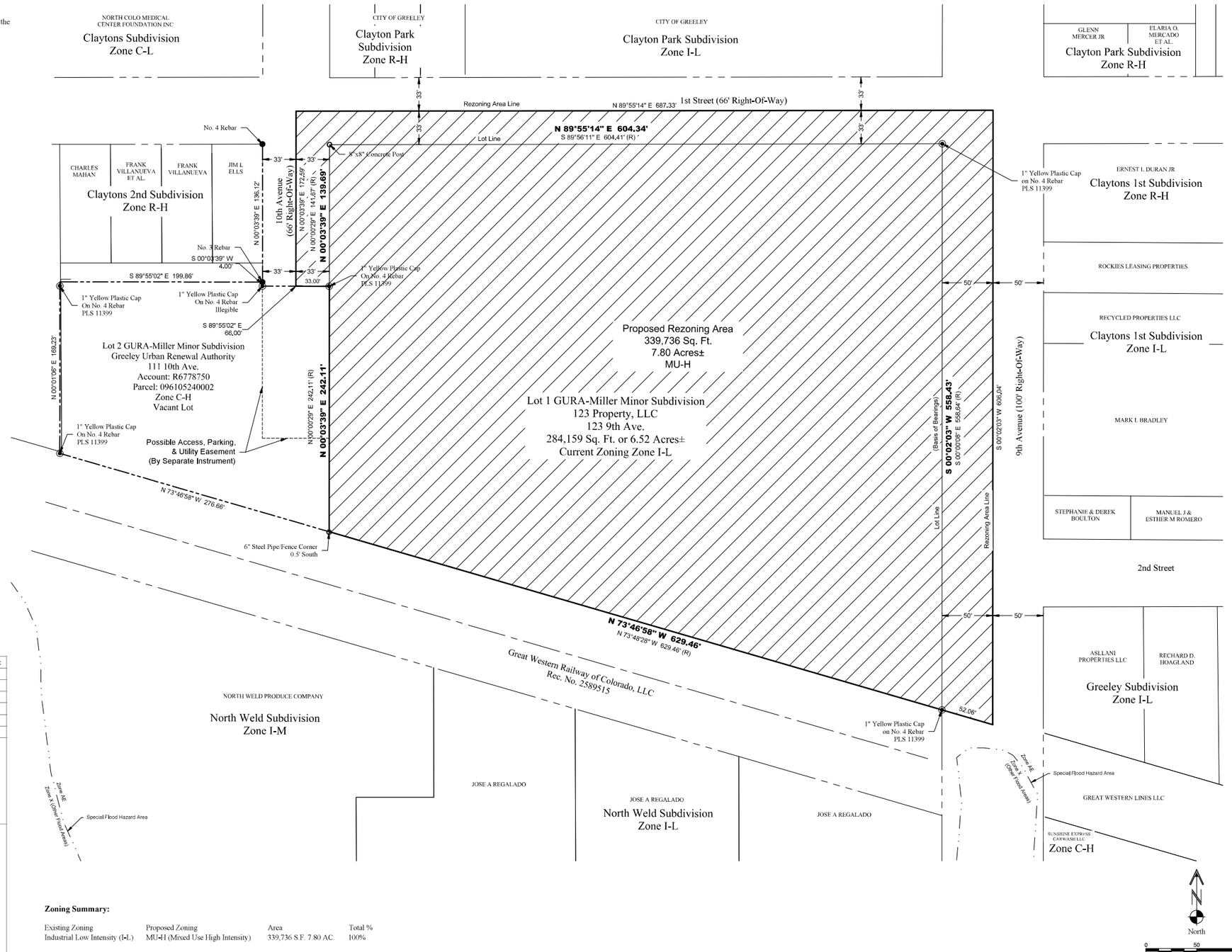
ZONING SUMMARY - 123 9TH AVENUE

Existing Zoning	Proposed Zoning	Area		Percent
I-L (Industrial - Light)	MU-H (Mixed Used High Intensity)	284,159 SF	6.52 Acres	83.6%
ROW	MU-H (Mixed Used High Intensity)	55,577 SF	1.28 Acres	16.4%
TOTAL		**339,736** SF	**7.80** Acres	**84%**
Use Area (Proposed Lot 1)	Multi-family Dwellings	52,487 SF	1.20 Acres	15.4%
Use Area (Proposed Lot 2)	Multi-family Dwellings	87,008 SF	2.00 Acres	25.6%
Use Area (Proposed Lot 3)	TBD: - Multi-family Dwellings - Mixed-use Dwellings - Office - General (<20K GLA) - Personal Service - General (5K+ GLA; 1.0+ acre) - Retail - limited (<3K GLA) - Retail - general (3K - 20K GLA)	100,990 SF	2.32 Acres	29.7%
Use Area (Proposed Lot 4)	TBD: - Assembly - Limited up to 499 occupancy - Food & Beverage - Brewery / Winery; Bar General - Food & Beverage - Restaurant Limited (<5K GLS; <100 seats) - Office - General (<20K GLA) - Personal Service - General (5K+ GLA; 1.0+ acre) Manufacturing - Limited / Artisan (<5K GLA) - Manufacturing - Food & Beverage Minor (up to 3 acres)	43,675 SF	1.00 Acres	12.9%
ROW	MU-H (Mixed Used High Intensity)	55,577 SF	1.28 Acres	16.4%
TOTAL		**339,737** SF	**7.80** Acres	**100%**



Zoning Summary:

Existing Zoning	Proposed Zoning	Area	Total %
Industrial Low Intensity (I-L)	MU-H (Mixed Use High Intensity)	339,736 S.F. 7.80 AC.	100%

ZONING SUITABILITY MAP

Sheet 3 of 6

PREPARATION DATE

2022-08-23	Rezoning
2022-10-26	Revision
2022-12-02	Revision

WORKSHOP8
ARCHITECTURE INTERIORS GRAPHICS

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY

123 9th Avenue Rezoning

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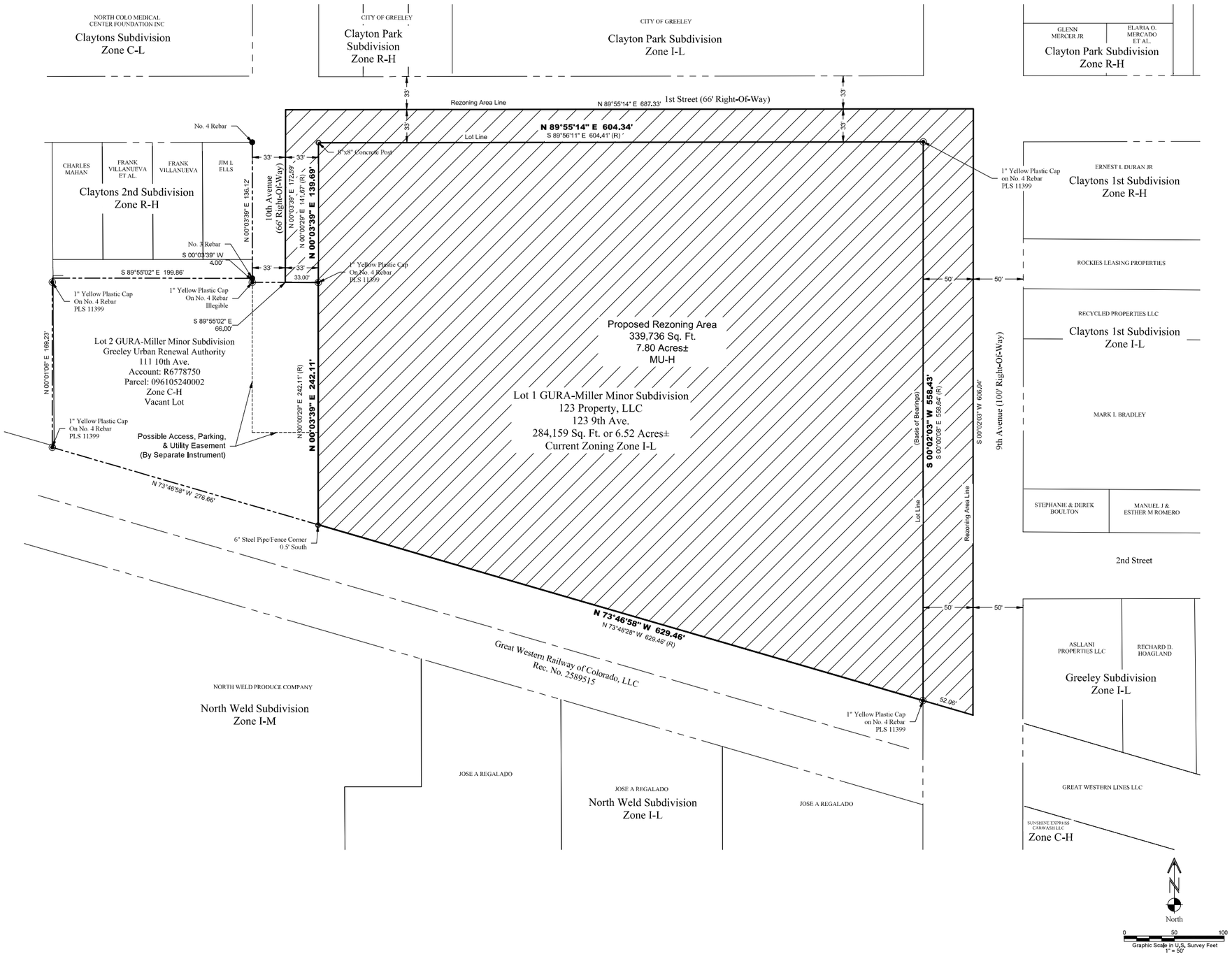

PROJECT BOUNDARY MAP

Sheet 4 of 6

PREPARATION DATE

2022-08-23	Rezoning
2022-10-26	Revision
2022-12-02	Revision

ZON2022-0012

WORKSHOP8
ARCHITECTURE INTERIORS GRAPHICS

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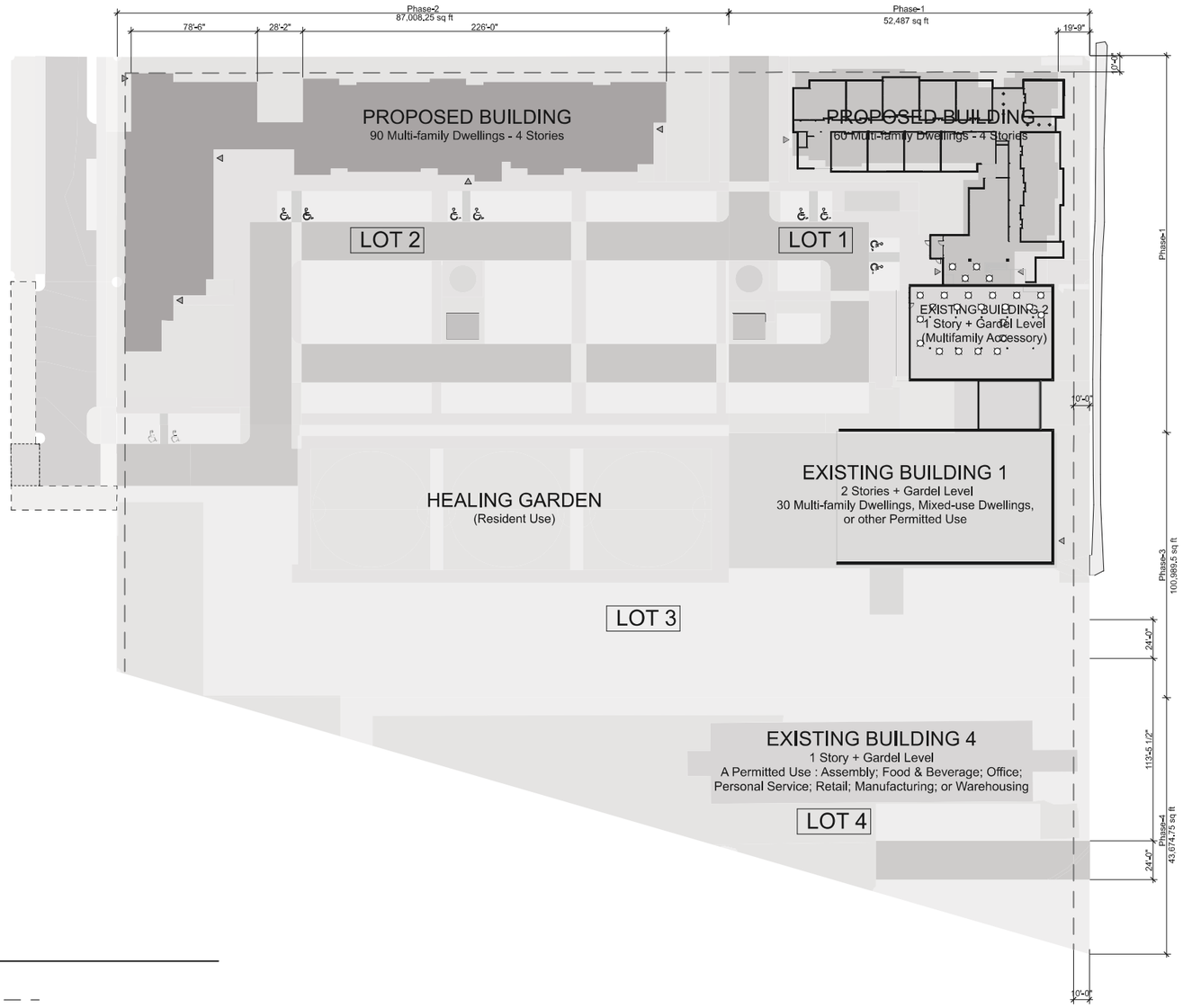

PROPOSED UNITS

Use Area (Proposed Lot 1)	Multi-family Dwellings	60
Use Area (Proposed Lot 2)	Multi-family Dwellings	90
Use Area (Proposed Lot 3)	TBD: - Multi-family Dwellings - Mixed-use Dwellings - Office - General (<20K GLA) - Personal Service - General (5K+ GLA; 1.0+ acre) - Retail - limited (<3K GLA) - Retail - general (3K - 20K GLA)	30
Use Area (Proposed Lot 4)	TBD: - Assembly - Limited up to 499 occupancy - Food & Beverage - Brewery / Winery; Bar General - Food & Beverage - Restaurant Limited (<5K GLS; <100 seats) - Office - General (<20K GLA) - Personal Service - General (5K+ GLA; 1.0+ acre) Manufacturing - Limited / Artisan (<5K GLA) - Manufacturing - Food & Beverage Minor (up to 3 acres)	0
TOTAL		**180**

NOTE
Conceptual Site Plan shown for reference only as part of the rezoning plat.

