



TUALATIN ARCHITECTURAL REVIEW BOARD MEETING

WEDNESDAY, JUNE 29, 2022

TUALATIN SERVICE CENTER
10699 SW HERMAN RD.
TUALATIN, OR 97062

OR

Join Zoom Meeting

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Meeting ID: 881 7324 8402

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Dial by your location

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CALL TO ORDER & ROLL CALL

ANNOUNCEMENTS & COMMUNICATION

COMMUNICATION FROM THE PUBLIC (NOT ON THE AGENDA)

ACTION ITEMS

1. Consideration of an Architectural Review application (AR21-0018) requesting approval of three buildings totaling 442,575 square feet located on a 21-acre site at 11345 SW Herman Road (2S122D000550). Building A will be 148,600 square feet, Building B will be 142,550 square feet and Building C will be 151,425 square feet.

COMMUNICATION FROM CITY STAFF

FUTURE ACTION ITEMS

ADJOURNMENT



TO: Architectural Review Board

THROUGH: Steve Koper, AICP, Assistant Community Development Director

FROM: Keith Leonard, AICP, Associate Planner

DATE: June 29, 2022

SUBJECT:

Consideration of an Architectural Review application (AR21-0018) requesting approval of three buildings totaling 442,575 square feet located on a 21-acre site at 11345 SW Herman Road (2S122D000550). Building A will be 148,600 square feet, Building B will be 142,550 square feet and Building C will be 151,425 square feet.

RECOMMENDATION:

Staff respectfully recommends approval of the subject Architectural Review application (AR 21-0018), subject to the recommended Conditions of Approval (Exhibit 2). This recommendation is supported by the Analysis and Findings (Exhibit 2), as well as the application materials demonstrating compliance with the applicable review criteria, s

EXECUTIVE SUMMARY:

- The subject proposal is a Type III land use case, subject to a quasi-judicial hearing before the Architectural Review Board.
- The subject site comprises 21 acres of land in the General Manufacturing (MG) zone, located north of the SW Myslony Street and SW 112th Avenue intersection.
- The land is currently vacant.
- The applicant requests approval of three buildings including Building A will be 148,600 square feet, Building B will be 142,550 square feet and Building C will be 151,425 square feet for a total of 442,575 square feet of building construction.
- Proposed uses are Warehousing and Freight Distribution.
- The building can serve up to four tenants and includes 335 parking stalls.
- Building A will have 18 loading docks on the west side of the building, Building B will have 26 loading docks on the east side of the building and Building C will have 27 loading docks on the west side of the building.
- Four vehicular access points are proposed.
- The Hedges Creek Trail, part of the Ice Age Tonquin Trail system, is located along the east side of the subject property.
- Conditions of Approval address compliance with Engineering and Development Code requirements.

OUTCOMES OF DECISION:

Approval of AR 21-0018 will facilitate construction of the proposed development.

ALTERNATIVES TO RECOMMENDATION:

The Architectural Review Board may alternatively:

- Approve AR 21-0018 with amended conditions of approval and direct staff to provide an updated Analysis and Findings;
 - Continue the hearing to a later date for further consideration; or
 - Deny AR 21-0018.
-

ATTACHMENTS:

- Exhibit 1 – Presentation
- Exhibit 2 – Analysis and Findings
- Exhibit A1 - Applicant's Narrative
- Exhibit A2 – Plan Set and Elevations
- Exhibit A3 – Arborist Report
- Exhibit A4 – Transportation Impact Analysis
- Exhibit A5 – Stormwater Report
- Exhibit A6 – Supporting Documents
- Exhibit B – Public Noticing Requirements
- Exhibit C – Tualatin Valley Fire & Rescue Application Review
- Exhibit D – Clean Water Services Memorandum
- Exhibit E – Parks and Recreation Department Findings and Conditions
- Exhibit F – Map 8-1 Functional Classification Plan
- Exhibit G – Map 72-1 Natural Resources Protection Overlay District (NRPO)
- Exhibit H – Map 72-2 Greenway Development Plan and Path Locations
- Exhibit I – Map 72-3 Significant Natural Resources
- Exhibit J – Building Architecture Communications
- Exhibit K – DKS Transportation Impact Analysis Comments



AR 21-0018

**Walgraev Industrial Park (Hedges
Creek)**

11345 SW Herman Road

AR 21-0018
Walgraev Industrial Park (Hedges Creek)

ARCHITECTURAL REVIEW BOARD
June 29, 2022

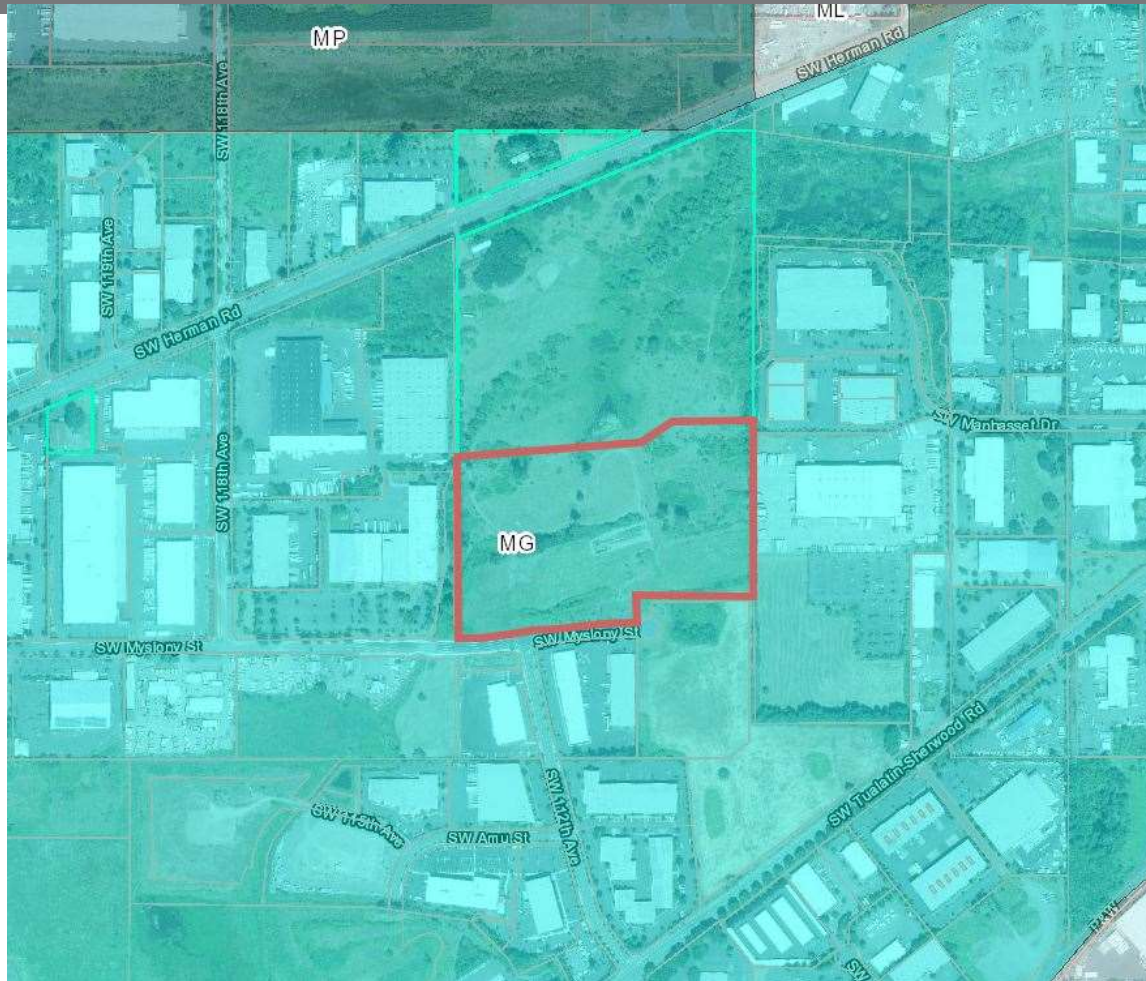


Tonight's Presentation

1. Site Background
2. Project Overview
3. Applicable Criteria
4. Conclusion



Site Background

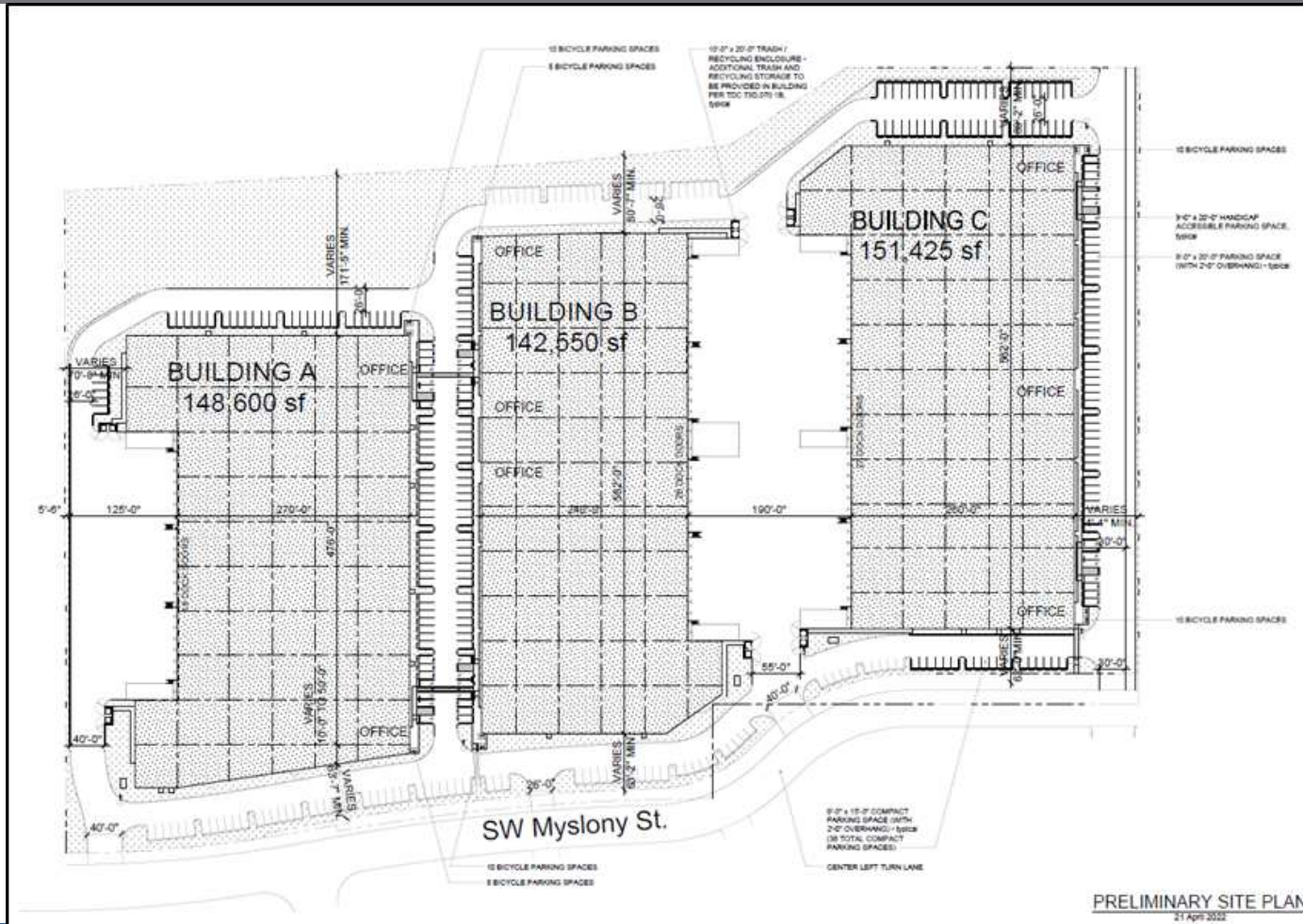


AR 21-0018
Walgraeve Industrial Park (Hedges Creek)

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Project Overview



AR 21-0018
Walgraev Industrial Park (Hedges Creek)

ARCHITECTURAL REVIEW BOARD
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Procedures (TDC 32.230)

Type III Architectural Review:

- Application submitted on December 29, 2021 and deemed incomplete on January 27, 2022.
- The applicant made several additional submittals and the application was deemed complete on May 3, 2022.
- Notice of Hearing sent on May 20, 2022
- Final decision required by August 31, 2022



Architectural Review (TDC 33.020)

Architectural Review for Large Industrial Developments:

Approval criteria listed in Chapter 73A through 73G, including:

- Site Design Standards
- Landscaping Standards
- Parking Standards
- Waste & Recyclable Management Standards

Conditions of Approval: may implement identified public facilities and services needed to serve the proposed development through Chapters 74 and 75.

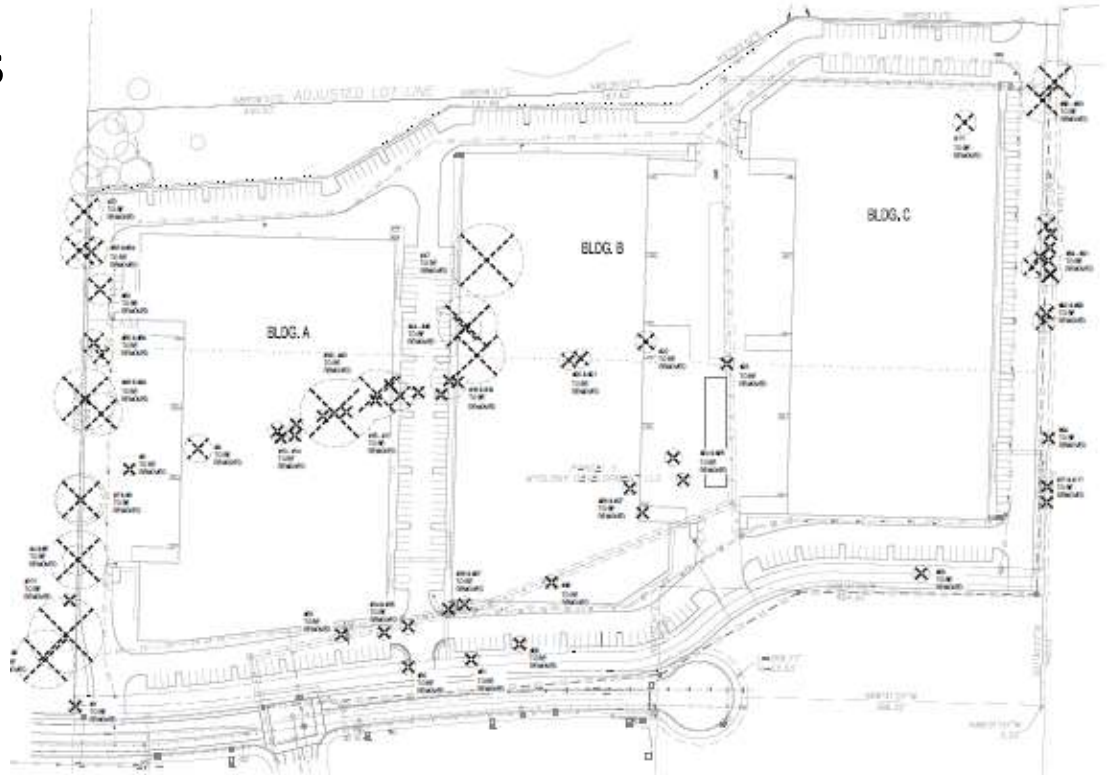


Tree Removal (TDC 33.110)

The application includes tree removal:

Approval Criteria

- The tree is diseased;
- The tree is a hazard;
- Necessary to remove tree to construct proposed improvements





MG Zone (TDC 61)

The proposal complies with zoning:

- Setbacks
- Building height
- Permitted uses

STANDARD	REQUIREMENT	MIN. PROPOSAL
Setbacks:		
<i>Front (SW Myslony St)</i>	30 ft	61'6" ft
<i>Side</i>	0-50 ft	70'9" ft
<i>Parking Area</i>	5 ft	5 ft
Building Height:	60 ft	42.8 ft

USE CATEGORY	STATUS	LIMITATIONS AND CODE REFERENCES
Warehouse and Freight Movement	P/C	Conditional use required for warehousing of building materials and supplies. All other uses permitted outright.
Light Manufacturing	P	-



TDC 70: Floodplain District

- Floodplain
- Floodway 
- 100-Year Floodplain 
- Hydrography
- Streams 



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Walgraev Industrial Park (Hedges Creek)

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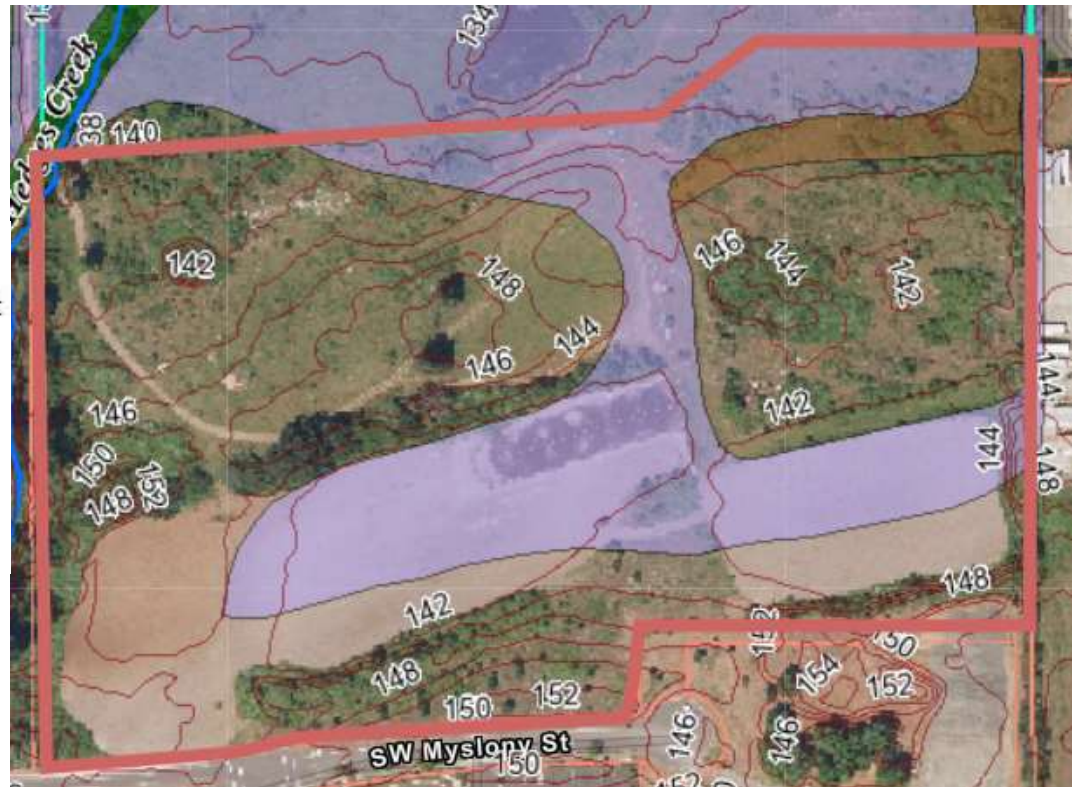


TDC 72: NRPO District

Natural Resources

Natural Resources Protection Overlay District

-  Wetland Preservation District
-  Wetland Conservation District
-  Open Space Preservation District
-  Greenway



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Regional Ice Age Tonquin Trail

- Planned Multi-Use Trail*
- Planned Pedestrian Trail*
- City Parks & Greenways



AR 21-0018
Walgraeve Industrial Park (Hedges Creek)

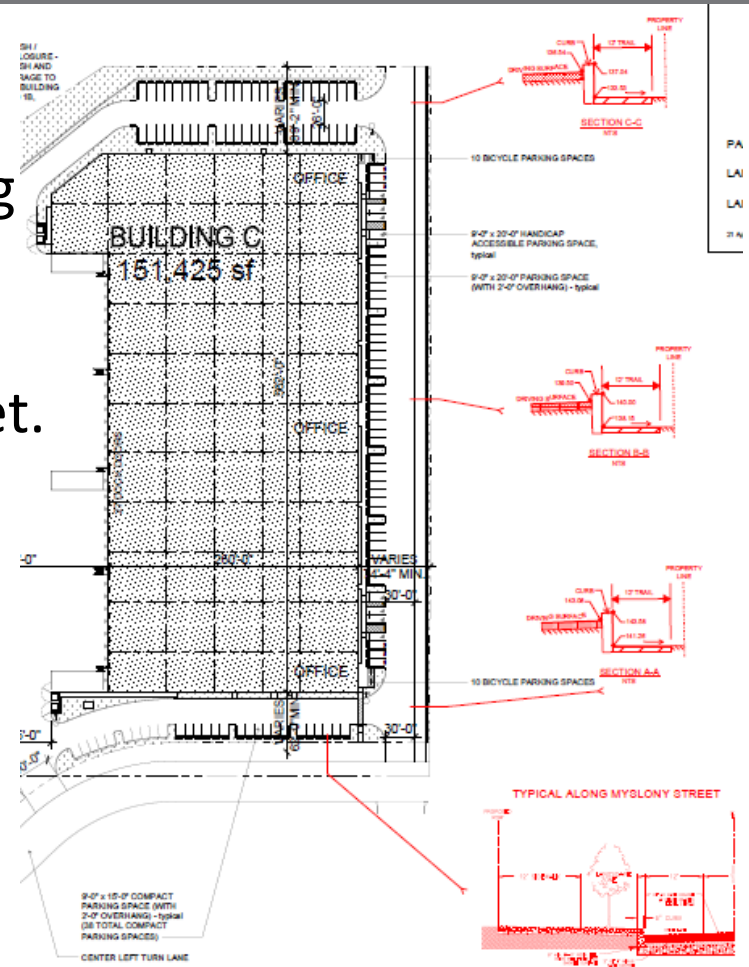
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Regional Ice Age Tonquin Trail

Ice Age Tonquin Trail:

- Pedestrian & Bicycle Easement along east side of property
- Trail along eastern property line & along a portion of SW Myslony Street.



AR 21-0018
Walgraev Industrial Park (Hedges Creek)

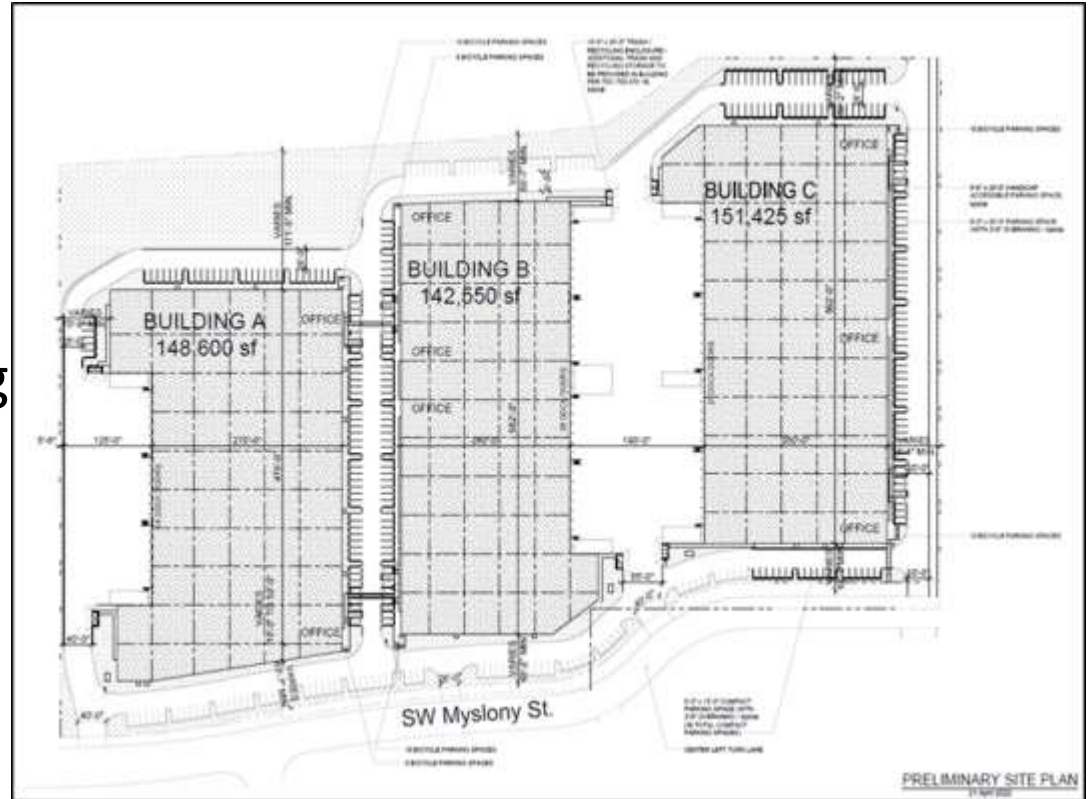
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Site Design (TDC 73A)

The proposal complies with requirements for:

- Windows
- Lighting
- Safety and security
- Storage and screening



AR 21-0018
Walgraev Industrial Park (Hedges Creek)

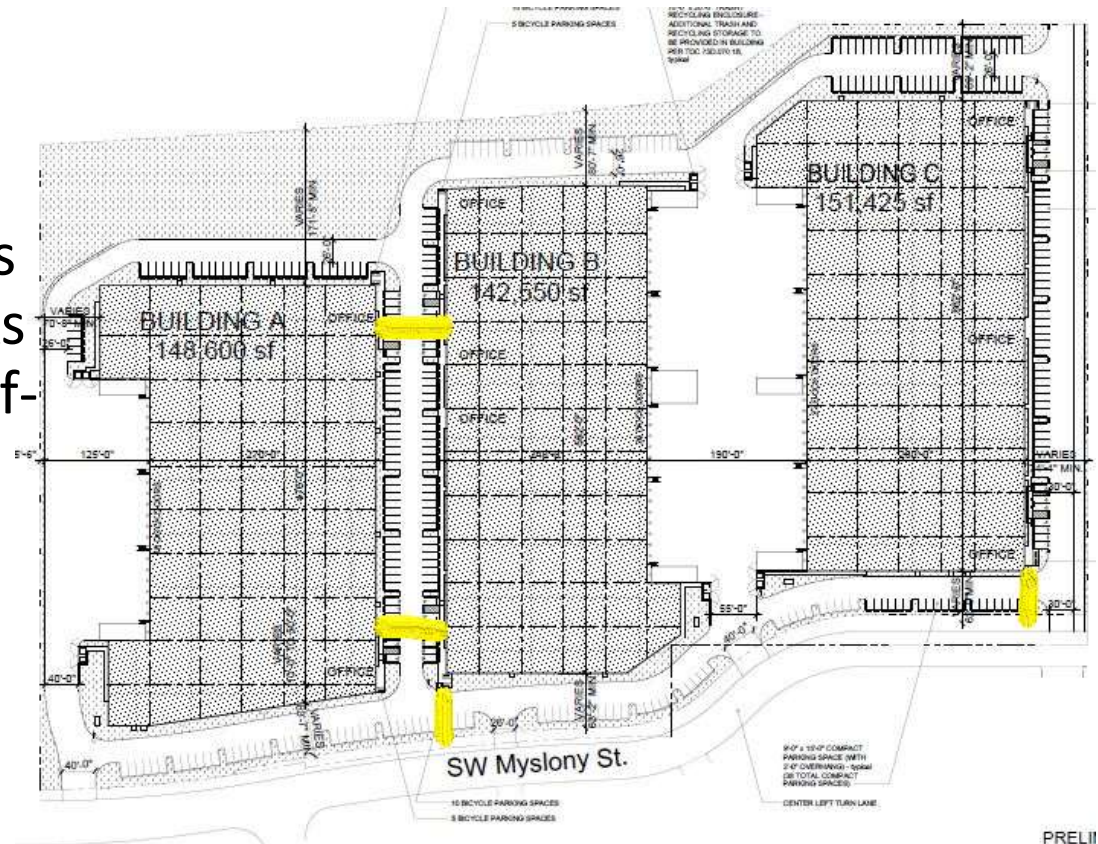
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Site Design (TDC 73A)

With conditions, the proposal complies with TDC 73A.500(1):

- Provide walkways between main buildings entrances and sidewalks along the public right-of-way;

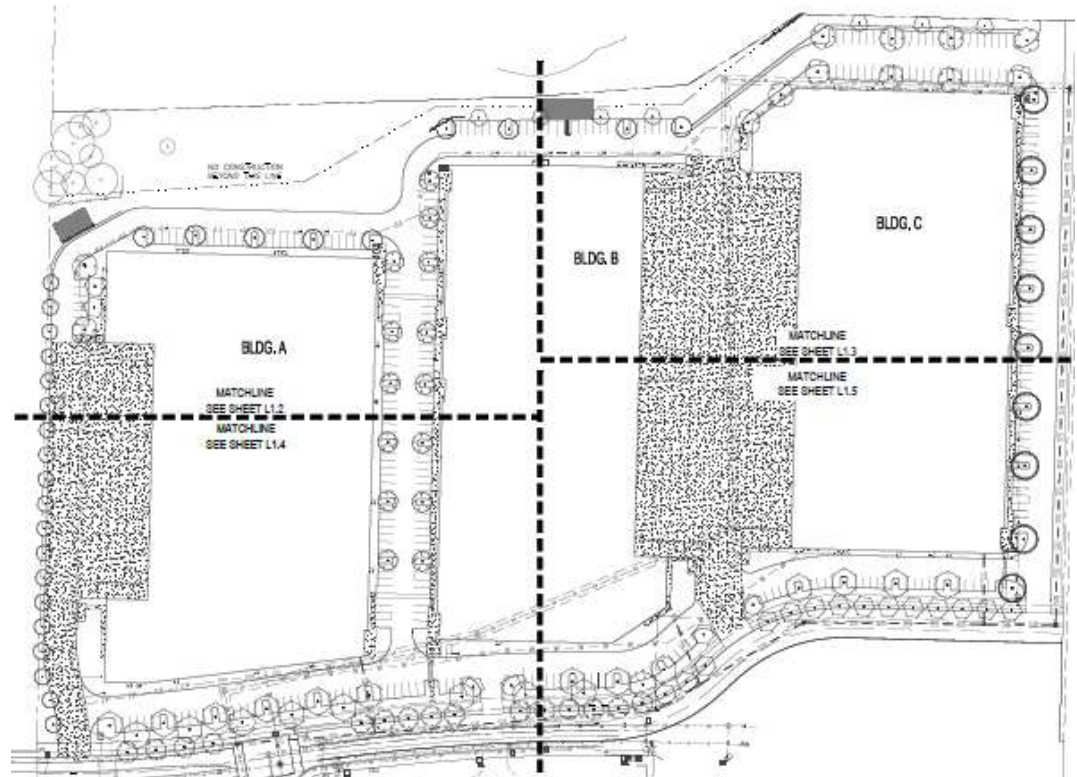




Site Design (TDC 73A)

With conditions, the proposal complies with TDC 73A.500(5):

- Provide an updated landscaping plan that utilizes evergreen or conifer type trees to provide year round screening for loading dock areas.



AR 21-0018

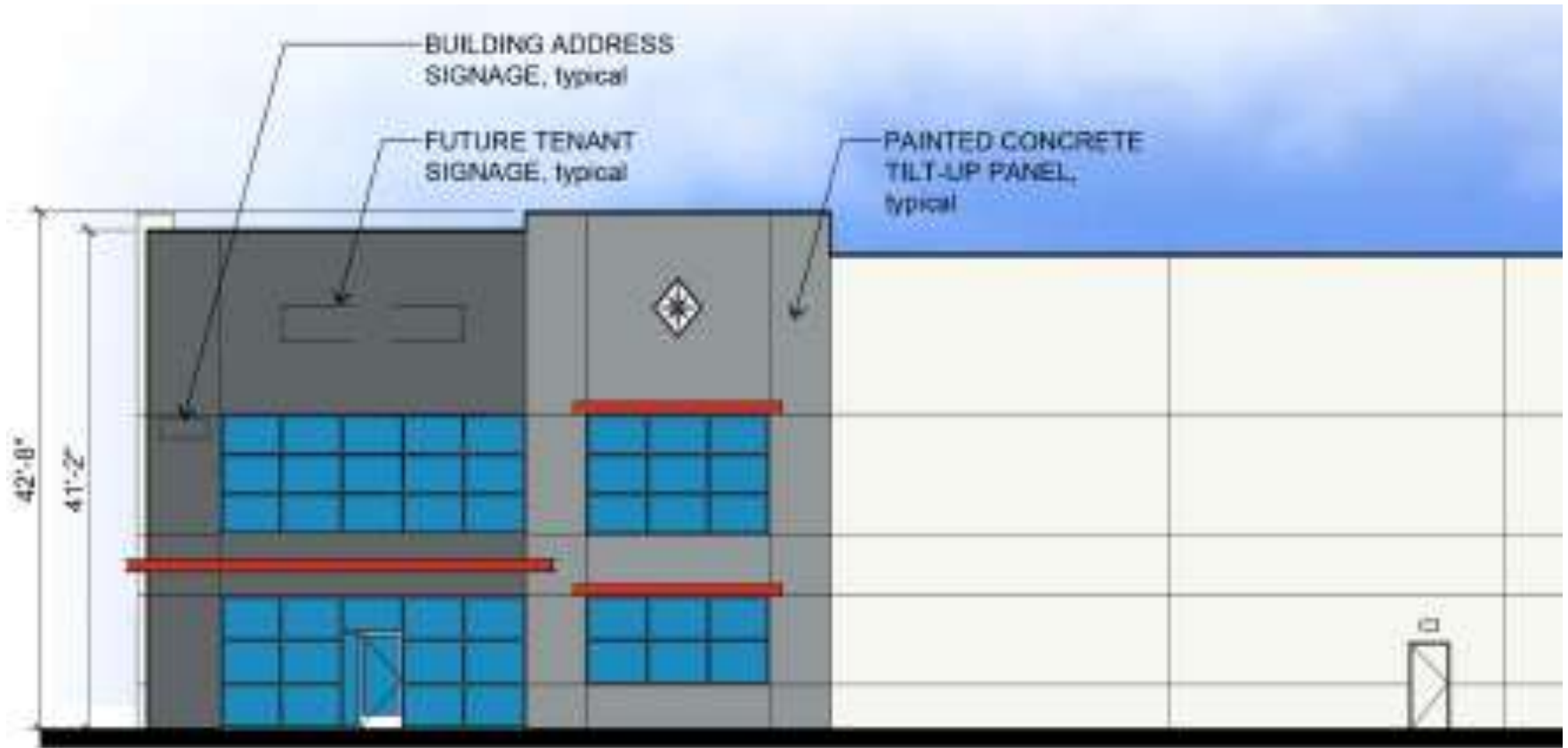
Walgraeve Industrial Park (Hedges Creek)

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Building Design (TDC 73A)



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Walgraeve Industrial Park (Hedges Creek)

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Building Design (TDC 73A)



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Walgraeve Industrial Park (Hedges Creek)

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Building Design (TDC 73A)



Myslony Street/112th Intersection (west)



Myslony Street/112th Intersection (east)



Under Construction end of SW Myslony St.