1 GENERAL CONCEPT LAYOUT PLAN
SCALE: 1" = 40'

GENERAL CONCEPT LAYOUT

Sheet 5 of 6

PREPARATION DATE

2022-08-23	Rezoning
2022-10-26	Revision
2022-12-02	Revision

ZON2022-0012

WORKSHOP8
ARCHITECTURE INTERIORS GRAPHICS

TOPOGRAPHIC
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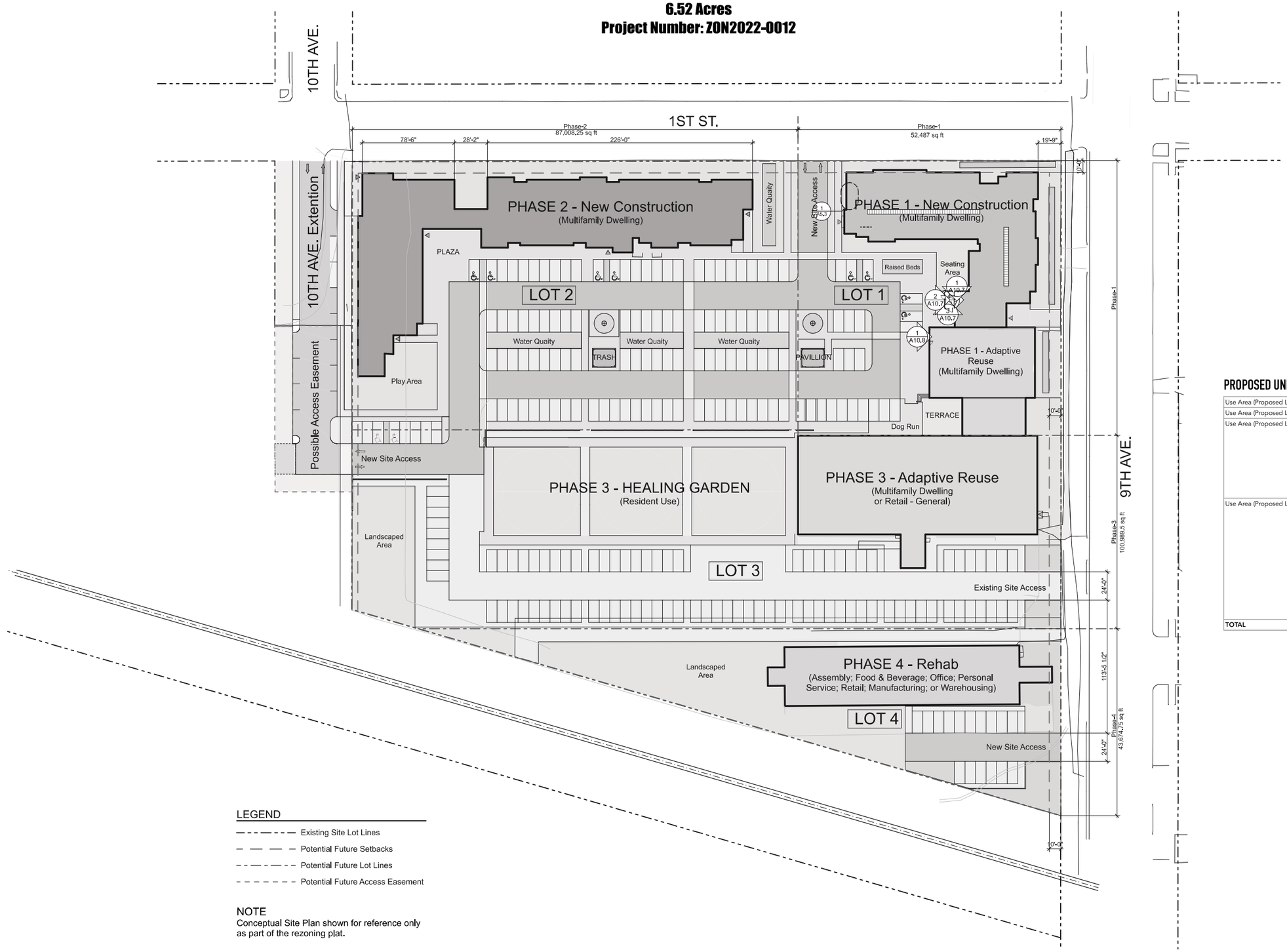

LEGEND

- Existing Site Lot Lines
- Potential Future Setbacks
- Potential Future Lot Lines
- Potential Future Access Easement

NOTE
Conceptual Site Plan shown for reference only as part of the rezoning plat.

1 PHASING CONCEPT PLAN
SCALE: 1" = 40'

PROPOSED UNITS

Use Area (Proposed Lot 1)	Multi-family Dwellings	60
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Use Area (Proposed Lot 4)	TBD: - Assembly - Limited up to 499 occupancy - Food & Beverage - Brewery / Winery; Bar General - Food & Beverage - Restaurant Limited (<5K GLS; <100 seats) - Office - General (<20K GLA) - Personal Service - General (5K+ GLA; 1.0+ acre) Manufacturing - Limited / Artisan (<5K GLA) - Manufacturing - Food & Beverage Minor (up to 3 acres)	0
TOTAL		**180**

PHASING CONCEPT

Sheet 6 of 6

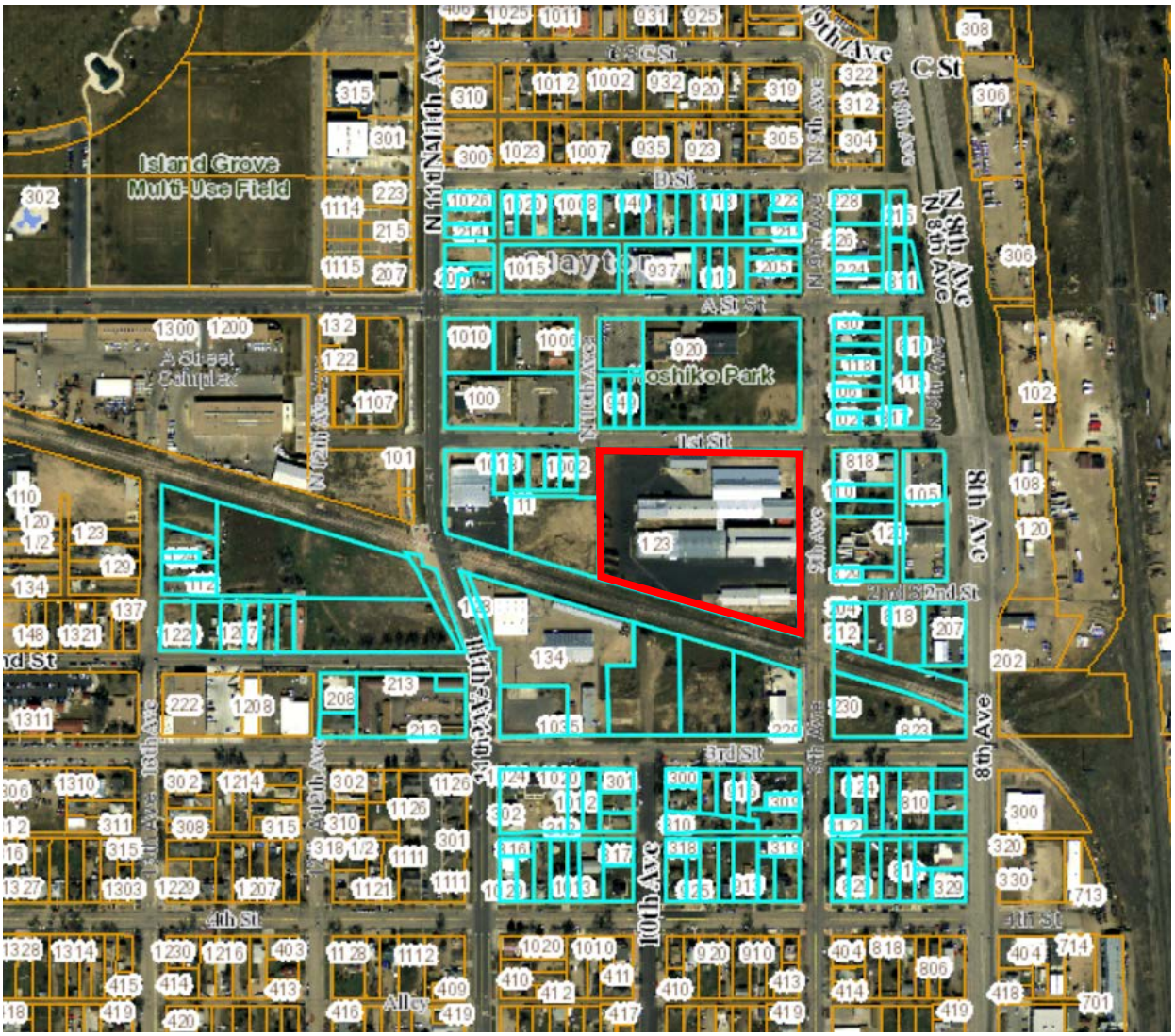
PREPARATION DATE

2022-08-23	Rezoning
2022-10-26	Revision
2022-12-02	Revision

ZON2022-0012

ATTACHMENT D

NEIGBORHOOD NOTIFICATION BOUNDARY MAP



ZON2022-0012

123 9th Avenue Rezoning
ZON2022-0012

City Council

January 17, 2023

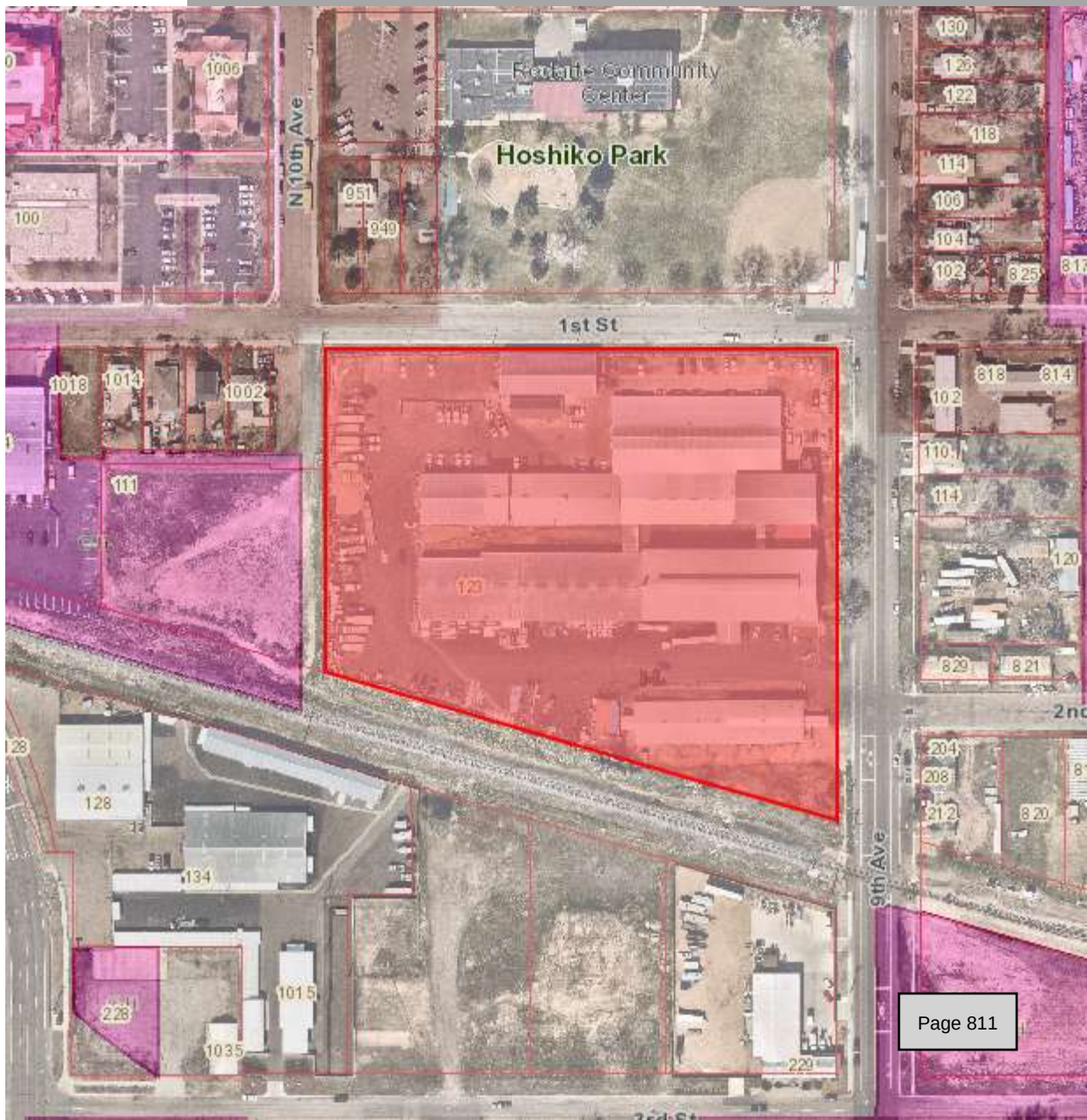
Caleb Jackson, AICP | Planner III

Request & Site Background

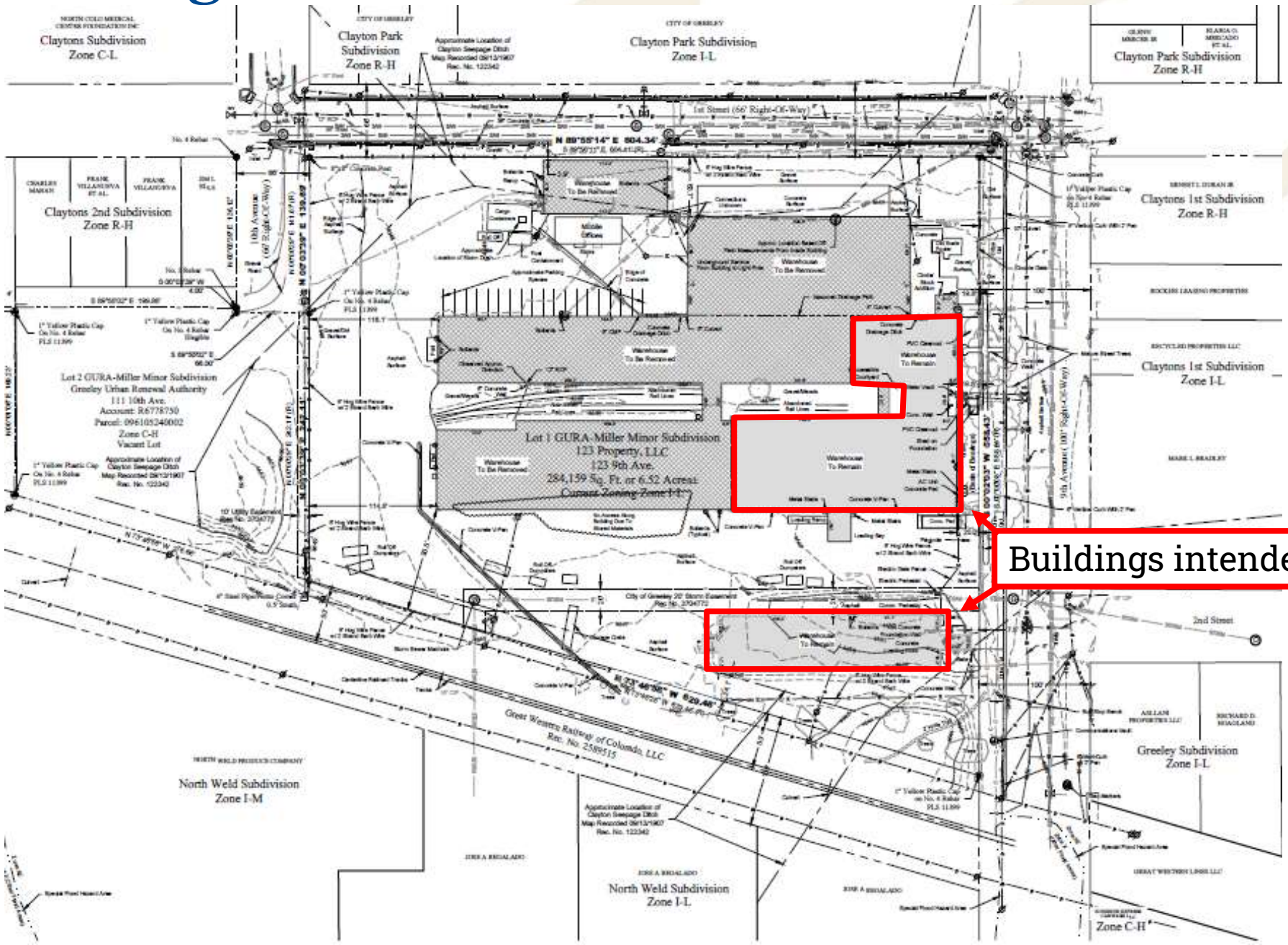
- Request:
  - Rezone 7.8 acres I-L (Industrial Low Intensity) to MU-H (Mixed-Use High Intensity)
- Background:
  - Currently developed as industrial buildings
  - Existing recycling use to remain
  - Applicant intends to redevelop the site in phases with a mixture of uses, including residential

Location

- 123 9th Avenue
- Surrounding Zoning and Land Uses:
  - North: R-H/I-L | Park/Community Center
  - East: R-H/I-L | Residential/Industrial
  - South: I-L/I-M | Railroad/Industrial
  - West: R-H/C-H | Residential/Undeveloped



Existing Conditions



Buildings intended to remain

Approval Criteria

Rezone Criteria – 24-204 – Nine Criteria Used to Evaluate Rezone applications

- **The proposed Rezone is consistent with the criteria as outlined in your Summary**