SW MYSLONY - Abutting to East

AR 21-0018
Walgraeve Industrial Park (Hedges Creek)

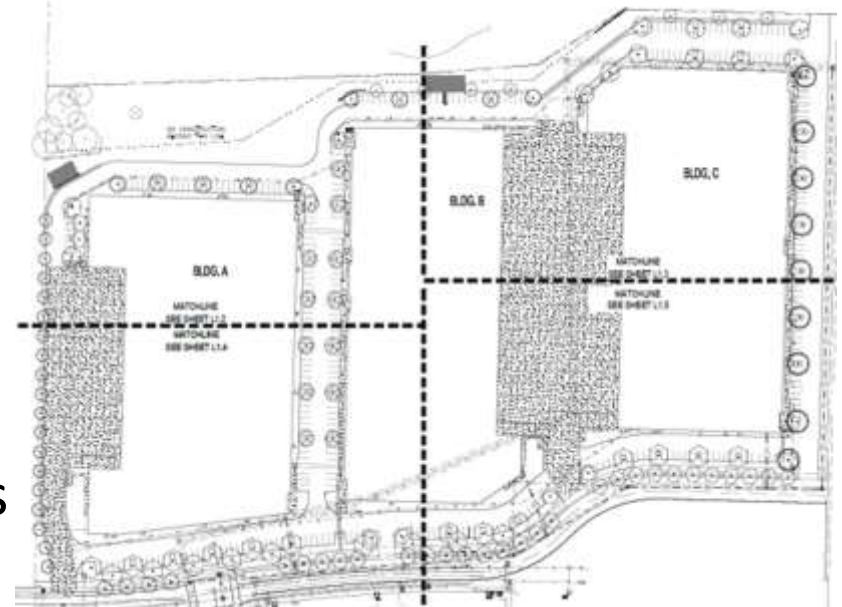
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Landscaping Standards (TDC 73B)

The application demonstrates the proposal complies with requirements for:

- Minimum landscape area (15%)
- Landscape buffers
- Tree preservation
- Irrigation
- Revegetation of disturbed areas
- Minimum standards for plantings



AR 21-0018

Walgraeve Industrial Park (Hedges Creek)

ARCHITECTURAL REVIEW BOARD

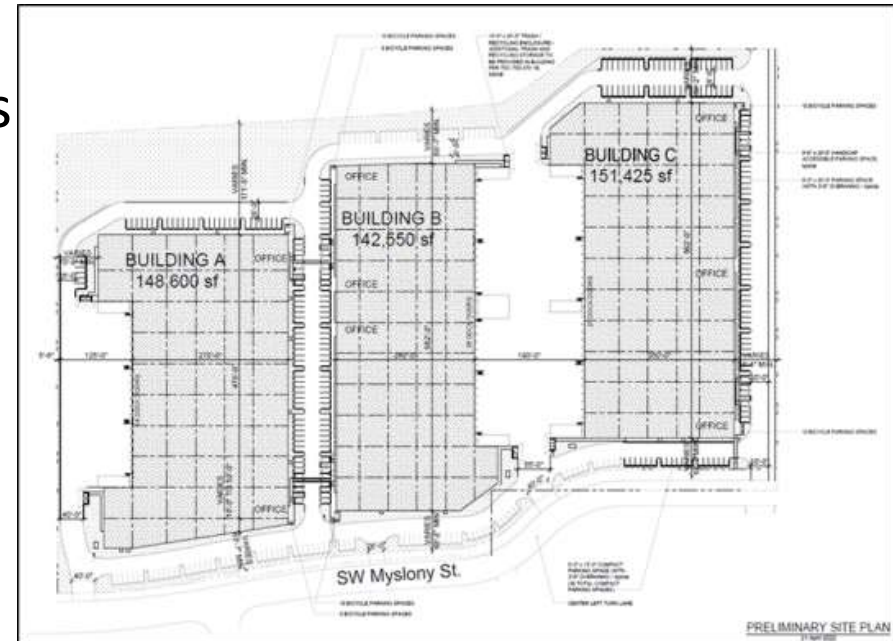
June 29, 2022



Parking Standards (TDC 73C)

The application demonstrates the proposal complies with requirements for:

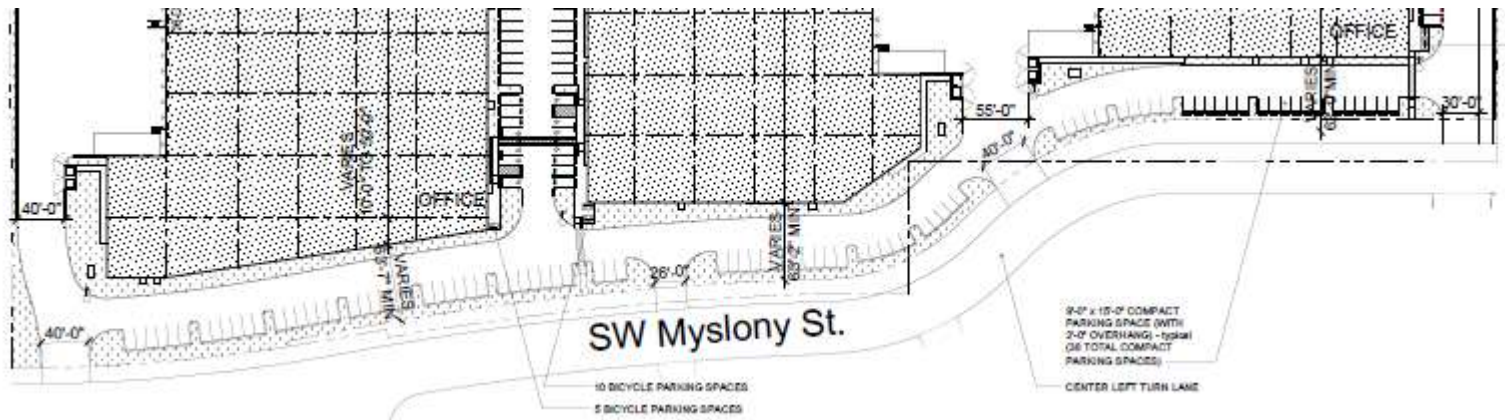
- Minimum parking requirements (335 proposed, 305 required)
- Bike parking (50 proposed, 45 spaces required)
- Parking / drive aisle standards
- Loading standards
- Parking lot landscaping





Parking Standards (TDC 73C)

- Ingress/egress for industrial uses with over 250 parking spaces must provide driveways at a maximum width as required by the City Manager



AR 21-0018
Walgraev Industrial Park (Hedges Creek)

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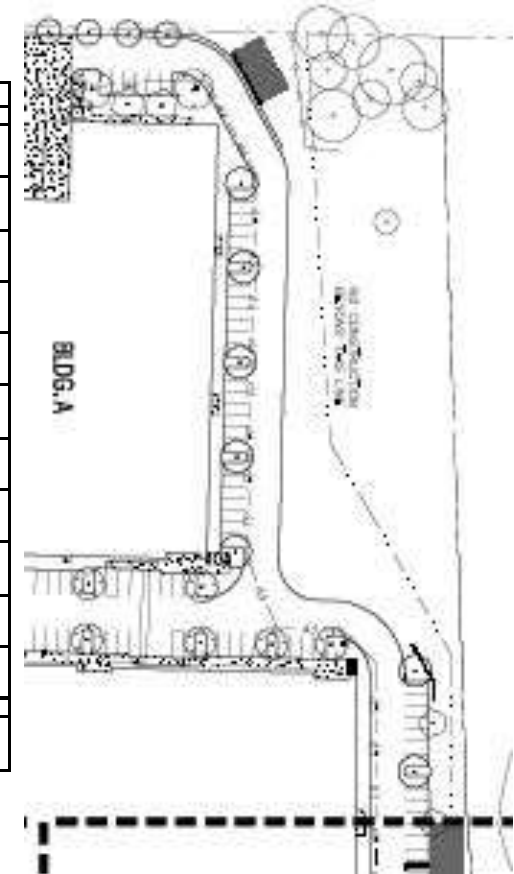


Parking Standards (TDC 73C)

With conditions, the proposal complies with TDC 73C.240(4):

- Must be planted with one deciduous shade trees for every four parking spaces; Required trees must be evenly dispersed throughout the parking lot

TREE	QTY	CITY	BOTANICAL NAME	COMMENTS	HT
	41	8	ALBIBALSA FRAXINOSA 'NICKER'	RED BUD	12/30
	28	8	QUCUERA ALBIFLORA	EUROPEAN HORSE	12/30
	28	8	QUCUERA ALBIFLORA	EUROPEAN HORSE	12/30
	8	8	QUCUERA ALBIFLORA 'NICKER'	RED BUD	12/30
	18	8	QUCUERA ALBIFLORA	EUROPEAN HORSE	12/30
	18	8	QUCUERA ALBIFLORA	EUROPEAN HORSE	12/30
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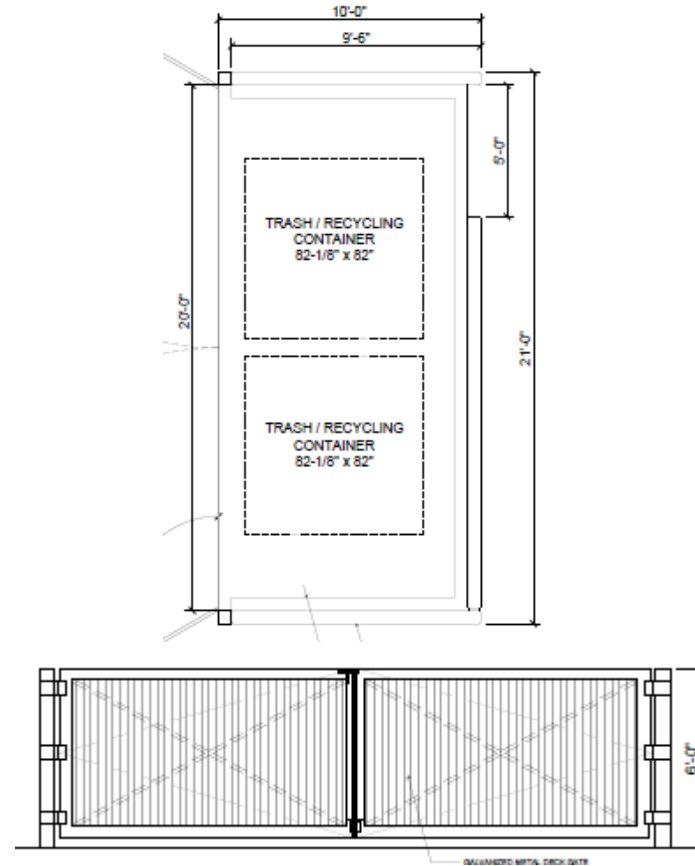




Waste and Recyclables (TDC 73D)

With conditions, the proposal complies with requirements for:

- Minimum storage area
- Location
- Design / screening



TRASH ENCLOSURE



Public Improvements (TDC 74)

- **TDC 74.610 Water Service.**

No upgrade is required for the existing 16-inch public main within SW Myslony Street. The proposal includes one three-inch domestic and two ten-inch fire service laterals with gate valves near the main.

- **TDC 74.620 Sanitary Sewer Service.**

The applicant proposes to relocate an existing 21-inch public sanitary sewer line that cuts diagonally through the site to SW Myslony Street to the east property line, then along the east property line within a 15-foot wide public sanitary sewer easement, and then reconnecting to the existing line near the northeast corner of this development. (may use Ice Age Tonquin Trail easement for relocated line)



Public Improvements (TDC 74)

With conditions, the proposal will require compliance with both the City and CWS storm drainage requirements, or an acceptable alternative.

- **TDC 74.630. - Storm Drainage System.**

Storm drainage near the north end of the site will be treated by vegetated corridor as filter strips with most of the impervious area by Bio-Clean's stormwater biofiltration system vaults. Underground detention systems will assure the overall site release rates match pre-development up to the 25-year storm event and hydromodification requirements. Some locations are unable to be detained due to topography but equivalent detention will be provided where possible.



Access Management (TDC 75)

- **TDC 75.140. - Existing Streets Access Standards.**
The eastern driveway must be a minimum of 36 feet wide either matching the existing recorded access easement or with a new or modified access easement to serve the lot to the north.
- Half street improvements will be required north of the SW Myslony Street centerline including curb and gutters, striping, planter strip and sidewalk.



Conclusion

- The findings demonstrate that the proposal meets the applicable criteria of the Tualatin Development Code with the recommended Conditions of Approval.
- Therefore, staff respectfully recommends approval of the subject Architectural Review application (AR 21-0018), as conditioned.
- Questions?



ANALYSIS AND FINDINGS
for Walgraeve Industrial Park/Hedges Creek
June 29, 2022

Case #:	AR 21-0018
Project:	Tualatin Logistics Park
Location:	11345 SW Herman Road; Tax Lot: 2S122D000550
Applicant:	Beth Zauner, AAI Engineering
Owner:	Ricky and Gary Walgraeve

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Arrangements can be made to provide these materials in alternative formats such as large type or audio recording. Please contact the Planning Division at 503.691.3026 and allow as much lead time as possible.

I. INTRODUCTION

A. Applicable Criteria

The following Chapters of the Tualatin Municipal Code (TMC) and the Tualatin Development Code (TDC) are applicable to the subject proposal:

- TMC 3: Utilities and Water Quality
- TDC 32: Procedures
- TDC 33.020: Architectural Review
- TDC 33.110: Tree Removal Permit/Review
- TDC 61: General Manufacturing
- TDC 70: Floodplain District
- TDC 72: Natural Resources Protection Overlay
- TDC 73A: Site Design
- TDC 73B: Landscaping Design
- TDC 73C: Parking Standards
- TDC 73D: Waste and Recyclables Management Standards
- TDC 74: Public Improvements
- TDC 75: Access

B. Site Description

The subject site is a 20.4 acre property located south of SW Herman Road and north of SW Myslony Street and the SW 112th Avenue intersection. The current street address is 11345 SW Herman Road (Washington County Tax Assessor Map 2S122D000550), which is also associated with an existing lot north of SW Herman Road. The subject property will have a new assigned address off of SW Myslony Street. The subject property is zoned General Manufacturing (MG). The property was recently annexed, ANN21-0002, to the City of Tualatin. A property line adjustment, PL21-0001, was also recently approved.

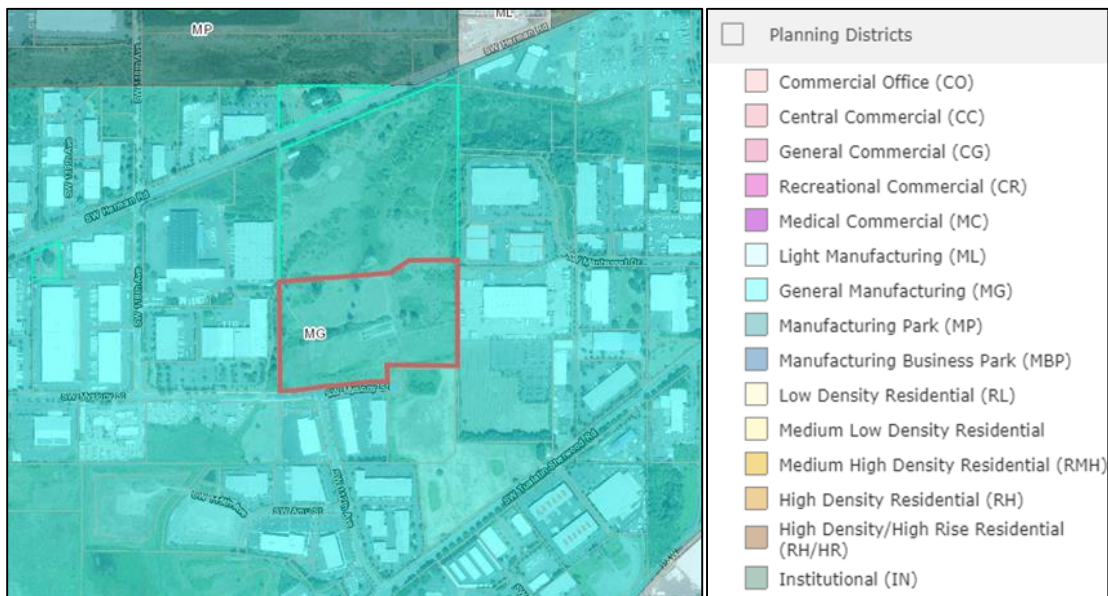


Figure 1: Aerial view of subject site (outlined in Red)

The site is undeveloped and has been previously utilized for various agricultural crops and grazing for cattle. The subject site will be provided with public street access from SW Myslony Street, which is under the City of Tualatin’s jurisdiction and classified as a Collector and Industrial Connector (Exhibit F).

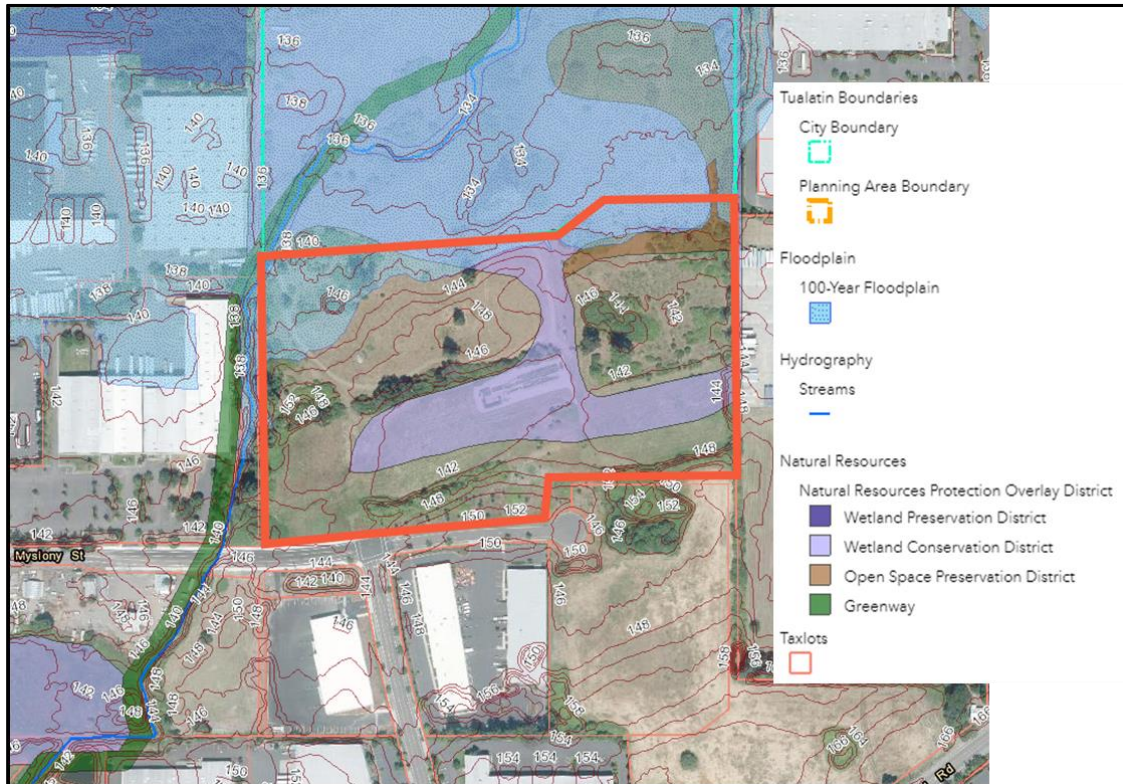


Figure 2 Wetland Conservation District (NRPO-WCNA) & Open Space Preservation District (NRPO-OSNA)

The property slopes slightly downward from SW Myslony Street to the northern portion of the property. The land reaches a high point of 152 feet in elevation along the southern border of the property and slopes down to a low point of 138 feet near the northern border of the property. The applicant has submitted a Natural Resource Assessment (NRA Exhibit A6) which details the natural resources within the confines of the subject property. The NRA was drafted for the property line adjustment (PLA21-0001) that is associated with this project. The shaded areas on Figure 2 illustrates a Natural Resource Protection Overlay including a Wetland Conservation District (NRPO-WCNA), Open Space Preservation District (NRPO-OSNA) and 100-year floodplain. The Tualatin Parks and Recreation Department has reviewed the site and has determined a need for a pedestrian and bicycle easement that is a section of the regional Ice Age Tonquin Trail (Exhibit E).

C. Proposed Project

As described in the applicant’s narrative (Exhibit A1), the applicant has proposed 3 buildings on approximately 20.4 acres of property. Building A will be 148,600 square feet, Building B will be 142,550 square feet and Building C will be 151,425 square feet for a total of 442,575 square feet of industrial buildings. The applicant’s narrative (Exhibit A1) states that the proposed uses of the buildings will consist of 35% manufacturing and 65% warehousing while the applicant’s plan set (Exhibit A2) states that the uses will be 30% manufacturing and 70% warehousing.

The applicant’s Landscaping Plans are within the Plan Set (Exhibit A2). The applicant is proposing a landscaped area of 16.2% or 147,915 square feet of landscaping. Perimeter and parking lot landscaping are proposed.

Parking and site circulation is illustrated in the Plan Set (Exhibit A2). A total of 335 vehicular parking spaces, 50 bicycle parking spaces and 18 vanpool/carpool spaces will be provided. There will be 71 loading docks with buildings B and C docks facing each other. Building A will have loading docks facing the property to the west.

As shown on the applicant’s architectural building elevation drawings in the Plan Set (Exhibit A2), the buildings will utilize tilt-up concrete walls for construction. The maximum height of all three buildings will be 41 feet 8 inches tall. The design of the buildings articulate entryways with contrasting painted walls and windows, canopies above entryways, loading docks and other site and building features that are discussed in greater detail in the findings.

The surrounding vicinity is dominated by concrete tilt-up structures of varying heights. There are a few examples of similarly sized and massed buildings with a comparable volume of loading docks in Tualatin. As comparison, to the east and west are buildings of approximately 100,000 square feet in area with loading docks.

The remainder of the site that is not dedicated to building and loading areas will be allocated to vehicle maneuvering and parking. The site plan proposes four vehicle access points off of SW Myslony Street that are discussed in greater detail within Exhibits A4 and K.

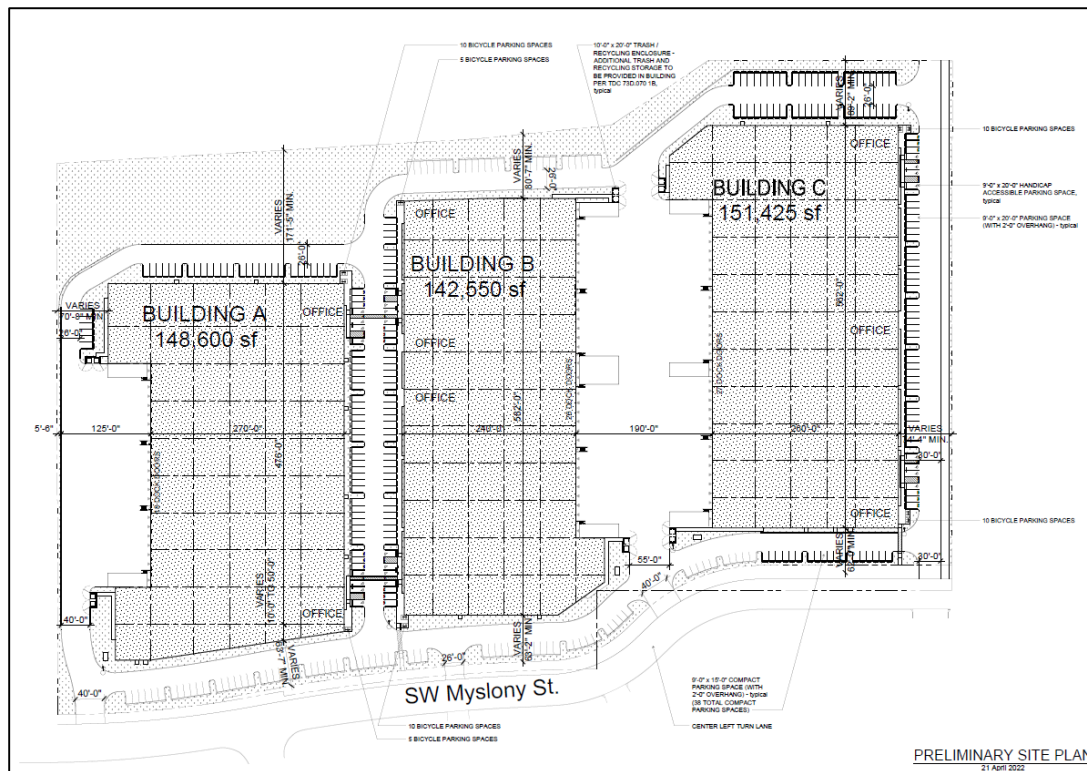


Figure 3: Site Plan (overview)

D. Previous Land Use Actions

- ANN21-0002 Property Annexed into Tualatin
- PLA21-0001 Property Line Adjustment

E. Surrounding Uses

The subject site is surrounded by industrial uses including:

North: General Manufacturing (MG)

- Vacant

East: General Manufacturing (MG)

- Industrial Use

West: General Manufacturing (MG)

- Industrial Use

South: General Manufacturing (MG)

- SW Myslony Street
- SW 112th Avenue
- Industrial Use

F. Exhibit List

Exhibit A1 - Applicant's Narrative

Exhibit A2 – Plan Set and Elevations

Exhibit A3 – Arborist Report

Exhibit A4 – Transportation Impact Analysis

Exhibit A5 – Stormwater Report

Exhibit A6 – Supporting Documents

Exhibit B – Public Noticing Requirements

Exhibit C – Tualatin Valley Fire & Rescue Application Review

Exhibit D – Clean Water Services Memorandum

Exhibit E – Parks and Recreation Department Findings and Conditions

Exhibit F – Map 8-1 Functional Classification Plan

Exhibit G – Map 72-1 Natural Resources Protection Overlay District (NRPO)

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Exhibit I – Map 72-3 Significant Natural Resources

Exhibit J – Building Architecture Communications

Exhibit K – DKS Transportation Impact Analysis Comments

II. PLANNING FINDINGS

These findings reference the Tualatin Development Code (TDC), unless otherwise noted.

Chapter 32: Procedures

Section 32.010 – Purpose and Applicability.

[...]

(2) **Applicability of Review Procedures.** All land use and development permit applications and decisions, will be made by using the procedures contained in this Chapter. The procedure “type” assigned to each application governs the decision-making process for that permit or application. There are five types of permit/application procedures as described in subsections (a) through (e) below. Table 32-1 lists the City’s land use and development applications and corresponding review procedure(s).

[...]

(c) **Type III Procedure (Quasi-Judicial Review – Public Hearing).** Type III procedure is used when the standards and criteria require discretion, interpretation, or policy or legal judgment. Quasi-Judicial decisions involve discretion but implement established policy. Type III decisions are made by the Planning Commission or Architectural Review Board and require public notice and a public hearing, with an opportunity for appeal to the City Council.

[...]

(3) **Determination of Review Type.** Unless specified in Table 32-1, the City Manager will determine whether a permit or application is processed as Type I, II, III, IV-A or IV-B based on the descriptions above. Questions regarding the appropriate procedure will be resolved in favor of the review type providing the widest notice and opportunity to participate. An applicant may choose to elevate a Type I or II application to a higher numbered review type, provided the applicant pays the appropriate fee for the selected review type.

Table 32-1 – Applications Types and Review Procedures

Application / Action	Type	Decision Body*	Appeal Body*	Pre-Application Conference Required	Neighborhood /Developer Mtg Required	Applicable Code Chapter
Architectural Review						
Industrial Buildings 150,000 square feet + [...] as requested by the CM	III	ARB	CC	Yes	Yes	TDC 33.020
[...]						
* City Council (CC); Planning Commission (PC); Architectural Review Board (ARB); City Manager or designee (CM); Land Use Board of Appeals (LUBA).						

Finding:

The proposed project includes three industrial buildings totaling 442,575 square feet in area and therefore requires a Type III review procedure according to Table 32-1. The application has been processed according to the applicable code criteria for Type III procedures. This standard is met.

Section 32.030 – Time to Process Applications.

(1) **Time Limit - 120-day Rule.** The City must take final action on all Type II, Type III, and Type IV-A land use applications, as provided by ORS 227.178, including resolution of all local appeals, within 120 days after the application has been deemed complete under TDC 32.160, unless the applicant provides

written request or consent to an extension in compliance with ORS 227.178. (Note: The 120-day rule does not apply to Type IV-B (Legislative Land Use) decisions.)

[...]

(3) Time Periods. "Days" means calendar days unless otherwise specified. In computing time periods prescribed or allowed by this Chapter, the day of the act or event from which the designated period of time begins is not included. The last day of the period is included, unless it is a Saturday, Sunday, or a legal holiday, in which case the period runs until the end of the next day that is not on a weekend or City recognized legal holiday.

Finding:

The application was deemed complete on May 3, 2022. The hearing for AR 21-0018 is scheduled for June 29, 2022. The final action will take place by August 31, 2022 in compliance with ORS 227.178. This standard is met.

Section 32.110 – Pre-Application Conference.

(1) Purpose of Pre-Application Conferences. Pre-application conferences are intended to familiarize applicants with the requirements of the TDC; to provide applicants with an opportunity discuss proposed projects in detail with City staff; and to identify approval criteria, standards, and procedures prior to filing a land use application. The pre-application conference is intended to be a tool to assist applicants in navigating the land use process, but is not intended to be an exhaustive review that identifies or resolves all potential issues, and does not bind or preclude the City from enforcing any applicable regulations or from applying regulations in a manner differently than may have been indicated at the time of the pre-application conference.

(2) When Mandatory. Pre-application conferences are mandatory for all land use actions identified as requiring a pre-application conference in Table 32-1. An applicant may voluntarily request a pre-application conference for any land use action even if it is not required.

(3) Timing of Pre-Application Conference. A pre-application conference must be held with City staff before an applicant submits an application and before an applicant conducts a Neighborhood/Developer meeting.

(4) Application Requirements for Pre-Application Conference.

(a) Application Form. Pre-application conference requests must be made on forms provided by the City Manager.

(b) Submittal Requirements. Pre-application conference requests must include:

(i) A completed application form;

(ii) Payment of the application fee;

(iii) The information required, if any, for the specific pre-application conference sought; and

(iv) Any additional information the applicant deems necessary to demonstrate the nature and scope of the proposal in sufficient detail to allow City staff to review and comment.

(5) Scheduling of Pre-Application Conference. Upon receipt of a complete application, the City Manager will schedule the pre-application conference. The City Manager will coordinate the involvement of city departments, as appropriate, in the pre-application conference. Pre-application conferences are not open to the general public.

(6) Validity Period for Mandatory Pre-Application Conferences; Follow-Up Conferences. A follow-up conference is required for those mandatory pre-application conferences that have previously been held when:

(a) An application relating to the proposed development that was the subject of the pre-application conference has not been submitted within six (6) months of the pre-application conference;

- (b) The proposed use, layout, and/or design of the proposal have significantly changed; or**
- (c) The owner and/or developer of a project changes after the pre-application conference and prior to application submittal.**

Finding:

The subject land use action is identified as requiring a pre-application conference in Table 32-1. The applicant participated in a pre-application meeting on August 18, 2021. The applicant has also discussed the project with staff by phone call and email in-follow-ups to the pre-application meeting date. These standards are met.

Section 32.120 – Neighborhood/Developer Meetings.

- (1) Purpose.** The purpose of this meeting is to provide a means for the applicant and surrounding property owners to meet to review a development proposal and identify issues regarding the proposal so they can be considered prior to the application submittal. The meeting is intended to allow the developer and neighbors to share information and concerns regarding the project. The applicant may consider whether to incorporate solutions to these issues prior to application submittal.
- (2) When Mandatory.** Neighborhood/developer meetings are mandatory for all land use actions identified in Table 32-1 as requiring a neighborhood/developer meeting. An applicant may voluntarily conduct a neighborhood/developer meeting even if it is not required and may conduct more than one neighborhood/developer meeting at their election.
- (3) Timing.** A neighborhood/developer meeting must be held after a pre-application meeting with City staff, but before submittal of an application.
- (4) Time and Location.** Required neighborhood/developer meetings must be held within the city limits of the City of Tualatin at the following times:
 - (a)** If scheduled on a weekday, the meeting must begin no earlier than 6:00 p.m.
 - (b)** If scheduled on a weekend, the meeting must begin between 10:00 a.m. and 6:00 p.m.
- (5) Notice Requirements.**
 - (a)** The applicant must provide notice of the meeting at least 14 calendar days and no more than 28 calendar days before the meeting. The notice must be by first class mail providing the date, time, and location of the meeting, as well as a brief description of the proposal and its location. The applicant must keep a copy of the notice to be submitted with their land use application.
 - (b)** The applicant must mail notice of a neighborhood/developer meeting to the following persons:
 - (i)** All property owners within 1,000 feet measured from the boundaries of the subject property;
 - (ii)** All property owners within a platted residential subdivision that is located within 1,000 feet of the boundaries of the subject property. The notice area includes the entire subdivision and not just those lots within 1,000 feet. If the residential subdivision is one of two or more individually platted phases sharing a single subdivision name, the notice area need not include the additional phases; and
 - (iii)** All designated representatives of recognized Citizen Involvement Organizations as established in TMC Chapter 11-9.
 - (c)** The City will provide the applicant with labels for mailing for a fee.
 - (d)** Failure of a property owner to receive notice does not invalidate the neighborhood/developer meeting proceedings.
- (6) Neighborhood/Developer Sign Posting Requirements.** The applicant must provide and post on the subject property, at least 14 calendar days before the meeting. The sign must conform to the design

and placement standards established by the City for signs notifying the public of land use actions in TDC 32.150.

(7) Neighborhood/Developer Meeting Requirements. The applicant must have a sign-in sheet for all attendees to provide their name, address, telephone number, and email address and keep a copy of the sign-in sheet to provide with their land use application. The applicant must prepare meeting notes identifying the persons attending, those commenting and the substance of the comments expressed, and the major points that were discussed. The applicant must keep a copy of the meeting notes for submittal with their land use application.

Finding:

The applicant has provided evidence within Exhibit A6 that they held a Neighborhood/Developer meeting on September 16, 2021, 104 days prior to application submittal on December 29, 2021. The applicant has provided documentation of sign posting and notification in compliance with this section, as well as a sign-in sheet and notes from the meeting. These standards are met.

Section 32.130 – Initiation of Applications.

(1) Type I, Type II, Type III, and Type IV-A Applications. Type I, Type II, Type III, and Type IV-A applications may be submitted by one or more of the following persons:

- (a) The owner of the subject property;
- (b) The contract purchaser of the subject property, when the application is accompanied by proof of the purchaser's status as such and by the seller's written consent;
- (c) A lessee in possession of the property, when the application is accompanied by the owners' written consent; or
- (d) The agent of any of the foregoing, when the application is duly authorized in writing by a person authorized to submit an application by paragraphs (a), (b) or (c) of this subsection, and accompanied by proof of the agent's authority.

[...]

Finding:

The application has been signed by the property owners Gary and Ricky Walgraeve. This standard is met.

Section 32.140 – Application Submittal.

(1) Submittal Requirements. Land use applications must be submitted on forms provided by the City. A land use application may not be accepted in partial submittals. All information supplied on the application form and accompanying the application must be complete and correct as to the applicable facts. Unless otherwise specified, all of the following must be submitted to initiate completeness review under TDC 32.160:

- (a) A completed application form. The application form must contain, at a minimum, the following information:
 - (i) The names and addresses of the applicant(s), the owner(s) of the subject property, and any authorized representative(s) thereof;
 - (ii) The address or location of the subject property and its assessor's map and tax lot number;
 - (iii) The size of the subject property;
 - (iv) The comprehensive plan designation and zoning of the subject property;
 - (v) The type of application(s);
 - (vi) A brief description of the proposal; and
 - (vii) Signatures of the applicant(s), owner(s) of the subject property, and/or the duly authorized representative(s) thereof authorizing the filing of the application(s).
- (b) A written statement addressing each applicable approval criterion and standard;

(c) Any additional information required under the TDC for the specific land use action sought;
(d) Payment of the applicable application fee(s) pursuant to the most recently adopted fee schedule;

(e) Recorded deed/land sales contract with legal description.

(f) A preliminary title report or other proof of ownership.

(g) For those applications requiring a neighborhood/developer meeting:

(i) The mailing list for the notice;

(ii) A copy of the notice;

(iii) An affidavit of the mailing and posting;

(iv) The original sign-in sheet of participants; and

(v) The meeting notes described in TDC 32.120(7).

(h) A statement as to whether any City-recognized Citizen Involvement Organizations (CIOs) whose boundaries include, or are adjacent to, the subject property were contacted in advance of filing the application and, if so, a summary of the contact. The summary must include the date when contact was made, the form of the contact and who it was with (e.g. phone conversation with neighborhood association chairperson, meeting with land use committee, presentation at neighborhood association meeting), and the result;

(i) Any additional information, as determined by the City Manager, that may be required by another provision, or for any other permit elsewhere, in the TDC, and any other information that may be required to adequately review and analyze the proposed development plan as to its conformance to the applicable criteria;

(2) Application Intake. Each application, when received, must be date-stamped with the date the application was received by the City, and designated with a receipt number and a notation of the staff person who received the application.

(3) Administrative Standards for Applications. The City Manager is authorized to establish administrative standards for application forms and submittals, including but not limited to plan details, information detail and specificity, number of copies, scale, and the form of submittal.

Finding:

The applicant submitted the subject application on December 29, 2021. The applicant submitted additional information on February 25, 2022, March 14, 2022, March 30, 2022, April 1, 2022, April 4, 2022 and April 22, 2021 with the application being deemed complete on May 3, 2022. The applicant made two other submittals after the application was deemed complete including May 20, 2022 and May 23, 2022. The general land use submittal requirements were included with this application. These standards are met.

Section 32.150 - Sign Posting.

(1) When Signs Posted. Signs in conformance with these standards must be posted as follows:

(a) Signs providing notice of an upcoming neighborhood/developer meeting must be posted prior to a required neighborhood/developer meeting in accordance with Section 32.120(6); and

(b) Signs providing notice of a pending land use application must be posted after land use application has been submitted for Type II, III and IV-A applications.

(2) Sign Design Requirements. The applicant must provide and post a sign(s) that conforms to the following standards:

(a) Waterproof sign materials;

(b) Sign face must be no less than eighteen (18) inches by twenty-four (24) inches (18" x 24"); and

(c) Sign text must be at least two (2) inch font.

(3) On-site Placement. The applicant must place one sign on their property along each public street frontage of the subject property. (Example: If a property adjoins four public streets, the applicant must place a sign at each of those public street frontages for a total of four signs). The applicant cannot place the sign within public right of way.

(4) Removal. If a sign providing notice of a pending land use application disappears prior to the final decision date of the subject land use application, the applicant must replace the sign within forty-eight (48) hours of discovery of the disappearance or of receipt of notice from the City of its disappearance, whichever occurs first. The applicant must remove the sign no later than fourteen (14) days after:

(a) The meeting date, in the case of signs providing notice of an upcoming neighborhood/developer meeting; or

(b) The City makes a final decision on the subject land use application, in the case of signs providing notice of a pending land use application.

Finding:

The applicant provided certification within Exhibit A6 that signs in conformance with this section were placed on site in accordance with this section. This standard is met.

Section 32.160 – Completeness Review.

(1) Duration. Except as otherwise provided under ORS 227.178, the City Manager must review an application for completeness within 30 days of its receipt.

(2) Considerations. Determination of completeness will be based upon receipt of the information required under TDC 32.140 and will not be based on opinions as to quality or accuracy. Applications that do not respond to relevant code requirements or standards can be deemed incomplete. A determination that an application is complete indicates only that the application is ready for review on its merits, not that the City will make a favorable decision on the application.

(3) Complete Applications. If an application is determined to be complete, review of the application will commence.

(4) Incomplete Applications. If an application is determined to be incomplete, the City Manager must provide written notice to the applicant identifying the specific information that is missing and allowing the applicant the opportunity to submit the missing information. An application which has been determined to be incomplete must be deemed complete for purposes of this section upon receipt of:

(a) All of the missing information;

(b) Some of the missing information and written notice from the applicant that no other information will be provided; or

(c) Written notice from the applicant that none of the missing information will be provided.

(5) Vesting. If an application was complete at the time it was first submitted, or if the applicant submits additional required information within 180 days of the date the application was first submitted, approval or denial of the application must be based upon the standards and criteria that were in effect at the time the application was first submitted.

(6) Void Applications. An application is void if the application has been on file with the City for more than 180 days and the applicant has not provided the missing information or otherwise responded, as provided in subsection (4) of this section.

Finding:

The subject application was submitted on December 29, 2021 and deemed incomplete on January 27, 2022. The applicant submitted additional material and the application was deemed complete on May 3, 2022. These standards are met.

TDC 32.170. - Revised Applications.

Revisions or alterations of an application may be made following the determination that an application is complete, provided such revisions or alterations do not render the application incomplete and do address applicable requirements. When revisions or alterations are desired by the applicant or required by the City, the applicant must provide fully revised application materials and clearly identifying those application materials which are revised.

[...]

Finding:

The applicant submitted revised material on May 20, 2022 and a revised narrative on May 23, 2022, after the application being deemed complete on May 3, 2022. The revisions addressed several staff concerns and did not render the application incomplete. This standard is met.

Section 32.230 – Type III Procedure (Quasi-Judicial Review – Public Hearing).

Type III decisions involve the use of discretion and judgment and are made by the Planning Commission or Architectural Review Board after a public hearing with an opportunity for appeal to the City Council. The decision body for each application type is specified in Table 32-1. A hearing under these procedures provides a forum to apply standards to a specific set of facts to determine whether the facts conform to the applicable criteria and the resulting determination will directly affect only a small number of identifiable persons.

(1) Submittal Requirements. Type III applications must include the submittal information required by TDC 32.140(1).

(2) Determination of Completeness. After receiving an application for filing, the City Manager will review the application will for completeness in accordance with TDC 32.160.

(3) Written Notice of Public Hearing – Type III. Once the application has been deemed complete, the City must mail by regular first class mail Notice of a Public Hearing to the following individuals and agencies no fewer than 20 days before the hearing.

(a) Recipients:

(i) The applicant and, the owners of the subject property;

(ii) All property owners within 1,000 feet measured from the boundaries of the subject property;

(iii) All property owners within a platted residential subdivision that is located within 1,000 feet of the boundaries of the subject property. The notice area includes the entire subdivision and not just those lots within 1,000 feet. If the residential subdivision is one of two or more individually platted phases sharing a single subdivision name, the notice area need not include the additional phases;

(iv) All recognized neighborhood associations within 1,000 feet from the boundaries of the subject property;

(v) All designated representatives of recognized Citizen Involvement Organizations as established in TMC Chapter 11-9;

(vi) Any person who submits a written request to receive a notice;

(vii) Any governmental agency that is entitled to notice under an intergovernmental agreement entered into with the City and any other affected agencies, including but not limited to: school districts; fire district; where the project either adjoins or directly affects a

state highway, the Oregon Department of Transportation; and where the project site would access a County road or otherwise be subject to review by the County, then the County; and Clean Water Services; Tri Met; and, ODOT Rail Division and the railroad company if a railroad-highway grade crossing provides or will provide the only access to the subject property. The failure of another agency to respond with written comments on a pending application does not invalidate an action or permit approval made by the City under this Code;

(viii) Utility companies (as applicable); and,
(ix) Members of the decision body identified in Table 32-1.

(b) The Notice of a Public Hearing, at a minimum, must contain all of the following information:

(i) The names of the applicant(s), any representative(s) thereof, and the owner(s) of the subject property;

(ii) The street address if assigned, if no street address has been assigned then Township, Range, Section, Tax Lot or Tax Lot ID;

(iii) The type of application and a concise description of the nature of the land use action;

(iv) A list of the approval criteria by TDC section for the decision and other ordinances or regulations that apply to the application at issue;

(v) Brief summary of the local decision making process for the land use decision being made and a general explanation of the requirements for submission of testimony and the procedure for conduct of hearings;

(vi) The date, time and location of the hearing;

(vii) Disclosure statement indicating that if any person fails to address the relevant approval criteria with enough detail, he or she may not be able to appeal to the Land Use Board of Appeals on that issue, and that only comments on the relevant approval criteria are considered relevant evidence;

(viii) The name of a City representative to contact and the telephone number where additional information may be obtained; and

(ix) Statement that the application and all documents and evidence submitted to the City are in the public record and available for review, and that copies can be obtained at a reasonable cost from the City; and

(x) Statement that a copy of the staff report will be available for inspection at no cost at least seven days prior to the hearing and will be provided at reasonable cost.

(c) Failure of a person or agency to receive a notice, does not invalidate any proceeding in connection with the application, provided the City can demonstrate by affidavit that required notice was given.

Finding:

After application submittal and completeness review as required by this section, notice for the Type III hearing concerning AR21-0018 was mailed by city staff on May 20, 2022 and contained the information required by this section (Exhibit B). No public comments were received as of the date this report was drafted. Service Provider Letters were received and can be found in Exhibit C (TVF&R) and Exhibit D (Clean Water Services). These standards are met.

(4) Conduct of the Hearing - Type III.

The person chairing the hearing must follow the order of proceedings set forth below. These procedures are intended to provide all interested persons a reasonable opportunity to participate in the hearing process and to provide for a full and impartial hearing on the application before the body. Questions concerning the propriety or the conduct of a hearing will be addressed to the chair with a request for a ruling. Rulings from the chair must, to the extent possible, carry out the stated intention of these procedures. A ruling given by the chair on such question may be modified or

reversed by a majority of those members of the decision body present and eligible to vote on the application before the body. The procedures to be followed by the chair in the conduct of the hearing are as follows:

- (a) At the commencement of the hearing, the person chairing the hearing must state to those in attendance all of the following information and instructions:**
 - (i) The applicable substantive criteria;**
 - (ii) That testimony, arguments and evidence must be directed toward the criteria described in paragraph (i) of this subsection or other criteria in the plan or land use regulation which the person believes to apply to the decision;**
 - (iii) That failure to raise an issue accompanied by statements or evidence sufficient to afford the decision maker and the parties an opportunity to respond to the issue precludes appeal to the State Land Use Board of Appeals based on that issue;**
 - (iv) At the conclusion of the initial evidentiary hearing, the decision body must deliberate and make a decision based on the facts and arguments in the public record; and**
 - (v) Any participant may ask the decision body for an opportunity to present additional relevant evidence or testimony that is within the scope of the hearing; if the decision body grants the request, it will schedule a date to continue the hearing as provided in TDC 32.230(4)(e), or leave the record open for additional written evidence or testimony as provided TDC 32.230(4)(f).**
- (b) The public is entitled to an impartial decision body as free from potential conflicts of interest and pre-hearing ex parte (outside the hearing) contacts as reasonably possible. Where questions related to ex parte contact are concerned, members of the decision body must follow the guidance for disclosure of ex parte contacts contained in ORS 227.180. Where a real conflict of interest arises, that member or members of the decision body must not participate in the hearing, except where state law provides otherwise. Where the appearance of a conflict of interest is likely, that member or members of the decision body must individually disclose their relationship to the applicant in the public hearing and state whether they are capable of rendering a fair and impartial decision. If they are unable to render a fair and impartial decision, they must be excused from the proceedings.**
- (c) Presenting and receiving evidence.**
 - (i) The decision body may set reasonable time limits for oral presentations and may limit or exclude cumulative, repetitious, irrelevant, or personally derogatory testimony or evidence;**
 - (ii) No oral testimony will be accepted after the close of the public hearing. Written testimony may be received after the close of the public hearing only as provided by this section; and**
 - (iii) Members of the decision body may visit the property and the surrounding area, and may use information obtained during the site visit to support their decision, if the information relied upon is disclosed at the beginning of the hearing and an opportunity is provided to dispute the evidence.**
- (d) The decision body, in making its decision, must consider only facts and arguments in the public hearing record; except that it may take notice of facts not in the hearing record (e.g., local, state, or federal regulations; previous City decisions; case law; staff reports). Upon announcing its intention to take notice of such facts in its deliberations, it must allow persons who previously participated in the hearing to request the hearing record be reopened, as necessary, to present evidence concerning the newly presented facts.**
- (e) If the decision body decides to continue the hearing, the hearing must be continued to a date that is at least seven days after the date of the first evidentiary hearing (e.g., next regularly scheduled meeting). An opportunity must be provided at the continued hearing for persons to present and respond to new written evidence and oral testimony. If new written evidence is**

submitted at the continued hearing, any person may request, before the conclusion of the hearing, that the record be left open for at least seven days, so that he or she can submit additional written evidence or arguments in response to the new written evidence. In the interest of time, after the close of the hearing, the decision body may limit additional testimony to arguments and not accept additional evidence.

(f) If the decision body leaves the record open for additional written testimony, the record must be left open for at least seven days after the hearing. Any participant may ask the decision body in writing for an opportunity to respond to new evidence (i.e., information not disclosed during the public hearing) submitted when the record was left open. If such a request is filed, the decision body must reopen the record, as follows:

(i) When the record is reopened to admit new evidence or arguments (testimony), any person may raise new issues that relate to that new evidence or testimony;

(ii) An extension of the hearing or record granted pursuant to this section is subject to the limitations of TDC 32.030, unless the applicant waives his or her right to a final decision being made within the required timeframe; and

(iii) If requested by the applicant, the decision body must grant the applicant at least seven days after the record is closed to all other persons to submit final written arguments, but not evidence, provided the applicant may expressly waive this right.

Finding:

The Architectural Review Board will follow the hearing requirements set forth by this section of the TDC. These standards will be met.

(5) Notice of Adoption of a Type III Decision.

Notice of Adoption must be provided to the property owner, applicant, and any person who provided testimony at the hearing or in writing. The Type III Notice of Adoption must contain all of the following information:

(a) A description of the applicant's proposal and the City's decision on the proposal, which may be a summary, provided it references the specifics of the proposal and conditions of approval in the public record;

(b) The address or other geographic description of the property proposed for development, including a map of the property in relation to the surrounding area;

(c) A statement that a copy of the decision and complete case file, including findings, conclusions, and conditions of approval, if any, is available for review and how copies can be obtained;

(d) The date the decision becomes final, unless a request for appeal is submitted; and

(e) The notice must include an explanation of rights to appeal the decision to the City Council in accordance with TDC 32.310.

(6) Appeal of a Type III Decision. Appeal of an Architectural Review Board or Planning Commission Type III Decision to the City Council may be made in accordance with TDC 32.310.

(7) Effective Date of a Type III Decision.

(a) The written order is the final decision on the application.

(b) The mailing date is the date of the order certifying its approval by the decision body.

(c) A decision of the Architectural Review Board or Planning Commission is final unless:

(i) a written appeal is received at the City offices within 14 calendar days of the date notice of the final decision is mailed; or

(ii) The City Manager or a member of the City Council requests a review of the decision within 14 calendar days of the date notice of the final decision is mailed.

[...]

Finding:

A final decision and any appeal will follow the requirements of this section. These standards will be met.

Chapter 33: Applications and Approval Criteria

[...]

Section 33.020 Architectural Review

[...]

(5) Approval Criteria.

(d) Large Commercial, Industrial, and Multifamily Development. Applications for Large Commercial, Industrial, and Multifamily Development must comply with the applicable standards and objectives in TDC Chapter 73A through 73G.

Finding:

The subject application, which is for large industrial development, must comply with the applicable standards and objectives in TDC 73A through 73G. These standards are met by the Findings and recommended Conditions of Approval for the subject application.

(9) Permit Expiration.

Architectural Review decisions (including Minor Architectural Review decisions) expire two (2) years from the effective date unless the applicant has received a building, or grading permit submitted in conjunction with a building permit application, substantial construction has occurred pursuant to the building permit, and an inspection has been performed by a member of the Building Division.

(10) Extension of Permit Expiration.

(a) An Architectural Review approval may be extended if the applicant, or successor interest, submits a written request for an extension of time within two (2) years of the effective date.

[...]

(c) Upon receipt of a request for an extension of time, the City will process the extension request as follows:

(i) If the City Manager approved the Architectural Review, then the City Manager will decide the extension request under the Type II procedures in TDC 32.220.

(ii) If the Architectural Review Board (ARB) approved the Architectural Review, then the ARB will decide the extension request under the Type III quasi-judicial procedures in TDC 32.230.

(d) The City must provide notice of the extension request to past recipients of the Architectural Review notice of decision and the applicant must post a sign pursuant to TDC 32.150.

(e) The City Manager or Architectural Review Board, as applicable, may grant the extension of time upon finding the following:

(i) The applicant submitted a written extension request prior to the expiration date;

(ii) There have been no significant changes in any conditions, ordinances, regulations or standards of the City or applicable agencies that affect the previously approved project so as to warrant its resubmittal for Architectural Review;

(iii) If the previously approved application included a special study, the applicant provided a status report includes a letter from a recognized professional that states that conditions have not changed after the original approval and that no new study is warranted; and

(iv) If the site has been neglected so as to allow the site to become blighted, the deciding party must factor this into its decision.

(f) The City Manager or Architectural Review Board, as applicable, may grant or deny the extension request. The decision must be in writing and must be made within sixty (60) days of receipt of the

request for extension. If the decision is to grant the extension, the extension can be no more than a single one-year extension.

(g) Upon making the decision, the City must provide notice of the extension decision as provided in TDC 32.220 for Type II decisions made by the City Manager and TDC 32.230 for Type III decisions made by the Architectural Review Board.

[...]

Finding:

The proposed application is approved subject the compliance with the above criteria. With recommended Condition of Approval A1, these standards are met.

Section 33.110 Tree Removal Permit/Review

(1) Purpose. To regulate the removal of trees within the City limits other than trees within the public right-of-way which are subject to TDC Chapter 74.

(2) Applicability. No person may remove a tree on private property within the City limits, unless the City grants a tree removal permit, consistent with the provisions of this Section.

[...]

(3) Procedure Type. Tree Removal Permit applications are subject to Type II Review in accordance with TDC Chapter 32. Tree Removal Permit applications submitted with an Architectural Review, Subdivision, or Partition application will be processed in conjunction with the Architectural Review, Subdivision, or Partition decision.

Finding:

The applicant has submitted a tree preservation plan and sufficient documentation in conjunction with the Architectural Review application (Exhibit A3). The criteria in TDC 33.110, addressed below, are the basis of approval or denial for tree removal as part of this Architectural Review. These standards are met.

Section 33.110 Tree Removal Permit/Review Approval Criteria

[...]

(5) Approval Criteria.

(a) An applicant must satisfactorily demonstrate that at least one of the following criteria are met:

(i) The tree is diseased and:

(A) The disease threatens the structural integrity of the tree; or

(B) The disease permanently and severely diminishes the esthetic value of the tree; or

(C) The continued retention of the tree could result in other trees being infected with a disease that threatens either their structural integrity or esthetic value.

(ii) The tree represents a hazard which may include but not be limited to:

(A) The tree is in danger of falling; or

(B) Substantial portions of the tree are in danger of falling.

(iii) It is necessary to remove the tree to construct proposed improvements based on Architectural Review approval, building permit, or approval of a Subdivision or Partition Review.

(b) If none of the conditions in TDC 33.110(5)(a) are met, the certified arborist must evaluate the condition of each tree.

(i) Evergreen Trees. An evergreen tree which meets any of the following criteria as determined by a certified arborist will not be required to be retained:

(A) Trunk Condition - extensive decay and hollow; or

(B) Crown Development - unbalanced and lacking a full crown;

(ii) Deciduous Trees. A deciduous tree which meets any of the following criteria as determined by a certified arborist will not be required to be retained:

- (A) Trunk Condition** - extensive decay and hollow;
- (B) Crown Development** - unbalanced and lacking a full crown; or
- (C) Structure** - Two or more dead limbs.

[...]

Finding:

The applicant’s arborist surveyed 103 trees over 6” dbh on site. The report recommends removal of 77 trees that are either in poor health or are in conflict with building or parking lot locations. Of the on-site trees proposed for removal, all are proposed to be removed to construct the proposed improvements in accordance with criterion 33.110(5)(a)(iii). The tree survey also identified tree protection measures. With recommended Condition of Approval A2 related to tree protection, these standards are met.

Chapter 61: General Manufacturing (MG) Zone

[...]

Section 61.200. - Use Categories.

(1) Use Categories. Table 61-1 lists use categories Permitted Outright (P) or Conditionally Permitted (C) in the MG zone. Use categories may also be designated as Limited (L) and subject to the limitations listed in Table 61-1 and restrictions identified in TDC 61.210. Limitations may restrict the specific type of use, location, size, or other characteristics of the use category. Use categories which are not listed are prohibited within the zone, except for uses which are found by the City Manager or appointee to be of a similar character and to meet the purpose of this zone, as provided in TDC 31.070.

[...]

**Table 61-1
 Use Categories in the MG Zone**

USE CATEGORY	STATUS	LIMITATIONS AND CODE REFERENCES
[...]		
INDUSTRIAL USE CATEGORIES		
[...]		
Light Manufacturing	P	—
Warehouse and Freight Movement	P/C	Conditional use required for warehousing of building materials and supplies. All other uses permitted outright.
[...]		

Finding:

The project narrative identifies “Light Manufacturing” and “Warehouse and Freight Movement” uses for the site. TDC 39.400 describes Light Manufacturing uses as being involved in the assembly, fabrication, or processing of goods and materials using processes that ordinarily do not create noise, smoke, fumes, odors, glare, or health or safety hazards outside of the building or lot where such activity takes place, and where such processes are housed entirely within a building. Light Manufacturing also includes the

repair and/or servicing of industrial, business, or consumer machinery, equipment, products or by-products, or in training or instruction of such repair or servicing. Products are generally not displayed or sold on site, but if so, sales and display are accessory to the primary use and subject to restrictions, such as size, set forth in the planning district in which the use will be located. All industrial uses must continually comply with the Environmental Regulations specified in TDC Chapter 63. Warehouse and freight movement are described in TDC 39.440 and characterized by the storage, repackaging, delivery and movement of products. A conditional use permit is required for warehousing of building materials and supplies, while other warehouse and freight movement uses are permitted in the subject zone. Additional review may be necessary at the time of tenant improvements. With recommended Condition of Approval A34, this standard is met.

[...]

Section 61.300 – Development Standards.

Development standards in the MG zone are listed in Table 61-2. Additional standards may apply to some uses and situations, see TDC 61.310.

**Table 61-2
 Development Standards in the MG Zone**

	Requirement	Minimum Proposed
MINIMUM SETBACKS		
Front	30	61'6"
Side	0-50 feet	70'9"
Rear	0-50 feet	65'10"
Parking and Circulation Areas	5 feet No minimum setback required adjacent to joint access approach in accordance with TDC 73C.	5'
STRUCTURE HEIGHT		
Maximum Height	60 feet	42' 8"

[...]

Finding:

As shown in the table above, the minimum setbacks and maximum building height development standards are met.

Section 61.310. - Additional Development Standards.

(1)Outdoor Uses. All uses must be conducted wholly within a completely enclosed building, except off-street parking and loading, Basic Utilities, Wireless Communication Facilities and outdoor play areas of child day care centers as required by state day care certification standards.

[...]

Finding:

The applicant has not proposed outdoor uses. With recommended Condition of Approval A35, this standard is met.

Section 63.020 – Applicability.

The regulations of this Chapter apply to:

- (1) All industrial uses and utilities, regardless of the Planning District in which they are located, and**
 - (2) All Manufacturing Planning Districts, regardless of the use category**
- [...]

Finding:

The site is located in the General Manufacturing (MG) District and the proposal includes industrial uses. Therefore the noise, vibration, air quality, odor, heat and glare, materials storage, waste disposal, and dangerous substances regulations of this Chapter apply. With recommended Condition of Approval A36, these standards are met.

Chapter 70: Floodplain District (FP)

Section 70.040 - Lands to Which This Chapter Applies.

This chapter shall apply to all areas of special flood hazards within the jurisdiction of the City of Tualatin.
[...]

Finding:

According to the FEMA Flood Mapping, the subject property is considered a Special Flood Hazard Area with the property designated as Zone AE and a small area Floodway located in the northwest corner of the property is also present within the confines of the property; therefore this Chapter applies to the proposed industrial development.

TDC 70.110. - Development Permit Required.

A development permit shall be obtained before construction or development begins within any area of special flood hazard established by TDC 70.050 (Basis for Establishing the Areas of Special Flood Hazard). The permit shall be for all structures, including manufactured homes, as set forth in TDC 70.030 (Definitions), and for all other development, including fill and other activities, also as set forth in TDC 70.030 (Definitions).

Finding:

The applicant has submitted this Architectural Review application for review of the proposed construction of three industrial shell buildings. This standard is met.

Section 70.170. - General Standards.

In all areas of special flood hazards, the following standards are required:

(1) Anchoring.

(a) All new construction and substantial improvements shall be anchored to prevent flotation, collapse or lateral movement of the structure.

(b) All manufactured dwellings shall be anchored according to TDC 70.180(3)(Specific Standards for Manufactured Dwellings).

(2) Construction Materials and Methods.

(a) All new construction and substantial improvements shall be constructed with materials and utility equipment resistant to flood damage.

(b) All new construction and substantial improvements shall be constructed using methods and practices that minimize flood damage.

(c) Electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities shall be designed and/or otherwise elevated or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

(3) Utilities.

(a) All new and replacement water supply systems shall be designed to minimize or eliminate infiltration of flood waters into the system;

(b) New and replacement sanitary sewage systems shall be designed to minimize or eliminate infiltration of flood waters into the systems and discharge from the systems into flood waters; and

(c) On-site waste disposal systems shall be located so as to avoid impairment to them or contamination from them during flooding consistent with the Oregon Department of Environmental Quality.

[...]

Section 70.180 - Specific Standards.

In all areas of special flood hazards where base flood elevation data has been provided (Zones A1-30, AH, and AE) as set forth in TDC 70.050 (Basis for Establishing the Areas of Special Flood Hazard) or TDC 70.140(2) (Use of Other Base Flood Data (In A and V Zones)), the following provisions are required:

[...]

(2) *Nonresidential Construction.* New construction and substantial improvement of any commercial, industrial or other nonresidential structure shall either have the lowest floor, including basement, elevated to a minimum according to ASCE 24; or, together with attendant utility and sanitary facilities, shall:

(a) Be flood proofed so that below the base flood level the structure is watertight, with walls substantially impermeable to the passage of water;

(b) Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy;

(c) Be certified by a registered professional engineer or architect that the design and methods of construction are in accordance with accepted standards of practice for meeting provisions of this subsection based on their development and review of the structural design, specifications and plans. Such certification shall be provided to the official as set forth in TDC 70.140(3)(b) (Duties and Responsibilities of the Local Floodplain Administrator);

(d) Nonresidential structures that are elevated, not floodproofed, must meet the same standards for space below the lowest floor as described in TDC 70.180(1)(d)(Specific Standards for Residential Construction).

(e) Applicants shall supply a Maintenance Plan for the entire structure to include but not limited to: exterior envelope of structure; all penetrations to the exterior of the structure; all shields, gates, barriers, or components designed to provide floodproofing protection to the structure; all seals or gaskets for shields, gates, barriers, or components; and, the location of all shields, gates, barriers, and components as well as all associated hardware, and any materials or specialized tools necessary to seal the structure.

[...]

(6) Below-Grade Crawl Spaces. Below-grade crawlspaces are allowed subject to the following standards as found in FEMA Technical Bulletin 11-01, Crawlspaces Construction for Buildings Located in Special Flood Hazard Areas:

(a) The building must be designed and adequately anchored to resist flotation, collapse, and lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy. Hydrostatic loads and the effects of buoyancy can usually be addressed through the

required openings stated in Section TDC 70.180(1)(Specific Standards for Residential Structures) above. Because of hydrodynamic loads, crawlspace construction is not allowed in areas with flood velocities greater than five feet per second unless the design is reviewed by a qualified design professional, such as a registered architect or professional engineer. Other types of foundations are recommended for these areas.

(b) The crawlspace is an enclosed area below the base flood elevation (BFE) and, as such, must have openings that equalize hydrostatic pressures by allowing the automatic entry and exit of floodwaters. The bottom of each flood vent opening can be no more than one-foot above the lowest adjacent exterior grade.

(c) Portions of the building below the BFE must be constructed with materials resistant to flood damage. This includes not only the foundation walls of the crawlspace used to elevate the building, but also any joists, insulation, or other materials that extend below the BFE. The recommended construction practice is to elevate the bottom of joists and all insulation above BFE.

(d) Any building utility systems within the crawlspace must be elevated above B components during flood conditions. Ductwork, in particular, must either be placed above the BFE or sealed from floodwaters.

(e) The interior grade of a crawlspace below the BFE must not be more than two feet below the lowest adjacent exterior grade.

(f) The height of the below-grade crawlspace, measured from the interior grade of the crawlspace to the top of the crawlspace foundation wall must not exceed four feet at any point. The height limitation is the maximum allowable unsupported wall height according to the engineering analyses and building code requirements for flood hazard areas.

(g) There must be an adequate drainage system that removes floodwaters from the interior area of the crawlspace. The enclosed area should be drained within a reasonable time after a flood event. The type of drainage system will vary because of the site gradient and other drainage characteristics, such as soil types. Possible options include natural drainage through porous, well-drained soils and drainage systems such as perforated pipes, drainage tiles or gravel or crushed stone drainage by gravity or mechanical means.

(h) The velocity of floodwaters at the site shall not exceed five feet per second for any crawlspace. For velocities in excess of five feet per second, other foundation types should be used.

For more detailed information refer to FEMA Technical Bulletin 11-01

Finding:

The plans show the proposed structure within the floodplain. FEMA identifies the floodplain elevation at this site as 136.1 to 142.1 feet, NAVD 1988, from east to west. All utilities planned with this development which are located within the floodplain must be designed to meet code.

A flood hazard area development permit must be obtained prior to construction. This permit must include final approved plans identifying balanced cut and fill. Elevation certificates prior to and post construction must show construction in accordance with TDC 70.170 and 70.180.

With recommended Conditions of Approval A3, A13 and A28, these standards are met.

Chapter 71: Wetlands Protection District (WPD)

TDC 71.030. - Applicability.

Uses located within the Wetlands Protection District (WPD) shall comply with the certification requirements contained in TDC 71.040.

Finding:

The subject property contains several natural resources including NRPO-WCNA Wetland Conservation Natural Areas. According to Map 71-1 the subject property is not located within a Wetland Protection District (WPD), therefore Chapter 71 is not applicable. The WPD is located just northeast and east of the subject property.

CHAPTER 72. - NATURAL RESOURCE PROTECTION OVERLAY DISTRICT (NRPO)

[...]

TDC 72.013. - Significant Natural Resources.

The following natural resource sites identified in the City of Tualatin Natural Resource Inventory and Local Wetlands Inventory (December, 1995) are Significant Natural Resources:

Finding:

The subject property, Tax Map/Lot2S122D000550, is not listed as a Significant Natural Resource in TDC 72.013.

TDC 72.020. - Location of Greenways and Natural Areas.

- (1) The designated significant natural resources are the Greenways and Natural Areas on Map 72-1, which shows the general location of the NRPO District.**
- (2) Lands in the Wetland Protection District (WPD) are subject to Chapter 71, and other applicable regulations, but not Chapter 72.**

Finding:

Map 72-1 illustrates Wetland Conservation Natural Areas (WCNA) and Open Space Natural Areas (OSNA) within the confines of the subject property, therefore Chapter 72 is applicable. The subject property does not contain land that is within a Wetlands Protection District, therefore Chapter 71 is not applicable.

TDC 72.040. - Natural Areas.

- (1) Natural Areas are the wetlands and upland open space areas on Map 72-1. They provide flood control, water quality, erosion control, fish and wildlife habitat, and valuable scenic qualities. Natural Areas may include restored and enhanced wetlands, park sites and other areas accessible by the public for passive recreation.**
- (2) Wetland Natural Areas.**
 - (a) Wetland Preservation Natural Areas (NRPO-WPNA) are shown on Map 72-1. They include all land within a delineated wetland boundary.**
 - (b) Wetland Conservation Natural Areas (NRPO-WCNA) are shown on Map 72-1. Except as provided in Subsection (c), they include all land within a delineated wetland boundary.**
 - (c) For uses not permitted in TDC 72.060(3), excavation, fill or removal in a NRPO-WCNA is allowed subject to the Oregon Division of State Lands (DSL) requirements and the following standards:**
 - (i) The wetland acreage affected by the excavation, fill or removal shall not exceed 30 percent of the subject property's delineated wetland acreage. The wetland acreage affected shall include excavation, fill or removal activities conducted since March 1, 1996.**

- (ii) The excavation, fill or removal shall not reduce or block water features such as springs, drainage courses and streams.
- (iii) The wetland' s functions and values listed in the City of Tualatin Natural Resource Inventory and Local Wetlands Inventory (December, 1995) shall be retained or improved through mitigation and/or enhancement. The wetland' s functions and values may be assessed using the Oregon Freshwater Wetland Assessment Methodology (DSL, 1996, as amended).
- (iv) Mitigation shall be conducted either on the subject property or within the same stream watershed as the subject wetland unless the applicant demonstrates the impracticality of doing so.

Finding:

The subject property contains Natural Resource Protection Overlay - Wetland Conservation Natural Areas (NRPO-WCNA) land. On March 17, 2022, the applicant submitted a Joint Permit Application (JPA) to the Oregon Division of State Lands (DSL) and the Army Corp of Engineers for review and approval of proposed removal and fill activities related to the proposed construction. According to the DSL website, the JPA is under review through June 21, 2022. The applicant will be required to submit the approved JPA for review. Standards within TDC 72.040(c)(i), (ii), (iii) and (iv) will be evaluated with the submittal of the approved JPA. With recommended Condition of Approval A6, these standards are met.

(3) Open Space Natural Areas.

- (a) Open Space Natural Areas (NRPO-OSNA) are shown on Map 72-1. They include upland forests, upland forests associated with slopes or streams, upland meadows, upland meadows associated with slopes or streams, the geologic features of the Tonquin Scablands, areas with slopes greater than 25 percent, areas within 50 feet of a delineated wetland and areas within 50 feet of a stream top of bank.
- (b) The top of bank for the Tualatin River is as stated in TDC 72.030 and for all other streams is the bankfull stage. Slope is the vertical elevation divided by the horizontal distance of vertical change and is measured for a horizontal distance of 100 feet.
- (c) Land use and permit applications shall show the NRPO-OSNA Boundary and shall include information on wetland delineations, location of streams, top of bank, topography and a vegetation inventory.

[...]

Finding:

As depicted on Map 72-1, the subject property contains Natural Resource Protection Overlay - Open Space Natural Areas (NRPO-OSNA) land. All material submitted for all land use and other permit application must illustrate the NRPO-OSNA Boundary and information on the wetland delineations, location of streams, top of bank, topography and a vegetation inventory. With recommended Condition of Approval A7, these standards are met.

TDC 72.056. - Vegetated Corridors of Sensitive Areas.

Lands subject to these regulations are also subject to the regulations in the Unified Sewage Agency's Design and Construction Standards.

Finding:

There are Vegetated Corridors as identified in the applicant Natural Resource Assessment (Exhibit A8). The proposed development has been reviewed by Clean Water Services and a review Memorandum

(Exhibit D) will apply to all grading and construction activity. With recommended Condition of Approval A10(a)(ix), this standard is met.

TDC 72.060. - Development Restrictions in Greenways and Natural Areas.

(1) Except as provided in Subsection (2), no building, structure, grading, excavation, placement of fill, vegetation removal, impervious surface, use, activity or other development shall occur within Riverbank, Creek and Other Greenways, and Wetland and Open Space Natural Areas.

(2) The following uses, activities and types of development are permitted within Riverbank, Creek and Other Greenways, and Wetland and Open Space Natural Areas provided they are designed to minimize intrusion into riparian areas:

(a) Public bicycle or pedestrian ways, subject to the provisions of TDC 72.070.

(b) Public streets, including bridges, when part of a City approved transportation plan, and public utility facilities, when part of a City approved plan and provided appropriate restoration is completed.

(c) Except in Wetland Natural Areas, private driveways and pedestrian ways when necessary to afford access between portions of private property that may be bisected by a Greenway or Open Space Natural Area.

(d) Except in Creek Greenways and Wetland Natural Areas, outdoor seating for a restaurant within the Central Urban Renewal District, but outside of any sensitive area or its vegetated corridor.

(e) Public parks and recreational facilities including, but not limited to, boat ramps, benches, interpretive stations, trash receptacles and directional signage, when part of a City-approved Greenway or Natural Area enhancement plan.

(f) Landscaping, when part of a landscape plan approved through the Architectural Review process. City initiated landscape projects are exempt from the Architectural Review process. Landscaping in Greenways and Natural Areas shall comply with the approved Plant List in the Parks and Recreation Master Plan. When appropriate, technical advice shall be obtained from the Oregon Department of Fish and Wildlife, U.S. Soil Conservation Service, or similar agency, to ensure the proposed landscaping will enhance the preservation of any existing fish or wildlife habitats in the vicinity.

(g) Wildlife protection and enhancement, including the removal of non-native vegetation and replacement with native plant species.

(h) Except in Wetland Natural Areas, public boating facilities, irrigation pumps, water-related and water-dependent uses including the removal of vegetation necessary for the development of water-related and water-dependent uses, and replacement of existing structures with structures in the same location that do not disturb additional riparian surface.

(i) In Wetland Natural Areas, perimeter mowing and other cutting necessary for hazard prevention.

Finding:

The application is currently going through the Joint Permit Application (JPA) review process through with the Oregon Department of State Lands (DSL) and Army Corp of Engineers for all removal, fill and construction activity. The regional Ice Age Tonquin Trail is located along the eastern edge of the subject property. The Parks and Recreation Department has reviewed the proposal and have provided several conditions of approval related to the regional trail. The subject property does not contain a Greenway, TDC 72.070 is not applicable. With recommended Condition of Approval A25, these standards are met.

(3) The City may, through the subdivision, conditional use, architectural review, or other development approval process, attach appropriate conditions to approval of a development permit. Such conditions may include, but are not limited to:

- (a) Use of Greenways and Natural Areas for storm drainage purposes;**
- (b) Location of approved landscaping, pedestrian and bike access areas, and other non-building uses and activities in Greenways and Natural Areas;**
- (c) Setback of proposed buildings, parking lots, and loading areas away from the Greenway and Natural Area boundary.**

(4) Greenways and Natural Areas in which an access easement is owned by the City, but retained in private ownership, shall be maintained by the property owner in their natural state and may only be modified if a landscape and maintenance plan complies with the approved Plant List in the Parks and Recreation Master Plan, and has been approved through the Architectural Review process or by the Parks and Recreation Director when Architectural Review is not required.

(5) The Parks and Recreation Director shall be included as a commentor when a development application proposes dedication of Greenway or Natural Area property to the City or when development is pro-posed on Greenway or Natural Areas property maintained by the Parks and Recreation Department.

[...]

Finding:

The proposed development is considered at Type III Architecture Review process and will be considered by the Architectural Review Board on June 29, 2022. The Tualatin Parks and Recreation Department have provided Findings and Conditions of Approval that are applicable to the subject property (Exhibit E). With recommended Conditions of Approval A24 and A33, these standards are met.

TDC 72.070. - General Guidelines for Pedestrian and Bike Paths in Greenways.

To construct bike and pedestrian paths in greenways, the developer of the path shall adhere to the following guidelines, wherever practicable:

[...]

Finding:

The subject property does not contain a Greenway, therefore TDC 72.070 is not applicable.

TDC 72.085. - Landscaping Credit within Commercial and Industrial Planning Districts Adjacent to Greenways and Natural Areas.

(1) When a property owner in a Commercial, Institutional, or Industrial Planning District dedicates to the City a portion of the NRPO District, or vegetated corridor located within or adjacent to the NRPO District in accordance with a City-approved landscape plan, a Greenway and Natural Area Landscaping Credit shall be applied toward a portion of the site's percentage landscaping requirement.

(2) The amount of the Greenway and Natural Area Landscaping Credit shall be as provided in TDC Chapter 73. The applicant must meet all landscaping requirements in this Code to the satisfaction of the Planning Director through the Architectural Review process.

TDC 72.090. - Reduction in Setback Requirements.

When a property owner in a IN, CO, CR, CO/MR, ML, or MG Planning District dedicates to the City land in the NRPO District, a bikeway or pedestrian path facility, or a vegetated corridor located within or adjacent to the NRPO District, the minimum front yard setback may be reduced through the AR process as provided in Chapters 50, 51, 52, 55, 60, and 61.

[...]

Finding:

This section of the TDC was not addressed in the submitted materials. Landscaping credits have not been considered in the review of the proposed industrial development.

TDC 72.110. - Easements for Pedestrian and Bicycle Access.

In any portion of the NRPO District, the City may, through the subdivision, partition, conditional use, architectural review, or other applicable development approval process, require that easements for pedestrian and bicycle access and maintenance uses be granted as a condition of approval when said easements are necessary to achieve the purposes of the Parks and Recreation Master Plan, Greenway and Trail Development Plan (Figure 72-2), or Bicycle and Pedestrian Plan (Figure 11-4).

Finding:

Figure 72-2 illustrates the regional Ice Age Tonquin Trail being located along the eastern edge of the subject property which will require a minimum 15' wide easement to accommodate the pedestrian and bike path. With recommended Conditions of Approval A24 and A33, this standard is met.