Notification

- 98 notice letters
- Signs posted on the property
- No inquiries

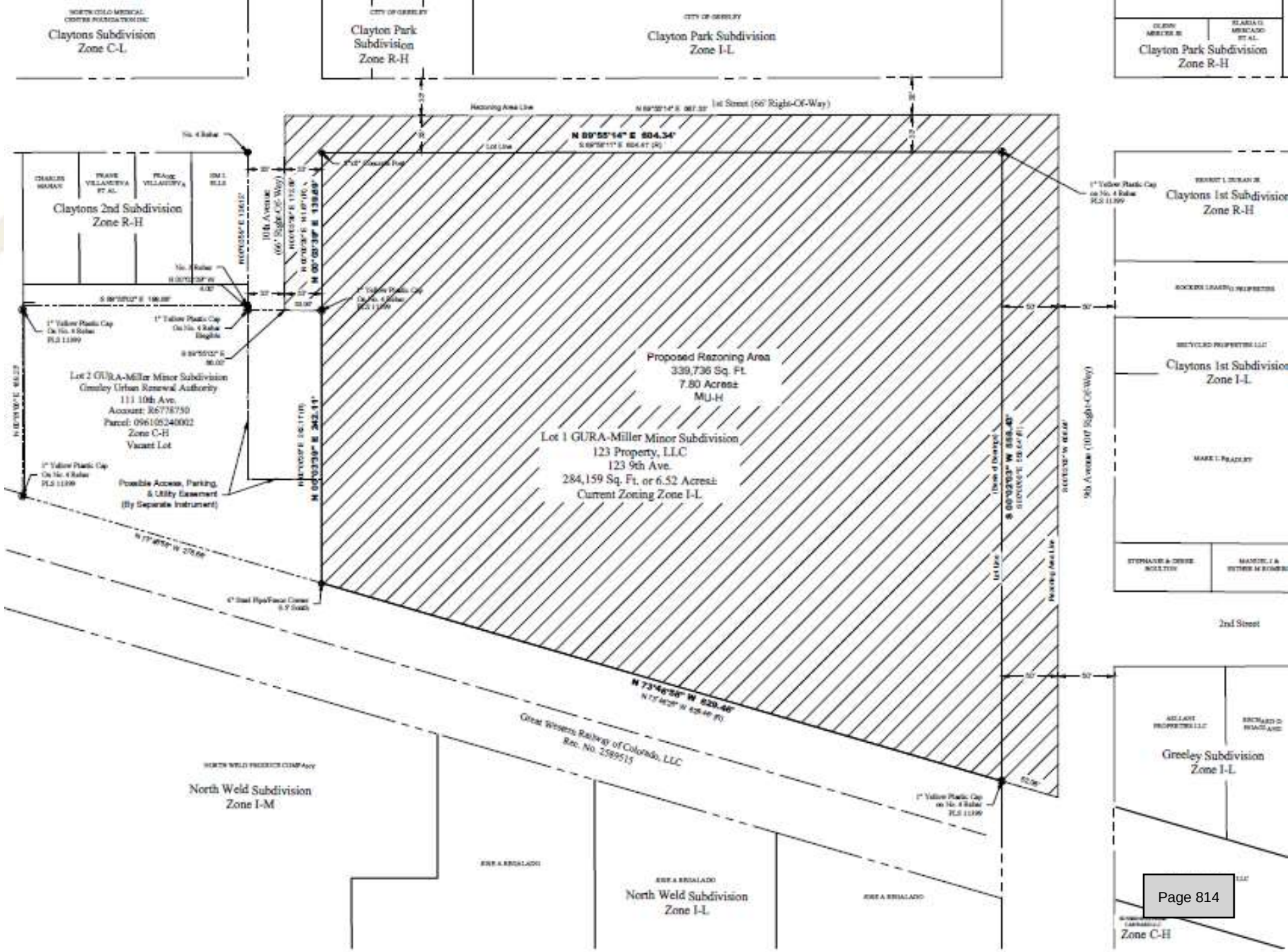
Recommendation

- Complies with Section 24-204(b) 1-9
- Planning Commission reviewed the request and conducted a public hearing on January 10, 2023

City of Greeley Colorado

Boundary Map

Item No. 15.



City of Greeley Colorado

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
1)	**The proposal is in accordance with the goals and objectives of the Comprehensive Plan and any other plan, policy, or guidance adopted pursuant to that plan**
	• *Comprehensive Plan	GC-4.2 Reinvestment/Adaptive Reuse, GC-4.3 Infill Compatibility, GC-1.2 Form of Growth, CG-2.2 Jobs/Housing Balance, GC-2.3 Pedestrian and Bicycle-Oriented Development, EH-2.4 Land Use, EH-2.6 Built Environment*
2)	**The proposal can fulfill the intent of the zoning district considering the relationship to the surrounding areas**
	• *Rezoning would allow more comprehensive redevelopment options that compliment the area*
3)	**The area changed or is it changing to such a degree that it is in the public interest to rezone the subject property to encourage development or redevelopment of the area?**
	• *The greater downtown area is experiencing redevelopment* • *The proposed rezoning would expand redevelopment/reuse opportunities north of downtown*

Approval Criteria

Rezone Criteria – Section 24-625(c)(3)	
4)	**The existing zoning has been in place for a substantial time without development, and if this indicates the existing zoning is inappropriate given development trends in the vicinity**
	• *Industrial zoning and uses have been present since the 1930s* • *Rezoning would provide the opportunity for more comprehensive redevelopment*
5)	**The proposed zoning will enable development in character with existing or anticipated development in the area considering the design of streets, civic spaces, and other open space; the pattern, scale and format of buildings and site; and the compatibility and transitions with other complimentary uses and development** What is the impact on the Zoning Suitability Plan?
	• *The proposed zoning would enable compatible and complimentary reuse of the site that is consistent with the mixture of uses in the vicinity*

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
6)	**The City or other agencies have the ability to provide services or facilities that may be necessary for anticipated uses in the proposed district**
	• *Being in a developed area, the site has access to adequate services* • *Any service upgrades needed would be required at the time of development*
7)	**The change will serve a community need, provide an amenity, or accommodate development that is not possible under the current zoning or that was not anticipated at the time of the initial zoning or the property, making the proposed zoning more appropriate that the current zoning.**
	• *The proposed zoning would allow for more development options* • *Allows for more potential services for the community*
8)	**Any reasonable anticipated negative impacts on the area or adjacent property either are mitigate by sound planning, design and engineering practices or are outweighed by broader public benefits to the surrounding community**
	• *Any impacts resulting from the rezone would be mitigated as part of the development review process* • *Traffic and drainage would be further evaluated at the time of a site plan application*

Approval Criteria

Rezone Criteria – Section 24-204(b) – Nine Criteria Used to Evaluate Rezones	
9)	**The recommendations of professional staff or advisory review bodies**
	• *Staff recommends approval of this rezoning request*

North Weld Village

Addressing homelessness & housing instability through affordable housing strategies

High Plains Housing Development Corp.

123 9th Avenue – 6.5 acres

This project is made possible through the generous donation of this former North Weld Produce property to High Plains Housing Development Corp. by Dennis Hoshiko, who's passion and vision to provide housing for our community's unhoused neighbors was the catalyst for this affordable housing campus.

High Plains Housing Development Corp. -

an Nonprofit Affordable Housing Developer

Our mission: to be the leading partner in the development of housing opportunities for low-to-moderate income households in Greeley/Weld Co.

Experienced tax-credit operator & developer, including properties in this neighborhood:

Stagecoach Gardens Apartments – 1126 3rd St., Greeley
30 units Multi-family Affordable Housing

La Casa Rosa Senior Apartments – 1009-1013 C St., Greeley
14 units Senior Affordable Housing (55+)

Dacono Senior Apartments – 412 7th Street, Dacono
20 units Senior Affordable Housing (62+)

NORTH WELD VILLAGE – A Phased Development, Campus Model

Phase 1: 58 units Permanent Supportive Housing

Phase 2: 90 units Multi-family Very Affordable Housing

Phase 3: 30 units Workforce Housing

Phase 4: Social Enterprise Resident Employment Center

NORTH WELD VILLAGE – Phase I "StarRise" Permanent Supportive Housing

- 58 one-bedroom units – supportive housing
- Serving chronically homeless individuals with complex and chronic health conditions
- On-site services including:
  - Case management
  - Security
  - Behavioral health services
  - 24/7 access to amenities & support

NORTH WELD VILLAGE - Phase I - StarRise Apartments Architect Renderings

NORTH WELD VILLAGE – Phase II – 90 Units Multi-family, Deeply Affordable Housing

Phase I – View from Northeast

Overhead View – Phase I & II Housing Developments

Phase II – View from Northwest

NOR LD VILLAGE – Phases III & IV – Additional Housing & Employment

Phase III – 30 Units Workforce Housing

Phase IV – Social Enterprise-Employment Opportunity

NOR LD VILLAGE – Fulfilling Critical Community Housing Needs

Housing for Chronically Homeless (Phase I)

- Weld County By-Name List: **69** chronically homeless individuals
- PIT Count – Jan. 2022: **135** sheltered and unsheltered homeless adults
- Without housing, homeless individuals cost tax payers an average of **$45,000/year**
    - Emergency room visits
    - Emergency shelters
    - Law enforcement, jails, psychiatric hospitals
- PSH saves an average of **$25,000/individual/year**
- What improves with Permanent Supportive Housing?
    - Residents' physical & mental health improve
    - Business community concerns with homeless encampments and street living improves
    - Law enforcement and emergency response calls improve
    - Formerly homeless individuals remain stably housed

Deeply Affordable Housing for Very Low Income Households (Phase II)

- Targeting very low income families and individuals earning @ or below 50% area median income (a very underserved population in Greeley's affordable housing continuum.
- A Demand Analysis conducted in July, 2020 reported that Greeley is short **6,281** housing units for households earning less than 50% AMI

NORTH WELD VILLAGE –

Providing Expertise & Critical Infrastructure Investment to meet the Housing Needs of the Most Vulnerable Individuals & Households

EXPERTISE - DEVELOPMENT TEAM:

Jodi Hartmann, High Plains Housing Dev. Corp. – Owner/Sponsor
Ryan Lunsford/Brandon Gentrup, GL Development Advisors, Developer Consultant
Sarah Batt, Dwelling Development, Financial Advisor
Joseph Vigil/Brandy LeMae, Workshop8 – Architects
Topographic, Civil Engineering
Terracon Engineering, Environmental & Structural Studies
Zoe LeBeau/Katie Symons, Beaux-Simone Consulting-Supportive Services Planning
KCI Construction, Longmont, General Contractor
Volunteers of America, Northern Colorado – Lead Services Provider
Rocky Mountain Communities – Property Management

INVESTMENT:

- Phase I - $26M infrastructure investment – 58 housing units
- Phase II - $30M infrastructure investment – 90 units
- TOTAL: $50M infrastructure investment – 148 new affordable housing units
- Phases III & IV – Infrastructure investment to be determined – 30 additional housing units projected

NORTH WELD VILLAGE

Local Stakeholders & Partners:

- Weld Trust
- City of Greeley
- City of Evans
- Greeley Urban Renewal Authority (GURA)
- Weld County
- Weld County Department of Human Services
- Greeley/Weld Housing Authority
- United Way of Weld County
- Northern Colorado Continuum of Care
- Volunteers of America
- North Range Behavioral Health
- Sunrise Community Health Centers
- Northern Colorado Health Alliance
- High Plains Library District

State of Colorado Partners:

- Colorado Housing & Finance Authority (CHFA)
- Colorado Division of Housing (DOH)

Thank you for sharing our vision for the North Weld Village

High Plains Housing Development Corp.

FOR MORE INFORMATION ABOUT THIS PROJECT:

Contact Ryan Lunsford (720) 275
or Jodi Hartmann (970) 405

Council Agenda Summary

January 17, 2023

Key Staff Contact: John Karner, Finance Director

Title:

Public hearing and second reading of an Ordinance Amending Sections 6-998, 6-1000, 6- 1002 through 6-1009, 6-1013 and 6-1015 the City of Greeley Municipal Code of Ordinances Relating to Development Impact Fees

Summary:

In 2020 the City contracted with Raftelis Consulting to update its development impact fee schedule (2020 Development Impact Fee Study) in accordance with the Greeley Municipal Code requirement to review development fees every five years. Following presentation of that update in fall of 2020, City Council elected to suspend adoption of the study's fee recommendations, resulting in the continued use of a development fee schedule created in 2014.

The continuation of fees at 2014 levels and unexpected level of new growth experienced over the past two years has combined to create an expanding funding gap between the fees collected and capital projects that can be constructed to support growth-related improvements. To mitigate this growing funding gap, staff has proposed revisiting the 2020 Development Impact Fee Study and adopting the study's recommended fees that were calculated to maximize the City's ability to recover the cost of new or enhanced infrastructure needed to support development growth in Greeley.

The proposed ordinance replaces the current development fees with those recommended in the 2020 Development Impact Fee Study, aged two years using the economic adjustment factor.

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
Is there grant funding for this item?	No
Additional Comments:	The proposed fee increase will result in an estimated additional $4.5 Million in annual development fee revenue on average over the next five years. The estimated average annual amount by type of facility is as follows: - Parks Development: $1,410,000 - Trails Development: $240,000 - Police Development: $110,000 - Fire Development: $60,000 - Transportation Development: $2,540,000 Storm Drainage Development: $140,000

Legal Issues:

Consideration of this matter is a legislative process which includes the following public hearing steps:

1) City staff presentation

2) Council questions of staff
3) Public input (hearing opened, testimony - up to three minutes per person, hearing closed)
4) Council discussion
5) Council decision

Other Issues and Considerations:

N/A

Strategic Focus Area:

Infrastructure and Mobility

Quality of Life

Safe and Secure Communities

Decision Options:

1) Adopt the ordinance as presented; or
2) Amend the ordinance and adopt as amended; or
3) Deny the ordinance; or
4) Continue consideration of the ordinance to a date certain.

Council's Recommended Action:

A motion to adopt the ordinance and publish with reference to title only.

Attachments:

Ordinance with Appendix A
PowerPoint Presentation

CITY OF GREELEY, COLORADO

ORDINANCE NO. 3, 2023

AN ORDINANCE OF THE CITY OF GREELEY AMENDING SECTIONS 6-998, 6-1000, 6- 1002 THROUGH 6-1009, 6-1013 AND 6-1015 OF THE CITY OF GREELEY CODE OF ORDINANCES

WHEREAS, in November 2020 a Development Impact Fee Study was prepared by Raftelis Financial Consultants, Inc. ("Raftelis Study"), setting forth a reasonable methodology and analysis for determining the impact of various types of development on the City's improvements, facilities, and equipment, and estimating the cost of improvements, facilities and equipment necessary to meet the demands created by new development; and

WHEREAS, the Greeley City Council decided not to adopt the Raftelis Study as documented in Resolution 6, 2021; and

WHEREAS, the protection of the health, safety, and general welfare of the citizens of the City requires that the City's improvements, facilities, and equipment accommodate continuing growth within the City, and that new development pays its equitable share of these new improvements, facilities, and equipment; and

WHEREAS, in addition to reviews done in 2020, the Raftelis Study has been reviewed in 2022 with interested community builders, developers, bankers, and real estate professionals; and

WHEREAS, the City of Greeley intends to amend the Greeley Municipal Code to incorporate recommended changes to development fees based on the Raftelis Study.

NOW, THEREFORE, BE IT HEREBY ORDAINED BY THE CITY COUNCIL OF THE CITY OF GREELEY, COLORADO:

Section 1. Sections 6-998, 6-1000, 6-1002 through 6-1009, 6-1013 and 6-1015 of the Greeley Municipal Code are hereby amended as shown on Appendix A attached hereto and incorporated herein by reference.

Section 2. This Ordinance shall become effective five (5) days following its final publication as provided by the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED ON THIS ___ DAY OF JANUARY, 2023.

ATTEST **THE CITY OF GREELEY, COLORADO**

_____ _____

City Clerk **Mayor John Gates**

Sec. 6-998. Legislative findings.