TDC 72.120. - Wetlands Protection District.

In cases where land within the NRPO District is also within the Wetlands Protection District, Chapter 71, any development permitted by TDC 72.060 shall be subject to the provisions of Chapter 71.

Finding:

Although the subject property contains Wetland Conservation Natural Areas, it is not within a Wetlands Protection District. These standards are not applicable.

TDC 72.130. - Floodplain District.

In cases where land within the NRPO District is also within the Floodplain District, Chapter 70, any development permitted by TDC 72.060 shall be subject to the provisions of Chapter 70.

Finding:

The subject property contains two NRPO Districts, 100-Year Floodplain and Floodway. The requirements of Chapter 70 have been previously addressed within this report.

TDC 72.140. - Dedication of Land for Park Purposes.

Nothing in this chapter shall prohibit the dedication of land within the NRPO District to the public for park or open space purposes when the City Council finds that such dedication would be consistent with the purpose and objectives of the parks and recreation element of the Tualatin Public Facilities Plan.

TDC 72.150. - Modifications for Storm Drainage Improvements.

Nothing in this chapter shall prohibit the City or any property owner from altering, enlarging, straightening, piping, or otherwise modifying a creek channel in the NRPO District upon a finding by the City Engineer that such modification is necessary for maintaining the ability of the creek to transmit storm water run-off.

Finding:

If necessary in the future, this section of the TDC will be applied.

Chapter 73A – Site Design Standards

TDC 73A.010. - Site and Building Design Standards Purpose and Objectives.

(1) Purpose. The purpose of the site and building design objectives and standards found in TDC 73A through TDC 73G is to promote functional, safe, innovative, and attractive sites and buildings that are compatible with the surrounding environment, including, but not limited to:

- (a)** The building form, articulation of walls, roof design, materials, and placement of elements such as windows, doors, and identification features; and
- (b)** The placement, design, and relationship of proposed site elements such as buildings, vehicular parking, circulation areas, bikeways and bike parking, accessways, walkways, buffer areas, and landscaping.

(2) Objectives. The objectives of site and building design standards in TDC 73A through TDC 73G are to:

- (a)** Enhance Tualatin through the creation of attractively designed development and streetscapes;
- (b)** Encourage originality, flexibility, and innovation in building design;
- (c)** Create opportunities for, or areas of, visual and aesthetic interest for occupants and visitors to the site;
- (d)** Provide a composition of building elements which responds to function, land form, identity and image, accessibility, orientation and climatic factors;
- (e)** Conserve, protect, and restore fish and wildlife habitat areas, and maintain or create visual and physical corridors to adjacent fish and wildlife habitat areas;
- (f)** Enhance energy efficiency through the use of landscape and architectural elements; and
- (g)** Minimize disruption of natural site features such as topography, trees, and water features.

Finding:

The Architecture Review Board (ARB) will review the subject application and make a determination if the purpose and objectives of Chapter 73A have been adequately addressed. The applicant's narrative states that the proposed designs "articulate entries and features through the varied height of the roof parapet, the use of reveals, paint locations, canopies and windows to provide an aesthetically interesting building for occupants and visitors."

In the completeness letter dated May 3, 2022, there were a number of advisory items included (Exhibit J). Advisory items are suggestions to the applicant to make adjustments to their application material to better comply with TDC requirements. One of the advisory items suggested that the applicant considered upgrading the buildings architecture. In an email dated April 8, 2022 (Exhibit J) City Staff specifically suggested that the building architecture be updated to better address architectural design criteria and the "Purpose" and "Objectives" of TDC 73A.010. However, no updated architectural elevation drawing or building materials were updated, during a phone call the applicant stated they would not be updating the building architecture and in an email dated May 20, 2022, stated that the other items, building architecture, would not be included in the package that was received on May 20, 2022. The applicant has chosen to go with the building architecture that was originally proposed in their initial application submittal on December 29, 2021. The ARB will review the subject application and may apply additional Conditions of Approval in order to meet the purpose and objectives of Chapter 73A.

TDC 73A.500. - Industrial Design Standards.

The following standards are minimum requirements for industrial development in all zones, except the Mixed-Use Commercial (MUC) zone, which has its own standards:

(1) Walkways. Industrial development must provide walkways as follows:

- (a) Walkways must be a minimum of five feet in width;
- (b) Walkways must be constructed of asphalt, concrete, pervious concrete, pavers, or grasscrete. Gravel or bark chips are not acceptable;
- (c) Walkways must meet ADA standards applicable at time of construction or alteration;
- (e) Walkways must be provided between the main building entrances and other on-site buildings, accessways, and sidewalks along the public right-of-way;
- (f) Walkways through parking areas, drive aisles, and loading areas must be of a different appearance than the adjacent paved vehicular areas; and
- (g) Outdoor Recreation Access Routes must be provided between the development's walkway and bikeway circulation system and parks, bikeways and greenways where a bike or pedestrian path is designated.

[...]

Finding:

The applicant's narrative refers to the Plan Set (Exhibit A2) to determine compliance with Walkway standards. Additional information is needed to determine compliance with this section of the TDC. With recommended Condition of Approval A15, these standards are met.

(4) Safety and Security. Industrial development must provide safety and security features as follows:

- (a) Locate windows and provide lighting in a manner that enables tenants, employees, and police to watch over pedestrian, parking, and loading areas;
- (b) Locate windows and interior lighting to enable surveillance of interior activity from the public right-of-way;
- (c) Locate, orient, and select exterior lighting to facilitate surveillance of on-site activities from the public right-of-way without shining into public rights-of-way or fish and wildlife habitat areas;
- (d) Provide an identification system which clearly locates buildings and their entries for patrons and emergency services; and
- (e) Above ground sewer or water pumping stations, pressure reading stations, water reservoirs, electrical substations, and above ground natural gas pumping stations must provide a minimum six foot tall security fence or wall.

Finding:

The applicant's narrative (Exhibit A1) refers to the Plan Set (Exhibit A2) for compliance. Windows are primarily located in the area of the entrances to the proposed buildings. Both pole and wall mounted lighting are proposed for the site. A lighting diagram was provided that demonstrates the parking lot is properly lit for safety and security. These standards are met.

(5) Service, Delivery, and Screening. Industrial development must provide service, delivery, and screening features as follows:

- (a) Above grade and on-grade electrical and mechanical equipment such as transformers, heat pumps and air conditioners must be screened with sight obscuring fences, walls or landscaping;
- (b) Outdoor storage must be screened with a sight obscuring fence, wall, berm or dense evergreen landscaping; and
- (c) Above ground pumping stations, pressure reading stations, water reservoirs; electrical substations, and above ground natural gas pumping stations must be screened with sight-obscuring fences or walls and landscaping.

Finding:

The service and delivery areas are proposed to be screened either by a building or landscaping. All finalized location of above grade and on-grade electrical and mechanical equipment will be checked for adequate screening. The applicant did not propose any outdoor storage areas. With the recommended Conditions of Approval A14, these standards are met.

- (6) Adjacent to Transit.** Industrial development adjacent to transit must comply with the following:
- (a)** Development on a transit street designated in TDC Chapter 11 (Figure 11-5) must provide either a transit stop pad on-site, or an on-site or public sidewalk connection to a transit stop along the subject property's frontage on the transit street; and
 - (b)** Development abutting major transit stops as designated in TDC Chapter 11 (Figure 11-5) must:
 - (i)** Locate any portion of a building within 20 feet of the major transit stop or provide a pedestrian plaza at the transit stop;
 - (ii)** Provide a reasonably direct pedestrian connection between the major transit stop and a building entrance on the site;
 - (iii)** Provide a transit passenger landing pad accessible to disabled persons;
 - (iv)** Provide an easement or dedication for a passenger shelter as determined by the City; and
 - (v)** Provide lighting at the major transit stop.

Finding:

The subject property is not adjacent to a transit facility. These standards are not applicable.

Chapter 73B: Landscaping Standards

Section 73B.020 – Landscape Area Standards Minimum Areas by Use and Zone.

Excerpted from 73B.020

Zone	Minimum Area Requirement*	Minimum Area Requirement with dedication for a fish and wildlife habitat*
[...]		
(3) CO, CR, CC, CG, ML and MG zones except within the Core Area Parking District—All uses	15 percent of the total area to be developed	12.5 percent of the total area to be developed

Finding:

As shown on the Site Plan (Exhibit A2), 143,321 square feet or 15.67% of the total site area being landscaped. The Landscaping Plan (Exhibit A2) lists 147,915 square feet or 16.2% of the total land area being landscaped. Both plan sheets illustrate more landscaping proposed than the minimum landscaping 15% required by this section of the TDC. With the recommended Conditions of Approval A16, these standard are met.

Section 73B.060 – Additional Minimum Landscaping Requirements for Industrial Uses.

(1)General. In addition to requirements in TDC 73B.020, industrial uses must comply with the following:

(a) All areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas, or undisturbed natural areas must be landscaped.

(i) This standard does not apply to areas subject to the Hedges Creek Wetlands Mitigation Agreement.

Finding:

Landscaping is provided in all areas not otherwise occupied by buildings, vehicle area, or pedestrian area. The site is not located adjacent to the Hedges Creek Wetland. With recommended Condition of Approval A29, this standard is met.

(b) Minimum 5-foot-wide landscaped area must be located along all building perimeters viewable by the general public from parking lots or the public right-of-way, but the following may be used instead of the 5-foot-wide landscaped area requirement:

(i) Pedestrian amenities such as landscaped plazas and arcades; and

(ii) Areas developed with pavers, bricks, or other surfaces, for exclusive pedestrian use and contain pedestrian amenities, such as benches, tables with umbrellas, children's play areas, shade trees, canopies.

(c) 5-foot-wide landscaped area requirement does not apply to:

(i) loading areas,

(ii) bicycle parking areas,

(iii) pedestrian egress/ingress locations, and

(iv) where the distance along a wall between two vehicle or pedestrian access openings (such as entry doors, garage doors, carports and pedestrian corridors) is less than 8 feet.

Finding:

The buildings are buffered with at least five feet of landscaping, with the exception of loading and pedestrian areas, as seen on the Landscape Plans (Exhibit A2). This standard is met.

Section 73B.080 – Minimum Landscaping Standards for All Zones.

The following are minimum standards for landscaping for all zones.

<p>(1) Required Landscape Areas</p>	<ul style="list-style-type: none"> • Must be designed, constructed, installed, and maintained so that within three years the ground must be covered by living grass or other plant materials. • The foliage crown of trees cannot be used to meet this requirement. • A maximum of 10% of the landscaped area may be covered with un-vegetated areas of bark chips, rock or stone. • Must be installed in accordance with the provisions of the American National Standards Institute ANSI A300 (Part 1) (Latest Edition). • Must be controlled by pruning, trimming, or otherwise so that: • It will not interfere with designated pedestrian or vehicular access; and • It will not constitute a traffic hazard because of reduced visibility.
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Finding:

The density of plantings as shown on Landscape Plans (Exhibit A2) is sufficient to provide full coverage of landscaping within three years. These standards are met.

<p>(2) Fences</p>	<p>Landscape plans that include fences must integrate any fencing into the plan to guide wild animals toward animal crossings under, over, or around transportation corridors.</p>
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Finding:

The applicant’s narrative (Exhibit A2) states that no fencing is proposed. As proposed by the applicant, this standard does not apply.

<p>(3) Tree Preservation</p>	<ul style="list-style-type: none"> • Trees and other plant materials to be retained must be identified on the landscape plan and grading plan. <p>During construction:</p> <ul style="list-style-type: none"> • Must provide above and below ground protection for existing trees and plant materials identified to remain; • Trees and plant materials identified for preservation must be protected by chain link or other sturdy fencing placed around the tree at the drip line; • If it is necessary to fence within the drip line, such fencing must be specified by a qualified arborist; • Top soil storage and construction material storage must not be located within the drip line of trees designated to be preserved; • Where site conditions make necessary a grading, building, paving, trenching, boring, digging, or other similar encroachment upon a preserved tree's drip-line area, such grading, paving, trenching, boring, digging, or similar encroachment must only be permitted under the direction of a qualified arborist. Such direction must assure that the health needs of trees within the preserved area can be met; and • Tree root ends must not remain exposed. • Landscaping under preserved trees must be compatible with the retention and health of the preserved tree. • When it is necessary for a preserved tree to be removed in accordance with TDC 33.110 (Tree Removal Permit) the landscaped area surrounding the tree or trees must be maintained and replanted with trees that relate to the present landscape plan, or if there is no landscape plan, then trees that are complementary with existing, landscape materials. Native trees are encouraged • 100% of the area preserved under any tree or group of trees (Except for impervious surface areas) retained in the landscape plan must apply directly to the percentage of landscaping required for a development
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Finding:

The Arborist Report (Exhibit A3) surveyed 103 trees over 6” dbh on site. The report recommends removal of 77 trees that are either in poor health or are in conflict with building or parking lot locations. Of the on-site trees proposed for removal, all are proposed to be removed to construct the proposed improvements in accordance with criterion 33.110(5)(a)(iii).

With recommended Condition of Approval A9, A17.b. and A26, these standards are met.

<p>(4) Grading</p>	<ul style="list-style-type: none"> • After completion of site grading, top-soil is to be restored to exposed cut and fill areas to provide a suitable base for seeding and planting. • All planting areas must be graded to provide positive drainage. • Soil, water, plant materials, mulch, or other materials must not be allowed to wash across roadways or walkways. • Impervious surface drainage must be directed away from pedestrian walkways, dwelling units, buildings, outdoor private and shared areas and landscape areas except where the landscape area is a water quality facility.
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Finding:

The applicant proposes to develop or landscape all exposed areas remaining after grading. With recommended Condition of Approval A29, this standard is met.

(5) Irrigation	<ul style="list-style-type: none"> • Landscaped areas must be irrigated with an automatic underground or drip irrigation system • Exceptions: Irrigation requirement does not apply to duplexes and townhouses.
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Finding:

Irrigation is proposed in new landscaping areas as detailed in the General Notes on the Landscape Plan (Exhibit A2). This standard is met.

(6) Re-vegetation in Un-landscaped Areas	<ul style="list-style-type: none"> • Vegetation must be replanted in all areas where vegetation has been removed or damaged in areas not affected by the landscaping requirements and that are not to be occupied by structures or other improvements,. • Plant materials must be watered at intervals sufficient to ensure survival and growth for a minimum of two growing seasons. • The use of native plant materials is encouraged to reduce irrigation and maintenance demands. • Disturbed soils should be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.
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Finding:

The applicant proposes to landscape all areas not otherwise proposed for development. With recommended Condition of Approval A29, this standard is met.

Section 73B.080 – Minimum Standards Trees and Plants.

The following minimum standards apply to the types of landscaping required to be installed for all zones.

(1) Deciduous Shade Trees	<ul style="list-style-type: none"> • One and on-half inch caliper measured six inches above ground; • Balled and burlapped; bare root trees will be acceptable to plant during their dormant season; • Reach a mature height of 30 feet or more; • Cast moderate to dense shade in summer; • Live over 60 years; • Do well in urban environments, tolerant of pollution and heat, and resistant to drought; • Require little maintenance and mechanically strong; • Insect- and disease-resistant; • Require little pruning; and • Barren of fruit production.
(2) Deciduous Ornamental Trees	<ul style="list-style-type: none"> • One and on-half inch caliper measured six inches above ground; • balled and burlapped; bare root trees will be acceptable to plant during their dormant season; and • Healthy, disease-free, damage-free, well-branched stock, characteristic of the species
(3) Coniferous Trees	<ul style="list-style-type: none"> • 5 feet in height above ground; • balled and burlapped; bare root trees will be acceptable to plant during their dormant season; and

	<ul style="list-style-type: none"> • Healthy, disease-free, damage-free, well-branched stock, characteristic of the species.
(4) Evergreen and Deciduous Shrubs	<ul style="list-style-type: none"> • One to five gallon size; • Healthy, disease-free, damage-free, well-branched stock, characteristic of the species; and • Side of shrub with best foliage must be oriented to public view.
(5) Groundcovers	<ul style="list-style-type: none"> • Fully rooted; • Well branched or leafed; • Healthy, disease-free, damage-free, well-branched stock, characteristic of the species; and • English ivy (<i>Hedera helix</i>) is prohibited.
(6) Lawns	<ul style="list-style-type: none"> • Consist of grasses, including sod, or seeds of acceptable mix within the local landscape industry; • 100 percent coverage and weed free; and • Healthy, disease-free, damage-free, characteristic of the species.

Finding:

Per the Plant Schedule provided on the Landscape Plan included in Exhibit A2, the standards for groundcover, shrubs, and trees to be planted are met.

Chapter 73C: Parking Standards

TDC 73C.010. - Off-Street Parking and Loading Applicability and General Requirements.

[...]

(2)General Requirements. Off-street parking spaces, off-street vanpool and carpool parking spaces, off-street bicycle parking, and off-street loading berths must be as provided as set forth in TDC 73C.100, unless greater requirements are otherwise established by the conditional use permit or the Architectural Review process.

(a)The following apply to property and/or use with respect to the provisions of TDC 73C.100:

(i) The requirements apply to both the existing structure and use, and enlarging a structure or use;

(ii) The floor area is measured by gross floor area of the building primary to the function of the particular use of the property other than space devoted to off-street parking or loading;

[...]

(v) If the use of a property changes, thereby increasing off-street parking or loading requirements, the increased parking/loading area must be provided prior to commencement of the new use;

(vi) Parking and loading requirements for structures not specifically listed herein must be determined by the City Manager, based upon requirements of comparable uses listed;

(vii) When several uses occupy a single structure, the total requirements for off-street parking may be the sum of the requirements of the several uses computed separately or be computed in accordance with TDC 73.370(1)(m), Joint Use Parking;

[...]

(ix) Required parking spaces must be available for the parking of operable passenger automobiles of residents, customers, patrons and employees and must not be used for storage of vehicles or materials or for the parking of trucks used in conducting the business;

(x)Institution of on-street parking, where none is previously provided, must not be done solely for the purpose of relieving crowded parking lots in commercial or industrial zones; and

(xi) Required vanpool and carpool parking must meet the 9-foot parking stall standards in Figure 73-1 and be identified with appropriate signage.

Finding:

While tenants have not been named for this development, the applicant has identified “Light Industrial” and “Warehousing and Freight Movement” uses for the site. Parking requirements have been evaluated based on this use category in TDC 73C.100. Drive aisles and stalls are proposed to be comprised of asphalt. Concrete curbs are also proposed. With recommended Condition of Approval A30 and A34 to show compliance with standards (v) and (xi), these standards are met.

Section 73C.020 – Parking Lot Design Standards.

A parking lot, whether an accessory or principal use, intended for the parking of automobiles or trucks, must comply with the following:

(1) Off-street parking lot design must comply with the dimensional standards set forth in Figure 73-1;

[...]

(2) Parking lot drive aisles must be constructed of asphalt, concrete, or pervious concrete;

(3) Parking stalls must be constructed of asphalt, concrete, pervious concrete, or a pervious surface such as pavers or grasscrete, but not gravel or woody material. Pervious surfaces, are encouraged for parking stalls in or abutting the Natural Resource Protection Overlay District, Other Natural Areas, or in a Clean Water Services Vegetated Corridor;

(4) Parking lots must be maintained adequately for all-weather use and drained to avoid water flow across sidewalks;

(5) Parking bumpers or wheel stops or curbing must be provided to prevent cars from encroaching on adjacent landscaped areas, or adjacent pedestrian walkways.

Finding:

As shown on the Site Plan (Exhibit A2), standard sized stalls are proposed to be 20 feet long and 9 feet wide and drive aisles are a minimum of 26-feet wide. Thirty eight 9’ wide by 15’ long compact parking stalls are proposed. Drive aisles and stalls are proposed to be comprised of asphalt. Concrete curbs are also proposed. These standards are met.

(6) Disability parking spaces and accessibility must meet ADA standards applicable at time of construction or alteration;

(7) Parking stalls for sub-compact vehicles must not exceed 35 percent of the total parking stalls required by TDC 73C.100. Stalls in excess of the number required by TDC 73C.100 can be sub-compact stalls;

Finding:

The Site Plan (Exhibit A2) shows a total of 24 ADA compliant parking spaces planned near five of the building entrances. The applicant is proposing 12.5% of the parking stalls to be subcompact stalls, less than the 35% maximum allowed for subcompact parking stalls. ADA standards will be reviewed in greater detail during the building permit phase. These standards are met.

(8) Groups of more than 4 parking spaces must be so located and served by driveways that their use will require no backing movements or other maneuvering within a street right-of-way other than an alley;

(9) Drives to off-street parking areas must be designed and constructed to facilitate the flow of traffic, provide maximum safety of traffic access and egress, and maximum safety of pedestrians and vehicular traffic on the site;

(10) On-site drive aisles without parking spaces, which provide access to parking areas with regular spaces or with a mix of regular and sub-compact spaces, must have a minimum width of 22 feet for two-way traffic and 12 feet for one-way traffic; When 90 degree stalls are located on both sides of a drive aisle, a minimum of 24 feet of aisle is required. On-site drive aisles without parking spaces, which provide access to parking areas with only sub-compact spaces, must have a minimum width of 20 feet for two-way traffic and 12 feet for one-way traffic;

Finding:

The design of the parking lot will not require movement on the public street. Drive aisles with parking are at least 26 feet wide as proposed, which is greater than the minimum of 24 feet wide drive aisles. These standards are met.

(11) Artificial lighting, must be deflected to not shine or create glare in a residential zones, street right-of-way, a Natural Resource Protection Overlay District, Other Natural Areas, or a Clean Water Services Vegetated Corridor;

(12) Parking lot landscaping must be provided pursuant to the requirements of TDC 73C.200; and

(13) Except for parking to serve residential uses, parking areas adjacent to or within residential zones or adjacent to residential uses must be designed to minimize disturbance of residents.

Finding:

As shown on the Site Lighting Plan (Exhibit A2), lighting will primarily be focused toward the building entrances, loading, and interior parking areas. These standards are met.

Section 73C.050 – Bicycle Parking Requirements and Standards.

(1) Requirements. Bicycle parking facilities must include:

(a) Long-term parking that consists of covered, secure stationary racks, lockable enclosures, or rooms in which the bicycle is stored;

(i) Long-term bicycle parking facilities may be provided inside a building in suitable secure and accessible locations.

(b) Short-term parking provided by secure stationary racks (covered or not covered), which accommodate a bicyclist's lock securing the frame and both wheels.

(2) Standards. Bicycle parking must comply with the following:

(a) Each bicycle parking space must be at least six feet long and two feet wide, with overhead clearance in covered areas must be at least seven feet;

(b) A five (5) foot-wide bicycle maneuvering area must be provided beside or between each row of bicycle parking. It must be constructed of concrete, asphalt, or a pervious hard surface such as pavers or grasscrete, and be maintained;

(c) Access to bicycle parking must be provided by an area at least three feet in width. It must be constructed of concrete, asphalt, or a pervious hard surface such as pavers or grasscrete, and be maintained;

(d) Bicycle parking areas and facilities must be identified with appropriate signing as specified in the Manual on Uniform Traffic Control Devices (MUTCD) (latest edition). At a minimum, bicycle parking signs must be located at the main entrance and at the location of the bicycle parking facilities;

(e) Bicycle parking must be located in convenient, secure, and well-lighted locations approved through the Architectural Review process. Lighting, which may be provided, must be deflected to not shine or create glare into street rights-of-way or fish and wildlife habitat areas;

(f) Required bicycle parking spaces must be provided at no cost to the bicyclist, or with only a nominal charge for key deposits, etc. This does not preclude the operation of private for-profit bicycle parking businesses;

[...]

(h) The City Manager or the Architectural Review Board may approve a form of bicycle parking not specified in these provisions but that meets the needs of long-term and/or short-term parking pursuant to Architectural Review.

Finding:

As shown on the Site Plan (Exhibit A2), the applicant proposes to provide outdoor bike parking at the building corners, near proposed tenant entrances. Dimensioned details of the bike parking furnishings were not included in the application materials.

With recommended Condition of Approval A17.f. and A30 to show compliance with standards (a), (b), (c), and (d), these standards are met.

Section 73C.100 – Off-Street Parking Minimum/Maximum Requirements.

USE	MINIMUM MOTOR VEHICLE PARKING	MAXIMUM MOTOR VEHICLE PARKING	BICYCLE PARKING	PERCENTAGE OF BICYCLE PARKING TO BE COVERED
[...]				
(f) Industrial				
(i) Manufacturing	1.60 spaces per 1,000 square feet of gross floor area	None	2 spaces, or 0.10 spaces per 1,000 gross square feet, whichever is greater	First five spaces or 30 percent, whichever is greater
(ii) Warehousing	0.30 spaces per 1,000 square feet of gross floor area	Zone A: 0.4 spaces per 1,000 square feet of gross floor area Zone B: 0.5 spaces per 1,000 square feet of gross floor area	2, or 0.10 spaces per 1,000 gross square feet, whichever is greater	First five spaces or 30 percent, whichever is greater

Finding:

While tenants have not been named for this development, the applicant has identified warehousing and freight movement and light manufacturing uses.

Table 1: Minimum and Proposed Parking by Use

Use	Square Footage	Vehicle Parking Min.	Proposed	Bike Parking Min.	Proposed
Manufacturing	132,772.5	213	335 Total	45	50
Warehousing	309,802.5	92			

A minimum of 305 parking spaces are required, and 335 vehicle parking spaces are provided. Additionally, 45 bike parking spaces are required by code based on the building area, 14 of which must be covered. The site plan notes that bike parking is proposed at all building entrances but does not

provide details (Exhibit A2). The narrative does state that all bicycle parking spaces will be covered. With recommended Conditions of Approval A34 and A17.f. requiring additional bike parking details, these standards are met.

(2) In addition to the general parking requirements in subsection (1), the following are the minimum number of off-street vanpool and carpool parking for commercial, institutional, and industrial uses.

Number of Required Parking Spaces	Number of Vanpool or Carpool Spaces
0 to 10	1
10 to 25	2
26 and greater	1 for each 25 spaces

[...]

Finding:

Since 305 parking spaces are required, 12.2 are required to be carpool/vanpool spaces. There are 18 carpool/vanpool spaces are designated on the Site Plan (Exhibit A2). With recommended Condition of Approval A30 pertaining to vanpool signage, this standard is met.

Section 73C.120 – Off-Street Loading Facilities Minimum Requirements.

(1) The minimum number of off-street loading berths for commercial, industrial, and institutional uses is as follows:

Use	Square Feet of Floor Area	Number of Berths	Dimensions of Berth	Unobstructed Clearance of Berth
Industrial	60,000 and over	3	12 feet x 35 feet	14 feet

(2) Loading berths must not use the public right-of-way as part of the required off-street loading area.

(3) Required loading areas must be screened from public view, public streets, and adjacent properties by means of sight-obscuring landscaping, walls or other means, as approved through the Architectural Review process.

(4) Required loading facilities must be installed prior to final building inspection and must be permanently maintained as a condition of use.

(5) The off-street loading facilities must in all cases be on the same lot or parcel as the structure they are intended to serve. In no case must the required off-street loading spaces be part of the area used to satisfy the off-street parking requirements.

[...]

Finding:

The proposal includes 71 loading docks oriented towards the interior of the proposed buildings as shown on the Site Plan (Exhibit A2) that are accessible from a private loading area. The applicant’s narrative (Exhibit A1) states they will be adding 71 berths. The loading areas are oriented towards the interior of the buildings/development site and will be screened from Adjacent SW Myslony Street with portions of the buildings and deciduous trees including Red Sunset Maple and Sawleaf Zelkova trees providing screening. Given that deciduous trees lose their leaf cover and ability to screen during the winter months, the applicant should provide additional evergreen trees placed in locations that will provide year-long screening of the loading docks from SW Myslony Street. With recommended Condition of Approval A23, these standards are met.

Section 73C.130 – Parking Lot Driveway and Walkway Minimum Requirements. Parking lot driveways and walkways must comply with the following requirements:

[...]

(3) Industrial Uses. Ingress and egress for industrial uses must not be less than the following:

Required Parking Spaces	Minimum Number Required	Minimum Pavement Width	Minimum Pavement Walkways, Etc.
1-250	1	36 feet for first 50' from ROW, 24 feet thereafter	No curbs or walkway required
Over 250	As required by City Manager	As required by City Manager	As required by City Manager

Finding:

The site proposes 4 points of ingress and egress off of SW Myslony Street. The proposal includes a total of 335 parking spaces. One of the ingress/egress accesses along SW Myslony Street is proposed at a minimum width of 26 feet for the first 50 feet from the right-of-way. Because there are over 250 parking spaces the Architectural Review Board will determine the minimum width of an access.

(6) Maximum Driveway Widths and Other Requirements.

- (a) Unless otherwise provided in this chapter, maximum driveway widths for Commercial, Industrial, and Institutional uses must not exceed 40 feet.
- (b) Driveways must not be constructed within 5 feet of an adjacent property line, unless the two adjacent property owners elect to provide joint access to their respective properties, as provided by TDC73C.040.
- (c) The provisions of subsection (b) do not apply to townhouses and duplexes, which are allowed to construct driveways within 5 feet of adjacent property lines.
- (d) There must be a minimum distance of 40 feet between any two adjacent driveways on a single property unless a lesser distance is approved by the City Manager.
- (e) Must comply with the distance requirements for access as provided in TDC 75.
- (f) Must comply with vision clearance requirements in TDC 75.

Finding:

Proposed driveway widths are illustrated between 24 feet and 40 feet, as shown on the Site Plan in Exhibit A2. Access findings are further addressed in Chapter 75. These standards are met.

Section 73C.240 – Industrial Parking Lot Landscaping Requirements.

Industrial uses must comply with the following landscaping requirements for parking lots in all zones.

(1) General. Locate landscaping or approved substitute materials in all areas not necessary for vehicular parking and maneuvering

Finding:

The parking lot contains landscaping in areas not used for vehicle and pedestrian movement. This standard is met.

(2) Clear Zone. Clear zone required for the driver at ends of on-site drive aisles and at driveway entrances, vertically between a maximum of 30 inches and a minimum of 8 feet as measured from the ground level.

Finding:

As shown in the Landscape Plans (Exhibit A2), the proposed plantings will provide for visual clearance at the end of drive aisles and drive entrances. With recommended Condition of Approval A18 related to maintenance, this standard is met.

(3) Perimeter. Minimum 5 feet in width in all off-street parking and vehicular circulation areas, including loading areas and must comply with the following:

- (a) Deciduous trees located not more than 30 feet apart on average as measured on center;**
- (b) Shrubs or ground cover, planted so as to achieve 90 percent coverage within three years;**
- (c) Plantings which reach a mature height of 30 inches in three years which provide screening of vehicular headlights year round;**
- (d) Native trees and shrubs are encouraged; and**
- (e) Exception: Not required where off-street parking areas on separate lots are adjacent to one another and connected by vehicular access.**

Finding:

As shown in the Landscape Plans (Exhibit A2), at least five feet of landscape buffer is proposed for all parking and vehicle drive areas. The applicant’s narrative (Exhibit A1) states that “landscape buffer planted with trees, evergreen hedge and groundcovers. A continuous evergreen hedge is proposed that will reach a mature height of 30 inches in three years. Ground cover is proposed and will achieve 90% coverage in three years.” With recommended Condition of Approval A17.d., these standards are met.

(4) Landscape Island. Minimum 25 square feet per parking stall must be improved with landscape island areas and must comply with the following.

- (a) May be lower than the surrounding parking surface to allow them to receive stormwater runoff and function as water quality facilities as well as parking lot landscaping;**
- (b) Must be protected from vehicles by curbs, but the curbs may have spaces to allow drainage into the islands;**
- (c) Islands must be utilized at aisle ends to protect parked vehicles from moving vehicles and emphasize vehicular circulation patterns;**
- (d) Landscape separation required for every eight continuous spaces in a row;**
- (e) Must be planted with one deciduous shade trees for every four parking spaces; Required trees must be evenly dispersed throughout the parking lot;**
- (f) Must be planted with groundcover or shrubs;**
- (g) Native plant materials are encouraged;**
- (h) Landscape island areas with trees must be a minimum of 5 feet in width (from inside of curb to curb);**
- (i) Required plant material in landscape islands must achieve 90 percent coverage within three years; and**
[...]

Finding:

Given that 335 parking spaces are proposed, 8,375 square feet of parking lot landscaping area is required. It’s unclear on the Site Plan or Landscape Plan (Exhibit A2) if the required parking lot landscaping area is met. Given 335 parking spaces, 84 trees are required and 86 are proposed (Exhibit A2). Curbs are included in the design and islands are provided at aisle ends. The landscape islands meet the spacing and size criteria as well. With recommended Condition of Approval A17.d., these standards are met.

Section 73D.010 – Applicability and Objectives.

(1) Applicability. The requirements of this Chapter apply to all new or expanded:

- (a) Common wall residential developments containing five or more units;
- (b) Commercial developments;
- (c) Industrial developments; and
- (d) Institutional developments.

(2) Objectives. Mixed solid waste and source separated recyclable storage areas should be designed to the maximum extent practicable to:

- (a) Screen elements such as garbage and recycling containers from view;
- (b) Ensure storage areas are centrally located and easy to use;
- (c) Meet dimensional and access requirements for haulers;
- (d) Designed to mitigate the visual impacts of storage areas;
- (e) Provide adequate storage for mixed solid waste and source separated recyclables; and
- (f) Improve the efficiency of collection of mixed solid waste and source separated recyclables.

Section 73D.020 - Design Methods.

An applicant required to provide mixed solid waste and source separated recyclables storage areas must comply with one of following methods:

- (1) The minimum standards method in TDC 73D.030;
- (2) The waste assessment method in TDC 73D.040;
- (3) The comprehensive recycling plan method in TDC 73D.050; or
- (4) The franchised hauler review method in TDC 73D.060.

Finding:

The applicant proposes to use the Minimum Standards Method (TDC 73D.030) and has verified that the location and configuration of the proposed waste facility and access will satisfy Republic Services (Exhibit A6). As discussed below, these standards are met.

Section 73D.030 – Minimum Standards Method.

This method specifies a minimum storage area requirement based on the size and general use category of the new or expanded development. This method is most appropriate when specific use of a new or expanded development is not known. It provides specific dimensional standards for the minimum size of storage areas by general use category.

(1) The size and location of the storage area(s) must be indicated on the site plan. Requirements are based on an assumed storage area height of four feet for mixed solid waste and source separated recyclables. Vertical storage higher than four feet, but no higher than 7 feet may be used to accommodate the same volume of storage in a reduced floor space (potential reduction of 43 percent of specific requirements). Where vertical or stacked storage is proposed, submitted plans must include drawings to illustrate the layout of the storage area and dimensions for containers.

(2) The storage area requirement is based on uses. If a building has more than one use and that use occupies 20 percent or less of the gross leasable area (GLA) of the building, the GLA occupied by that use must be counted toward the floor area of the predominant use(s). If a building has more than one use and that use occupies more than 20 percent of the GLA of the building, then the storage area requirement for the whole building must be the sum of the area of each use. Minimum storage area requirements by use is as follows:

[...]

(c) Commercial, industrial, and institutional developments must provide a minimum storage area of 10 square feet plus:

[...]

(iii) Wholesale/ Warehouse/ Manufacturing - 6 square feet/1000 square feet GLA;

[...]

(3) Mixed solid waste and source separated recyclables storage areas for multiple tenants on a single site may be combined and shared.

Finding:

While tenants have not yet been identified, warehousing and light industrial uses have been identified to fulfill the requirement. A minimum of 2,666 square feet of trash enclosure area is required to meet the minimum standards method $((442,575 \times 6)/1000) + 10$. Six trash enclosures are proposed to serve the overall development as shown on the Site Plan (Exhibit A2) and include two enclosures located at the north and south ends of each of the buildings. The site plan illustrates each enclosure proposed to be 210 square feet or 420 square feet of enclosure (Sheet A-9 of Exhibit A6). The applicant's narrative states that a total of 1,260 square feet for enclosures are proposed for the entire site. The applicant did submit a Service Provider Letter from Republic Services that stated the locations for the two enclosures, 10' x 20' each, for each building or 1,200 square feet was sufficient. With recommended Condition of Approval A19, demonstrating that the development includes an acceptable waste and recyclables management solution, these standards are met.

Section 73D.070 – Location, Design and Access Standards.

The following location, design, and access standards are applicable to all storage areas:

(1) Location Standards.

(a) The storage area for source separated recyclables may be collocated with the storage area for mixed solid waste.

(b) Storage area space requirements can be satisfied with a single location or multiple locations, and can combine both interior and exterior locations.

(c) Exterior storage areas must:

(i) Be located in central and visible locations on the site to enhance security for users;

(ii) Be located in a parking area; and

(iii) Not be located within a required front yard setback or in a yard adjacent to a public or private street.

(2) Design Standards.

(a) The dimensions of the storage area must accommodate containers consistent with current methods of local collection at time of construction or alteration.

(b) Indoor and outdoor storage areas must comply with Oregon Building and Fire Code requirements.

(c) Exterior storage areas must be enclosed by a sight obscuring fence or wall at least 6 feet in height.

(d) Evergreen plants must be placed around the enclosure walls, excluding the gate or entrance openings for common wall, commercial, and institutional developments.

(e) Gate openings for haulers must be a minimum of 10 feet wide and must be capable of being secured in a closed and open position.

(f) Horizontal clearance must be a minimum of 10 feet and a vertical clearance of 8 feet is required if the storage area is covered.

(g) A separate pedestrian access must also be provided in common wall, commercial, and institutional developments.