The city council finds that:

(1) The protection of the health, safety and general welfare of the citizens of the city requires that the city's improvements, facilities and equipment be expanded and improved to accommodate continuing growth within the city.

(2) New residential and nonresidential development imposes increasing demands upon existing city improvements, facilities and equipment and often overburdens those improvements, facilities and equipment.

(3) The tax revenues generated from new development do not generate sufficient funds to provide city facilities and equipment to serve the new development.

(4) New development is expected to continue and will place increasing demands on the city to provide services, facilities and equipment to serve new development.

(5) Development impact fees will enable the city to impose the proportionate share of the costs of required improvements, facilities and equipment on those new developments that create these new needs.

(6) All types of development that are not explicitly exempted from the provisions of this chapter will generate demand for improvements, facilities and equipment.

(7) The Development Impact Fee Study, prepared by ~~Duncan Associates~~ Raftelis, dated ~~December 2014~~ November 2020 (hereinafter referred to as the ~~Duncan~~ Raftelis Study), sets forth a reasonable methodology and analysis for determining the impact of various types of development on the city's improvements, facilities and equipment and for determining the cost of improvements, facilities and equipment necessary to meet the demands created by new development. The ~~Duncan~~ Raftelis Study provides the basis for the police, fire, parks, trails, storm drainage and transportation impact fees.

~~(8) The Development Fee Study prepared by Red Oak Consulting, dated May 2007 (hereinafter referred to as the Red Oak Study), sets forth a reasonable methodology and analysis for determining the impact of various types of development on the city's storm drainage facilities and for determining the cost of improvements, facilities and equipment necessary to meet the demands created by new development. The Red Oak Study provides the basis for the storm drainage fees.~~

(8) Due to the delay between completion of the Raftelis Study and adoption by the City Council, the fees adopted herein have been adjusted from those set forth in the Raftelis Study by application of the Economic Adjustment Factor.

(9) The development impact fees described in this chapter do not exceed the costs of providing additional improvements, facilities and equipment required to serve those new developments.

(10) The improvements, facilities and equipment will benefit new development in the city, and it is therefore appropriate to treat the entire city as a single service area for the purposes of calculating, collecting and spending the development fees.

(11) There is both a rational nexus and a rough proportionality between the development impacts created by each type of development covered by this chapter and the development impact fees that development will be required to pay.

(12) Except as described in section 6-1002(c) concerning optional independent fee calculation studies, the development fees created by this chapter are standardized fees to be applied uniformly within each specified class of development and are not discretionary fees to be determined on a case-by-case basis.

(13) The development fees paid in new developments shall be used to expand or improve the city's improvements, facilities and equipment in ways that benefit the development that paid each fee within a reasonable period of time after the fee is paid.

(14) The development fees created by this chapter shall not be used to cure deficiencies in existing improvements, facilities and equipment.

Sec. 6-1000. Intent.

(a) The intent of this chapter is to ensure that new development bears its proportionate share of the cost of improvements, facilities and equipment, that such proportionate share does not exceed the cost of the improvements, facilities and equipment required to serve such new development, and that funds collected from new developments are used to construct and pay for the improvements, facilities and equipment that benefit such new developments.

(b) It is the further intent of this chapter that new development pay its proportionate share of improvements, facilities and equipment through the imposition of police, fire, parks, trail, storm drainage and transportation development impact fees to finance, defray or reimburse all or a portion of the costs incurred by the city to construct the improvements, facilities and equipment that serve or benefit such new development.

(c) It is the intent of this chapter to collect from new development that amount of money necessary to offset new demand for improvements, facilities and equipment generated by the new development.

(d) It is the intent of this chapter that monies collected as development fees and deposited in separate accounts for each fee never be commingled with monies from any other development fee fund and never be used for a type of facility or equipment different from that for which the fee was paid.

(e) This chapter is adopted to ensure that the city will have sufficient improvements, facilities and equipment that are consistent with the improvements, facilities and equipment identified in the ~~Duncan~~ Raftelis Study, dated ~~December 2014~~

November 2020 ~~and the Red Oak Study, dated May 2007;~~ and such other plans, policies, regulations and ordinances that are relevant and that have been approved by the city council.

Sec. 6-1002. Computation of amount of development fee.

(a) An applicant required by this chapter to pay development impact fees may choose to have the amount of such fee determined pursuant to either subsection (b) or (c) of this section. Regardless of whether the applicant calculates the amount of the fee pursuant to subsection (b) or (c) of this section, such fee may be subject to the adjustment described in section 6-1013.

(b) Unless an applicant requests that the city determine the amount of such fee pursuant to subsection (c) of this section, the city shall determine the amount of the required development fees by reference to the fee schedule in this chapter.

(1) If the applicant's development is of a type not listed in the schedule, then the city shall use the fee applicable to the most nearly comparable type of land use in that schedule.

(2) If the applicant's development includes a mix of those uses listed in the fee schedules, then the fee shall be determined by adding up the fees that would be payable for each use if it was a freestanding use pursuant to the fee schedule.

(3) If the applicant is applying for a permit to allow a change of use, the expansion or modification of an existing nonresidential building by more than 1,000 square feet, or the redevelopment of an existing development, the fee shall be based on the net positive increase in the fee for the new use or structure as compared to the development fee, if any, that would have been due under this chapter for the previous use or structure, whether or not such fee was actually paid. In the event that the proposed change of use, expansion, redevelopment or modification results in a net decrease in the fee for the new use or development as compared to the previous use or development, there shall be no refund of development fees previously paid.

(c) An applicant may request that the city determine the amount of the required development fee by reference to an independent fee calculation study for the applicant's development prepared at the applicant's cost by qualified professionals, experts and/or economists and submitted to the city manager or his designee. Any such study shall be based on the same service standards, unit costs and criteria used in the ~~Duncan Study and/or the Red Oak~~ Raftelis Study, whichever is applicable, and must document the economic methodologies and assumptions used. The city may hire a qualified professional or consultant to review any independent fee calculation study on behalf of the city and may charge the costs of such review to the applicant. Any independent fee calculation study submitted by an applicant may be accepted, rejected or accepted with modifications by the city as the basis for calculating the development fees. If such study is accepted or accepted with modifications as a more accurate measure of the demand for new improvements facilities and equipment created by the applicant's proposed development than the applicable fee shown in the fee

schedules, then the applicable development fees due under this chapter may be calculated according to such study.

Sec. 6-1003. Automatic annual inflation adjustment.

(a) The development impact fees shall be recalculated by the city manager, or his designee, on an annual basis, to reflect cost inflation experienced in the previous year, and the revised fee shall be effective on March 1 of each year. The revised fees will be adopted via city manager policy and shall be made available to the public approximately 120 days, or as soon as practical thereafter, before the March 1 effective date.

(b) The fees will be recalculated by applying the economic adjustment factor. The economic adjustment factor shall be calculated ~~pursuant to the guidelines established in the economic adjustment factor~~ for all transportation, parks, fire, police, trails and storm drainage fees~~.~~ using six weighted data variables, considered to be representative of economic growth, the cost of materials and services associated with constructing capital projects, and general economic conditions. The variables are:

(1) Percent change in Greeley Utility Customer Accounts – representing the growth and scope of public services;
(2) Percent change in CDOT Construction Cost Index – representing the cost of providing transportation networks;
(3) Percent change in Engineering News Records Construction Cost Index – representing material costs associated with capital projects;
(4) Percent change in Engineering News Records Building Cost Index – representing labor costs associated with capital projects;
(5) Percent change in Assessed Value of Greeley Real Property – representing growth and the economic value of real property assets; and
(6) Percent change in Greeley MSA Employment – representing a general indicator of the economic health of the area.

(c) The economic adjustment factor method of revising all transportation, parks, fire, police, trails and storm drainage development impact fees will be in effect until such time as a new development fee study ~~is completed and adopted~~ recommends a change to the methodology.

Sec. 6-1004. Police development fee schedule.

The police development fee schedule has been calculated pursuant to the ~~Duncan~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows: ~~and is set forth as follows:~~

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-family detached~~	~~Dwelling~~	~~$117.00~~
~~Multifamily~~	~~Dwelling~~	~~$88.00~~
~~Mobile home park~~	~~Site~~	~~$123.00~~

~~Retail/commercial~~	~~1,000 sq. ft.~~	~~$143.00~~
~~Office~~	~~1,000 sq. ft.~~	~~$67.00~~
~~Industrial~~	~~1,000 sq. ft.~~	~~$27.00~~
~~Warehouse~~	~~1,000 sq. ft.~~	~~$13.00~~
~~Public/institutional~~	~~1,000 sq. ft.~~	~~$51.00~~
~~Oil and gas well~~	~~Wellhead~~	~~$58.00~~

Land Use Type	Unit	Fee
Residential	1,200 or less of heated living space[1]	$131
Residential	1,201 to 1500 of heated living space[1]	$231
Residential	1,501 to 1,800 of heated living space[1]	$263
Residential	1,801 or more of heated living space[1]	$280
Retail/Restaurant	1,000 Sq. Ft of Building	$841
Office & Other Services	1,000 Sq. Ft of Building	$452
Industrial	1,000 Sq. Ft of Building	$230

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1005. Fire development fee schedule.

The fire development fee schedule has been calculated pursuant to the ~~Duncan Study and is set forth as follows:~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-family detached~~	~~Dwelling~~	~~$524.00~~
~~Multifamily~~	~~Dwelling~~	~~$393.00~~
~~Mobile home park~~	~~Site~~	~~$550.00~~
~~Retail/commercial~~	~~1,000 sq. ft.~~	~~$641.00~~
~~Office~~	~~1,000 sq. ft.~~	~~$301.00~~
~~Industrial~~	~~1,000 sq. ft.~~	~~$119.00~~
~~Warehouse~~	~~1,000 sq. ft.~~	~~$57.00~~
~~Public/institutional~~	~~1,000 sq. ft.~~	~~$229.00~~
~~Oil and gas well~~	~~Wellhead~~	~~$261.00~~

Land Use Type	Unit	Fee
Residential	1,200 or less of heated living space[1]	$342
Residential	1,201 to 1500 of heated living space[1]	$602

Residential	1,501 to 1,800 of heated living space[1]	$683
Residential	1,801 or more of heated living space[1]	$728
Retail/Restaurant	1,000 Sq. Ft of Building	$1,872
Office & Other Services	1,000 Sq. Ft of Building	$1,006
Industrial	1,000 Sq. Ft of Building	$513

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1006. Park development fee schedule.

The park development impact fee schedule has been calculated pursuant to the ~~Duncan Study and is set forth as follows:~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-Family Detached~~	~~Dwelling~~	~~$2,721.00~~
~~Multifamily~~	~~Dwelling~~	~~$2,041.00~~
~~Mobile Home Park~~	~~Site~~	~~$2,857.00~~

Land Use Type	Unit	Fee
Residential	1,200 or less of heated living space[1]	$2,543
Residential	1,201 to 1500 of heated living space[1]	$4,469
Residential	1,501 to 1,800 of heated living space[1]	$5,067
Residential	1,801 or more of heated living space[1]	$5,403

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1007. Trails development fee schedule.

The trails development fee schedule has been calculated pursuant to the ~~Duncan Study and is set forth as follows:~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-family detached~~	~~Dwelling~~	~~$377.00~~
~~Multifamily~~	~~Dwelling~~	~~$283.00~~
~~Mobile home park~~	~~Site~~	~~$396.00~~

Land Use Type	Unit	Fee

Residential	1,200 or less of heated living space[1]	$382
Residential	1,201 to 1500 of heated living space[1]	$671
Residential	1,501 to 1,800 of heated living space[1]	$759
Residential	1,801 or more of heated living space[1]	$810

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1008. Storm drainage development fee schedule.

The storm drainage development fee schedule has been calculated pursuant to the Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows: ~~The 2007 phased-in base level storm drainage development fee schedule has been calculated pursuant to the Red Oak Study and has been adjusted pursuant to an economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:~~

	~~Fee~~
~~Single-family residential, per dwelling unit~~	~~$341.00~~
~~Multifamily residential, per dwelling unit~~	~~$245.00~~
~~Retail, per site square foot of impervious surface[1]~~	~~$0.094~~
~~Commercial, per site square foot of impervious surface[2]~~	~~$0.094~~
~~Industrial, per site square foot of impervious surface[3]~~	~~$0.094~~
~~Oil and gas~~	~~$188.00~~

~~[1] Shall not exceed 70 percent of the impervious surface.~~

~~[2] Shall not exceed 70 percent of the impervious surface.~~

~~[3] Shall not exceed 76 percent of the impervious surface.~~

Unit	Fee
Per site square foot of impervious surface	$0.264

Sec. 6-1009. Transportation development fee schedule.

The transportation development impact fee schedule has been calculated pursuant to the ~~Duncan Study and is set forth as follows:~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-family detached~~	~~Dwelling~~	~~$3,645.00~~
~~Multifamily~~	~~Dwelling~~	~~$2,353.00~~
~~Mobile home park~~	~~Site~~	~~$1,092.00~~
~~Retail/commercial~~	~~1,000 sq. ft.~~	~~$4,825.00~~
~~Office~~	~~1,000 sq. ft.~~	~~$4,266.00~~

~~Industrial~~	~~1,000 sq. ft.~~	~~$1,476.00~~
~~Warehouse~~	~~1,000 sq. ft.~~	~~$1,376.00~~
~~Public/institutional~~	~~1,000 sq. ft.~~	~~$2,390.00~~
~~Oil and gas well~~	~~Wellhead~~	~~$1,680.00~~

Land Use Type	Unit	Fee
Residential	1,200 or less of heated living space[1]	$3,192
Residential	1,201 to 1500 of heated living space[1]	$5,895
Residential	1,501 to 1,800 of heated living space[1]	$6,751
Residential	1,801 or more of heated living space[1]	$7,213
Retail/Restaurant	1,000 Sq. Ft of Building	$8,347
Office & Other Services	1,000 Sq. Ft of Building	$5,383
Industrial	1,000 Sq. Ft of Building	$2,742

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1013. Credits against development fees.

(a) After the effective date of the ordinance from which this chapter is derived, all land dedications and property improvements over and above those required by the city for a proposed development may be granted a credit against the applicable development fee imposed for such land dedication or property improvement uses that would otherwise be due for such development. However, no credit shall be awarded for:

(1) Any land dedication for acquisition or construction of site-related improvements;

(2) Any land dedications not accepted by the city;

(3) Any acquisition or construction of property improvements not approved in writing by the city prior to commencement of the acquisition or construction; or

(4) Any land dedication, construction or acquisition of property improvements not included in the calculation of the applicable development fee pursuant to the ~~Duncan Study or the Red Oak Study, whichever is applicable~~ Raftelis Study.

(b) In order to obtain a credit against development fees otherwise due, an applicant must submit a written offer to dedicate to the city specific parcels of land over and above those regularly required by the city or to acquire or construct specific improvements in accordance with all applicable state or city design and construction standards, and must specifically request a credit against the applicable identified development fee. Such written request must be made on a form provided by the city, must contain a statement under oath of the facts that

qualify the applicant to receive a credit, must be accompanied by documents evidencing those facts and must be filed not later than the time when an applicant applies for the first building permit that includes the obligation to pay the development fee against which the credit is requested. Failure by the applicant to follow the above procedures waives the claim for credit.

(c) The credit due to an applicant shall be calculated and documented as follows:

(1) Credit for qualifying land dedications shall, at the applicant's option, be valued at:

a. One hundred percent of the most recent estimated actual value for such land as shown in the records of the county assessor; or

b. That fair market value established by an MAI or Colorado Certified General Real Estate Appraiser acceptable to the city in an appraisal paid for by the applicant.

(2) In order to receive credit for qualifying acquisition or construction of improvements, the applicant shall submit completed engineering drawings, specifications and construction cost estimates to the city. The city shall determine the amount of credit due based on the information submitted or, if it determines that such information is inaccurate or unreliable, then on alternative engineering or construction costs acceptable to the city.

(d) Approved credits shall become effective at the following times:

(1) Approved credits for land dedications shall become effective when the land has been conveyed to the city in a form acceptable to the city at no cost to the city and accepted by the city. When such conditions have been met, the city shall note that fact in its records. Upon written request from the applicant, the city shall issue a letter stating the amount of credit available.