- (h) Exterior storage areas must have either a concrete or asphalt floor surface.**
- (i) Storage areas and containers must be clearly labeled to indicate the type of material accepted.**

Finding:

The applicant has proposed six waste enclosure areas that are in visible areas convenient to tenant entries, parking and loading areas, and are outside of the applicable setbacks, as shown in the applicant's submittal (Exhibit A2). Further compliance with Building and Fire Code standards will be reviewed at the time of building permit. While location standards are met on the plan set; the applicant has not provided sufficient details addressing design standards. With recommended Condition of Approval A17.e., design method standards (c),(e), and (f) are met.

(3) Access Standards.

- (a) Storage areas must be accessible to users at convenient times of the day, and to hauler personnel on the day and approximate time they are scheduled to provide hauler service.**
- (b) Storage areas must be designed to be easily accessible to hauler trucks and equipment, considering paving, grade, gate clearance and vehicle access.**
- (c) Storage areas must be accessible to hauler trucks without requiring backing out of a driveway onto a public street. If only a single access point is available to the storage area, adequate turning radius must be provided to allow hauler trucks to safely exit the site in a forward motion.**
- (d) Storage areas must be located so that pedestrian and vehicular traffic movement are not obstructed on site or on public streets adjacent to the site.**
- (e) The following is an exception to the access standard:**
 - (i) Access may be limited for security reasons.**

Finding:

As shown in the applicant's submittal, Republic Services, the applicable waste hauler, has indicated that the dimensions and accessibility of the enclosures meet their service needs (Exhibit A6). These standards are met.

Chapter 74: Public Improvement Requirements

[...]

TDC 74.120 Public Improvements.

(1) Except as specially provided, all public improvements must be installed at the expense of the applicant. All public improvements installed by the applicant must be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. Work must not be undertaken on any public improvement until after the construction plans have been approved by the City Manager and a Public Works Permit issued and the required fees paid.

TDC 74.130 Private Improvements.

All private improvements must be installed at the expense of the applicant. The property owner must retain maintenance responsibilities over all private improvements.

TDC 74.140 Construction Timing.

(1) All the public improvements required under this chapter must be completed and accepted by the City prior to the issuance of a Certificate of Occupancy; or, for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

(2) All private improvements required under this Chapter must be approved by the City prior to the issuance of a Certificate of Occupancy; or for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

Finding:

All public and private improvements proposed and modified by conditions of approval must be completed prior to receiving a Certificate of Occupancy. With recommended Conditions of Approval A13 and A31, these standards are met.

TDC 74.610 Water Service.

(1) Water lines must be installed to serve each property in accordance with the Public Works Construction Code. Water line construction plans must be submitted to the City Manager for review and approval prior to construction.

(2) If there are undeveloped properties adjacent to the subject public water lines must be extended by the applicant to the common boundary line of these properties. The lines must be sized to provide service to future development, in accordance with the City's Water System Master Plan, TDC Chapter 12.

(3) As set forth is TDC Chapter 12, Water Service, the City has three water service levels. All development applicants must be required to connect the proposed development site to the service level in which the development site is located. If the development site is located on a boundary line between two service levels the applicant must be required to connect to the service level with the higher reservoir elevation. The applicant may also be required to install or provide pressure reducing valves to supply appropriate water pressure to the properties in the proposed development site.

[...]

Finding:

The proposal includes one three-inch domestic and two ten-inch fire service laterals with gate valves near the main. The fire services include vaults to create a private loop and domestic includes meter and backflow device. Vaults, the domestic meter, and backflow devices must be within the planter strip or surrounded by five feet of public utility easement. With recommended Conditions of Approval A5 and A13, these standards are met.

TDC 74.620 Sanitary Sewer Service.

(1) Sanitary sewer lines must be installed to serve each property in accordance with the Public Works Construction Code. Sanitary sewer construction plans and calculations must be submitted to the City Manager for review and approval prior to construction.

(2) If there are undeveloped properties adjacent to the proposed development site which can be served by the gravity sewer system on the proposed development site, the applicant must extend public sanitary sewer lines to the common boundary line with these properties. The lines must be sized to convey flows to include all future development from all up stream areas that can be expected to drain through the lines on the site, in accordance with the City's Sanitary Sewer System Master Plan, TDC Chapter 13.

[...]

Finding:

The applicant's proposal is to relocate an existing 21-inch public sanitary sewer line. The existing line is approximately diagonally through their site from the intersection of SW 112th Avenue and SW Myslony Street to the northeast corner. The relocated line is shown east of the intersection within SW Myslony Street then north within a public easement to reconnect to existing lines near the northeast corner. All proposed lines will be required to be installed in accordance with the Public Works Construction Code. With recommended Conditions of Approval A5 and A13, these standards are met.

[...]

TDC 74.630 Storm Drainage System.

(1) Storm drainage lines must be installed to serve each property in accordance with City standards. Storm drainage construction plans and calculations must be submitted to the City Manager for review and approval prior to construction.

(2) The storm drainage calculations must confirm that adequate capacity exists to serve the site. The discharge from the development must be analyzed in accordance with the City's Storm and Surface Water Regulations.

(3) If there are undeveloped properties adjacent to the proposed development site which can be served by the storm drainage system on the proposed development site, the applicant must extend storm drainage lines to the common boundary line with these properties. The lines must be sized to convey expected flows to include all future development from all up stream areas that will drain through the lines on the site, in accordance with the Tualatin Drainage Plan in TDC Chapter 14.

[...]

TDC 74.650 Water Quality, Storm Water Detention and Erosion Control.

The applicant must comply with the water quality, storm water detention and erosion control requirements in the Surface Water Management Ordinance. If required:

(2) On all other development applications, prior to issuance of any building permit, the applicant must arrange to construct a permanent on-site water quality facility and storm water detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be met and obtain a Stormwater Connection Permit from Clean Water Services.

(3) For on-site private and regional non-residential public facilities, the applicant must submit a stormwater facility agreement, which will include an operation and maintenance plan provided by the City, for the water quality facility for the City's review and approval. The applicant must submit an erosion control plan prior to issuance of a Public Works Permit. No construction or disturbing of the site must occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City.

[...]

Finding:

The applicant submitted a Stormwater Memo dated December 23, 2021 and a revised Stormwater Report dated April 25, 2022 demonstrating compliance with the above standards subject to provision of a final Stormwater Report compliance with applicable conditions of approval. With recommended Conditions of Approval A10 and A13, these standards are met.

[...]

TDC 74.640 Grading.

(1) Development sites must be graded to minimize the impact of storm water runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development.

(2) A development applicant must submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Manager may require the applicant to remove all excess material from the development site.

TMC Chapter 03-05 – Erosion Control, Surface Water Management, Water Quality Facilities, and Building and Sewers.

[...]

Finding:

The plans indicate disturbance of approximately 21 acres. Erosion and sediment control plans and permit applications conforming to the requirements of the City of Tualatin, CWS, and Oregon Department of Environmental Quality must be provided with the construction permit submittal documents. The entire site is within and drains into the Hedges Creek Subbasin. Stormwater from all impervious areas are conveyed to private treatment and detention facilities then released to the public stormwater system which discharges into Hedges Creek. With recommended Conditions of Approval A11 and A12, these standards are met.

[...]

Streets

TDC 74.210 Minimum Street Right-of-Way Widths.

The width of streets in feet shall not be less than the width required to accommodate a street improvement needed to mitigate the impact of a proposed development. In cases where a street is required to be improved according to the standards of the TDC, the width of the right-of-way shall not be less than the minimums indicated in TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G.

[...]

(2) For development applications other than subdivisions and partitions, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width, the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G of the Tualatin Community Plan must be dedicated to the City for use by the public prior to issuance of any building permit for the proposed development. This right-of-way dedication must be for the full width of the property abutting the roadway and, if required by the City Manager, additional dedications must be provided for slope and utility easements if deemed necessary.

[...]

TDC 74.330. - Utility Easements.

(1) Utility easements for water, sanitary sewer and storm drainage facilities, telephone, television cable, gas, electric lines and other public utilities must be granted to the City.

[...]

(4) For development applications other than subdivisions and partitions, and for both on-site and off-site easement areas, a utility easement must be granted to the City; building permits must not be issued for the development prior to acceptance of the easement by the City. The City may elect to exercise eminent domain and condemn necessary off-site public utility easements at the applicant's request and expense. The City Council must determine when condemnation proceedings are to be used.

(5) The width of the public utility easement must meet the requirements of the Public Works Construction Code. All subdivisions and partitions must have a 6-foot public utility easement adjacent to the street and a 5-foot public utility easement adjacent to all side and rear lot lines. Other easements may be required as determined by the City Manager.

[...]

TDC 74.420 Street Improvements.

When an applicant proposes to develop land adjacent to an existing or proposed street, including land which has been excluded under TDC 74.220, the applicant should be responsible for the improvements to the adjacent existing or proposed street that will bring the improvement of the street into conformance with the Transportation Plan (TDC Chapter 11), TDC 74.425 (Street Design Standards), and the City’s Public Works Construction Code, subject to the following provisions:

(1) For any development proposed within the City, roadway facilities within the right-of-way described in TDC 74.210 must be improved to standards as set out in the Public Works Construction Code.

(2) The required improvements may include the rebuilding or the reconstruction of any existing facilities located within the right-of-way adjacent to the proposed development to bring the facilities into compliance with the Public Works Construction Code.

(3) The required improvements may include the construction or rebuilding of off-site improvements which are identified to mitigate the impact of the development.

[...]

(6) All required street improvements must include curbs, sidewalks with appropriate buffering, storm drainage, street lights, street signs, street trees, and, where designated, bikeways and transit facilities.

[...]

(8) For development applications other than subdivisions and partitions, all street improvements required by this section must be completed and accepted by the City prior to the issuance of a Certificate of Occupancy.

[...]

(11) Existing streets which abut the proposed development site must be graded, constructed, reconstructed, surfaced or repaired as necessary in accordance with the Public Works Construction Code and TDC Chapter 11, Transportation Plan, and TDC 74.425 (Street Design Standards).

(12) Sidewalks with appropriate buffering must be constructed along both sides of each internal street and at a minimum along the development side of each external street in accordance with the Public Works Construction Code.

(13) The applicant must comply with the requirements of the Oregon Department of Transportation (ODOT), Tri-Met, Washington County and Clackamas County when a proposed development site is adjacent to a roadway under any of their jurisdictions, in addition to the requirements of this chapter.

(14) The applicant must construct any required street improvements adjacent to parcels excluded from development, as set forth in TDC 74.220 of this chapter.

(15) Except as provided in TDC 74.430, whenever an applicant proposes to develop land with frontage on certain arterial streets and, due to the access management provisions of TDC Chapter 75, is not allowed direct access onto the arterial, but instead must take access from another existing or future public street thereby providing an alternate to direct arterial access, the applicant must be required to construct and place at a minimum street signage, a sidewalk, street trees and street lights along that portion of the arterial street adjacent to the applicant's property. The three certain arterial streets are S.W. Tualatin-Sherwood Road, S.W. Pacific Highway (99W) and S.W. 124th Avenue. In addition, the applicant may be required to construct and place on the arterial at the intersection of the arterial and an existing or future public non-arterial street warranted traffic control devices (in accordance with

the Manual on Uniform Traffic Control Devices, latest edition), pavement markings, street tapers and turning lanes, in accordance with the Public Works Construction Code.

[...]

(17) Intersections should be improved to operate at a level of service of at least D and E for signalized and unsignalized intersections, respectively.

[...]

TDC 74.470 Street Lights.

(1) Street light poles and luminaries must be installed in accordance with the Public Works Construction Code.

(2) The applicant must submit a street lighting plan for all interior and exterior streets on the proposed development site prior to issuance of a Public Works Permit.

[...]

TDC 74.485. - Street Trees.

(1) Prior to approval of a residential subdivision or partition final plat, the applicant must pay the City a non-refundable fee equal to the cost of the purchase and installation of street trees. The location, placement, and cost of the trees must be determined by the City. This sum must be calculated on the interior and exterior streets as indicated on the final subdivision or partition plat.

(2) In nonresidential subdivisions and partitions street trees must be planted by the owners of the individual lots as development occurs.

(3) The Street Tree Ordinance specifies the species of tree which is to be planted and the spacing between trees.

[...]

TDC 74.660 Underground.

(1) All utility lines including, but not limited to, those required for gas, electric, communication, lighting and cable television services and related facilities must be placed underground. Surface-mounted transformers, surface-mounted connection boxes and meter cabinets may be placed above ground. Temporary utility service facilities, high capacity electric and communication feeder lines, and utility transmission lines operating at 50,000 volts or above may be placed above ground. The applicant must make all necessary arrangements with all utility companies to provide the underground services. The City reserves the right to approve the location of all surface-mounted transformers.

(2) Any existing overhead utilities may not be upgraded to serve any proposed development. If existing overhead utilities are not adequate to serve the proposed development, the applicant must, at their own expense, provide an underground system. The applicant must be responsible for obtaining any off-site deeds and/or easements necessary to provide utility service to this site; the deeds and/or easements must be submitted to the City Manager for acceptance by the City prior to issuance of the Public Works Permit.

[...]

TDC 74.765. - Street Tree Species and Planting Locations.

All trees, plants or shrubs planted in the right-of-way of the City must conform in species and location and in accordance with the street tree plan and City standards, including Table 74-1. If the City Manager determines that none of the species in City standards, including Table 74-1 is appropriate or finds appropriate a species not listed, the City Manager may substitute an unlisted species.

Table 74-1 Street Tree Species					
Species Common Names	Planting Strip Width (feet)			Power line compatible	Spacing on center (feet)
	4	5	6+		
Amur Maackia	•	•	•	•	30
Amur Maple	•	•	•	•	30
Armstrong Maple	•	•	•		30
Autumn Applause Ash		•	•		30
Black Tupelo	•	•	•		30
Capital Flowering Pear	•	•	•		30
Cascara	•	•	•	•	30
Crimson King Maple		•	•		30
Crimson Sentry Maple	•	•	•	•	30
Eastern Redbud	•	•	•		30
European Hornbeam	•	•	•	•	30
Frontier Elm			•		60
Ginko		•	•		30
Globe Sugar Maple			•		60
Golden Desert Ash	•	•	•	•	30
Goldenrain	•	•	•		30
Greenspire Linden		•	•		30
Ivory Japanese Lilac	•	•	•	•	30
Leprechaun Ash	•	•	•		30
Persain Parrotia	•	•	•		30
Purple Beech	•	•	•		30
Raywood Ash		•	•	•	30
Katsura	•	•	•		30
Red Oak			•		60
Red Sunset Maple			•		60
Scanlon/Bowhall Maple	•	•	•		30
Scarlet Oak			•		60
Shademaster Honey Locust		•	•		30
Skyrocket English Oak	•	•	•		30
Japanese snowbell	•	•	•	•	30
Sourwood	•	•	•	•	30
Tall Stewartia	•	•	•	•	30
Chinese Fringetree	•	•	•	•	30
Tri-Color Beech			•		60
Trident Maple	•	•	•	•	30
Urbanite Ash		•	•		30
Yellowwood	•	•	•		30
Zelkova Musashino	•	•	•		30

[...]

Chapter 75 Access Management

[...]

TDC 75.020. - Permit for New Driveway Approach

(1) **Applicability.** A driveway approach permit must be obtained prior to constructing, relocating, reconstructing, enlarging, or altering any driveway approach.

[...]

(3) **Procedure Type.** A Driveway Approach Permit is processed as a Type II procedure under TDC 32.220 (Type II).

(4) Submittal Requirements. In addition to the application materials required by TDC 32.140 (Application Submittal), the following application materials are also required:

- (a) A site plan, of a size and form and in the number of copies meeting the standards established by the City Manager, containing the following information:
 - (i) The location and dimensions of the proposed driveway approach;
 - (ii) The relationship to nearest street intersection and adjacent driveway approaches;
 - (iii) Topographic conditions;
 - (iv) The location of all utilities;
 - (v) The location of any existing or proposed buildings, structures, or vehicular use areas;
 - (vi) The location of any trees and vegetation adjacent to the location of the proposed driveway approach that are required to be protected pursuant to TDC Chapter 73B or 73C; and
 - (vii) The location of any street trees adjacent to the location of the proposed driveway approach.
- (b) Identification of the uses or activities served, or proposed to be served, by the driveway approach; and
- (c) Any other information, as determined by the City Manager, which may be required to adequately review and analyze the proposed driveway approach for conformance with the applicable criteria.

(5) Criteria. A Driveway Approach Permit must be granted if:

- (a) The proposed driveway approach meets the standards of this Chapter and the Public Works Construction Code;
- (b) No site conditions prevent placing the driveway approach in the required location;
- (c) The number of driveway approaches onto an arterial are minimized;
- (d) The proposed driveway approach, where possible:
 - (i) Is shared with an adjacent property; or
 - (ii) Takes access from the lowest classification of street abutting the property;
- (e) The proposed driveway approach meets vision clearance standards;
- (f) The proposed driveway approach does not create traffic hazards and provides for safe turning movements and access;
- (g) The proposed driveway approach does not result in significant adverse impacts to the vicinity;
- (h) The proposed driveway approach minimizes impact to the functionality of adjacent streets and intersections; and
- (i) The proposed driveway approach balances the adverse impacts to residentially zoned property and the functionality of adjacent streets.

[...]

TDC 75.030. - Driveway Approach Closure

(1) The City Manager may require the closure of a driveway approach where:

- (a) The driveway approach is not constructed in conformance with this Chapter and the Public Works Construction Code;
- (b) The driveway approach is not maintained in a safe manner;
- (c) A public street improvement project is being constructed, and closure of the driveway approach will more closely conform to the current driveway approach standards;
- (d) A new building or driveway is constructed on the property;
- (e) A plan text amendment or zone change is proposed for the property served by the driveway;

- (f) A change of use or activity in an existing building increases the amount of required parking;**
- (g) The driveway approach has been abandoned; or**
- (h) There is a demonstrated safety issue.**

[...]

TDC 75.040. - Driveway Approach Requirements

[...]

(2) Owners of two or more uses, structures, or parcels of land may agree to utilize jointly the same driveway approach when the combined driveway approach of both uses, structures, or parcels of land satisfies their combined requirements as designated in this code; provided that satisfactory legal evidence is presented to the City Attorney in the form of deeds, easements, leases or contracts to establish joint use. Copies of said deeds, easements, leases or contracts must be placed on permanent file with the City Recorder.

(3) Joint and Cross Access.

(a) Adjacent commercial uses may be required to provide cross access drive and pedestrian access to allow circulation between sites.

(b) A system of joint use driveways and cross access easements may be required and may incorporate the following:

(i) A continuous service drive or cross access corridor extending the entire length of each block served to provide for driveway separation consistent with the access management classification system and standards;

(ii) A design speed of ten mph and a maximum width of 24 feet to accommodate two-way travel aisles designated to accommodate automobiles, service vehicles, and loading vehicles;

(iii) Stub-outs and other design features to make it visually obvious that the abutting properties may be tied in to provide cross access via a service drive; and

(iv) An unified access and circulation system plan for coordinated or shared parking areas.

(c) Pursuant to this section, property owners may be required to:

(i) Record an easement with the deed allowing cross access to and from other properties served by the joint use driveways and cross access or service drive;

(ii) Record an agreement with the deed that remaining access rights along the roadway will be dedicated to the city and pre-existing driveways will be closed and eliminated after construction of the joint-use driveway;

(iii) Record a joint maintenance agreement with the deed defining maintenance responsibilities of property owners; and

(iv) If subsection (i) through (iii) above involve access to the state highway system or county road system, ODOT or the county must be contacted and must approve changes to subsection (i) through (iii) above prior to any changes.

(4) Requirements for Development on Less than the Entire Site.

(a) To promote unified access and circulation systems, lots and parcels under the same ownership or consolidated for the purposes of development and comprised of more than one building site must be reviewed as one unit in relation to the access standards. The number of access points permitted must be the minimum number necessary to provide reasonable

access to these properties, not the maximum available for that frontage. All necessary easements, agreements, and stipulations must be met. This must also apply to phased development plans. The owner and all lessees within the affected area must comply with the access requirements.

(b) All access must be internalized using the shared circulation system of the principal commercial development or retail center. Driveways should be designed to avoid queuing across surrounding parking and driving aisles.

(5) Lots that front on more than one street may be required to locate motor vehicle accesses on the street with the lower functional classification as determined by the City Manager.

(6) Except as provided in TDC 53.100, all driveway approach must connect directly with public streets.

(7) To afford safe pedestrian access and egress for properties within the City, a sidewalk must be constructed along all street frontage, prior to use or occupancy of the building or structure proposed for said property. The sidewalks required by this section must be constructed to City standards, except in the case of streets with inadequate right-of-way width or where the final street design and grade have not been established, in which case the sidewalks must be constructed to a design and in a manner approved by the City Manager. Sidewalks approved by the City Manager may include temporary sidewalks and sidewalks constructed on private property; provided, however, that such sidewalks must provide continuity with sidewalks of adjoining commercial developments existing or proposed. When a sidewalk is to adjoin a future street improvement, the sidewalk construction must include construction of the curb and gutter section to grades and alignment established by the City Manager.

(8) The standards set forth in this Code are minimum standards for driveway approaches, and may be increased through the Architectural Review process in any particular instance where the standards provided herein are deemed insufficient to protect the public health, safety, and general welfare.

(9) Minimum driveway approach width for uses are as provided in Table 75-1 (Driveway Approach Width):

TABLE 75-1 Driveway Approach Width		
Use	Minimum Driveway Approach Width	Maximum Driveway Approach Width
Single-Family Residential, townhouses, and duplexes	10 feet	26 feet for one or two care garages 37 feet for three or more garages
Multi-family	2 Units = 16 feet	May provide two 16 foot one-way driveways instead of one 24-foot driveway
	3-49 Units = 24 feet	
	50-499 = 32 feet	May provide two 24-foot one-way driveways instead of one 32-foot driveway
	Over 500 = as required by the City Manager	
Commercial	1-99 Parking Spaces = 32 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet
	100-249 Parking Spaces = two approaches each 32 feet	
Industrial	36 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet
Institutional	1-99 Parking Spaces = 32 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet
	100-249 Parking Spaces = two approaches each 32 feet	

[...]

(11) Distance between Driveways and Intersections. Except for single-family dwellings, the minimum distance between driveways and intersections must be as provided below.

Distances listed must be measured from the stop bar at the intersection.

(a) At the intersection of collector or arterial streets, driveways must be located a minimum of 150 feet from the intersection.

(b) At the intersection of two local streets, driveways must be located a minimum of 30 feet from the intersection.

(c) If the subject property is not of sufficient width to allow for the separation between driveway and intersection as provided, the driveway must be constructed as far from the intersection as possible, while still maintaining the 5-foot setback between the driveway and property line.

(d) When considering a driveway approach permit, the City Manager may approve the location of a driveway closer than 150 feet from the intersection of collector or arterial streets, based on written findings of fact in support of the decision.

(12) Vision Clearance Area.

(a) Local Streets. A vision clearance area for all local street intersections, local street and driveway intersections, and local street or driveway and railroad intersections must be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are ten feet from the intersection point of the right-of-way lines, as measured along such lines (see Figure 73-2 for illustration).

(b) Collector Streets. A vision clearance area for all collector/arterial street intersections, collector/arterial street and local street intersections, and collector/arterial street and railroad intersections must be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 25 feet from the intersection point of the right-of-way lines, as measured along such lines. Where a driveway intersects with a collector/arterial street, the distance measured along the driveway line for the triangular area must be ten feet (see Figure 73-2 for illustration).

(c) Vertical Height Restriction. Except for items associated with utilities or publicly owned structures such as poles and signs and existing street trees, no vehicular parking, hedge, planting, fence, wall structure, or temporary or permanent physical obstruction must be permitted between 30 inches and eight feet above the established height of the curb in the clear vision area (see Figure 73-2 for illustration).

[...]

TDC 75.110. - Joint Access Standards.

When the City Manager determines that joint accesses are required by properties undergoing development or redevelopment, an overall access plan shall be prescribed by the City Manager and all properties shall adhere to this. Interim accesses may be allowed in accordance with TDC 75.060 of this chapter to provide for the eventual implementation of the overall access plan.

[...]

Finding:

A Transportation Impact Study by Lancaster Mobley dated January 6, 2022 along with two memorandums dated March 30, 2022 and May 18, 2022 were submitted. The City's traffic engineering consultant DKS provided TIA review comments dated February 23, 2022 and April 14, 2022.

The updated site plan includes the multi-use path along SW Myslony Street as well as a 12-foot-wide trail within a 15-foot easement along the east property line. Driveway 1 will be located at the western end of the property located as far as reasonable from nearby driveways. Driveway 2, east of SW 112th Avenue, will be located to align with the driveway to its south which eliminates offset and meets the 150-foot required distance from SW 112th Avenue. The northern lot is also zoned industrial and requires a 36-foot wide access at right-of-way. A 40-foot wide access easement was recorded as Washington County document #2022-008774 near the east lot line in the vicinity of the eastern access. The final plans must include the eastern driveway to be a minimum of 36 feet wide either matching the existing recorded access easement or with a new or modified access easement to serve the lot to the north. The updated site plans also show SW Myslony Street as approximately 42 feet in width through the S-curve to the eastern property line. The applicant must widen SW Myslony Street accordingly by recording adequate dedication of right-of-way and striping a center turn/two-way left-turn lane along this segment of SW Myslony Street to a standard three-lane section width and a half-street improvement for SW Myslony Street. In addition, the north side of SW Myslony must be constructed from the east side of SW 112th Avenue to the west property line, including a 12-foot wide multi-use path from the west side of SW 112th Avenue to the east property line. With recommended Conditions of Approval A12, A13, A20, A21, A22, A31 and A27, these standards are met.

III. RECOMMENDATION

Based on the application materials and analysis and findings presented above, staff finds that the applicable criteria have been met relative to AR 21-0018, and therefore recommends approval of this application with the following conditions of approval:

GENERAL:

- A1. This Architectural Review approval shall expire after two years unless a building, or grading permit submitted in conjunction with a building permit application, has been issued and substantial construction pursuant thereto has taken place and an inspection performed by a member of the Building Division, or an extension is granted under the terms of Section 33.020(10).

PRIOR TO EROSION CONTROL, PUBLIC WORKS, AND WATER QUALITY PERMIT ISSUANCE:

Submit to [eTrakit](#) for review and approval:

- A2. The applicant must follow the requirements of TDC 33.110 and recommendations within the arborists report dated December 21, 2021.
- A3. In accordance with TDC 70.120, submit a completed and owner signed Flood Hazard Area Development Permit application based on Base Flood Elevations ranging from 136.1 to 142.1 feet, NAVD 1988 from east to west including:
- a. Plans certified by a professional civil engineer registered in Oregon showing:
 - i. Floodplain fill balanced by cut in accordance with TMC 3-5-250, and
 - ii. Proposed construction in accordance with TDC 70.170 and 70.180.
 - b. A floodplain elevation certificate for the proposed building indicating Construction Drawing, and
 - c. Operations and maintenance procedures.
- A4. In accordance with code section TDC 74.330, 74.350, and 74.620, Tualatin Municipal Code (TMC) 3-2, and the Public Works Construction Code (PWCC) the applicant must:
- a. Submit sanitary sewer system conveyance calculations and plans that show:
 - i. A minimum of 2 feet per second design flow in the proposed public mains in accordance with PWCC 205.2.07C.
 - ii. Location of the lines, grade, materials, and other details.
 - iii. Relocation of the existing public sanitary sewer line onsite
 - 1. Within SW Myslony Street to the east property line, then
 - 2. Adjacent to the east property line centered within a 15-foot wide public sanitary sewer easement, and then
 - 3. Reconnecting to the existing line near the northeast corner of this development.
 - 4. The line and easement may be in the same location as the easement for the Ice Age Tonquin Trail.
 - iv. A 12-foot wide paved surface:
 - 1. Meeting PWCC construction specifications for maintenance vehicles,
 - 2. Within the 15-foot wide access easement from SW Myslony Street to and surrounding the proposed manhole near the northeast corner of this development, and
 - 3. This surface may be designed and utilized for the Ice Age Tonquin Trail.

- A5. In accordance with TMC 3-3, TDC 74.610, and the Public Works Construction Code the applicant must submit final water plans that show:
- a. A gate valve at the main for domestic and fire service laterals.
 - b. Adjacent to SW Myslony Street right-of-way:
 - i. Reduced pressure backflow prevention and water meter for the domestic lateral,
 - ii. The water meter within the planter strip,
 - iii. Irrigation after a domestic meter and reduced pressure backflow device, and
 - iv. Fire vaults surrounded by a five foot public utility easement.
- A6. The applicant must submit an approved JPA for evaluation prior to erosion control, public works, and water quality permit issuance and provide documentation that demonstrates compliance with TDC 72.040(c)(i), (ii), (iii) and (iv).
- A7. The applicant shall provide all information meeting the requirements of TDC 72.040(3)(a, b and c) for all permit submittals.
- A8. The applicant must provide a site plan and written responses that demonstrates compliance with TDC 73A.500(1).
- A9. The applicant must follow the requirements of TDC 33.110 and recommendations within the arborists report dated December 21, 2021.
- A10. In accordance with TDC 74.630 and 74.650, Public Works Construction Code (PWCC), TMC 3-5-200 through 3-5-430, and Clean Water Services' (CWS) Design and Construction Standards (D&CS) Chapter 4 the applicant must submit:
- a. Final stormwater plans and calculations stamped by an Oregon registered, professional engineer in accordance with TMC 3-5-390(1) proving proposed systems:
 - i. Engineer to provide a downstream analysis, including but not limited to erosion, and include solutions within final plans for ¼ mile downstream from the release from the private development through the public stormwater system, in accordance with TMC 3-5-210(4).
 - ii. With gravity flow five feet from the outside of the established line of the building to the public stormwater system or as otherwise approved by the City Engineer, in accordance with CWS D&CS 1.03.39 and 5.09.3(a) (1) and (4).
 - iii. Discharge must be to an approved public system.
 - iv. Address runoff from all new and modified private and public impervious areas.
 - v. Treat new and modified impervious areas in accordance with CWS D&CS 4.08.1.d meeting phosphorous removal in accordance with TMC 3-5-350 per the design storm in accordance with TMC 3-5-360 and CWS D&CS 4.08.2.
 1. Public water quality facilities may be LIDA street swales within appropriately sized planter strips, and
 2. Additional dedication of right-of-way may be required to accommodate public stormwater facilities.
 - vi. Detain up to the 25-year storm event in accordance with TMC 3-5-220, TMC 3-5-230, and CWS D&CS 4.08.
 - vii. Show onsite facilities accommodating hydromodification including post-development runoff rates not exceeding pre-development runoff rates for ½ the 2-year storm event and the 5-year and 10-year storm events for proposed new and modified impervious areas in accordance with CWS D&CS 4.03.5.
 - viii. Submit conveyance calculations that accommodates up to a 25-year storm event within the public stormwater system in accordance with TDC 74.640 and CWS D&CS 5.05.2.d.

- ix. In accordance with TDC 74.650(2) and CWS D&CS 3.01.2(d), comply with:
 - 1. The submitted Clean Water Services' Service Provider Letter CWS File Number 22-000820 dated March 29, 2022 conditions to obtain a Stormwater Connection Permit Authorization Letter.
 - 2. Any new or updated Service Provider Letter required due to final approved plans.
 - 3. Requirements stated within the Clean Water Services' Memorandum dated June 9, 2022.
 - b. Submit financial assurance for construction performance in accordance with TMC 3-390(3), PWCC 102.14.00, and amount per CWS D&CS 2.07 Table 2-1.
 - c. Submit a copy of the recorded private stormwater maintenance agreement in accordance with TMD 3-5-390(4). The agreement must assure the owner as responsible for maintenance of the constructed portions of private stormwater systems within their lot. The identified system must include all conveyance, detention, hydromodification, and treatment.
- A11. In accordance with TMC 3-5-050 and 3-5-060, TDC 74.640, Public Works Construction Code, and Clean Water Services' Design and Construction Standards Chapters 2 and 6 the applicant must submit final erosion control plans:
- a. Minimizing the impact of stormwater from the development to adjacent properties, and
 - b. Including a copy of the National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ.
- A12. In accordance with code sections TDC 74.120, 74.130, 74.210, 74.330, 74.420, 74.425, 74.430, 74.440, 74.470, 74.485, 74.660, 74.765, 75.020, 75.030, 75.040, and 75.120:
- a. A signal at the intersection of SW 124th Avenue and SW Myslony Street.
 - b. For SW Myslony Street the applicant must submit final construction plans that include:
 - i. From the west side of SW 112th Avenue to the east property line:
 - 1. Half-street improvements north of centerline,
 - 2. Striping of the entire street section to a standard two travel and one center turn lane,
 - 3. Curbs and gutters,
 - 4. One 6-foot wide planter strip on the north side starting east of SW 112th Avenue,
 - 5. Street lights, Option A, as needed,
 - 6. Approvable street trees and planting locations with permanent irrigation,
 - 7. A 12-foot wide multi-use path on the north side, tapering at the existing sidewalk west of SW 112th Avenue,
 - 8. An 8-foot wide public utility easement adjacent to right-of-way with additional as required to support water meters and vaults, and
 - 9. The eastern access with a minimum 36-foot width:
 - a. Align with existing recorded 40-foot wide access easement Washington County document #2022-008774, or
 - b. Align with a new or modified access easement to serve the lot to the north.
 - ii. Reconstruction of exiting sidewalk, ramps, and closure of the existing driveway approach at SW 112th Avenue as needed for the proposed frontage on the north side of Myslony,

- iii. Dedication of adequate right-of-way to accommodate the construction of the public improvements.

PRIOR TO BUILDING OR ENGINEERING PERMIT ISSUANCE:

Submit to [eTrakit](#) for review and approval:

- A13. The applicant must obtain:
- a. A National Pollution Discharge Elimination System (NPDES) 1200-C Construction Erosion Control permit from Oregon DEQ;
 - b. Erosion Control, Flood Hazard Area Development Permit, Public Works, and Water Quality Permits from the City of Tualatin; and
 - c. An approved JPA meeting Oregon Division of State Lands (DSL) requirements.
- A14. The applicant must provide plans and written description that demonstrates compliance with TDC 73A.500(5)(a, b and c).
- A15. The applicant must provide a site plan and written responses that demonstrates compliance with TDC 73A.500(1).
- A16. The applicant shall submit a final landscaping plan that clearly demonstrates compliance with TDC Section 73B.020(3).
- A17. The applicant must submit a Final Site Plan Set (in PDF format) to the Planning Division that is in substantial conformance to the submitted site plans and includes:
- a. Walkways must be a minimum of five feet and provided between the main building entrances and sidewalks along the public right-of-way, consistent with TDC 73A.500(1).
 - b. Trees identified for retention in Tree Assessment Report (Exhibit A3) must be identified on the grading plan, consistent with TDC 73B.080(3). Tree protection fencing and other preservation measures recommended by the Arborist should also be specified on the grading plan.
 - c. Trees, as approved by the Architectural Review Board, must be planted no more than 30 feet apart on the perimeter of vehicle circulation areas consistent with TDC 73C.230(3). Such trees may be omitted where the perimeter area is also within a Public Utility Easement as required by the City Engineer, and where there are existing trees at or near the property line.
 - d. A minimum of 8,375 square feet or 25 square feet per parking stall improved with parking lot landscape island area with one deciduous shade trees for every four parking spaces, consistent with TDC 73C.240(4).
 - e. Demonstrate that an adequate waste and recyclables management solution is provided in compliance with TDC 73D. If the minimum standards method is chosen, a minimum of 2,727 square feet of trash enclosure area must be shown on the plans. These facilities must comply with the location, design, and access standards in TDC 73D.070.
 - f. Details to demonstrate that proposed bicycle parking meets the standards of TDC 73C.050(2) (a), (b), and (c), and 45 spaces are provided, with 14 covered, in conformance with TDC 73C.100(1).
 - g. Design for a 12 foot-wide multi-use pathway (regional Ice Age Tonquin Trail) on the north side of SW Myslony Street ROW from the intersection at 112th Avenue to the termination of the property to the east property line including required mitigation, enhancement, and related improvements or facilities. Design and construction standards for the pathway and related facilities shall be approved by the Parks and Recreation Director in accordance with City Public Works Construction Code, Parks Multi Use Pathway Standards, and Street Design Standards for a 12' multi-use path. Trees and

shrubs must be shown between the pathway and the properties adjoining the Subject Property to create and maintain visual privacy. Plant selection and location shall be in accordance with City standards.

- A18. No vehicular parking, hedge, planting, fence, wall structure, or temporary/permanent physical obstruction is permitted between 30 inches and eight feet above the established height of the curb in the vision clearance area specified in TDC Figure 73-2.
- A19. The applicant must submit a solid waste and recyclables storage area plan that is in substantial conformance with the Minimum Standards Method described in TDC 73D.060 or other design method listed in TDC 73.020.
- A20. In accordance with code sections TDC 74.120, 74.420, 74.470, 74.485, and 74.765 the applicant must submit a copy of recorded dedication of sufficient right-of-way for SW Myslony Street from the centerline plus any additional to accommodate required public street and stormwater improvements.
- A21. In accordance with TDC 74.330, the applicant must submit a copy of recorded easements:
- A public utility easement, as approved by City Engineer, adjacent to SW Myslony Street including five feet of public water easement surrounding water meter, backflow protection, and/or fire vaults, and
 - A 15-foot wide public sanitary sewer line and access easement centered on the relocated public line adjacent to the east property line. This easement may include the Ice Age Tonquin Trail.
 - If modified as a result of final approved plans, the modified existing private access easement near the east property line from SW Myslony Street to the property to the north.
- A22. The relocation of the onsite public sanitary sewer line to within SW Myslony Street then north adjacent to the east property line must be constructed along with the maintenance access and approved by the City.
- A23. The applicant will provide an updated landscaping plan that illustrates evergreen trees meeting the requirements of TDC73B.090(4) located in areas of the site that will provide year-long screening of the loading docks.
- A24. The applicant must complete the following items noted in the Parks and Recreation Memo dated June 15, 2022 that are related to the multi-use regional Ice Age Tonquin Trail easement located on the eastside of the property as depicted on the attached site plan with required trail cross sections (Exhibit E).
- Provide a north south active transportation pedestrian and bike easement on the east side of the property as shown in 3.1 A-2 Preliminary Site Plan dated April 12, 2022.
 - Easement is to be a minimum of 15' wide to accommodate the 12' multi use regional Ice Age Tonquin Trail.
 - The easement will run from Myslony Street, along the eastside of the property, to the terminus of the property at the north boundary.
 - Execute and record the easement in accordance with City standards.