(2) Approved credits for the acquisition or construction of property improvements shall become effective when:

a. All required construction has been completed and has been accepted by the city;

b. A suitable maintenance and warranty bond has been received and approved by the city; and

c. All design, construction, inspection, testing, bonding and acceptance procedures have been completed in compliance with all applicable city and state procedures. However, approved credits for the construction of property improvements may become effective at an earlier date if the applicant posts security in the form of a performance bond, irrevocable letter of credit or escrow agreement and the amount and terms of such security are accepted by the city. At a minimum, such security must be in the amount of 125 percent of the approved credit, or 125 percent of the amount determined to be adequate by the city manager or designee, to allow the city to construct the property improvements for which the credit was given, whichever is higher. When such conditions have been met, the

city shall note that fact in its records. Upon request of the applicant, the city shall issue a letter stating the amount of credit available.

(e) Approved credits may be used to reduce the amount of the applicable development fees due from that specific proposed development until the amount of the credit is exhausted. Each time a request to use approved credits is presented to the city, the city shall reduce the amount of the applicable development fee otherwise due from the applicant, and shall note in the city records the amount of credit remaining, if any. Upon written request from the applicant, the city shall issue a letter stating the number of credits available.

(f) Approved credits shall only be used to reduce the amount of development impact fees otherwise due under this chapter, and shall not be paid to the applicant in cash or in credits against any other monies due from the applicant to the city.

Sec. 6-1015. Separate account for each fee.

All development fees collected shall be deposited into a separate account identifying each fee account, in the city's Development Infrastructure Fund, which shall be a special fund created in accordance with section 5-6 of the city Charter. The city council shall have authority to make continuing appropriations from the accounts, and appropriations and expenditures from the accounts shall be made for the purpose of paying revenue bonds of the city and (subject to any contractual restrictions entered into by the city in connection with such revenue bonds) for the purpose of paying for improvements, facilities and equipment of the types identified in the ~~Duncan Study or the Red Oak~~ Raftelis Study.

Development Impact Fees

City Council Meeting January 17, 2023

Second Reading and Public Hearing

Development Fee Study Overview

- Development fees
  - can only be used toward new or expanded facilities.
  - can be no greater than necessary to defray the impacts of new development.
  - Greeley's current fees are based on a 2014 Study.
  - methodology must be reviewed every five years (per Greeley Municipal Code).
- The City contracted with an external consulting firm to update the fee methodology in 2020.
  - Council accepted the study but did not implement the recommended fee structure.
  - The next regularly scheduled fee update is in 2025.
- Given the significant growth Greeley is experiencing, staff proposed revisiting the 2020 study's recommended fees to ensure the City can support growth-related capital needs into the future.

Background on Discussions to Date

Meeting Date	Focus of Discussion	Council Feedback
October 27, 2020	Staff and the study consultant gave a presentation focused on impact fee fundamentals, fee proposal detail and funding alternatives. There were two prior Council Worksessions in April and August 2020.	Given uncertainty, Council accepted the study with tiered fee proposal but did not adopt recommended fee changes.
September 13th, 2022	Given significant growth and post COVID environment, staff presented funding gap impact and requested reconsideration of 2020 Fee Study.	Council requested clarity on how funds would be used if 2020 study proposed fees were adopted.
November 15th, 2022	Staff presented detail on proposed fee adjustments and detail on which projects additional fee revenue fund.	Council requested more time to consider the proposal and additional detail on the Fee Study methodology.
December 13th, 2022	Staff presented detail on the 2020 Impact Fee Study methodology and options for Council to consider to move forward.	Council consensus was to bring forward a new fee Ordinance for consideration in January 2023.
January 3rd, 2023	First Reading of new fee Ordinance	Consent Agenda Approval
January 17th, 2023	Second Reading with summary presentation of the proposed impact fee changes	Pending vote

The Why Behind Adopting New Fees

Greeley Qualify of Life Targets:

- All residents
  - within ½ mile of a neighborhood park
  - within 1 mile of a community park
  - within a 10-min walk to trails and open space
- Maintain fire and police response times
- Maintain existing transportation network service levels

Fiscal and Equity Considerations

- Eliminate funding subsidies from sources otherwise dedicated to maintenance of existing infrastructure
- Reduce the burden on utility ratepayers and/or debt levels needed to take on for capital investments

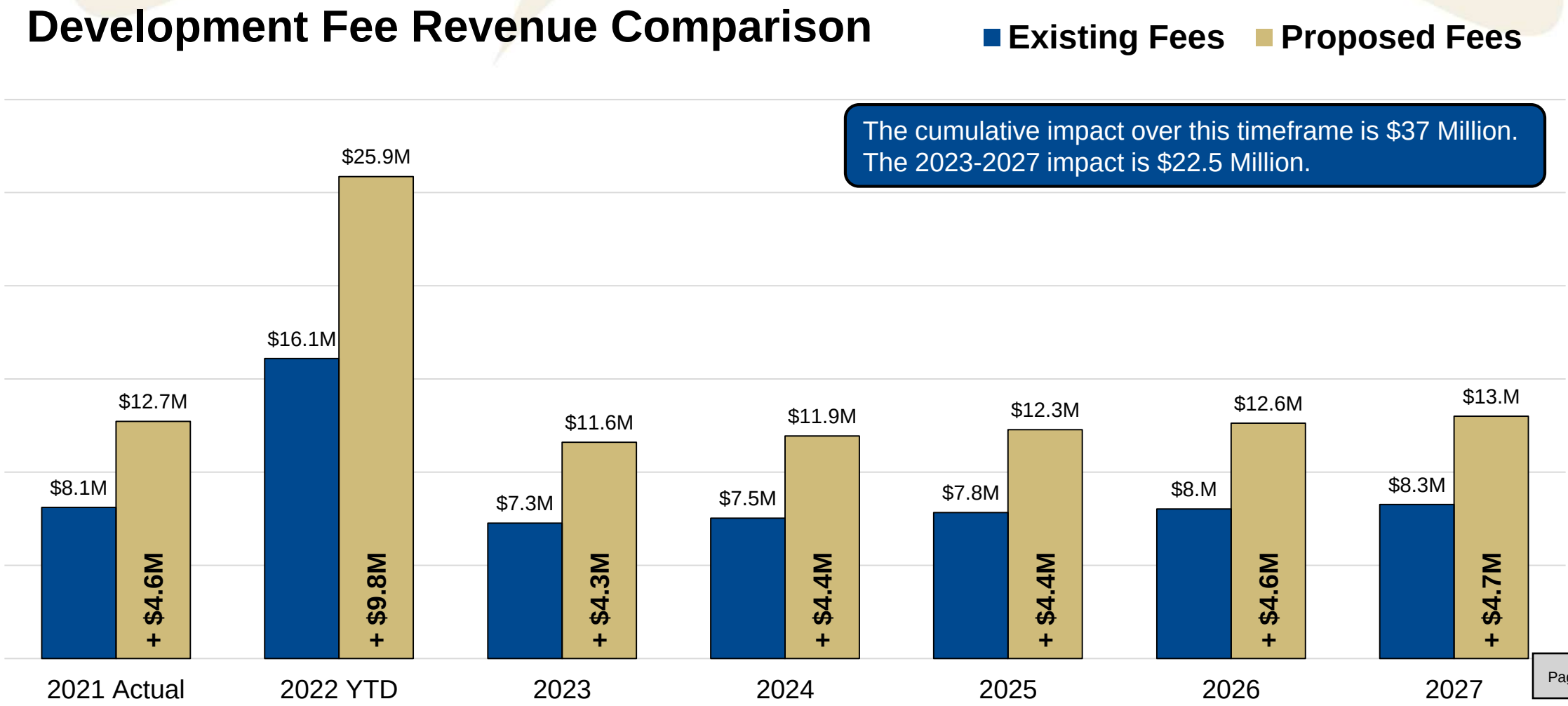
Path 2A:

Less than Recommended Fees w/ Service Reduction

Path 2B:

Less than Recommended Fees w/ Subsidies

A Growing Funding Gap



How Additional Fees Will be Spent

	Facility Type	Estimated 5 Year Impact of Increased Fees	Project Planned with Additional Revenue/Future Needs
	Parks	+ $7 Million	✓ Sanborn Dog Park, ✓ Two land purchases for park expansion, and ✓ Funding for 50% of the Hazelton Park expansion project
	Trails	+ $1.2 Million	✓ Complete Sheep Draw Trail connection to Poudre River
	Transportation	+ $12.7 Million	✓ Eliminate the $2.5M annual transfer from KGM to Road Development. Will result in 10.6 miles of pavement rehab and additional concrete work each year.
	Stormwater	+ $720 Thousand	✓ Reduce the amount needed for future stormwater bonding
	Police	+ $571 Thousand	✓ Reduce the amount needed for bonding of new police facility
	Fire	+ $287 Thousand	✓ Reduce the amount needed for bonding of new fire st

Greeley's Proposed Fee Structure Changes

Residential Tiers vs Flat Fee

- Why did the 2020 Study recommend residential tiers?
  - Equitable fee structure (lower cost for smaller units, higher cost for larger units)
  - Proportionate assessment of infrastructure demand based on size of development
- How were the tiers developed?
  - Greeley-specific analysis of persons per household, number of bedrooms and new residential building permits
  - Persons by square feet of living space plotted to determine four size thresholds
- What other fee structures exist?
  - Flat and tiered are the most common residential structures (of our peer group Fort Collins and Berthoud also utilize a tiered structure). Other structures include a bedroom/bathroom count or rely on some other project-specific metric.

Reduction in Nonresidential Categories

Reduction of nonresidential categories (from six to three in this case) follows best management practice across peer municipalities and supports a simplified structure by grouping like development categories together.

Stormwater by Impervious Area vs Flat Fee

Assessing storm fees by impervious area (as most other municipalities do) provides an incentive to future development to mitigate impacts to the storm drainage system through minimizing impervious area.

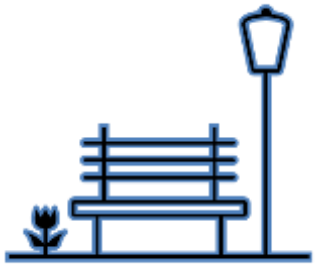
The Why Behind Adopting New Fees – Considerations

Fiscal Constraints

- Many development impacted projects are not optional.
- Funding requirements come at cost to other City priorities/goals.

Equity Considerations

- Subsidies come at the expense of existing tax-payers and rate payers to support the impact of new development.
- Equitable Development fees reduce the burden on utility ratepayers for projects and/or required debt levels.



Maintain Existing Service Levels

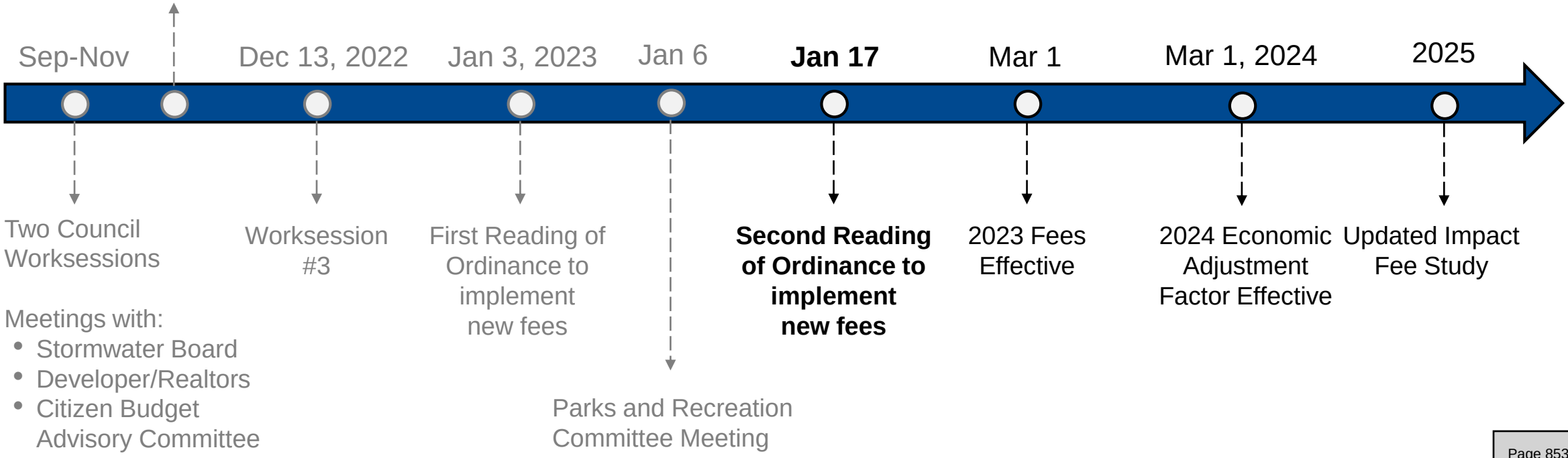
- Maintain fire and police response times
- Every resident is within ½ mile of a neighborhood park
- Every resident is within 1 mile of a community park
- Every resident is within a 10-minute walk to trails and open space

Planning for Greeley's Future

- One-time revenues
- No opportunity to recapture in future
- Development Fee projects are critical to ensuring Greeley remains competitive and for maintaining quality of life for citizens

Implementation Timeline

If Council adopts the updated development impact fee structure, the timeline is as follows:



Applies 2023 economic adjustment factor of 5.99%

Appendix

The Proposed Impact Fee Structure

	Current Fee Structure		Proposed Fee Structure		Description of Change
Residential	Single Family	Dwelling	Tier 1 - 1,200 or less of heated living space		The flat residential fee structure is replaced by four tiers. All single family, multi-family and mobile homes will be assessed based on square footage.
	Multi-Family	Dwelling	Tier 2 - 1,201 to 1500 of heated living space		
	Mobile Home Park	Site	Tier 3 - 1,501 to 1,800 of heated living space		
			Tier 4 - 1,801 or more of heated living space		
Nonresidential	Retail/Commercial	1,000 sqft	Retail/Restaurant	1,000 sqft	No change to retail fee structure
	Office	1,000 sqft	Office & Other	1,000 sqft	Now includes category “other”
	Industrial	1,000 sqft	Industrial	1,000 sqft	No change to industrial fee structure
	Warehouse	1,000 sqft			Warehouse will fall under industrial
	Public/Institutional	1,000 sqft			Institutional will fall under other
	Oil and Gas Well	Well Head			Oil & Gas will fall under industrial
Storm	Residential	Flat	Fee assessed per impervious sqft		Flat fee replaced by fee per sqft
	Nonresidential	Impervious sqft	Fee assessed per impervious sqft		No change to non-res storm fee structure