DURING CONSTRUCTION ACTIVITY:

- A25. All associated construction activities must comply with the requirements of TDC 72.060(2).
- A26. The applicant must install the tree protection fencing consistent with the Tree Assessment Report submitted as Exhibit A3 and Section 73B.080(3). Please contact the Planning Division to schedule an inspection with a minimum of 48 hours' notice. Where site conditions make grading or other similar encroachment upon a preserved tree's drip-line area, such grading or similar encroachment must only be permitted under the direction of a qualified arborist.

PRIOR TO ISSUANCE OF CERTIFICATE OF OCCUPANCY:

- A27. The applicant must submit paper and electronic as-builts of the Engineering permits along with maintenance bonds and any final fees for public and water quality improvements.
- A28. The applicant must submit a floodplain elevation certificate for all structures indicating Finished Construction in accordance with TDC 70.120.
- A29. Areas impacted by grading and all areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas, or undisturbed natural areas must be landscaped, pursuant to TDC 73B.060(1).
- A30. The applicant must install bicycle parking signage and vanpool/carpool parking signage per industrial and or General Manufacturing standards, pursuant to TDC 73C.010(2)(xi) and TDC 73C.050(2)(d).
- A31. The applicant must complete all the private stormwater and public improvements as shown on the approved permit plans. All improvements must also be accepted by the City in accordance with TDC 74.120.
- A32. The applicant must construct proposed buildings and all site improvements as illustrated on the approved Final Site Plan and Final Color Architectural Elevations. The applicant must contact the Planning Division for a site inspection at least 72 hours prior to requesting a certificate of occupancy. This inspection is separate from inspection(s) done by the Building Division.
- A33. The applicant must complete the following items noted in the Parks and Recreation Memo dated June 15, 2022 that are related to the multi-use regional Ice Age Tonquin Trail easement as depicted on the attached site plan with required trail cross sections (Exhibit E).
 - a. Applicable to the eastside of the property where the trail trends north-south.
 - i. Applicant shall grade the trail easement to ADA compliant slope and evaluations shown in 3.1 A-2 Preliminary Site Plan dated April 12, 2022 (attached) or substantially similar as approved by the Parks & Recreation Director.
 - b. Applicable to the SW Myslony Street Right of Way.
 - i. Applicant shall design and construct a 12 foot-wide multi-use pathway (regional Ice Age Tonquin Trail) on the north side of SW Myslony Street ROW from the intersection at 112th Avenue to the termination of the property to the east property line.
 - ii. Must include required mitigation, enhancement, and related improvements or facilities.
 - iii. Design and construction standards for the pathway and related facilities shall be approved by the Parks and Recreation Director in accordance with City Public Works Construction Code, Parks Multi Use Pathway Standards, and Street Design Standards for a 12' multi-use path.
 - iv. Trees and shrubs shall be planted between the pathway and the properties adjoining the Subject Property to create and maintain visual privacy. Plant selection and location shall be in accordance with City standards.

THE FOLLOWING ITEMS APPLY TO THE SITE IN AN ON-GOING MANNER:

- A34. The site allows both Light Industrial (39.400) and Warehouse and Freight Movement uses (TDC 39.440) as permitted uses. A conditional use permit must be obtained if warehousing of building materials and supplies is proposed by future tenants. Future proposals that change the use of the property will be subject to review and limited to uses permitted in the General Manufacturing (MG) District, as identified in Table 61-1. If the use of a property changes, thereby increasing off-street parking or loading requirements, the increased parking/loading

area must be provided prior to commencement of the new use, in accordance with TDC 73C.010(2)(a)(v).

- A35. All uses must be conducted within a completely enclosed building, except off-street parking and loading, and basic utilities, pursuant to TDC 61.310(1).
- A36. The proposed development must comply with the Environmental Regulations of TDC 63.

Walgraeves Industrial Park

Narrative Architectural Review Application

Prepared for:
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May 2022
20120.30

Walgraeves Industrial Park

Summary

PROJECT DESCRIPTION

This project proposes a three structure, Industrial Park facility with associated parking, loading, landscape and utilities.

SITE DESCRIPTION

The property is located at 11345 SW Herman Road. The project site is 914,700 SF or approximately 21 acres. The project will take access from SW Myslony St. and will receive a new address. The property is vacant with no significant vegetation; however, wetlands do exist of the site and will be mitigated as required.

The property is zoned MG – General Manufacturing. The proposed use is Warehouse and Freight Distribution and Light Manufacturing.

APPLICABLE STANDARDS

The following narrative addresses the compliance of this project with all applicable codes and standards of the Tualatin Development Code (TDC) and the Tualatin Municipal Code (TMC).

Tualatin Development Code:

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32.140. - Application Submittal	
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33.020 Architectural Review	
33:110 Tree Removal Permit/Review	
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Tualatin Development Code

CHAPTER 32 – Procedures

32.140. - Application Submittal.

(1) Submittal Requirements. Land use applications must be submitted on forms provided by the City. A land use application may not be accepted in partial submittals. All information supplied on the application form and accompanying the application must be complete and correct as to the applicable facts. Unless otherwise specified, all of the following must be submitted to initiate completeness review under TDC 32.160:

Response: A proposed, the Architectural Review submittal package includes all the required materials.

CHAPTER 33 – Applications and Approval Criteria

TDC 33.020 – Architectural Review

(3) Types of Architectural Review Applications—Procedure Type.

(d) Large Commercial, Industrial, and Multifamily Development. Development applications that propose any of the following are subject to Type III Review by the Architectural Review Board as the hearing body:

(ii) New Industrial Buildings 150,000 square feet and larger; and

Response: This application will be a Type III, Architectural Review.

(5) Approval Criteria.

(c) Large Commercial, Industrial, and Multifamily Development. Applications for Large Commercial, Industrial, and Multifamily Development must comply with the applicable standards and objectives in TDC Chapter 73A through 73G.

Response: This document addresses the development standards and objects for this type of development. Please see 73A – 73G.

TDC 33.110. - Tree Removal Permit/Review.

(3) *Procedure Type*. Tree Removal Permit applications are subject to Type II Review in accordance with TDC Chapter 32. Tree Removal Permit applications submitted with an Architectural Review, Subdivision, or Partition application will be processed in conjunction with the Architectural Review, Subdivision, or Partition decision.

Response: The tree removal permit is being submitted with this Architectural Review package.

(4) *Specific Submittal Requirements*. In addition to the general submittal requirements in TDC 32.140 (Application Submittal), an applicant must submit the following:

(a) *Tree Preservation Plan*. A tree preservation plan drawn to scale must include:

(b) *Tree Assessment Report*. A tree assessment prepared by a certified arborist must include:

(c) *Tree Tags*. All trees on-site must be physically identified and numbered in the field with an arborist-approved tagging system that corresponds to the Tree Preservation Plan and Tree Assessment Report.

Response: A tree plan is included, see sheet L1.0. An Arborist report is included and the site trees have been tagged.

(5) *Approval Criteria.*

(a) An applicant must satisfactorily demonstrate that at least one of the following criteria are met:

(i) The tree is diseased and:

(ii) The tree represents a hazard which may include but not be limited to:

(iii) It is necessary to remove the tree to construct proposed improvements based on Architectural Review approval, building permit, or approval of a Subdivision or Partition Review.

(b) If none of the conditions in TDC 33.110(5)(a) are met, the certified arborist must evaluate the condition of each tree.

(7) *Conditions of Approval.* Any tree required to be retained must be protected in accordance with the TDC 73B and 73C

Response: Please see the Arborist report and sheet L1.0 for tree removal specifics.

CHAPTER 61 – General Manufacturing Planning District

TDC 61.200. Use Categories.

**Table 61-1
Use Categories in the MG Zone**

USE CATEGORY	STATUS	LIMITATIONS AND CODE REFERENCES
Warehouse and Freight Movement	P/C	Conditional use required for warehousing of building materials and supplies. All other uses permitted outright.
Light Manufacturing	P	—

Response: Warehouse and Freight Movement and Light Manufacturing are permitted uses.

TDC 61.210. - Additional Limitations on Use

Response: This project proposes Warehouse and Freight Movement and Light Manufacturing. As such none of the standards of this section apply.

TDC 61.300. - Development Standards.

MINIMUM SETBACKS		
Front	30 feet	
Front Setback Adjacent to Residential or Manufacturing Park Zone	50 feet	
Side	0-50 feet	Determined through Architectural Review process. No minimum setback if adjacent to railroad right-of-way or spur track.
Side Setback Adjacent to Residential or Manufacturing Park Zone	50 feet	
Rear	0-50 feet	Determined through Architectural Review process. No minimum setback if adjacent to railroad right-of-way or spur track.
Rear setback adjacent to Residential or Manufacturing Park Zone	50 feet	
Parking and Circulation Areas	5 feet	No minimum setback required adjacent to joint access approach in accordance with TDC 73C .
Parking and Circulation Areas Adjacent to Residential or Manufacturing Park Zone	10 feet	
Fences	10 feet	From public right-of-way.

Response: The property abuts like zoning to the south east and west. To the north the property remains in Washington County and is zoned FD-10, (Future Development 10-acre district.) Therefore, although a residential use exists to the north, it is not zoned residential and residential setbacks are not required. As proposed, the Site Plan complies with the required setbacks as illustrated below.

Proposed Front

Building Setback: Varies – 61’-6” min.

Parking and Circulation Setback: 5’-6”

Proposed Side

Building Setback: Varies – 70’-9” min.

Parking and Circulation Setbacks: Varies – 31’-9” min.

Proposed Rear

Building Setback: Varies – 65’-10” min.

Parking and Circulation Setback: Varies – 5’-0” min.

CHAPTER 63 – Industrial Uses – Environmental Regulations

TDC 63.020. - Applicability.

The regulations of this Chapter apply to:

- (1) All industrial uses and utilities, regardless of the Planning District in which they are located, and
- (2) All Manufacturing Planning Districts, regardless of the use category.

Response: These standards apply to this project.

TDC 63.051. - Noise.

All uses and development must comply with the Oregon State Department of Environmental Quality standards relating to noise and the City of Tualatin noise ordinance in, TMC 6-14.

Response: Tenants will be held to this standard.

TDC 63.052. - Vibration.

- (1) Restrictions. All uses and development must not cause or permit ground vibration into the property of another person that exceeds the limits set forth below in this section.

Response: Tenants will be held to this standard.

TDC 63.053 - Air Quality.

- (1) Restrictions. All uses and development must comply with the most recent air quality standards adopted by the Oregon Department of Environmental Quality. Plans of construction and operations must comply with the recommendations and regulations of the State Department of Environmental Quality.

Response: Tenants will be held to this standard.

TDC 63.054. - Odors.

All uses and development must not emit odors in such quantities as to create a nuisance condition at any point beyond the subject property line of the emitting use.

Response: Tenants will be held to this standard.

TDC 63.055. - Heat and Glare.

- (1) All uses and development must conduct all operations producing heat or glare entirely within an enclosed building.
- (2) All uses and development may utilize exterior lighting, but the exterior lighting must be screened, baffled or directed away from residential planning districts.

Response: Tenants will be held to this standard. The property does not abut a residential planning district.

TDC 63.056. - Storage and Stored Materials.

- (1) All uses and development must store all materials, including wastes, in a manner that will not attract or aid the propagation of insects or rodents, or in any other way create a health or safety hazard.
- (2) All uses and development that utilize open storage that would otherwise be visible at the property line must conceal it from view at the abutting property line by a sight

obscuring fence not less than six feet high and not accessible to the general public to protect public safety.

Response: Tenants will be held to this standard. All exterior storage will be screened as required.

TDC 63.057. - Liquid or Solid Waste Materials.

All uses and development are prohibited from disposing waste onto the site or into adjacent drainage ditches, creeks or other natural waterways in violation of State of Oregon DEQ standards, Clean Water Services Standards, City Standards, or in a manner that causes harm to wildlife.

Response: Tenants will be held to this standard.

TDC 63.058. - Dangerous Substances.

All uses and development are prohibited from the storage, transfer, or processing of hazardous, toxic, or radioactive waste.

Response: Tenants will be held to this standard.

CHAPTER 70 - Floodplain District (FP)

TDC 70.020. - Methods of Reducing Flood Losses.

In order to accomplish its purposes, this Chapter includes methods and provisions for:

- (1) Restricting or prohibiting uses that are dangerous to health, safety and property due to water or erosion hazards, or which result in damaging increases in erosion or in flood heights or velocities;
- (2) Requiring that uses vulnerable to floods, including facilities that serve such uses, be protected against flood damage at the time of initial construction.
- (3) Controlling the alteration of natural flood plains, stream channels, and natural protective barriers, which help accommodate or channel flood waters;
- (4) Controlling filling, grading, dredging, and other development which may increase flood damage;
- (5) Preventing or regulating the construction of flood barriers that will unnaturally divert flood waters or that may increase flood hazards in other areas; and
- (6) Coordination and supplementing the provisions of the site building code with local land use and development ordinances.

Response: The site is located within the Special Flood Hazard Area. Methods of reducing flood losses for this project include underground flood storage matching volume of new fill.

CHAPTER 72. – Natural Resource Protection Overlay District

Response: Please refer to the CWS Service Provided Letter and the Natural Resources Assessment Report included in this application.

CHAPTER 73A - Site Design Standards

TDC 73A.010. - Site and Building Design Standards Purpose and Objectives.

(1) *Purpose.* The purpose of the site and building design objectives and standards found in TDC 73A through TDC 73G is to promote functional, safe, innovative, and attractive sites and buildings that are compatible with the surrounding environment, including, but not limited to:

(a) The building form, articulation of walls, roof design, materials, and placement of elements such as windows, doors, and identification features; and

(b) The placement, design, and relationship of proposed site elements such as buildings, vehicular parking, circulation areas, bikeways and bike parking, accessways, walkways, buffer areas, and landscaping.

(2) *Objectives.* The objectives of site and building design standards in TDC 73A through TDC 73G are to:

(a) Enhance Tualatin through the creation of attractively designed development and streetscapes;

(b) Encourage originality, flexibility, and innovation in building design;

(c) Create opportunities for, or areas of, visual and aesthetic interest for occupants and visitors to the site;

(d) Provide a composition of building elements which responds to function, land form, identity and image, accessibility, orientation and climatic factors;

(e) Conserve, protect, and restore fish and wildlife habitat areas, and maintain or create visual and physical corridors to adjacent fish and wildlife habitat areas;

(f) Enhance energy efficiency through the use of landscape and architectural elements; and

(g) Minimize disruption of natural site features such as topography, trees, and water features.

Response: The building has been designed to articulate entries and features through the varied height of the roof parapet, the use of reveals, paint locations, canopies and windows to provide an aesthetically interesting building for occupants and visitors.

TDC 73A.500. - Industrial Design Standards.

The following standards are minimum requirements for industrial development in all zones:

(1) *Walkways.* Industrial development must provide walkways as follows:

(a) Walkways must be a minimum of five feet in width;

(b) Walkways must be constructed of asphalt, concrete, or a pervious surface such as pavers or grasscrete (not gravel or woody material);

(c) Walkways must meet ADA standards applicable at time of construction or alteration;

(e) Walkways must be provided between the main building entrances and other on-site buildings, accessways, and sidewalks along the public right-of-way;

(f) Walkways through parking areas, drive aisles, and loading areas must be of a different appearance than the adjacent paved vehicular areas; and

(g) Outdoor Recreation Access Routes must be provided between the development's walkway and bikeway circulation system and parks, bikeways and greenways where a bike or pedestrian path is designated.

Response: Walkways have been provided as required by this code section. Please refer to the Site Plan.

(2) *Accessways.*

(a) When Required. Accessways are required to be constructed when a common wall development is adjacent to any of the following:

- (i) Residential property;
- (ii) Commercial property;
- (iii) Areas intended for public use, such as schools and parks; and
- (iv) Collector or arterial streets where transit stops or bike lanes are provided or designated.

Response: The project is not a common wall development and does not abut any of the identified uses, therefore, accessways are not required.

(4) *Safety and Security.* Industrial development must provide safety and security features as follows:

- (a) Locate windows and provide lighting in a manner that enables tenants, employees, and police to watch over pedestrian, parking, and loading areas;
- (b) Locate windows and interior lighting to enable surveillance of interior activity from the public right-of-way;
- (c) Locate, orient, and select exterior lighting to facilitate surveillance of on-site activities from the public right-of-way without shining into public rights-of-way or fish and wildlife habitat areas;
- (d) Provide an identification system which clearly locates buildings and their entries for patrons and emergency services; and
- (e) Above ground sewer or water pumping stations, pressure reading stations, water reservoirs, electrical substations, and above ground natural gas pumping stations must provide a minimum six-foot-tall security fence or wall.

Response: The proposed development locates windows for lighting and security toward public areas and street frontage. Exterior lighting is proposed that complies with dark sky initiatives. Building addresses will be prominently displayed. No above ground sewer, water pumping stations, pressure reading stations, water reservoirs, electrical substations, or above ground natural gas pumping stations are proposed as part of this development.

(5) *Service, Delivery, and Screening.* Industrial development must provide service, delivery, and screening features as follows:

- (a) Above grade and on-grade electrical and mechanical equipment such as transformers, heat pumps and air conditioners must be screened with sight obscuring fences, walls or landscaping;
- (b) Outdoor storage must be screened with a sight obscuring fence, wall, berm or dense evergreen landscaping; and
- (c) Above ground pumping stations, pressure reading stations, water reservoirs; electrical substations, and above ground natural gas pumping stations must be screened with sight-obscuring fences or walls and landscaping.

Response: Outdoor storage of trucks/trailers is proposed and has been screened accordingly. All other identified items have been screened as required.

(6) *Adjacent to Transit.* Industrial development adjacent to transit must comply with the following:

Response: The closest transit stop to this property is at SW Tualatin-Sherwood Rd and Avery. From that transit stop the walking distance to the project site is approximately .5 miles.

CHAPTER 73B - Landscaping Standards

TDC 73B.020. - Landscape Area Standards Minimum Areas by Use and Zone.

Minimum Area Requirement - 15 percent of the total area to be developed

Response: Please see below landscape calculations for the site.

TOTAL SITE AREA	= 914,700 sf
LANDSCAPE AREA REQUIRED 15% OF SITE	= 137,205 sf
LANDSCAPE AREA PROPOSED 16.2 % OF SITE	= 147,915 sf

TDC 73B.060. - Additional Minimum Landscaping Requirements for Industrial Uses.

(1) *General.* In addition to requirements in TDC 73B.020, industrial uses must comply with the following:

(a) All areas not occupied by buildings, parking spaces, driveways, drive aisles, pedestrian areas, or undisturbed natural areas must be landscaped.

(i) This standard does not apply to areas subject to the Hedges Creek Wetlands Mitigation Agreement.

(b) Minimum 5-foot-wide landscaped area must be located along all building perimeters viewable by the general public from parking lots or the public right-of-way, but the following may be used instead of the 5-foot-wide landscaped area requirement:

(i) Pedestrian amenities such as landscaped plazas and arcades; and

(ii) Areas developed with pavers, bricks, or other surfaces, for exclusive pedestrian use and contain pedestrian amenities, such as benches, tables with umbrellas, children's play areas, shade trees, canopies.

(c) Five-foot-wide landscaped area requirement does not apply to:

(i) Loading areas,

(ii) Bicycle parking areas,

(iii) Pedestrian egress/ingress locations, and

(iv) Where the distance along a wall between two vehicle or pedestrian access openings (such as entry doors, garage doors, carports and pedestrian corridors) is less than eight feet.

(d) Development that abuts an RL or MP Zone must have landscaping approved through Architectural Review and must provide and perpetually maintain dense, evergreen landscaped buffers between allowed uses and the adjacent RL and MP zones.

Response: The project does not abut a RL or MP zone. All additional landscape requirements have been met.

(2) MP Area—Wetland Buffer. Wetland buffer areas up to 50 feet in width may be counted toward the required percentage of site landscaping, subject to the following:

- (a) Area counted as landscaping is limited to a maximum of two and one-half percent of the total land area to be developed;
- (b) Area to be counted as landscape must be within the boundaries of the subject property;
- (c) No credit may be claimed for wetland buffer areas lying outside the lot lines of the subject parcel;
- (d) Where wetlands mitigation in the buffer has not yet occurred at the time of development, the developer must perform, or bear the cost of, all necessary mitigation work in the course of site development, in accordance with a Removal/Fill Permit or permits issued by the Oregon Division of State Lands and the US Army Corps of Engineers and the Clean Water Services; and
- (e) Where wetlands mitigation in the buffer has already been performed in accordance with a Removal/Fill Permit or permits issued by the Oregon Division of State Lands and the US Army Corps of Engineers, the developer must include an enhanced mitigation plan approved by the Oregon Division of State Lands and Clean Water Services, as part of the Architectural Review submittal. The developer must complete all work required by the enhanced wetland mitigation plan in conjunction with development of the site.

Response: A portion of the required landscape area is in a vegetative corridor. Please see the report from Pacific Habitat, included in this application package.

TDC 73B.080. - Minimum Landscaping Standards for All Zones.

The following are minimum standards for landscaping for all zones.

(1) Required Landscape Areas:

- Must be designed, constructed, installed, and maintained so that within three years the ground must be covered by living grass or other plant materials.
- The foliage crown of trees cannot be used to meet this requirement.
- A maximum of ten percent of the landscaped area may be covered with un-vegetated areas of bark chips, rock or stone.
- Must be installed in accordance with the provisions of the American National Standards Institute ANSI A300 (Part 1) (Latest Edition).
- Must be controlled by pruning, trimming, or otherwise so that:
- It will not interfere with designated pedestrian or vehicular access; and
- It will not constitute a traffic hazard because of reduced visibility.

Response: The landscape plan meets the above minimum requirements. Please see sheets L1.1- L1.5.

(2) Fences:

Landscape plans that include fences must integrate any fencing into the plan to guide wild animals toward animal crossings under, over, or around transportation corridors.

Response: Fencing is not proposed.

(3) Tree Preservation:

Trees and other plant materials to be retained must be identified on the landscape plan and grading plan.

During construction:

Must provide above and below ground protection for existing trees and

plant materials identified to remain;

Trees and plant materials identified for preservation must be protected by chain link or other sturdy fencing placed around the tree at the drip line;

If it is necessary to fence within the drip line, such fencing must be specified by a qualified arborist;

Top soil storage and construction material storage must not be located within the drip line of trees designated to be preserved;

Where site conditions make necessary a grading, building, paving, trenching, boring, digging, or other similar encroachment upon a preserved tree's drip-line area, such grading, paving, trenching, boring, digging, or similar encroachment must only be permitted under the direction of a qualified arborist. Such direction must assure that the health needs of trees within the preserved area can be met; and

Tree root ends must not remain exposed.

Landscaping under preserved trees must be compatible with the retention and health of the preserved tree.

When it is necessary for a preserved tree to be removed in accordance with TDC 33.110 (Tree Removal Permit) the landscaped area surrounding the tree or trees must be maintained and replanted with trees that relate to the present landscape plan, or if there is no landscape plan, then trees that are complementary with existing, landscape materials. Native trees are encouraged

100 percent of the area preserved under any tree or group of trees (Except for impervious surface areas) retained in the landscape plan must apply directly to the percentage of landscaping required for a development

Response: Please see the Tree removal and protection plan for trees to be removed and protected, the arborist report and the landscape plan for proposed new trees to be planted.

(4) Grading:

After completion of site grading, top-soil is to be restored to exposed cut and fill areas to provide a suitable base for seeding and planting.

All planting areas must be graded to provide positive drainage.

Soil, water, plant materials, mulch, or other materials must not be allowed to wash across roadways or walkways.

Impervious surface drainage must be directed away from pedestrian walkways, dwelling units, buildings, outdoor private and shared areas and landscape areas except where the landscape area is a water quality facility.

Response: Grading achieves positive drainage and directs stormwater away from walkways and buildings.

(5) Irrigation

Landscape areas must be irrigated with an automatic underground or drip irrigation system.

Response: A design build/underground irrigation system is proposed.

(6) Re-vegetation in Un-landscaped Areas:

Vegetation must be replanted in all areas where vegetation has been removed or damaged in areas not affected by the landscaping requirements and that are not to be occupied by structures or other improvements.

Plant materials must be watered at intervals sufficient to ensure survival and

growth for a minimum of two growing seasons.

The use of native plant materials is encouraged to reduce irrigation and maintenance demands.

Disturbed soils should be amended to an original or higher level of porosity to regain infiltration and stormwater storage capacity.

Response: All disturbed areas as a result of construction will be vegetated.

TDC 73B.090. - Minimum Standards Trees and Plants.

The following minimum standards apply to the types of landscaping required to be installed for all zones.

(1) Deciduous Shade Trees:

- One and on-half inch caliper measured six inches above ground;
- Balled and burlapped; bare root trees will be acceptable to plant during their dormant season;
- Reach a mature height of 30 feet or more;
- Cast moderate to dense shade in summer;
- Live over 60 years;
- Do well in urban environments, tolerate pollution, heat, and resistant to drought;
- Require little maintenance and mechanically strong;
- Insect- and disease-resistant;
- Require little pruning; and
- Barren of fruit production.

Response: Deciduous Shade trees are specified at 1.5-inch caliper B&B, mature at 30 feet min., are long lived and do well in an urban environment. Please see the Landscape Plan for Tree species, size and specifications.

(2) Deciduous Ornamental Trees:

- One and on-half inch caliper measured six inches above ground;
- balled and burlapped; bare root trees will be acceptable to plant during their dormant season; and
- Healthy, disease-free, damage-free, well-branched stock, characteristic of the species

Response: Ornamental trees are specified at 1.5-inch caliper B&B. Please see the Landscape Plan for Tree species, size and specifications.

(3) Coniferous Trees:

- Five feet in height above ground;
- Balled and burlapped; bare root trees will be acceptable to plant during their dormant season; and
- Healthy, disease-free, damage-free, well-branched stock, characteristic of the species.

Response: Evergreen trees are specified at 5 feet tall B&B. Please see the Landscape Plan for Evergreen Tree species, size and specifications.

(4) Evergreen and Deciduous Shrubs:

- One to five-gallon size;
- Healthy, disease-free, damage-free, well-branched stock, characteristic of the species; and
- Side of shrub with best foliage must be oriented to public view.

Response: Please see the Landscape Plan for Shrub species, size and specifications.

(5) Groundcovers:

- Fully rooted;
- Well branched or leafed;
- Healthy, disease-free, damage-free, well-branched stock, characteristic of the species; and
- English ivy (*Hedera helix*) is prohibited.

Response: Please see the Landscape Plan for groundcover species, size and specifications. No *Hedera helix* is proposed.

(6) Lawns:

- Consist of grasses, including sod, or seeds of acceptable mix within the local landscape industry;
- 100 percent coverage and weed free; and
- Healthy, disease-free, damage-free, characteristic of the species.

Response: Please see the Landscape plan and specifications.

CHAPTER 73C - Parking Standards

TDC 73C.100. - Off-Street Parking Minimum/Maximum Requirements.

(1) The following are the minimum and maximum requirements for off-street motor vehicle parking in the City, except these standards do not apply in the Core Area Parking District. The Core Area Parking District standards are in TDC 73C.110.

Response: The project site is not within the Core Area Parking District. The following off-street parking requirements apply.

(f) Industrial

(i) Manufacturing

- Minimum Vehicle Parking - 1.60 spaces per 1,000 SF of gross floor area
- Maximum Vehicle Parking - None
- Bicycle Parking - 2, or 0.10 spaces per 1,000 GSF, whichever is greater
- % Bicycle Parking/Covered - First 5 spaces or 30%, whichever is greater

(ii) Warehousing

- Minimum Vehicle Parking - 0.30 spaces per 1,000 SF of gross floor area
- Maximum Vehicle Parking - Zone B: 0.5 spaces per 1,000 SF of gross floor area
- Bicycle Parking - 2, or 0.10 spaces per 1,000 GSF, whichever is greater
- % Bicycle Parking/Covered - First 5 spaces or 30%, whichever is greater

Response: Overall the site proposes 35% manufacturing and 65% warehousing.

BUILDING A: 148,600 SF

Manufacturing (35%)

- **1.6/1000 = 72 minimum spaces**
- **No maximum spaces**

Warehouse (65%)

- **0.30/1000= 32 spaces minimum**
- **No maximum combined with Manufacturing**

Required Total	Total Provided	
113 vehicular spaces (min.)	104 vehicular spaces	
15 bike parking spaces/ covered	15 bike parking spaces	

BUILDING B: 142,550 SF

Manufacturing (35%)

- 1.6/1000 = 69 minimum spaces
- No maximum spaces

Warehouse (65%)

- 0.30/1000=30 spaces minimum
- No maximum combined with Manufacturing

<u>Required Total</u>	<u>Total Provided</u>
108 vehicular spaces (min.)	90 vehicular spaces
14 bike parking spaces/covered	15 bike parking spaces

BUILDING C: 151,425 SF

Manufacturing (35%)

- 1.6/1000 = 73 minimum spaces
- No maximum spaces

Warehouse (65%)

- 0.30/1000=32 spaces minimum
- No maximum combined with Manufacturing

<u>Required Total</u>	<u>Total Provided</u>
115 vehicular spaces (min.)	105 vehicular spaces
15 bike parking spaces/ covered	20 bike parking spaces

TOTAL PARKING Required – 308 spaces
Provided – 335 spaces

(2) In addition to the general parking requirements in subsection (1), the following are the minimum number of off-street vanpool and carpool parking for commercial, institutional, and industrial uses.

<u>Number of Required Parking Spaces</u>	<u>Number Vanpool/Carpool spaces</u>
0-10 spaces	1 space
10-25 spaces	2 spaces
26 spaces and greater	1/each 25 spaces

Response: Off street vanpool/carpool has been provided as required.

BUILDING A:

Vanpool/Carpool Required -5 spaces
Provided -6 spaces

BUILDING B:

Vanpool/Carpool Required -5 spaces
Provided -6 spaces

BUILDING C:

Vanpool/Carpool Required -5 spaces
Provided -6 spaces

TDC 73C.120. - Off-Street Loading Facilities Minimum Requirements.

(1) The minimum number of off-street loading berths for commercial, industrial, and institutional users as follows:

<u>Industrial</u>	<u># of Berths</u>	<u>Dimensions</u>	<u>Unobstructed Clearance</u>
Less than 5,000 SF	0	0	0
5,000 - 25,000	1	12' x 60'	14'
25,000 - 60,000	2	12' x 60'	14'
60,000 and over	3	12' x 60'	14'

Response: Off street loading has been provided as required.

BUILDING A:

Off-street loading **Required - 3 berths**
 Provided - 18 berths

BUILDING B:

Off-street Loading **Required - 3 berths**
 Provided - 26 berths

BUILDING C:

Off-street Loading **Required - 3 berths**
 Provided - 27 berths

(2) Loading berths must not use the public right-of-way as part of the required off-street loading area.

Response: The loading areas for both buildings are designed with adequate maneuvering room to eliminate the use of the right-of-way.

(3) Required loading areas must be screened from public view, public streets, and adjacent properties by means of sight-obscuring landscaping, walls or other means, as approved through the Architectural Review process.

Response: Landscape is used to screen these areas from adjacent properties.

(4) Required loading facilities must be installed prior to final building inspection and must be permanently maintained as a condition of use.

Response: The loading facilities will be installed prior to final building inspection and will be maintained to the highest standard.

(5) The off-street loading facilities must in all cases be on the same lot or parcel as the structure they are intended to serve. In no case must the required off-street loading spaces be part of the area used to satisfy the off-street parking requirements.

Response: The loading areas for both buildings are located on the lot, with the building it serves.

TDC 73C.130. - Parking Lot Driveway and Walkway Minimum Requirements.

Parking lot driveways and walkways must comply with the following requirements:

(3) *Industrial Use.* Ingress and egress for industrial uses must not be less than the following:

<u>Required Spaces</u>	<u>Min. # Required</u>	<u>Min. Pavement</u>	<u>Min. walkways</u>
1 -250	1	36' for 1st 50' ROW 24' thereafter	No curbs or walkways required

Response: Per the submitted Site Plan the project meets these requirements.

(6) *Maximum Driveway Widths and Other Requirements.*

(a) Unless otherwise provided in this chapter, maximum driveway widths for Commercial, Industrial, and Institutional uses must not exceed 40 feet.

(b) Driveways must not be constructed within five feet of an adjacent property line, unless the two adjacent property owners elect to provide joint access to their respective properties, as provided by TDC73C.040.

(d) There must be a minimum distance of 40 feet between any two adjacent driveways on a single property unless a lesser distance is approved by the City Manager.

(e) Must comply with the distance requirements for access as provided in TDC 75.

(f) Must comply with vision clearance requirements in TDC 75.

Response: These dimensional requirements have been met.

Parking Lot Landscape

TDC 73C.240. - Industrial Parking Lot Landscaping Requirements.

Industrial uses must comply with the following landscaping requirements for parking lots in all zones.

(1) *General.* Locate landscaping or approved substitute materials in all areas not necessary for vehicular parking and maneuvering.

(2) *Clear Zone.* Clear zone required for the driver at ends of on-site drive aisles and at driveway entrances, vertically between a maximum of 30 inches and a minimum of eight feet as measured from the ground level.

(a) Exception: does not apply to parking structures and underground parking.

(3) *Perimeter.* Minimum five feet in width in all off-street parking and vehicular circulation areas, including loading areas and must comply with the following:

(a) Deciduous trees located not more than 30 feet apart on average as measured on center;

(b) Shrubs or ground cover, planted so as to achieve 90 percent coverage within three years;

(c) Plantings which reach a mature height of 30 inches in three years which provide screening of vehicular headlights year-round;

(d) Native trees and shrubs are encouraged; and

(e) Exception: Not required where off-street parking areas on separate lots are adjacent to one another and connected by vehicular access.

Response: Parking is surrounded by a minimum 5'-0" landscape buffer planted with trees, evergreen hedge and groundcovers. A continuous evergreen hedge is proposed that will reach a mature height of 30 inches in three years. Ground cover is proposed and will achieve 90% coverage in three years.

(4) *Landscape Island.* Minimum 25 square feet per parking stall must be improved with landscape island areas and must comply with the following.

(a) May be lower than the surrounding parking surface to allow them to receive stormwater run-off and function as water quality facilities as well as parking lot landscaping;

(b) Must be protected from vehicles by curbs, but the curbs may have spaces to allow drainage into the islands;

- (c) Islands must be utilized at aisle ends to protect parked vehicles from moving vehicles and emphasize vehicular circulation patterns;
- (d) Landscape separation required for every eight continuous spaces in a row;
- (e) Must be planted with one deciduous shade trees for every four parking spaces; Required trees must be evenly dispersed throughout the parking lot;
- (f) Must be planted with groundcover or shrubs;
- (g) Native plant materials are encouraged;
- (h) Landscape island areas with trees must be a minimum of five feet in width (from inside of curb to curb);
- (i) Required plant material in landscape islands must achieve 90 percent coverage within three years; and
- (j) Exception: Landscape square footage requirements do not apply to parking structures and underground parking.

(5) *Landscaping Along Driveway Access.* For lots with 12 or more parking spaces:

- (a) Landscape area at least five (5) feet in width on each side of an accessway;
- (b) Landscape area must extend 30 feet back from the property line; and
- (c) Exceptions: does not apply to parking structures and underground parking which must be determined through the Architectural Review process.

Response: Landscape islands are provided at every eight parking spaces and at the ends of parking spaces. Each island is planted with a deciduous shade tree and groundcover. Driveway access landscaping is proposed along each side a minimum of 5 feet wide and extends 30 feet into the property. See the Landscape plans.

CHAPTER 73D - Waste and Recyclables Management Standards

TDC 73D.020. - Design Methods.

An applicant required to provide mixed solid waste and source separated recyclables storage areas must comply with one of following methods:

- (1) The minimum standards method in TDSC 73D.030;
- (2) The waste assessment method in TDC 73D.040;
- (3) The comprehensive recycling plan method in TDC 73D.050; or
- (4) The franchised hauler review method in TDC 73D.060.

Response: The minimum standard method has been used to size the solid waste and recycling storage areas.

TDC 73D.030. - Minimum Standards Method.

This method specifies a minimum storage area requirement based on the size and general use category of the new or expanded development. This method is most appropriate when specific use of a new or expanded development is not known. It provides specific dimensional standards for the minimum size of storage areas by general use category.

- (1) The size and location of the storage area(s) must be indicated on the site plan. Requirements are based on an assumed storage area height of four feet for mixed solid waste and source separated recyclables. Vertical storage higher than four feet, but no higher than seven feet may be used to accommodate the same volume of storage in a reduced floor space (potential reduction of 43 percent of specific requirements). Where

vertical or stacked storage is proposed, submitted plans must include drawings to illustrate the layout of the storage area and dimensions for containers.