Proposed Fee Structure Detail

Existing 2023 Fees

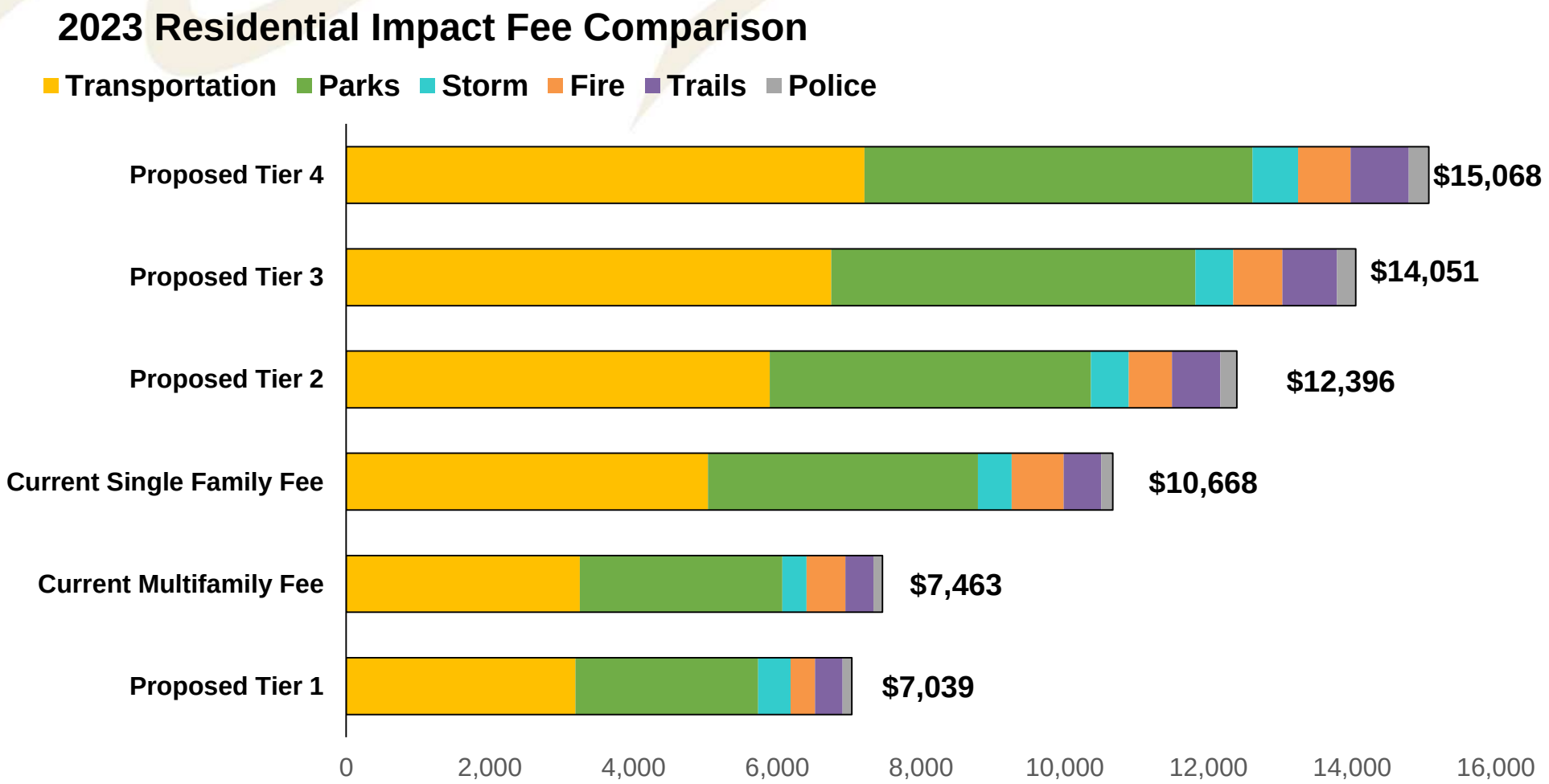
	Parks	Trails	Police	Fire	Transportation	Storm	
Single Family	3,757	521	161	724	5,033	471	**$10,668 / unit**
Multifamily	2,819	391	123	542	3,250	338	**$7,463 / unit**
Industrial	0	0	38	163	2,039	0.130	**$2,240 /1k building sf + storm**
Retail/Commercial	0	0	198	886	6,663	0.130	**$7,747 /1k building sf + storm**
Office	0	0	93	415	5,892	0.130	**$6,400 /1k building sf + storm**

Proposed 2023 Fees

	Parks	Trails	Police	Fire	Transportation	Storm*	
Residential Tier 1 (1,200 or less)	2,543	382	131	342	3,192	449	**$7,039 / unit**
Residential Tier 2 (1,201 to 1500)	4,469	671	231	602	5,895	528	**$12,396 /unit**
Residential Tier 3 (1,501 to 1,800)	5,067	759	263	683	6,751	528	**$14,051 /unit**
Residential Tier 4 (1,801 or more)	5,403	810	280	728	7,213	634	**$15,068 /unit**
Industrial	0	0	230	513	2,742	0.264	**$3,485 /1k building sf + storm**
Retail/Restaurant	0	0	841	1,872	8,347	0.264	**$11,060 /1k building sf + storm**
Office & Other Services	0	0	452	1,006	5,383	0.264	**$6,841 /1k building sf + storm**

* Stormwater fees will be assessed $0.264 per impervious square foot. For comparison purposes, an average impervious sf total was assigned to each residential tier based on an analysis of recent development figures used are as follows: Tier 1 - 1,700 sf / Tiers 2&3 - 2,000 sf / Tier 4 - 2,400 sf

Fee Comparison Residential



Tier Key
Tier 1 (1,200 or less)
Tier 2 (1,201 to 1500)
Tier 3 (1,501 to 1,800)
Tier 4 (1,801 or more)

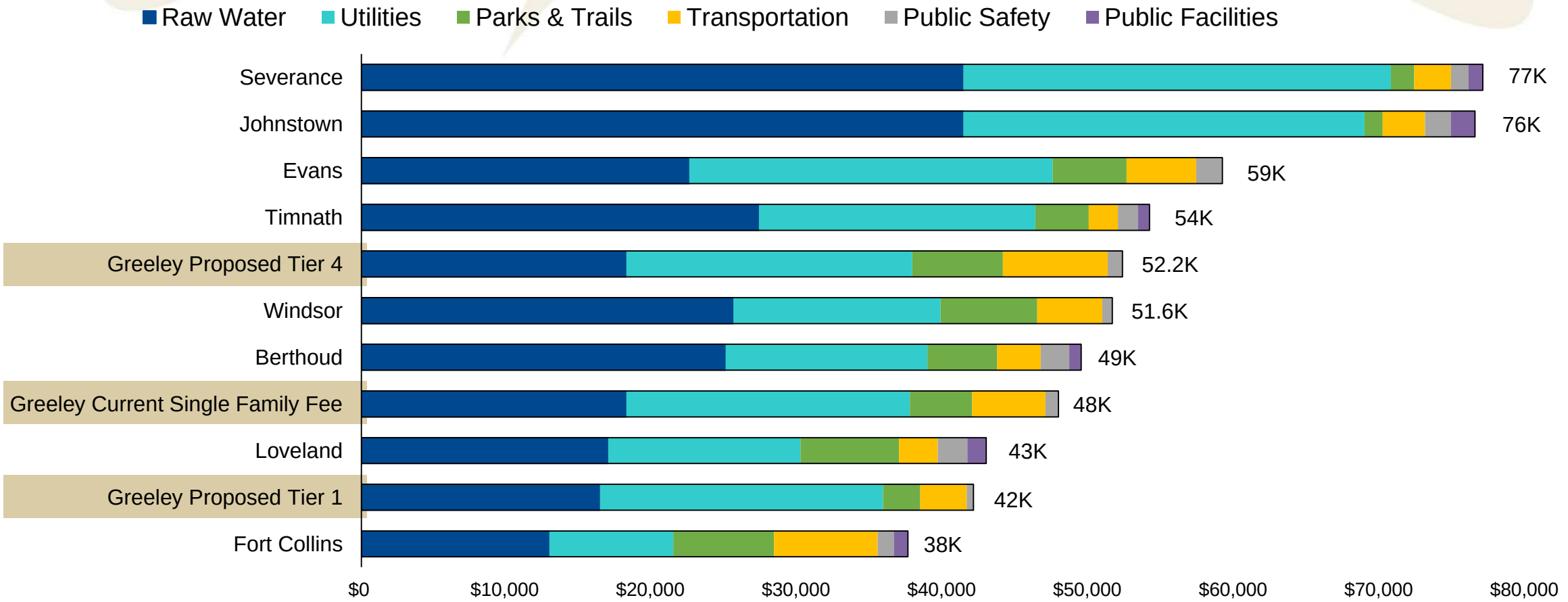
Tiers are based on square footage of heated living space (excludes garages, outdoor patios/porches/ balconies and unfinished basements)

Current fees represent 2023 inflated figures

Fee Comparison Residential

Data Source: Aug 2022 review of municipality's published fees.
Single family example: 6,000 sf lot, 2,000 sf living space

Single Family Residential Impact Fee Comparison

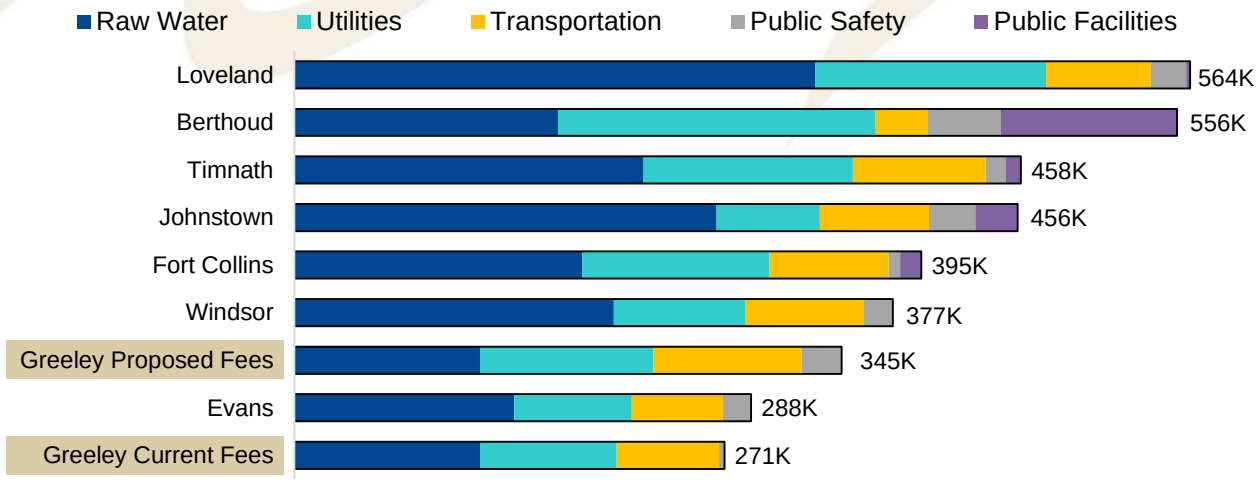


Note: Total fees represented here do not include other development-imposed costs such as application fees which vary widely between municipalities, the requi
by some municipalities to construct off-site improvements in addition to paying development fees and the timing of raw water dedication.

Fee Comparison Non-Residential

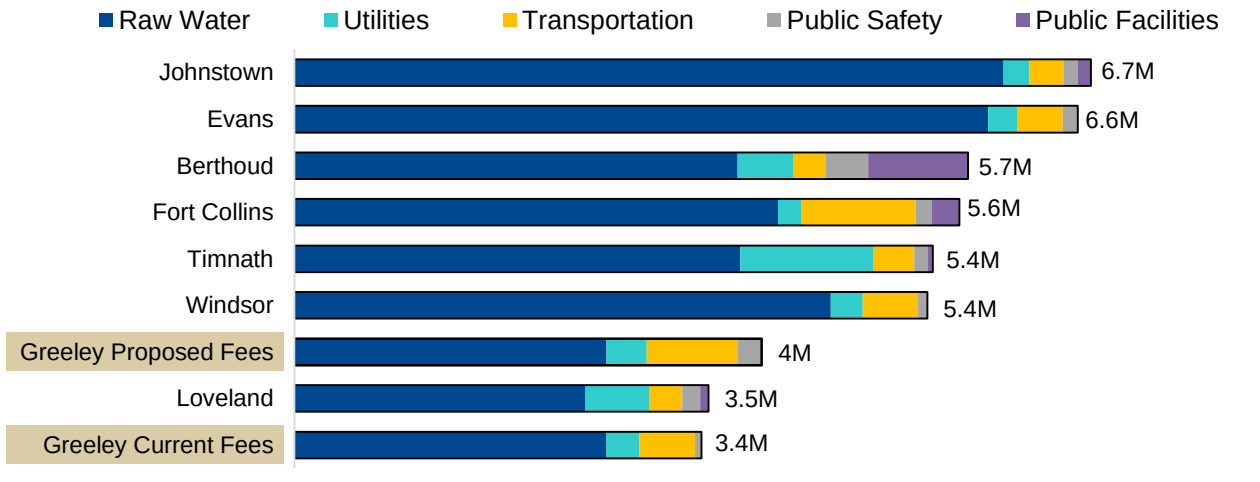
Sample Development: Warehouse

Example Project: Industrial Flex Property 34,000 sqft



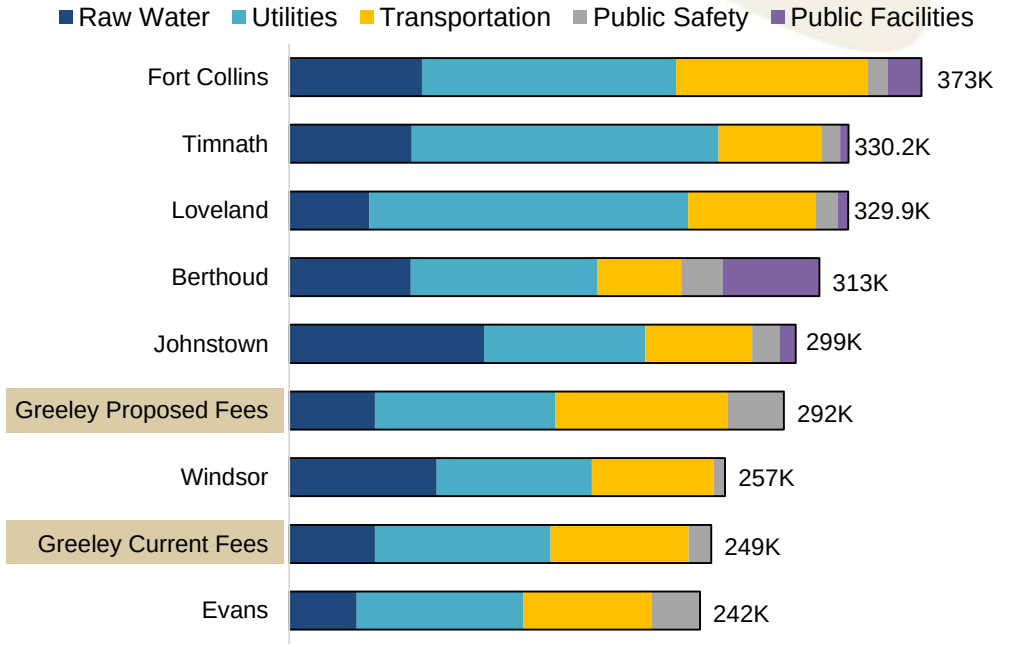
Sample Development: Institutional

Example Project: K-8 School Campus, 142,000 sqft



Sample Development: Commercial

Example Project: Core & Shell Commercial 12,000 sqft



FOR ILLUSTRATION PURPOSES ONLY
Source: Nov 2022 review of municipality's published fees.
Includes Fire, Police, Public Facilities, Transportation, Water, Sewer and Storm.
Parks and Trails fees are not charged to nonresidential development.

Notes and Assumptions

Revenue Projections:

- The Budget Division's methodology for projecting fee revenue was followed which bases future years on community development's annual growth and development report's residential unit projections plus 20% as a placeholder for nonresidential growth. A conservative 1% inflation factor is applied to fees each year.

- To project future revenue in the proposed tiered fee structure, future multi-family and single-family development were assigned to Tiers 2 and 4 respectively. The full range of possible 5-year revenue for each facility type is shown below. This represents the total amount collected if all development were to come in at Tier 1 vs. all development at Tier 4:
  - Parks: $10.5M - $22.4M
  - Trails: $1.6M - $3.3M
  - Transportation: $15.8M - $35.8M
  - Stormwater: $2.2M - $3.1M
  - Police: $647K - $1.4M
  - Fire: $1.7M - $3.6M

- Stormwater fees will be applied per impervious square foot. For comparison purposes, an average impervious sf total was assigned to each residential tier based on an analysis of recent development. The figures used are as follows: Tier 1 - 1,700 sf / Tiers 2&3 - 2,000 sf / Tier 4 - 2,400 sf

Phased Fee Adjustments

If Council phases the fee adjustments over two years, the adjustments would be structured in a manner where half the proposed changes will be applied in 2023 and the remainder in 2024. In this case the following criteria will apply:

- Any fee decreases will not be phased, they will be fully implemented in 2023
- Phased fee increases for residential tiers will be calculated using single family as a baseline
- The phased increase for the stormwater fee will be calculated using nonresidential as a baseline

Phased Fee Adjustment Examples

Fee Category	Total Increase	2022 Fee	2023 Fee	2024 Fee*
Example	+ $100	$50	$100 (+$50)	$150 (+$50)
Police - Tier 2 Residential	+ $79	$152	$192 (+$40)	$231 (+$39)
Transportation - Industrial	+$818	$1,924	$2,333 (+$409)	$2,742 (+$409)
Fire - Office & Other Services	+$614	$392	$699 (+$307)	$1,006 (+$307)

*Subject to 2024 economic adjustment factor

CITY OF GREELEY, COLORADO

ORDINANCE NO. 3, 2023

AN ORDINANCE OF THE CITY OF GREELEY AMENDING SECTIONS 6-998, 6-1000, 6- 1002 THROUGH 6-1009, 6-1013 AND 6-1015 OF THE CITY OF GREELEY CODE OF ORDINANCES

WHEREAS, in November 2020 a Development Impact Fee Study was prepared by Raftelis Financial Consultants, Inc. ("Raftelis Study"), setting forth a reasonable methodology and analysis for determining the impact of various types of development on the City's improvements, facilities, and equipment, and estimating the cost of improvements, facilities and equipment necessary to meet the demands created by new development; and

WHEREAS, the Greeley City Council decided not to adopt the Raftelis Study as documented in Resolution 6, 2021; and

WHEREAS, the protection of the health, safety, and general welfare of the citizens of the City requires that the City's improvements, facilities, and equipment accommodate continuing growth within the City, and that new development pays its equitable share of these new improvements, facilities, and equipment; and

WHEREAS, in addition to reviews done in 2020, the Raftelis Study has been reviewed in 2022 with interested community builders, developers, bankers, and real estate professionals; and

WHEREAS, the City of Greeley intends to amend the Greeley Municipal Code to incorporate recommended changes to development fees based on the Raftelis Study.

NOW, THEREFORE, BE IT HEREBY ORDAINED BY THE CITY COUNCIL OF THE CITY OF GREELEY, COLORADO:

Section 1. Sections 6-998, 6-1000, 6-1002 through 6-1009, 6-1013 and 6-1015 of the Greeley Municipal Code are hereby amended as shown on Appendix A attached hereto and incorporated herein by reference.

Section 2. This Ordinance shall become effective five (5) days following its final publication as provided by the Greeley City Charter.

PASSED AND ADOPTED, SIGNED AND APPROVED ON THIS 17th DAY OF JANUARY, 2023.

ATTEST

City Clerk

THE CITY OF GREELEY, COLORADO

Mayor John Gates

Sec. 6-998. Legislative findings.

The city council finds that:

(1) The protection of the health, safety and general welfare of the citizens of the city requires that the city's improvements, facilities and equipment be expanded and improved to accommodate continuing growth within the city.

(2) New residential and nonresidential development imposes increasing demands upon existing city improvements, facilities and equipment and often overburdens those improvements, facilities and equipment.

(3) The tax revenues generated from new development do not generate sufficient funds to provide city facilities and equipment to serve the new development.

(4) New development is expected to continue and will place increasing demands on the city to provide services, facilities and equipment to serve new development.

(5) Development impact fees will enable the city to impose the proportionate share of the costs of required improvements, facilities and equipment on those new developments that create these new needs.

(6) All types of development that are not explicitly exempted from the provisions of this chapter will generate demand for improvements, facilities and equipment.

(7) The Development Impact Fee Study, prepared by ~~Duncan Associates~~ Raftelis, dated ~~December 2014~~ November 2020 (hereinafter referred to as the ~~Duncan~~ Raftelis Study), sets forth a reasonable methodology and analysis for determining the impact of various types of development on the city's improvements, facilities and equipment and for determining the cost of improvements, facilities and equipment necessary to meet the demands created by new development. The ~~Duncan~~ Raftelis Study provides the basis for the police, fire, parks, trails, storm drainage and transportation impact fees.

~~(8) The Development Fee Study prepared by Red Oak Consulting, dated May 2007 (hereinafter referred to as the Red Oak Study), sets forth a reasonable methodology and analysis for determining the impact of various types of development on the city's storm drainage facilities and for determining the cost of improvements, facilities and equipment necessary to meet the demands created by new development. The Red Oak Study provides the basis for the storm drainage fees.~~

(8) Due to the delay between completion of the Raftelis Study and adoption by the City Council, the fees adopted herein have been adjusted from those set forth in the Raftelis Study by application of the Economic Adjustment Factor.

(9) The development impact fees described in this chapter do not exceed the costs of providing additional improvements, facilities and equipment required to serve those new developments.

(10) The improvements, facilities and equipment will benefit new development in the city, and it is therefore appropriate to treat the entire city as a single service area for the purposes of calculating, collecting and spending the development fees.

(11) There is both a rational nexus and a rough proportionality between the development impacts created by each type of development covered by this chapter and the development impact fees that development will be required to pay.

(12) Except as described in section 6-1002(c) concerning optional independent fee calculation studies, the development fees created by this chapter are standardized fees to be applied uniformly within each specified class of development and are not discretionary fees to be determined on a case-by-case basis.

(13) The development fees paid in new developments shall be used to expand or improve the city's improvements, facilities and equipment in ways that benefit the development that paid each fee within a reasonable period of time after the fee is paid.

(14) The development fees created by this chapter shall not be used to cure deficiencies in existing improvements, facilities and equipment.

Sec. 6-1000. Intent.

(a) The intent of this chapter is to ensure that new development bears its proportionate share of the cost of improvements, facilities and equipment, that such proportionate share does not exceed the cost of the improvements, facilities and equipment required to serve such new development, and that funds collected from new developments are used to construct and pay for the improvements, facilities and equipment that benefit such new developments.

(b) It is the further intent of this chapter that new development pay its proportionate share of improvements, facilities and equipment through the imposition of police, fire, parks, trail, storm drainage and transportation development impact fees to finance, defray or reimburse all or a portion of the costs incurred by the city to construct the improvements, facilities and equipment that serve or benefit such new development.

(c) It is the intent of this chapter to collect from new development that amount of money necessary to offset new demand for improvements, facilities and equipment generated by the new development.

(d) It is the intent of this chapter that monies collected as development fees and deposited in separate accounts for each fee never be commingled with monies from any other development fee fund and never be used for a type of facility or equipment different from that for which the fee was paid.

(e) This chapter is adopted to ensure that the city will have sufficient improvements, facilities and equipment that are consistent with the improvements, facilities and equipment identified in the ~~Duncan~~ Raftelis Study, dated ~~December 2014~~

November 2020 ~~and the Red Oak Study, dated May 2007;~~ and such other plans, policies, regulations and ordinances that are relevant and that have been approved by the city council.

Sec. 6-1002. Computation of amount of development fee.

(a) An applicant required by this chapter to pay development impact fees may choose to have the amount of such fee determined pursuant to either subsection (b) or (c) of this section. Regardless of whether the applicant calculates the amount of the fee pursuant to subsection (b) or (c) of this section, such fee may be subject to the adjustment described in section 6-1013.

(b) Unless an applicant requests that the city determine the amount of such fee pursuant to subsection (c) of this section, the city shall determine the amount of the required development fees by reference to the fee schedule in this chapter.

(1) If the applicant's development is of a type not listed in the schedule, then the city shall use the fee applicable to the most nearly comparable type of land use in that schedule.

(2) If the applicant's development includes a mix of those uses listed in the fee schedules, then the fee shall be determined by adding up the fees that would be payable for each use if it was a freestanding use pursuant to the fee schedule.

(3) If the applicant is applying for a permit to allow a change of use, the expansion or modification of an existing nonresidential building by more than 1,000 square feet, or the redevelopment of an existing development, the fee shall be based on the net positive increase in the fee for the new use or structure as compared to the development fee, if any, that would have been due under this chapter for the previous use or structure, whether or not such fee was actually paid. In the event that the proposed change of use, expansion, redevelopment or modification results in a net decrease in the fee for the new use or development as compared to the previous use or development, there shall be no refund of development fees previously paid.

(c) An applicant may request that the city determine the amount of the required development fee by reference to an independent fee calculation study for the applicant's development prepared at the applicant's cost by qualified professionals, experts and/or economists and submitted to the city manager or his designee. Any such study shall be based on the same service standards, unit costs and criteria used in the ~~Duncan Study and/or the Red Oak~~ Raftelis Study, whichever is applicable, and must document the economic methodologies and assumptions used. The city may hire a qualified professional or consultant to review any independent fee calculation study on behalf of the city and may charge the costs of such review to the applicant. Any independent fee calculation study submitted by an applicant may be accepted, rejected or accepted with modifications by the city as the basis for calculating the development fees. If such study is accepted or accepted with modifications as a more accurate measure of the demand for new improvements facilities and equipment created by the applicant's proposed development than the applicable fee shown in the fee

schedules, then the applicable development fees due under this chapter may be calculated according to such study.

Sec. 6-1003. Automatic annual inflation adjustment.

(a) The development impact fees shall be recalculated by the city manager, or his designee, on an annual basis, to reflect cost inflation experienced in the previous year, and the revised fee shall be effective on March 1 of each year. The revised fees will be adopted via city manager policy and shall be made available to the public approximately 120 days, or as soon as practical thereafter, before the March 1 effective date.

(b) The fees will be recalculated by applying the economic adjustment factor. The economic adjustment factor shall be calculated ~~pursuant to the guidelines established in the economic adjustment factor~~ for all transportation, parks, fire, police, trails and storm drainage fees~~.~~ using six weighted data variables, considered to be representative of economic growth, the cost of materials and services associated with constructing capital projects, and general economic conditions. The variables are:

(1) Percent change in Greeley Utility Customer Accounts – representing the growth and scope of public services;
(2) Percent change in CDOT Construction Cost Index – representing the cost of providing transportation networks;
(3) Percent change in Engineering News Records Construction Cost Index – representing material costs associated with capital projects;
(4) Percent change in Engineering News Records Building Cost Index – representing labor costs associated with capital projects;
(5) Percent change in Assessed Value of Greeley Real Property – representing growth and the economic value of real property assets; and
(6) Percent change in Greeley MSA Employment – representing a general indicator of the economic health of the area.

(c) The economic adjustment factor method of revising all transportation, parks, fire, police, trails and storm drainage development impact fees will be in effect until such time as a new development fee study ~~is completed and adopted~~ recommends a change to the methodology.

Sec. 6-1004. Police development fee schedule.

The police development fee schedule has been calculated pursuant to the ~~Duncan~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows: ~~and is set forth as follows:~~

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-family detached~~	~~Dwelling~~	~~$117.00~~
~~Multifamily~~	~~Dwelling~~	~~$88.00~~
~~Mobile home park~~	~~Site~~	~~$123.00~~

~~Retail/commercial~~	~~1,000 sq. ft.~~	~~$143.00~~
~~Office~~	~~1,000 sq. ft.~~	~~$67.00~~
~~Industrial~~	~~1,000 sq. ft.~~	~~$27.00~~
~~Warehouse~~	~~1,000 sq. ft.~~	~~$13.00~~
~~Public/institutional~~	~~1,000 sq. ft.~~	~~$51.00~~
~~Oil and gas well~~	~~Wellhead~~	~~$58.00~~

Land Use Type	Unit	Fee
Residential	1,200 or less of heated living space[1]	$131
Residential	1,201 to 1500 of heated living space[1]	$231
Residential	1,501 to 1,800 of heated living space[1]	$263
Residential	1,801 or more of heated living space[1]	$280
Retail/Restaurant	1,000 Sq. Ft of Building	$841
Office & Other Services	1,000 Sq. Ft of Building	$452
Industrial	1,000 Sq. Ft of Building	$230

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1005. Fire development fee schedule.

The fire development fee schedule has been calculated pursuant to the ~~Duncan Study and is set forth as follows:~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-family detached~~	~~Dwelling~~	~~$524.00~~
~~Multifamily~~	~~Dwelling~~	~~$393.00~~
~~Mobile home park~~	~~Site~~	~~$550.00~~
~~Retail/commercial~~	~~1,000 sq. ft.~~	~~$641.00~~
~~Office~~	~~1,000 sq. ft.~~	~~$301.00~~
~~Industrial~~	~~1,000 sq. ft.~~	~~$119.00~~
~~Warehouse~~	~~1,000 sq. ft.~~	~~$57.00~~
~~Public/institutional~~	~~1,000 sq. ft.~~	~~$229.00~~
~~Oil and gas well~~	~~Wellhead~~	~~$261.00~~

Land Use Type	Unit	Fee
Residential	1,200 or less of heated living space[1]	$342
Residential	1,201 to 1500 of heated living space[1]	$602

Residential	1,501 to 1,800 of heated living space[1]	$683
Residential	1,801 or more of heated living space[1]	$728
Retail/Restaurant	1,000 Sq. Ft of Building	$1,872
Office & Other Services	1,000 Sq. Ft of Building	$1,006
Industrial	1,000 Sq. Ft of Building	$513

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1006. Park development fee schedule.

The park development impact fee schedule has been calculated pursuant to the ~~Duncan Study and is set forth as follows:~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-Family Detached~~	~~Dwelling~~	~~$2,721.00~~
~~Multifamily~~	~~Dwelling~~	~~$2,041.00~~
~~Mobile Home Park~~	~~Site~~	~~$2,857.00~~

Land Use Type	Unit	Fee
Residential	1,200 or less of heated living space[1]	$2,543
Residential	1,201 to 1500 of heated living space[1]	$4,469
Residential	1,501 to 1,800 of heated living space[1]	$5,067
Residential	1,801 or more of heated living space[1]	$5,403

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1007. Trails development fee schedule.

The trails development fee schedule has been calculated pursuant to the ~~Duncan Study and is set forth as follows:~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-family detached~~	~~Dwelling~~	~~$377.00~~
~~Multifamily~~	~~Dwelling~~	~~$283.00~~
~~Mobile home park~~	~~Site~~	~~$396.00~~

Land Use Type	Unit	Fee

Residential	1,200 or less of heated living space[1]	$382
Residential	1,201 to 1500 of heated living space[1]	$671
Residential	1,501 to 1,800 of heated living space[1]	$759
Residential	1,801 or more of heated living space[1]	$810

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1008. Storm drainage development fee schedule.

The storm drainage development fee schedule has been calculated pursuant to the Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows: ~~The 2007 phased-in base level storm drainage development fee schedule has been calculated pursuant to the Red Oak Study and has been adjusted pursuant to an economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:~~

	~~Fee~~
~~Single-family residential, per dwelling unit~~	~~$341.00~~
~~Multifamily residential, per dwelling unit~~	~~$245.00~~
~~Retail, per site square foot of impervious surface[1]~~	~~$0.094~~
~~Commercial, per site square foot of impervious surface[2]~~	~~$0.094~~
~~Industrial, per site square foot of impervious surface[3]~~	~~$0.094~~
~~Oil and gas~~	~~$188.00~~

~~[1] Shall not exceed 70 percent of the impervious surface.~~

~~[2] Shall not exceed 70 percent of the impervious surface.~~

~~[3] Shall not exceed 76 percent of the impervious surface.~~

Unit	Fee
Per site square foot of impervious surface	$0.264

Sec. 6-1009. Transportation development fee schedule.

The transportation development impact fee schedule has been calculated pursuant to the ~~Duncan Study and is set forth as follows:~~ Raftelis Study and has been adjusted pursuant to the economic adjustment factor. The current fee schedule as of the date the ordinance codified herein is adopted is set forth as follows:

~~Land Use Type~~	~~Unit~~	~~Fee~~
~~Single-family detached~~	~~Dwelling~~	~~$3,645.00~~
~~Multifamily~~	~~Dwelling~~	~~$2,353.00~~
~~Mobile home park~~	~~Site~~	~~$1,092.00~~
~~Retail/commercial~~	~~1,000 sq. ft.~~	~~$4,825.00~~
~~Office~~	~~1,000 sq. ft.~~	~~$4,266.00~~

~~Industrial~~	~~1,000 sq. ft.~~	~~$1,476.00~~
~~Warehouse~~	~~1,000 sq. ft.~~	~~$1,376.00~~
~~Public/institutional~~	~~1,000 sq. ft.~~	~~$2,390.00~~
~~Oil and gas well~~	~~Wellhead~~	~~$1,680.00~~

Land Use Type	Unit	Fee
Residential	1,200 or less of heated living space[1]	$3,192
Residential	1,201 to 1500 of heated living space[1]	$5,895
Residential	1,501 to 1,800 of heated living space[1]	$6,751
Residential	1,801 or more of heated living space[1]	$7,213
Retail/Restaurant	1,000 Sq. Ft of Building	$8,347
Office & Other Services	1,000 Sq. Ft of Building	$5,383
Industrial	1,000 Sq. Ft of Building	$2,742

[1] Heated living space excludes garages, outdoor patio/porches/balconies, and unfinished basements

Sec. 6-1013. Credits against development fees.