(2) The storage area requirement is based on uses. If a building has more than one use and that use occupies 20 percent or less of the gross leasable area (GLA) of the building, the GLA occupied by that use must be counted toward the floor area of the predominant use(s). If a building has more than one use and that use occupies more than 20 percent of the GLA of the building, then the storage area requirement for the whole building must be the sum of the area of each use. Minimum storage area requirements by use is as follows:

(a) Common wall residential five to ten units must provide 50 square feet.

(b) Common wall residential greater than ten units must provide 50 square feet plus an (additional five square feet per unit above ten.

(c) Commercial, industrial, and institutional developments must provide a minimum storage area of ten square feet plus:

(i) Office—Four square feet/1,000 square feet gross leasable area (GLA);

(ii) Retail—Ten square feet/1,000 square feet GLA;

(iii) Wholesale/Warehouse/Manufacturing—Six square feet/1,000 square feet GLA;

(iv) Educational and Institutional—Four square feet/1,000 square feet GLA; and

(v) All other uses—Four square feet/1,000 square feet GLA.

(3) Mixed solid waste and source separated recyclables storage areas for multiple tenants on a single site may be combined and shared.

Response: 892 square feet of trash/recycling storage is required for Building A 855 square feet of trash/recycling storage is required for Building B. 908 square feet of trash/recycling storage is required for Building C. Six trash enclosures are provided which total 1280 square feet, these have been approved by the waste hauler, Republic Services – see the letter provided. Additional trash and recycling locations inside the buildings will be provided to satisfy the size requirements above.

TDC 73D.070. - Location, Design and Access Standards.

The following location, design, and access standards are applicable to all storage areas:

(1) Location Standards.

(a) The storage area for source separated recyclables may be collocated with the storage area for mixed solid waste.

(b) Storage area space requirements can be satisfied with a single location or multiple locations, and can combine both interior and exterior locations.

(c) Exterior storage areas must:

(i) Be located in central and visible locations on the site to enhance security for users;

(ii) Be located in a parking area; and

(iii) Not be located within a required front yard setback or in a yard adjacent to a public or private street.

(2) Design Standards.

(a) The dimensions of the storage area must accommodate containers consistent with current methods of local collection at time of construction or alteration.

(b) Indoor and outdoor storage areas must comply with Oregon Building and Fire Code requirements.

(c) Exterior storage areas must be enclosed by a sight obscuring fence or wall at least six feet in height.

(d) Evergreen plants must be placed around the enclosure walls, excluding the gate or entrance openings for common wall, commercial, and institutional developments.

(e) Gate openings for haulers must be a minimum of ten feet wide and must be capable of being secured in a closed and open position.

(f) Horizontal clearance must be a minimum of ten feet and a vertical clearance of eight feet is required if the storage area is covered.

(g) A separate pedestrian access must also be provided in common wall, commercial, and institutional developments.

(h) Exterior storage areas must have either a concrete or asphalt floor surface.

(i) Storage areas and containers must be clearly labeled to indicate the type of material accepted.

(3) *Access Standards.*

(a) Storage areas must be accessible to users at convenient times of the day, and to hauler personnel on the day and approximate time they are scheduled to provide hauler service.

(b) Storage areas must be designed to be easily accessible to hauler trucks and equipment, considering paving, grade, gate clearance and vehicle access.

(c) Storage areas must be accessible to hauler trucks without requiring backing out of a driveway onto a public street. If only a single access point is available to the storage area, adequate turning radius must be provided to allow hauler trucks to safely exit the site in a forward motion.

(d) Storage areas must be located so that pedestrian and vehicular traffic movement are not obstructed on site or on public streets adjacent to the site.

(e) The following is an exception to the access standard:

(i) Access may be limited for security reasons.

Response: The six proposed enclosures are 10-feet x 21 feet, 4 inches.

Trash/recycling enclosures will comply with the requirements above. Please refer to the Trash Enclosure detail. Enclosure locations are called out on the Site Plan.

CHAPTER 74: Public Improvement Requirements

IMPROVEMENTS

Section 74.110 Phasing of Improvements.

The applicant may build the development in phases. If the development is to be phased the applicant shall submit a phasing plan to the City Engineer for approval with the development application. The timing and extent or scope of public improvements and the conditions of development shall be determined by the City Council on subdivision applications and by the City Engineer on other development applications.

Response: Phasing is not proposed.

Section 74.120 Public Improvements.

(1) Except as specially provided, all public improvements shall be installed at the expense of the applicant. All public improvements installed by the applicant shall be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. No work shall be undertaken on any public improvement until after the construction plans have been approved by the City Engineer and a Public Works Permit issued and the required fees paid.

(2) In accordance with the Tualatin Basin Program for fish and wildlife habitat the City intends to minimize or eliminate the negative affects of public streets by modifying right-of-way widths and street improvements when appropriate. The City Engineer is authorized to modify right-of-way widths and street improvements to address the negative affects on fish and wildlife habitat.

Response: Any public improvements completed as a result of the AR process shall be installed at expense of applicant.

Section 74.130 Private Improvements.

All private improvements shall be in-stalled at the expense of the applicant. The property owner shall retain maintenance responsibilities over all private improvements.

Response: All private improvements to be installed at expense of the applicant.

Section 74.140 Construction Timing.

(1) All the public improvements required under this chapter shall be completed and accepted by the City prior to the issuance of a Certificate of Occupancy; or, for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

(2) All private improvements required under this chapter shall be approved by the City prior to the issuance of a Certificate of Occupancy; or for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations. [Ord. 895-93, 5/24/1993]

Response: All improvements to be done before issuance of Certificate of Occupancy.

RIGHT-OF-WAY

Section 74.210 Minimum Street Right-of-Way Widths.

The width of streets in feet shall not be less than the width required to accommodate a street improvement needed to mitigate the impact of a proposed development. In cases where a street is required to be improved according to the standards of the TDC, the width of the right-of-way shall not be less than the minimums indicated in TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G.

(2) For development applications other than subdivisions and partitions, wherever existing or future streets adjacent to property proposed for development are of inadequate right-of-way width, the additional right-of-way necessary to comply with TDC Chapter 74, Public Improvement Requirements, Figures 74-2A through 74-2G of the Tualatin Community Plan shall be dedicated to the City for use by the public prior to issuance of any building permit for the proposed development. This right-of-way dedication shall be for the full width of the property abutting the roadway and, if required by the City

Engineer, additional dedications shall be provided for slope and utility easements if deemed necessary.

Response: Public right-of-way improvements will meet standards and additional right-of-way will be dedicated as necessary to meet required width.

Section 74.330 Utility Easements.

(1) Utility easements for water, sanitary sewer and storm drainage facilities, telephone, television cable, gas, electric lines and other public utilities shall be granted to the City.

(2) For subdivision and partition applications, the on-site public utility easement dedication area shall be shown to be dedicated to the City on the final subdivision or partition plat prior to approval of the plat by the City; and

(3) For subdivision and partition applications which require off-site public utility easements to serve the proposed development, a utility easement shall be granted to the City prior to approval of the final plat by the City. The City may elect to exercise eminent domain and condemn necessary off-site public utility easements at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used.

(4) For development applications other than subdivisions and partitions, and for both on-site and off-site easement areas, a utility easement shall be granted to the City; building permits shall not be issued for the development prior to acceptance of the easement by the City. The City may elect to exercise eminent domain and condemn necessary off-site public utility easements at the applicant's request and expense. The City Council shall determine when condemnation proceedings are to be used.

(5) The width of the public utility easement shall meet the requirements of the Public Works Construction Code. All subdivisions and partitions shall have a 6-foot public utility easement adjacent to the street and a 5-foot public utility easement adjacent to all side and rear lot lines.

Response: Easements will be granted for any public utilities onsite.

TDC 74.440. - Streets, Traffic Study Required.

(1) The City Manager may require a traffic study to be provided by the applicant and furnished to the City as part of the development approval process as provided by this Code, when the City Manager determines that such a study is necessary in connection with a proposed development project in order to:

(2) The required traffic study must be completed prior to the approval of the development application.

(3) The traffic study must include, at a minimum:

(4) The applicant must implement all or a portion of the improvements called for in the traffic study as determined by the City Manager.

Response: A Traffic Impact Study is included in this application.

TDC 74.450. - Bikeways and Pedestrian Paths.

Response: Bicycle and pedestrian accessways have been provided as required and shown on the Site Plan.

TDC 74.470. - Street Lights.

Response: Street lights in right-of-way will be installed per city standards.

UTILITIES

TDC 74.610. - Water Service.

(1) Water lines must be installed to serve each property in accordance with the Public Works Construction Code. Water line construction plans must be submitted to the City Manager for review and approval prior to construction.

Response: Submitted plans show proposed water service.

TDC 74.620. - Sanitary Sewer Service.

(1) Sanitary sewer lines must be installed to serve each property in accordance with the Public Works Construction Code. Sanitary sewer construction plans and calculations must be submitted to the City Manager for review and approval prior to construction.

Response: Submitted plans show proposed sanitary service.

TDC 74.630. - Storm Drainage System.

(1) Storm drainage lines must be installed to serve each property in accordance with City standards. Storm drainage construction plans and calculations must be submitted to the City Manager for review and approval prior to construction.

(2) The storm drainage calculations must confirm that adequate capacity exists to serve the site. The discharge from the development must be analyzed in accordance with the City's Storm and Surface Water Regulations.

Response: The proposed design includes separate stormwater systems for each building located within their own property. A general stormwater agreement will also be put into place between the two properties for some drainage area overlaps. Although all piping and structures for each properties systems will be completely contained within the subject property.

Response: Submitted plans and storm drainage calculations conform to the City of Tualatin and Clean Water Services (CWS) current design standards.

TDC 74.640. - Grading.

(1) Development sites must be graded to minimize the impact of storm water runoff onto adjacent properties and to allow adjacent properties to drain as they did before the new development.

(2) A development applicant must submit a grading plan showing that all lots in all portions of the development will be served by gravity drainage from the building crawl spaces; and that this development will not affect the drainage on adjacent properties. The City Manager may require the applicant to remove all excess material from the development site.

Response: Submitted grading plans show that all runoff is contained within the development area. No changes to drainage of adjacent sites will occur.

TDC 74.650. - Water Quality, Storm Water Detention and Erosion Control.

The applicant must comply with the water quality, storm water detention and erosion control requirements in the Surface Water Management Ordinance. If required:

(2) On all other development applications, prior to issuance of any building permit, the applicant must arrange to construct a permanent on-site water quality facility and storm water detention facility and submit a design and calculations indicating that the requirements of the Surface Water Management Ordinance will be met and obtain a Stormwater Connection Permit from Clean Water Services.

(3) For on-site private and regional non-residential public facilities, the applicant must submit a stormwater facility agreement, which will include an operation and maintenance plan provided by the City, for the water quality facility for the City's review and approval. The applicant must submit an erosion control plan prior to issuance of a Public Works Permit. No construction or disturbing of the site must occur until the erosion control plan is approved by the City and the required measures are in place and approved by the City.

Response: Submitted plans and storm drainage calculations conform to the City of Tualatin and Clean Water Services (CWS) current design standards. A stormwater facility agreement will be provided with construction permit applications.

TDC 74.660. - Underground.

(1) All utility lines including, but not limited to, those required for gas, electric, communication, lighting and cable television services and related facilities must be placed underground. Surface-mounted transformers, surface-mounted connection boxes and meter cabinets may be placed above ground. Temporary utility service facilities, high capacity electric and communication feeder lines, and utility transmission lines operating at 50,000 volts or above may be placed above ground. The applicant must make all necessary arrangements with all utility companies to provide the underground services. The City reserves the right to approve the location of all surface-mounted transformers.

(2) Any existing overhead utilities may not be upgraded to serve any proposed development. If existing overhead utilities are not adequate to serve the proposed development, the applicant must, at their own expense, provide an underground system. The applicant must be responsible for obtaining any off-site deeds and/or easements necessary to provide utility service to this site; the deeds and/or easements must be submitted to the City Manager for acceptance by the City prior to issuance of the Public Works Permit.

Response: Franchise utilities will be installed underground.

TDC 74.765. - Street Tree Species and Planting Locations.

All trees, plants or shrubs planted in the right-of-way of the City must conform in species and location and in accordance with the street tree plan and City standards, including Table 74-1. If the City Manager determines that none of the species in City standards, including Table 74-1 is appropriate or finds appropriate a species not listed, the City Manager may substitute an unlisted species.

Response: Street trees conform to the street tree plan and city standards. See landscape plans.

CHAPTER 75 - Access Management

TDC 75.020. - Permit for New Driveway Approach.

(1) *Applicability.* A driveway approach permit must be obtained prior to constructing, relocating, reconstructing, enlarging, or altering any driveway approach.

Response: Driveway Approach permitting will be completed as required.

TDC 75.040. - Driveway Approach Requirements.

Response: Driveway approaches will be designed per code and dedication required.

**TABLE 75-1
Driveway Approach Width**

Industrial	36 feet	Over 250 Parking Spaces = As Required by the City Manager, but not exceeding 40 feet
------------	---------	--

(10) *Driveway Approach Separation.* There must be a minimum distance of 40 feet between any two adjacent driveways on a single property unless a lesser distance is approved by the City Manager.

Response: Driveways are separated by at least 40 feet.

(11) *Distance between Driveways and Intersections.* Except for single-family dwellings, the minimum distance between driveways and intersections must be as provided below. Distances listed must be measured from the stop bar at the intersection.

(a) At the intersection of collector or arterial streets, driveways must be located a minimum of 150 feet from the intersection.

(b) At the intersection of two local streets, driveways must be located a minimum of 30 feet from the intersection.

(c) If the subject property is not of sufficient width to allow for the separation between driveway and intersection as provided, the driveway must be constructed as far from the intersection as possible, while still maintaining the 5-foot setback between the driveway and property line.

(d) When considering a driveway approach permit, the City Manager may approve the location of a driveway closer than 150 feet from the intersection of collector or arterial streets, based on written findings of fact in support of the decision.

Response: One driveway is 120' from intersection of 112th Ave and Myslony St. All others are more than 150' from intersection.

(12) *Vision Clearance Area.*

(a) *Local Streets.* A vision clearance area for all local street intersections, local street and driveway intersections, and local street or driveway and railroad intersections must be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are ten feet from the intersection point of the right-of-way lines, as measured along such lines (see Figure 73-2 for illustration).

(b) *Collector Streets.* A vision clearance area for all collector/arterial street intersections, collector/arterial street and local street intersections, and collector/arterial street and railroad intersections must be that triangular area formed by the right-of-way lines along such lots and a straight line joining the right-of-way lines at points which are 25 feet from the intersection point of the right-of-way lines, as measured along such lines.

Where a driveway intersects with a collector/arterial street, the distance measured along the driveway line for the triangular area must be ten feet (see Figure 73-2 for illustration).

(c) *Vertical Height Restriction.* Except for items associated with utilities or publicly owned structures such as poles and signs and existing street trees, no vehicular parking, hedge, planting, fence, wall structure, or temporary or permanent physical obstruction must be permitted between 30 inches and eight feet above the established height of the curb in the clear vision area (see Figure 73-2 for illustration).

Response: The project meets the minimum vision clearance areas for the proposed driveways. (Please refer to the traffic study included in this application).

Tualatin Municipal Code

CHAPTER 3-02 - Sewer Regulations

TMC 3-2-030 - Material and Manner of Construction

(1) All building sewers, side sewers and connections to the main sewer shall be so constructed as to conform to the requirements of the Oregon State Plumbing Laws and rules and regulations and specifications for sewerage construction of the City.

(2) Old building sewers may be used in connection with new buildings only when they are found, upon examination and test by the City Inspector, to meet all requirements of the City.

Response: Submitted plans show sewer construction per Oregon laws and City requirements.

TMC 3-2-050 - Industrial Wastes.

(1) The admission into the public sewers of any waters or wastes having

Response: Industrial wastes as described in this code section will not be produced by potential uses and tenants.

]

TMC 3-2-160 Construction Standards

All sewer line construction and installation of services and equipment shall be in conformance with the City of Tualatin Public Works Construction Code. In addition, whenever a property owner extends a sewer line, the extension shall be carried to the opposite property line or to such other point as determined by the Public Works Director.

Response: Submitted plans show sewer construction per City code.

CHAPTER 3-03 - Water Service

TMC 3-3-040 Separate Services Required.

Except as authorized by the City Engineer, a separate service and meter to supply regular water service or fire protection services shall be required for each building, residential unit of structure served. For the purposes of this section, trailer parks and multi-family residences of more than four dwelling units shall constitute a single unit unless the City Engineer determines that separate services are required.

Response: Submitted plans show water and fire protection service for the site.

TMC 3-3-080 - Fire Protection Service.

Fire protection facilities will be allowed under the following conditions:

- (1) The owner of a fire protection system shall furnish and install a service meter approved by the City.
- (2) When a building has a fire protection service which is separate from the regular water service to the building, an appropriate backflow device, but not less than a double check detector check, approved by the Operations Director, shall be used in place of a service meter. Water supplied through this service shall not be used for any purpose except for suppressing a fire or testing of the fire protection system. If registration of regular water usage is recorded on the detector check meter, the City may require installation of a service meter or removal of the fire protection service.
- (3) The service meter shall be owned and maintained by the City and the appropriate backflow device shall be owned and maintained by the owner.
- (4) No charge shall be made for water used in the extinguishing of a fire or system testing if the customer reports the use to the City in writing within ten days of the use.
- (5) Water may be obtained from fire protection facilities for filling a tank connected with the fire service, but only if written permission is secured from the City in advance and an approved means of measurement is available and utilized. The water used shall be charged at the rates for general use.
- (6) Charges for fire protection service shall be as specified in the rates and charges.

Response: Submitted plans show code compliant fire protection service for the site.

TMC 3-3-100 - Meters.

- (1) Meters up to and including two inches will be furnished by the City. Meters larger than two inches may be furnished by the customer upon approval of the Operations Director.
- (2) All meters, including those for fire protection service, shall be located within the public right-of-way or within an access easement approved by the City Engineer.

Response: Submitted plans show City water meter.

TMC 3-3-110 Construction Standards.

All water line construction and installation of services and equipment shall be in conformance with the City of Tualatin Public Works Construction Code. In addition, whenever a property owner extends a water line, which upon completion, is intended to be dedicated to the City as part of the public water system, said extension shall be carried to the opposite property line or to such other point as determined by the City Engineer. Water line size shall be determined by the City Engineer in accordance with the City's Development Code or implementing ordinances and the Public Works Constr. Code.

Response: Submitted plans show General utility notes indicate work is to conform to the current building, plumbing, and fire codes and to the requirements of the City of Tualatin and Tualatin Valley Fire and Rescue.

TMC 3-3-120 Backflow Prevention Devices and Cross Connections.

The owner of property to which City water is furnished for human consumption shall install in accordance with City standards an appropriate backflow prevention device on the premises where any of the following circumstances exist:

Except as otherwise provided in this subsection, all irrigation systems shall be installed with a double check valve assembly. Irrigation system backflow prevention device assemblies installed before the effective date of this ordinance, which were approved at the time they were installed but are not on the current list of approved device assemblies maintained by the Oregon State Health Division, shall be permitted to remain in service provided they are properly maintained, are commensurate with the degree of hazard, are tested at least annually, and perform satisfactorily. When devices of this type are moved, or require more than minimum maintenance, they shall be replaced by device assemblies which are on the Health Division list of approved device assemblies.

Response: Submitted plans show backflow prevention for the site.

General utility notes indicate work is to conform to the current building, plumbing, and fire codes and to the requirements of the City of Tualatin and Tualatin Valley Fire and Rescue.

TMC 3-3-130 Control Valves.

The customer shall install a suitable valve, as close to the meter location as practical, the operation of which will control the entire water supply from the service. The operation by the customer of the curb stop in the meter box is prohibited.

Response: Submitted plans show water connection for the site.

CHAPTER 3-05 - Soil Erosion, Surface Water Management, Water Quality
Facilities, and Building and Sewers

TMC 3-5-050 Erosion Control Permits

(1) Except as noted in subsection (3) of this section, no person shall cause any change to improved or unimproved real property that causes, will cause, or is likely to cause a temporary or permanent increase in the rate of soil erosion from the site without first obtaining a permit from the City and paying prescribed fees. Such changes to land shall include, but are not limited to, grading, excavating, filling, working of land, or stripping of soil or vegetation from land.

(2) No construction, land development, grading, excavation, fill, or the clearing of land is allowed until the City has issued an Erosion Control Permit covering such work, or the City has determined that no such permit is required. No public agency or body shall undertake any public works project without first obtaining from the City an Erosion Control Permit covering such work, or receiving a determination from the City that none is required.

(3) No Erosion Control Permit from City is required for the following:

Response: Erosion and sediment control plans and permit applications conforming to the requirements of the City of Tualatin, CWS, and Oregon Department of Environmental Quality will be provided with the construction permit submittal documents.

TMC 3-5-060 Permit Process

(1) *Applications for an Erosion Control Permit.* Application for an Erosion Control Permit shall include an Erosion Control Plan which contains methods and interim facilities to be constructed or used concurrently and to be operated during construction to control erosion. The plan shall include either:

Response: Erosion and sediment control plans and permit applications conforming to the requirements of the City of Tualatin, CWS, and Oregon Department of Environmental Quality will be provided with the construction permit submittal documents.

TMC 3-5-110 - Air Pollution—Dust, Fumes, Smoke and Odors.

(1) Dust shall be minimized to the extent practicable, utilizing all measures necessary, including, but not limited to:

Response: BMPs and construction means and methods will be provided to prevent air pollution from leaving the site.

TMC 3-5-120 - Maintaining Water Quality.

(4) All sediment-laden water from construction operations shall be routed through stilling basins, filtered or otherwise treated to reduce the sediment load.

Response: Erosion control measures and construction means and methods will be in place to prevent water contamination onsite or leaving the site.

TMC 3-5-140 - Control of Noise Levels.

Construction noise shall be minimized by the use of proper engine mufflers, protective sound reducing enclosures, and other sound barriers. Construction activities producing excessive noise that cannot be reduced by mechanical means shall be restricted to locations where their sound impact is reduced to a minimum at the edge of work area.

Response: The contractor will be required to have methods in place to reduce noise pollution to meet standards during construction.

TMC 3-5-150 - Natural Vegetation.

(1) As far as is practicable, the natural vegetation shall be protected and left in place. Work areas shall be carefully located and marked to reduce potential damage. Trees shall not be used as anchors for stabilizing working equipment.

(2) During clearing operations, trees shall not be permitted to fall outside the work area. In areas designated for selective cutting or clearing, care in falling and removing trees and brush shall be taken to avoid injuring trees and shrubs to be left in place.

(3) Where natural vegetation has been removed, or the original land contours disturbed, the site shall be revegetated, and the vegetation established, as soon as practicable after construction has commenced, except where construction of sewers will be followed by paving.

Response: A Tree protection plan will be followed see the Tree protection plan and all areas of disturbance will be re-vegetated per the Landscape plan.

TMC 3-5-180 - Contaminated Soils.

If the construction process reveals soils contaminated with hazardous materials or chemicals the contractor shall stop work immediately, ensure no contaminated material is hauled from the site, remove the contractor's work force from the immediate area of the contaminated area, leaving all machinery and equipment, and secure the area from access by the public until such time as a mitigation team has relieved them of that responsibility. Contractor shall notify the City and an emergency response team (911) of the situation upon its discovery. No employees who may have come in contact with the contaminated material shall be allowed to leave the site until such time as the emergency response team releases them.

Response: No contaminated soils are known to be on site, but if encountered the contractor will export them off site for treatment at one of the approved treatment facilities.

TMC 3-5-190 - Soil Erosion Control Matrix and Methods.

(1) *Establishing Primary Access Point.* As one of the initial activities at the start of any earthwork, a gravel driveway shall be established. The driveway shall meet the following:

(2) *Additional Access.* Construction and delivery vehicles and equipment shall use the primary access point (the gravel driveway). Vehicles and equipment shall not access the property from any other point (shall not "hop the curb"), unless required due to the physical layout of the parcel, and not simply due to convenience.

Response: A construction entrance is proposed and will be shown on the permit plans.

If is necessary to access the site at other than the primary access point:

(a) A second temporary or permanent crushed rock access point shall be established if there is an ongoing need to access the property at a second point. Large or difficult properties may require more than one permanent access point

(b) If there is only a one time or infrequent need to access the property at other than an established access point, then the vehicle or equipment may "hop the curb". Each time the vehicle or equipment reenters the street any mud, dirt, or other such debris that falls or is deposited on the street shall be immediately cleaned using hand labor or mechanical means.

Immediate means within five minutes of the mud, dirt, or debris being deposited on the street. Mud, dirt and debris shall not be allowed to accumulate to be cleaned up at the end of the day or "later". Under no circumstance shall mud, dirt or debris be washed into the storm and surface water system.

(c) Under no circumstance shall vehicles or equipment enter a property adjacent to a stream, water course, or other storm and surface water facility, or a wetland such that it would not be possible to avoid contaminating or depositing mud, dirt, or debris into the water or wetland.

(3) *Silt Barriers.* Silt barriers shall be installed concurrent with grading, and will be inspected prior to "footing" inspection. They shall be installed downhill of all graded, filled and stripped areas, and across the path of concentrated flows. They shall be designed and installed to capture erosion on site. Silt barriers can be:

(6) *Protection Measure Removal.* The erosion control facilities and techniques shall remain in place and be maintained in good condition until all disturbed soil areas are

permanently stabilized by installation of landscaping, seeding, mulching or otherwise covered and protected from erosion.

(7) *Miscellaneous*. Filter systems may not be used on catch basins in public streets as a part of single family erosion control plans. Plastic sheeting should generally not be used as an erosion control measure in single family house construction. Plastic sheeting may be used to protect small, highly erodible areas, or temporary stock-piles of material. If used, the path of concentrated flow from the plastic must be protected.

Response: Erosion and sediment control plans and permit applications conforming to the requirements of the City of Tualatin, CWS, and Oregon Department of Environmental Quality will be provided with the construction permit submittal documents.

ADDITIONAL SURFACE WATER MANAGEMENT STANDARDS TMC 3-5-200 - Downstream Protection Requirement.

Each new development is responsible for mitigating the impacts of that development upon the public storm water quantity system. The development may satisfy this requirement through the use of any of the following techniques, subject to the limitations and requirements in TMC 3-5-210:

- (1) Construction of permanent on-site stormwater quantity detention facilities designed in accordance with this title;
- (2) Enlargement of the downstream conveyance system in accordance with this title and the Public Works Construction Code;
- (3) The payment of a Storm and Surface Water Management System Development Charge, which includes a water quantity component designated to meet these requirements.

Response: The submitted plans and drainage calculations provide stormwater quantity design.

TMC 3-5-220 - Criteria for Requiring On-Site Detention to be Constructed.

The City shall determine whether the onsite facility shall be constructed. If the onsite facility is constructed, the development shall be eligible for a credit against Storm and Surface Water System Development Charges, as provided in City ordinance.

On-site facilities shall be constructed when any of the following conditions exist:

Response: The submitted plans and drainage calculations provide on-site detention design.

TMC 3-5-230 - On-Site Detention Design Criteria.

(1) Unless designed to meet the requirements of an identified downstream deficiency as defined in TMC 3-5.210, stormwater quantity onsite detention facilities shall be designed to capture run-off so the run-off rates from the site after development do not exceed predevelopment conditions, based upon a 25-year, 24-hour return storm.

(2) When designed to meet the requirements of an identified downstream deficiency as defined in TMC 3-5.210, stormwater quantity on-site detention facilities shall be designed such that the peak runoff rates will not exceed predevelopment rates for the two through 100 year storms, as required by the determined downstream deficiency.

(3) Construction of on-site detention shall not be allowed as an option if such a detention facility would have an adverse effect upon receiving waters in the basin or subbasin in the event of flooding, or would increase the likelihood or severity of flooding problems downstream of the site.

Response: The submitted plans and drainage calculations provide onsite detention design.

TMC 3-5-240 - On-Site Detention Design Method.

(1) The procedure for determining the detention quantities is set forth in Section 4.4 Retention/Detention Facility Analysis and Design, King County, Washington, Surface Water Design Manual, January, 1990, except subchapters 4.4.5 Tanks, 4.4.6 Vaults and Figure 4.4.4G Permanent Surface Water Control Pond Sign. This reference shall be used for procedure only. The design criteria shall be as noted herein. Engineers desiring to utilize a procedure other than that set forth herein shall obtain City approval prior to submitting calculations utilizing the proposed procedure.

(3) All developments other than single family and duplex, whether residential, multi-family, commercial, industrial, or other uses, the sizing of stormwater quantity detention facilities shall be based on the impervious area to be created by the development, including structures and all roads and impervious areas which are assessed a surface water management monthly fee under Unified Sewerage Agency rules. Impervious surfaces shall be determined based upon building permits, construction plans, site visits or other appropriate methods deemed reliable by City.

Response: The submitted plans and drainage calculations provide onsite detention design.

TMC 3-5-280 - Placement of Water Quality Facilities.

Title III specifies that certain properties shall install water quality facilities for the purpose of removing phosphorous. No such water quality facilities shall be constructed within the defined area of existing or created wetlands unless a mitigation action, approved by the City, is constructed to replace the area used for the water quality facility.

Response: No such water quality facility is proposed within a wetland.

PERMANENT ON-SITE WATER QUALITY FACILITIES

TMC 3-5-350 - Phosphorous Removal Standard.

The stormwater quality control facilities shall be designed to remove 65 percent of the phosphorous from the runoff from 100 percent of the newly constructed impervious surfaces. Impervious surfaces shall include pavement, buildings, public and private roadways, and all other surfaces with similar runoff characteristics.

Response: The submitted plans and drainage calculations provide on-site storm runoff treatment as mandated in the City of Tualatin and CWS standards.

TMC 3-5-360 - Design Storm.

The stormwater quality control facilities shall be designed to meet the removal efficiency of TMC 3-5-350 for a mean summertime storm event totaling 0.36 inches of precipitation falling in four hours with an average return period of 96 hours.

Response: The submitted plans and drainage calculations provide on-site storm runoff treatment as mandated in the City of Tualatin and CWS standards.

TMC 3-5-370 - Design Requirements.

TMC 3-5-430 - Placement of Water Quality Facilities.

No water quality facilities shall be constructed within the defined area of existing or created wetlands unless a mitigation action is approved by the City, and is constructed to replace the area used for water quality.

Response: The submitted plans and drainage calculations provide on-site storm runoff treatment as mandated in the City of Tualatin and CWS standards.

MC 3-5-440 - General Provisions.

(1) The specifications contained in this Title III, together with the State of Oregon Uniform Plumbing Code and all other applicable requirements of federal, state and local law, shall govern the installation of all building and side sewers.

Response: As submitted plans show construction will meet all federal, state, and local law.

TMC 3-5-450 - Building Sewers.

(1) *Materials.* Pipes for building sewers shall be one of the following types or approved equal:

(2) *Joints.* The ends of pipes, collars, gaskets and retaining clamps shall be kept clean and free of foreign material when pipe is laid. All joints shall be made watertight and gastight.

(3) *Cleanouts.* All changes in direction shall be made with long radius bends, 45 degrees, 22½ degrees, tee or wye branches with straight-through opening plugged for a cleanout. Cleanouts shall be installed in the building sewer between the building outlet and the side sewer when the distance is greater than 100 feet. All bends within the sewer shall not exceed 135 degrees without an additional cleanout. Cleanouts shall be plugged to prevent entrance of dirt, roots, or ground water. Plugs shall be sealed with rubber gaskets and secured against back pressure.

(4) *Size.* The minimum size of any building sewer shall be determined on the basis of the total number of fixture units drained by such sewer in accordance with Table 4-3 of the Oregon State Plumbing Code.

(5) *Installation.*

(6) *Excavation.* All excavations required for the installation of a building sewer shall be open trench work unless otherwise approved by the City.

(7) *Alignment.* All pipe shall be true to grade with the bells up grade. Pipe shall be carefully centered prior to jointing. The bottom of the trench shall be smooth and free from rocks which may injure the pipe. The pipe shall be laid on four inches of ¾-inch minus crushed rock throughout its entire length, and any such piping laid in fill shall be laid on a bed of approved materials and shall be adequately supported to the satisfaction of the City.

(8) *Grade.* All sewers shall be laid on a grade of not less than ¼ inch per foot for a four-inch pipe and 3/16-inch per foot for a six-inch pipe.

(9) *Backfill.* If common material is available which is free from rocks one inch in diameter, it may be used to backfill the remainder of the ditch. If suitable material is not available, 3/4-inch minus granular material shall be used to backfill the trench to a point six inches above the top of the pipe. The remainder of the ditch may then be backfilled with common material.

A modified method of backfilling shall be used where the house service laterals cross lawn, shrub, or planting areas between the curb and the property line. In this area, backfill shall be modified so that a minimum of 18 inches and a maximum of 36 inches of compacted top soil shall be provided in the upper portions of the trench. The lower portions of the trench shall be backfilled as described above.

(10) *Cover.* Cover on private property shall be not less than 12 inches from top of pipe to finished grade.

(11) *Sewer and Water Lines.* Building sewers or drainage piping of materials which are not approved for use within a building shall not be laid in the same trench with water service pipes unless both of the following requirements are met.

(12) *Testing.* All building sewers shall be tested for leakage 15 minutes prior to the City inspection and prior to backfilling the trench. Sewers shall be tested by plugging the building sewer at its point of connection with the side sewer and completely filling the building sewer with water from the lowest point to the highest point thereof. The building sewer shall be watertight and have no visible leakage.

A tee shall be installed at the property line at the expense of the installer. After the test is complete, a plug shall be inserted in the tee. After a satisfactory test has been performed, the trench shall be backfilled.

Response: As submitted, plans show proposed sewers are designed to meet applicable standards.

PRELIMINARY BASE SURVEY
WALGRAEVES

SITUATED IN THE SOUTHEAST 1/4 OF SECTION 22,
TOWNSHIP 2 SOUTH, RANGE 1 WEST, W.M.,
CITY OF TUALATIN, WASHINGTON COUNTY, OREGON

PREPARED FOR
PHELAN DEVELOPMENT
AUGUST 17, 2020

BASIS OF BEARINGS
STATE PLANE GRID COORDINATES
INTERNATIONAL FEET
3601 OREGON NORTH
NAD83(2011)(EPOCH2010.0000)
POINT SCALE 0.99990106
COMBINED FACTOR 0.99989672

VERTICAL DATUM
WASHINGTON COUNTY (NAVD29)
COMPUTED USING GEOID 18



LEGEND

- FOUND SURVEY MONUMENT AS NOTED
- ⊕ BORE TEST PIT
- GUY WIRE
- ⊕ POWER POLE
- ⊕ ELECTRIC BOX
- ⊕ ELECTRIC METER
- ⊕ TELEPHONE PEDESTAL
- ⊕ TELEPHONE VAULT
- ↑ SIGN
- ⊕ WATER METER
- ⊕ WATER VAULT
- ⊕ WATER HYDRANT
- ⊕ TEST PIT
- ⊕ DECIDUOUS TREE
- CONIFEROUS UNDERGROUND STORM DRAINAGE LINE
- UNDERGROUND STORM LINE
- UNDERGROUND WATER LINE
- UNDERGROUND TELEPHONE LINE
- x — EXTERIOR FENCE LINE AS NOTED

NOTE: UNDERGROUND UTILITIES ARE APPROXIMATE,
SHOWN ON THE BASIS OF SURFACE STRUCTURES,
AS-BUILT MAPPING, AND UTILITY LOCATES BY
OTHERS.