(a) After the effective date of the ordinance from which this chapter is derived, all land dedications and property improvements over and above those required by the city for a proposed development may be granted a credit against the applicable development fee imposed for such land dedication or property improvement uses that would otherwise be due for such development. However, no credit shall be awarded for:

(1) Any land dedication for acquisition or construction of site-related improvements;

(2) Any land dedications not accepted by the city;

(3) Any acquisition or construction of property improvements not approved in writing by the city prior to commencement of the acquisition or construction; or

(4) Any land dedication, construction or acquisition of property improvements not included in the calculation of the applicable development fee pursuant to the ~~Duncan Study or the Red Oak Study, whichever is applicable~~ Raftelis Study.

(b) In order to obtain a credit against development fees otherwise due, an applicant must submit a written offer to dedicate to the city specific parcels of land over and above those regularly required by the city or to acquire or construct specific improvements in accordance with all applicable state or city design and construction standards, and must specifically request a credit against the applicable identified development fee. Such written request must be made on a form provided by the city, must contain a statement under oath of the facts that

qualify the applicant to receive a credit, must be accompanied by documents evidencing those facts and must be filed not later than the time when an applicant applies for the first building permit that includes the obligation to pay the development fee against which the credit is requested. Failure by the applicant to follow the above procedures waives the claim for credit.

(c) The credit due to an applicant shall be calculated and documented as follows:

(1) Credit for qualifying land dedications shall, at the applicant's option, be valued at:

a. One hundred percent of the most recent estimated actual value for such land as shown in the records of the county assessor; or

b. That fair market value established by an MAI or Colorado Certified General Real Estate Appraiser acceptable to the city in an appraisal paid for by the applicant.

(2) In order to receive credit for qualifying acquisition or construction of improvements, the applicant shall submit completed engineering drawings, specifications and construction cost estimates to the city. The city shall determine the amount of credit due based on the information submitted or, if it determines that such information is inaccurate or unreliable, then on alternative engineering or construction costs acceptable to the city.

(d) Approved credits shall become effective at the following times:

(1) Approved credits for land dedications shall become effective when the land has been conveyed to the city in a form acceptable to the city at no cost to the city and accepted by the city. When such conditions have been met, the city shall note that fact in its records. Upon written request from the applicant, the city shall issue a letter stating the amount of credit available.

(2) Approved credits for the acquisition or construction of property improvements shall become effective when:

a. All required construction has been completed and has been accepted by the city;

b. A suitable maintenance and warranty bond has been received and approved by the city; and

c. All design, construction, inspection, testing, bonding and acceptance procedures have been completed in compliance with all applicable city and state procedures. However, approved credits for the construction of property improvements may become effective at an earlier date if the applicant posts security in the form of a performance bond, irrevocable letter of credit or escrow agreement and the amount and terms of such security are accepted by the city. At a minimum, such security must be in the amount of 125 percent of the approved credit, or 125 percent of the amount determined to be adequate by the city manager or designee, to allow the city to construct the property improvements for which the credit was given, whichever is higher. When such conditions have been met, the

city shall note that fact in its records. Upon request of the applicant, the city shall issue a letter stating the amount of credit available.

(e) Approved credits may be used to reduce the amount of the applicable development fees due from that specific proposed development until the amount of the credit is exhausted. Each time a request to use approved credits is presented to the city, the city shall reduce the amount of the applicable development fee otherwise due from the applicant, and shall note in the city records the amount of credit remaining, if any. Upon written request from the applicant, the city shall issue a letter stating the number of credits available.

(f) Approved credits shall only be used to reduce the amount of development impact fees otherwise due under this chapter, and shall not be paid to the applicant in cash or in credits against any other monies due from the applicant to the city.

Sec. 6-1015. Separate account for each fee.

All development fees collected shall be deposited into a separate account identifying each fee account, in the city's Development Infrastructure Fund, which shall be a special fund created in accordance with section 5-6 of the city Charter. The city council shall have authority to make continuing appropriations from the accounts, and appropriations and expenditures from the accounts shall be made for the purpose of paying revenue bonds of the city and (subject to any contractual restrictions entered into by the city in connection with such revenue bonds) for the purpose of paying for improvements, facilities and equipment of the types identified in the ~~Duncan Study or the Red Oak~~ Raftelis Study.

Council Agenda Summary

January 17, 2023

Key Staff Contact: Heidi Leatherwood, City Clerk

Title:

Appointment of applicants to the Commission on Disabilities, Civil Service Commission, Greeley Art Commission, Greeley Urban Renewal Authority, and Museum Advisory Board

Summary:

Council appointment is needed to the above-mentioned Boards and Commissions due to vacancies and term expirations. City staff continues to actively recruit to fill all other vacant positions

Fiscal Impact:

Does this item create a fiscal impact on the City of Greeley?	No
If yes, what is the initial, or, onetime impact?	
What is the annual impact?	
What fund of the City will provide Funding?	
What is the source of revenue within the fund?	
Is there grant funding for this item?	N/A
If yes, does this grant require a match?	
Is this grant onetime or ongoing?	
Additional Comments:	

Legal Issues:

The City Attorney's Office reviewed the applications and advised of potential conflicts of interest.

It should be noted that there is a possibility that the applicants currently serve as a volunteer on a board or commission besides the one they are applying to. It is also important to point out to the applicants that there are always potential conflicts that exist with business and investments, current jobs or relatives and family members coming before the Board or Commission.

Should such conflicts arise, the Board or Commission member simply excuses themselves from that particular item but such a potential conflict does not preclude anyone from servicing on a Board or Commission in general, just that particular agenda item.

Other Issues and Considerations:

Not applicable

Strategic Work Program Item or Applicable Council Priority and Goal:

Community Vitality *- Greeley is an inviting community of choice that is developed by design. The City's innovative growth management, as reflected in its codes and master plans, intentionally develops the vitality which all residents and visitors enjoy. The City balances new development, redevelopment, and the preservation of open space and natural areas. Quality gateways, connectivity, and a vast network of entertainment, eateries, and abundant recreational opportunities make us the best place to live, work and play.*

Decision Options:

1) Appoint or reappoint the individuals to serve on applicable board or commission.
   Or
2) Direct staff to re-advertise applicable vacancy

Council's Recommended Action:

No motion is necessary. The City Council's Policies and Protocol authorize appointment of Board and Commission members by written ballot, which can be used in lieu of a motion or voice vote for individual or multiple appointments. This policy was adopted by Council as a time-savings measure. Accordingly, a ballot is attached for Council's use in making appointments. Candidates receiving a majority vote (at least 4 votes) are appointed with no further action needed by Council.

Attachments:

Ballot
January 2023 Boards and Commissions Transmittal Summary

City o

Boards & Commissions

Appointment Ballot

January 17, 2023

Applicants for the boards and/or commissions listed below are in alphabetical order and recommendations from the interview team are shown in bold.

********** BALLOT **********

Civil Service Commission
1 Position
____ Stephanie Welle
____ (Recruit for Additional Applicants)

Commission on Dissabilities
3 Positions
____ Martha Kyler
____ (Recruit for Additional Applicants)

Greeley Art Commission
4 Positions
____ Heather Utrata
____ (Recruit for Additional Applicants)

Greeley Urban Renewal Authority
1 Position
____ Meghan Wilcox
____ (Recruit for Additional Applicants)

Museum Advisory Board
1 Position
____ Irene Davila
____ Janice Hayes
____ Martha Kyler
____ Nancy Masimer
____ Patti Harold
____ (Recruit for Additional Applicants)

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Boards & Commissions Transmittal

January 12, 2023
Key Staff Contact: Allie Powell, Senior Assistant City Clerk, 350-9746

Interview Date	*Council Interview Team*	*Council Appointment Date*
January 13, 2023	Councilmembers Hall & Clark	January 17, 2023

Boards and Commissions Being Interviewed

- **Civil Service Commission**
- **Commission on Disabilities**
- **Greeley Art Commission**
- **Greeley Urban Renewal Authority**
- **Museum Advisory Board**

Council's Recruitment and Qualifications Policy
General recruitment efforts shall be made with special measures being taken to balance ward representation and attract minority and special population applicants. Generally, volunteers will be limited to serving on one board or commission at a time. (14.2. (c)(2) City Council, Policies and Protocol)

Demographic information of existing board members and any specialty requirements are contained within the attached Membership Rosters.

Legal Issues
The City Attorney's Office reviewed the applications and the attached memorandum addresses any potential conflicts of interest.

It should be noted that there is a possibility that the applicants currently serve as a volunteer on a board or commission besides the one they are applying to. It is also important to point out to the applicants that there are always potential conflicts that exist with business and investments, current jobs or relatives and family members coming before the Board or Commission.

Should such conflicts arise, the Board or Commission member simply excuses themselves from that particular item but such a potential conflict does not preclude anyone from serving on a Board or Commission in general, just that particular agenda item.

Applicable Council Goal or Objective
Infrastructure & Growth – Establish the capital & human infrastructure to support & maintain a safe, competitive, appealing, and dynamic community.

Decision Options
1. Recommend candidates for appointment; or
2. Direct staff to re-advertise applicable vacancy.

Attachments
1. Interview Schedule
2. Conflict Memorandum from City Attorney's Office
3. Sample Ballot
4. Membership Rosters & Input from above mentioned Boards and Commissions
5. Applications of those being considered for interview and/or considered for appointment

Transmittal reviewed by: DS RL Raymond Lee, City Manager DS HL Heidi Leatherwood, City Clerk

Council Agenda Summary

Title:

Scheduling of Meetings, Other Events

Summary:

During this portion of the meeting the City Manager or City Council may review the attached Council Calendar or Planning Calendar and Schedule for City Council Meetings and Work Sessions and make any necessary changes regarding any upcoming meetings or events.

Attachments:

Council Meetings and Other Events Calendars
Council Meeting and Work Session Schedule/Planning Calendar

January 16, 2023 - January 22, 2023

January 2023

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February 2023

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

Monday, January 16

Tuesday, January 17

6:00pm - City Council Meeting - Council Master Calendar

Wednesday, January 18

7:30am - Visit Greeley (Butler)

2:00pm - 5:00pm Water & Sewer Board (Gates)

Thursday, January 19

7:30am - 8:30am DDA (DeBoutez/Butler)

10:00am - 11:00am Register for Jan 19th Northern Colorado Refugee Quarterly Community Consultation (Microsoft Teams (Link will be Received After Registration)) - Council Master Calendar

3:30pm - 4:30pm Airport Authority (Clark/Payton)

Friday, January 20

Saturday, January 21

Sunday, January 22

January 23, 2023 - January 29, 2023

January 2023

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February 2023

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

Monday, January 23

11:30am - 12:30pm Greeley Chamber of Commerce (Hall)

6:00pm - 7:00pm Youth Commission (Clark)

Tuesday, January 24

6:00pm - City Council Worksession Meeting - Council Master Calendar

Wednesday, January 25

7:00am - 8:00am Upstate Colorado Economic Development (Gates/Hall) (Upstate Colorado Conference Room) - Council Master Calendar

5:00pm - 6:00pm GPD Annual Awards Ceremony (Greeley Recreation Center, Room 101) - Council Master Calendar

5:30pm - Scholarship Dinner to honor our Colorado Farm Show Scholarship winners (RSVP by noon Friday, January 13, 2023) (Room C of the Island Grove Events Center located at 425 N. 15th Ave., Greeley, CO (Bring Hard Copy Letter Provided with Mail at January 3 Council Meeting)) - Council Master Calendar

Thursday, January 26

Friday, January 27

Saturday, January 28

Sunday, January 29

January 30, 2023 - February 5, 2023

January 2023

Su	Mo	Tu	We	Th	Fr	Sa
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

February 2023

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

Monday, January 30

Tuesday, January 31

Wednesday, February 1

Thursday, February 2

- 7:30am - Poudre River Trail (Hall)
- 3:30pm - IG Adv. Board (Butler)
- 6:00pm - 8:30pm North Front Range MPO Meeting (Olson/Payton)

Friday, February 3

Saturday, February 4

Sunday, February 5

February 6, 2023 - February 12, 2023

February 2023

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28				

March 2023

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30	31	

Monday, February 6

Tuesday, February 7

6:00pm - City Council Meeting (Council Chambers and via Zoom) - Council Master Calendar

Wednesday, February 8

Thursday, February 9

Friday, February 10

Saturday, February 11

Sunday, February 12

City Council Meeting Scheduling 2023

	1/11/2023		
	This schedule is subject to change		
Date/Type	**Description**	**Sponsor**	**Placement/Time**
January 24, 2023 Council Work Session	Cigar Bar update	Becky Safarik	
	2021 COG Audit Review and ERP Project Update	John Karner	
February 07, 2023 Council Meeting	Minutes Approval (1/10/23 Work Session; 1/17/23 Council Meeting)	Heidi Leatherwood	Consent
	Intro & 1st Rdg Ord - Development Code Amendments	Becky Safarik	Consent
	Intro & 1st Rdg Ord - Grant Approval limits	John Karner	Consent
	PH & 2nd Rdg Ord - Updated W&S Design Criteria Standards and Specifications	Sean Chambers	Regular
	Executive Session - City Manager Performance Review	Noel Mink/Doug Marek	
February 14, 2023 Council Work Session	Potential Cancellation		
February 21, 2023 Council Meeting	Proclamation - Youth Art Month	Mayor	Intro
	Minutes Approval (1/24/23 Work Session; 2/7/23 Council Meeting)	Heidi Leatherwood	Consent
	Intro & 1st Rdg Ord - Metropolitan District Code Updates	Becky Safarik	Consent
	Intro & 1st Rdg Ord - HP Greeley Sub, 6th Plat Rezone	Becky Safarik/Darrel Geisick	Consent
	PH & 2nd Rdg Ord - Development Code Amendments	Becky Safarik	Regular
	PH & 2nd Rdg Ord - Grant Approval Limits	John Karner	Regular
	Boards & Commissions Appointments	Heidi Leatherwood	Regular
	Executive Session - City Attorney Performance Review	Noel Mink/Doug Marek	

Council Agenda Summary

Title:

Consideration of a motion authorizing the City Attorney to prepare any required resolutions, agreements, and ordinances to reflect action taken by the City Council at this meeting and any previous meetings, and authorizing the Mayor and City Clerk to sign all such resolutions, agreements, and ordinances

Council's Recommended Action:

A motion to approve the above authorizations.

Council Agenda Summary

January 17, 2023

Key Staff Contacts:

Doug Marek, City Attorney
Noel Mink, Human Resources Director

Title:

Consideration of a motion to go into Executive Session to receive legal advice from the City Attorney and to determine positions, develop strategy, and give instructions to negotiators regarding 2023 collective bargaining with Greeley Firefighters

Summary:

The Greeley Municipal Charter sets out the policy, process, and timeline for negotiating collective bargaining agreements with Greeley Firefighters. This agenda item calls for an executive session so that -- prior to initiating collective bargaining for 2023 with Greeley Firefighters -- the City Council can meet with those management officials who establish compensation, hours, working conditions, and all other terms and conditions of employment. For purposes of collective bargaining, the City acts through the Chief of the Fire Department, Director of Human Resources, City Manager, and City Council.

Pursuant to Colorado law and consistent with the Greeley Municipal Code, the City Council is authorized to move for an executive session to receive legal advice and to determine positions, develop strategies, and provide instructions to negotiators regarding collective bargaining.

Strategic Focus Area:

High-Performance Government

Safe and Secure Communities

Decision Options:

A motion to go into an Executive Session for a conferral with the City Attorney to receive legal advice and to determine positions, develop strategies, and provide instructions to negotiators regarding collective bargaining, as provided in C.R.S. 24-6-402(4)(b) and 24-6-402(4)(e)(I), and Greeley Municipal Code 2-151(a)(2) and 2-151(a)(5)