HEDGES CREEK
TUALATIN, OR

SHEET TITLE

EXISTING
CONDITIONS

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

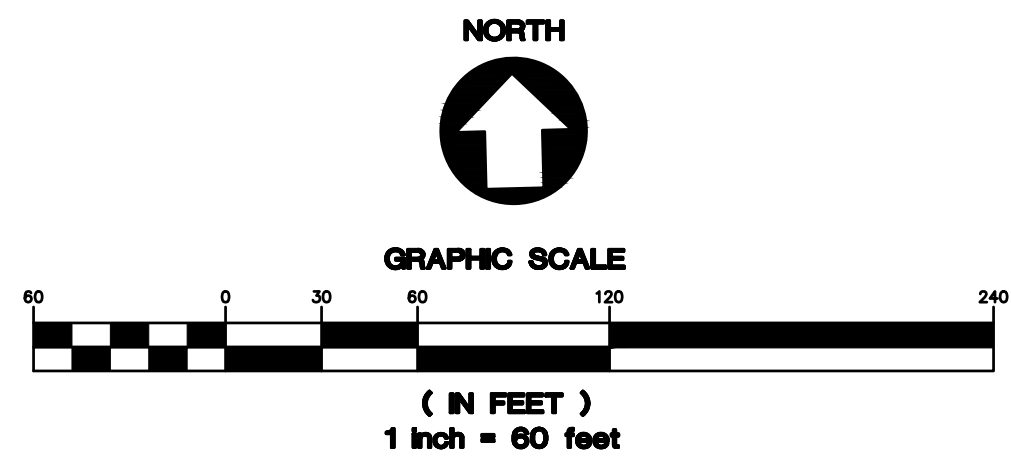
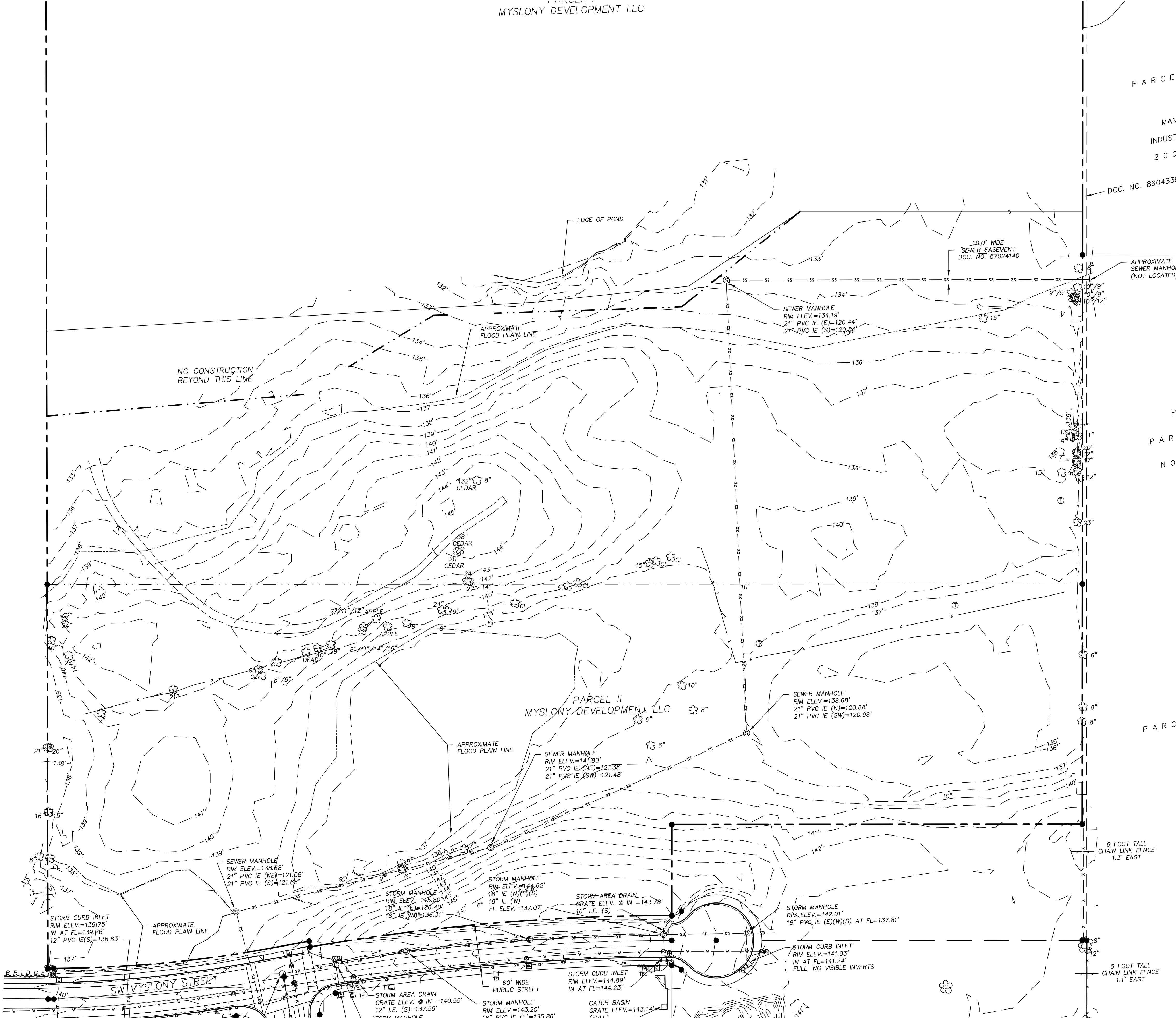
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SHEET NUMBER

C0.2

JOB NUMBER: A20120.10



DESIGN REVIEW - 12/23/2021

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PARCEL I
MYSLONY DEVELOPMENT LLC

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INDUST

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DOC. NO. 8604336

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SHEET NOTES

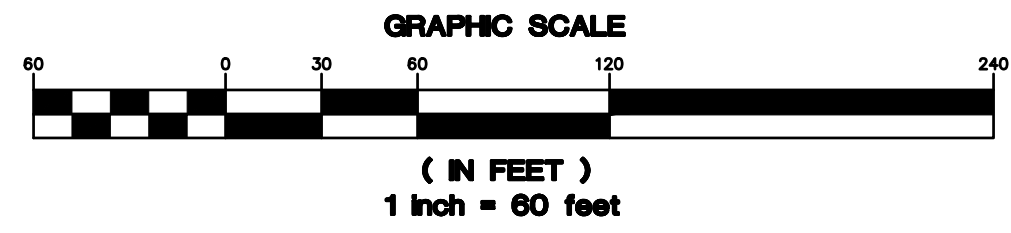
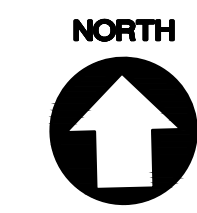
1. CONTRACTOR MAY STAGE WITHIN LIMITS OF DEMOLITION.
2. REMOVE ALL SITE COMPONENTS AND RECYCLE COMPONENTS AS REQUIRED IN THE SPECIFICATIONS.
3. ALL TRADE LICENSES AND PERMITS NECESSARY FOR THE PROCUREMENT AND COMPLETION OF THE WORK SHALL BE SECURED BY THE CONTRACTOR PRIOR TO COMMENCING DEMOLITION.
4. THE CONTRACTOR SHALL PRESERVE AND PROTECT FROM DAMAGE ALL EXISTING RIGHT-OF-WAY SURVEY MONUMENTATION DURING DEMOLITION. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING AND PAYING FOR THE REPLACEMENT BY A LICENSED SURVEYOR OF ANY DAMAGED OR REMOVED MONUMENTS.
5. PROTECT ALL ITEMS ON ADJACENT PROPERTIES AND IN THE RIGHT OF WAY INCLUDING BUT NOT LIMITED TO SIGNAL EQUIPMENT, PARKING METERS, SIDEWALKS, STREET TREES, STREET LIGHTS, CURBS, PAVEMENT AND SIGNS. CONTRACTOR SHALL BE RESPONSIBLE FOR RESTORING ANY DAMAGED ITEMS TO ORIGINAL CONDITION.
6. PROTECT STRUCTURES, UTILITIES, SIDEWALKS, AND OTHER FACILITIES IMMEDIATELY ADJACENT TO EXCAVATIONS FROM DAMAGES CAUSED BY SETTLEMENT, LATERAL MOVEMENT, UNDERMINING, WASHOUT AND OTHER HAZARDS.
7. SAWCUT STRAIGHT LINES IN SIDEWALK, AS NECESSARY.
8. CONTRACTOR IS RESPONSIBLE TO CONTROL DUST AND MUD DURING THE DEMOLITION PERIOD, AND DURING TRANSPORTATION OF DEMOLITION DEBRIS. ALL STREET SURFACES OUTSIDE THE CONSTRUCTION ZONE MUST BE KEPT CLEAN.
9. PROTECT ALL EXISTING UTILITY STRUCTURES AND UNDERGROUND MAINS TO REMAIN.
10. PROTECT ALL EXISTING VEGETATION TO REMAIN.

X PROTECTION NOTES

- 1 PROTECT EXISTING SANITARY SEWER, ADJUST MANHOLES TO GRADE.
- 2 PROTECT EXISTING PUBLIC UTILITIES
- 3 PROTECT EXISTING PUBLIC ROADWAY

X DEMOLITION NOTES

- 1 REMOVE EXISTING FENCE
- 2 REMOVE OR ABANDON EXISTING SANITARY SEWER
- 3 REMOVE EXISTING UTILITY



AAI ENGINEERING
4875 SW Center Drive Suite 1001 Beaverton, OR 97005
503.638.0888 Fax 503.638.0888

PHELAN
DEMOLITION
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660

HEDGES CREEK
TUALATIN, OR

SHEET TITLE

DEMOLITION PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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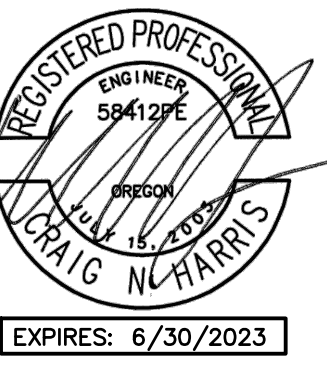
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JOB NUMBER: A20120.10

DESIGN REVIEW - 12/23/2021

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 503.638.0888 | www.aai-engineering.com

PHELAN DEVELOPMENT
 450 Newport Center Drive, Suite 405
 Newport Beach, CA 92660

HEDGES CREEK
 TUALATIN, OR

SHEET TITLE

SITE PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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SHEET NUMBER

C1.0

JOB NUMBER: A20120.10

SHEET NOTES

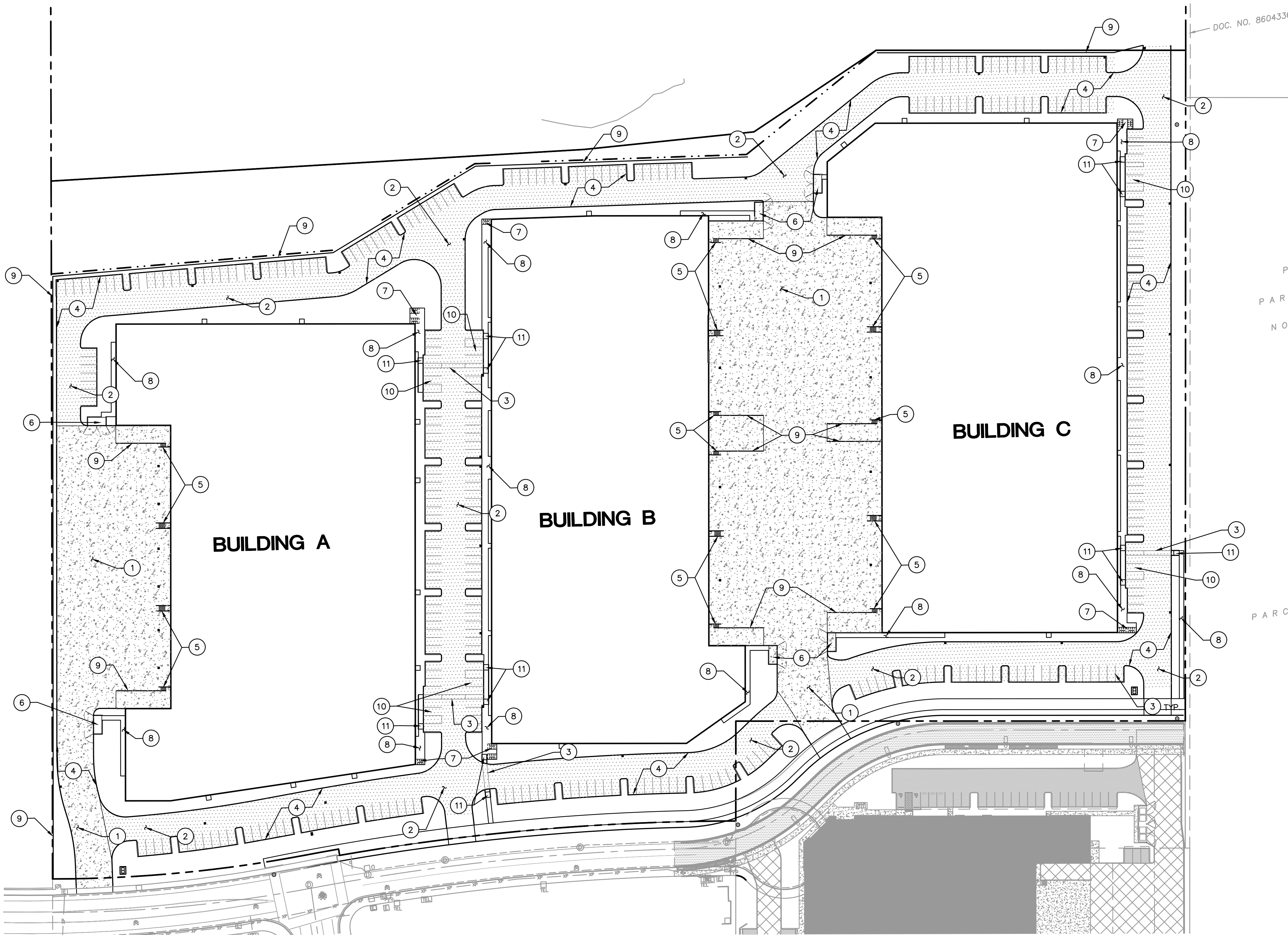
1. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
2. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
3. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24-HOUR NOTICE IS REQUIRED.

(X) CONSTRUCTION NOTES

1. INSTALL CONCRETE TRUCK DRIVING SURFACE
2. INSTALL ASPHALT SURFACING
3. INSTALL STRIPING. SEE ARCHITECTURAL PLANS.
4. INSTALL CURB
5. INSTALL STAIRS. SEE ARCHITECTURAL PLANS.
6. INSTALL TRASH ENCLOSURE. SEE ARCHITECTURAL PLANS.
7. INSTALL BICYCLE PARKING. SEE ARCHITECTURAL PLANS.
8. INSTALL SIDEWALK
9. INSTALL WALL
10. INSTALL ADA PARKING
11. INSTALL ADA CURB RAMP

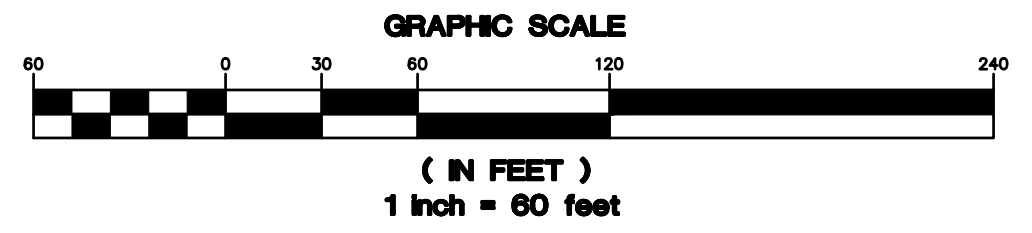
LEGEND

PROPERTY LINE	
CONCRETE SURFACING	
ASPHALT SURFACING	



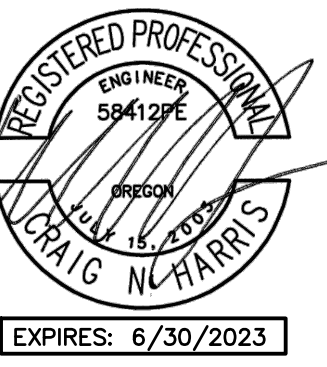
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DESIGN REVIEW - 12/23/2021

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4875 SW Griffin Drive, Suite 100, Beaverton, OR 97005
503.638.0800 Fax 503.638.0808

PHELAN
DEVELOPMENT
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660

HEDGES CREEK
TUALATIN, OR

SHEET NOTES

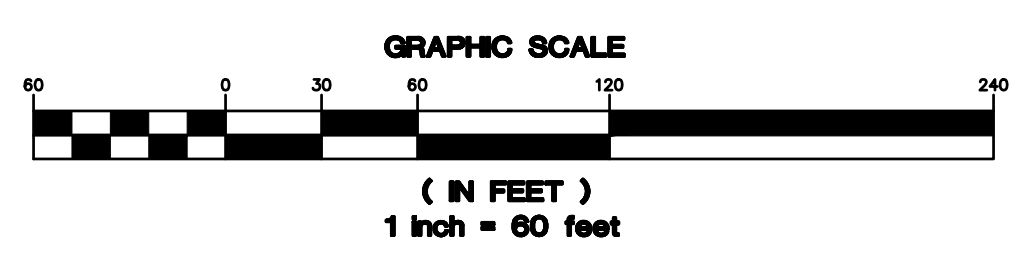
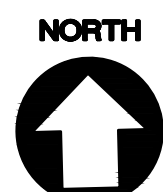
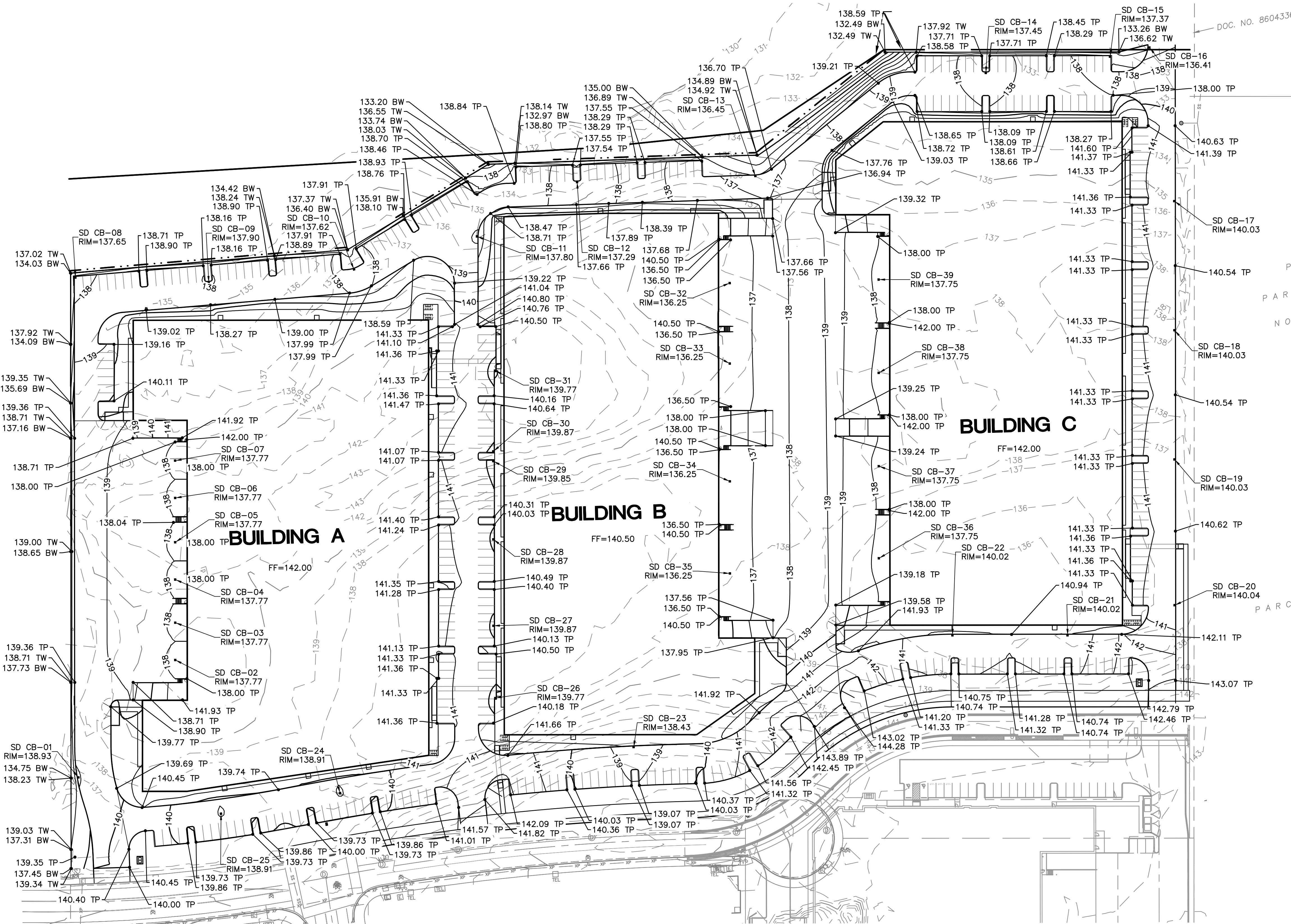
- CURB HEIGHTS ARE 6" UNLESS NOTED OTHERWISE.
- LANDINGS ON ACCESSIBLE ROUTES SHALL NOT EXCEED 2% IN ANY DIRECTION.
- ALL ACCESSIBLE ROUTES SHALL COMPLY WITH CURRENT ADA ACCESSIBILITY GUIDELINES FOR BUILDING AND FACILITIES (ADAAG).
- ALL WALKWAYS FROM ACCESSIBLE UNITS ARE DESIGNED TO NOT REQUIRE HANDRAILS. THEREFORE, RAMPS WITH SLOPES STEEPER THAN 5.0% AND LESS THAN 8.33% SHALL NOT EXCEED 0.5' RISE OR 6.0' LENGTH.
- FINISH GRADES ARE TO BE BROUGHT TO WITHIN 0.08 FT IN 10 FT OF THE GRADES SHOWN AT SUBGRADE AND TO WITHIN 0.03 FT IN 10 FT AT FINISH GRADE. CONTRACTOR TO ALLOW FOR PLACEMENT OF REQUIRED TOPSOIL IN ROUGH GRADING.
- GRADING ELEVATIONS AS SHOWN ON SITE AND LANDSCAPE PLANS ARE FINISHED GRADE WHICH INCLUDES SUBGRADE SOIL, TOPSOIL, SOIL AMENDMENTS, ROCKERY AND RUNOFF PROTECTION CONTRACTOR IS RESPONSIBLE TO COORDINATE GRADING WITH BOTH EXCAVATOR AND LANDSCAPE CONTRACTOR.

GRADING LABEL LEGEND

CALLOUT	DESCRIPTION
XX.XX XX	DESCRIPTION LISTED BELOW.
BS	BOTTOM OF STAIRS
BW	FINISHED GRADE AT BOTTOM OF WALL
DS	DOOR SILL
FF	FINISHED FLOOR ELEVATION
FG	FINISH GRADE
G	GROUND
SW	SIDEWALK
TC	TOP OF CURB
TP	TOP OF PAVEMENT
TS	TOP OF STAIRS
TW	FINISHED GRADE AT TOP OF WALL

LEGEND

EXISTING CONTOUR MINOR	---	102
EXISTING CONTOUR MAJOR	---	100
PROPOSED CONTOUR MINOR	---	102
PROPOSED CONTOUR MAJOR	---	100



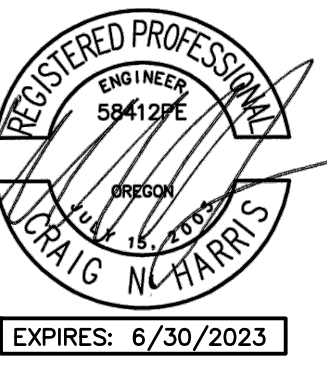
SHEET TITLE
GRADING PLAN

DATE: 08/02/2021
DRAWN: KPM
CHECKED: CNH

REVISIONS:

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C2.0



AAI ENGINEERING INC.
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PHELAN
ENGINEERING
DEVELOPMENT
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660

HEDGES CREEK
TUALATIN, OR

SHEET NOTES

- ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
- THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
- CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. THIS PLAN MAY NOT SHOW ALL REQUIRED CLEAN OUTS.
- DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
- UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
- INLETS AND OUTLETS TO ON-SITE MANHOLES SHALL HAVE FLEXIBLE CONNECTION NO CLOSER THAN 12" AND NO FARTHER THAN 36" FROM THE MANHOLE.
- CONTRACTOR TO VERIFY SANITARY AND WATER SIZING AND INVERTS WITH APPROVED PLUMBING PLANS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION OF SAID UTILITIES.
- ALL STORM AND SANITARY FITTINGS TO BE ECCENTRIC FITTINGS UNLESS OTHERWISE NOTED.

LABEL LEGEND

PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
XXLF - XX" XX — UTILITY TYPE
S=X.XX% — SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (FP= FIRE PROTECTION, S=SANITARY, SD=STORM DRAINAGE, W=WATER)
STRUCTURE TYPE (SEE BELOW)
XX XX-XX — ID NUMBER (WHERE APPLICABLE)
RIM=XX.XX — STRUCTURE INFO (WHERE APPLICABLE)

STRUCTURE TYPES

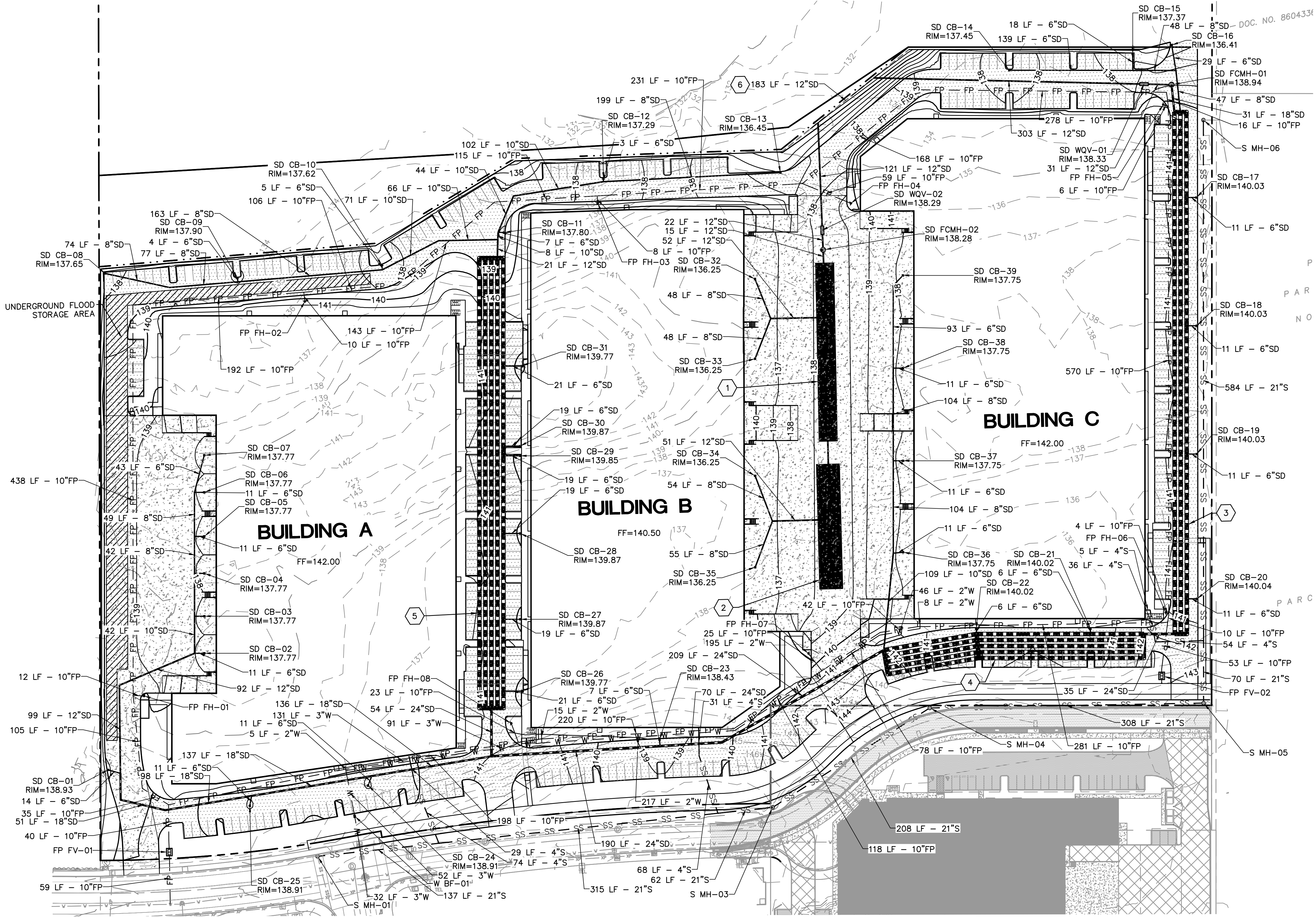
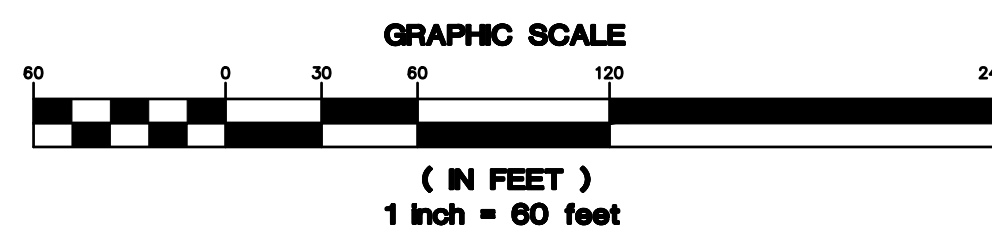
TYPE	DESCRIPTION
BF	REDUCED PRESSURE BACKFLOW PREVENTION DEVICE
CB	CATCH BASIN
FCMH	FLOW CONTROL MANHOLE
FV	FIRE VAULT
MH	MANHOLE
WQV	WATER QUALITY VAULT

LEGEND

SANITARY SEWER LINE	SS — SS
WATER LINE	W — W — W
FIRE LINE	FP — FP — FP — FP
FDC LINE	FDC — FDC — FDC
STORM LINE	SD — SD — SD

STORM NOTES

- INSTALL 800 LF 49X33 ARCH CMP DETENTION. IE=134.00.
- INSTALL 700 LF 49X33 ARCH CMP DETENTION. IE=134.00.
- INSTALL 1750 LF 52" CMP DETENTION. IE=134.00.
- INSTALL 1500 LF 52" CMP DETENTION. IE=134.00.
- INSTALL 2500 LF 52" CMP DETENTION. IE=134.00.
- INSTALL PERFORATED PIPE IN 2'X2' DRAIN ROCK. BOTTOM OF ROCK=132.50.



SHEET TITLE

UTILITY PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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SHEET NUMBER

C3.0

JOB NUMBER: A20120.10

DESIGN REVIEW - 12/23/2021

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Hedges Creek

11345 SW Herman Road

Tualatin, Oregon

15 February 2022

ARCHITECTURAL

- A-1 COVER SHEET
- A-2 PRELIMINARY SITE PLAN
- A-3 BUILDING A FLOOR PLAN
- A-4 BUILDING B FLOOR PLAN
- A-5 BUILDING C FLOOR PLAN
- A-6 BUILDING A EXTERIOR ELEVATIONS
- A-7 BUILDING B EXTERIOR ELEVATIONS
- A-8 BUILDING C EXTERIOR ELEVATIONS
- A-9 TRASH / RECYCLING ENCLOSURE PLANS AND ELEVATIONS & COVERED BIKE PARKING ELEVATIONS

CIVIL

- C0.2 EXISTING CONDITIONS
- C0.3 DEMOLITION PLAN
- C1.0 SITE PLAN
- C2.0 GRADING PLAN
- C3.0 UTILITY PLAN

ELECTRICAL

- E1.00 SITE LIGHTING PLAN
- E1.01 SITE LIGHTING PHOTOMETRIC

LANDSCAPE

- L1.0 TREE REMOVAL & PROTECTION PLAN
- L1.1 OVERALL LANDSCAPE & TREE PLAN
- L1.2 ENLARGED LANDSCAPE PLAN
- L1.3 ENLARGED LANDSCAPE PLAN
- L1.4 ENLARGED LANDSCAPE PLAN
- L1.5 ENLARGED LANDSCAPE PLAN
- L2.0 LANDSCAPE DETAILS
- L2.1 IRRIGATION DETAILS
- L3.0 LANDSCAPE & IR DETAILS

- PROPERTY LINE
- LINE OF SOFFIT OR ELEMENT ABOVE
- CENTER LINE
- COLUMN GRID LINE

LEGEND

ALL CONSTRUCTION SHALL CONFORM WITH ALL APPLICABLE LOCAL STATE AND FEDERAL CODES REGULATION AND LAWS, INCLUDING, BUT NOT LIMITED TO:

- BUILDING 2019 OREGON STRUCTURAL SPECIALTY CODE
- MECHANICAL 2019 OREGON MECHANICAL SPECIALTY CODE
- PLUMBING 2017 OREGON PLUMBING SPECIALTY CODE
- ELECTRICAL 2017 OREGON ELECTRICAL SPECIALTY CODE
- FIRE 2014 OREGON FIRE CODE
- ACCESSIBILITY 2009 ICC / ANSI A117.1 ACCESSIBILITY CODE
- ENERGY 2019 OREGON ZERO ENERGY READY COMMERCIAL CODE

CURRENT ZONING USE: MG - GENERAL MANUFACTURING
 PROPOSED ZONING USE: MG - GENERAL MANUFACTURING

OCCUPANCY GROUP: S-1 / B

CONSTRUCTION TYPE: V-B

LEGAL DESCRIPTION:

TAX LOT 500 FROM TAX MAP 2S 1 27AA, TAX LOT 600 AND 700 FROM TAX MAP 2S 1 22DD.

LOT AREA: ± 914,700
 21.00 acres

TOTAL BUILDING AREA: 442,575 sf

BUILDING A: 148,600 sf
 MANUFACTURING: 52,010 sf (35%)
 WAREHOUSE: 96,590 sf (65%)
 BUILDING B: 142,550 sf
 MANUFACTURING: 49,893 sf (35%)
 WAREHOUSE: 92,657 sf (65%)
 BUILDING C: 151,425 sf
 MANUFACTURING: 52,999 sf (35%)
 WAREHOUSE: 98,426 sf (65%)

SITE COVERAGE: 48.13 %

DOCK DOOR RATIO:

BUILDING A: 1 / 8,255 sf
 BUILDING B: 1 / 5,483 sf
 BUILDING C: 1 / 5,608 sf

PARKING REQUIRED: 308 spaces

BUILDING A: 104 spaces
 MANUFACTURING (1.6 / 1,000 sf) 72 spaces
 WAREHOUSE (0.3 / 1,000 sf) 32 spaces
 BUILDING B: 99 spaces
 MANUFACTURING (1.6 / 1,000 sf) 69 spaces
 WAREHOUSE (0.3 / 1,000 sf) 30 spaces
 BUILDING C: 105 spaces
 MANUFACTURING (1.6 / 1,000 sf) 73 spaces
 WAREHOUSE (0.3 / 1,000 sf) 32 spaces

PARKING PROVIDED: 335 spaces

LANDSCAPE REQUIRED: 135,610 sf (15.0%)

LANDSCAPE PROVIDED: 143,321 sf (15.67%)

OWNER / DEVELOPER

PHELAN DEVELOPMENT COMPANY
 450 NEWPORT CENTER DRIVE, SUITE 405
 NEWPORT BEACH, CA 92660
 (949) 720-8050

APPLICANT

MICHAEL DEARMEY
 PHELAN DEVELOPMENT COMPANY
 450 NEWPORT CENTER DRIVE, SUITE 405
 NEWPORT BEACH, CA 92660
 (949) 720-8050

ARCHITECT

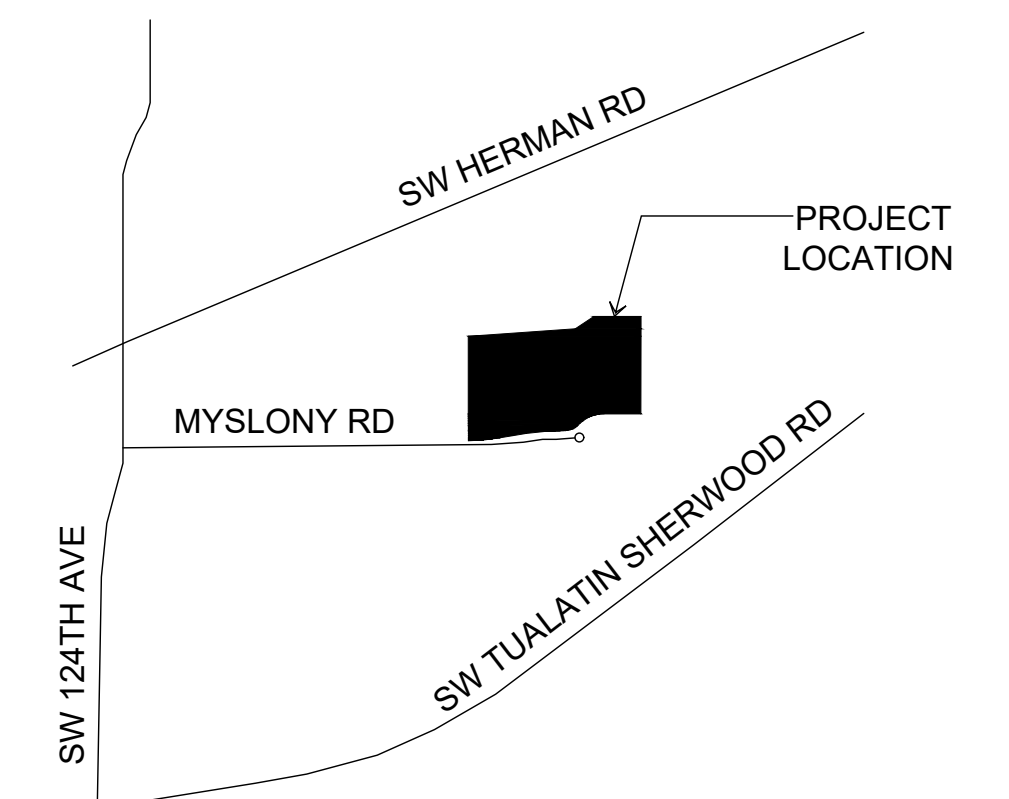
CALVIN J. COATSWORTH ARCHITECTS, PC
 1574 GULF ROAD
 PMB 212
 POINT ROBERTS, WA 98281
 PHONE: (949) 833-1930

CIVIL ENGINEER

CRAIG HARRIS
 AAI ENGINEERING
 4875 SW GRIFFITH DRIVE, SUITE 300
 BEAVERTON, OR 97005
 PHONE: (503) 352-3030

LANDSCAPE

TERESA LONG, PLA
 AAI ENGINEERING
 4875 SW GRIFFITH DRIVE, SUITE 100
 BEAVERTON, OR 97005
 PHONE: (503) 352-3030



SHEET INDEX

APPLICABLE CODES

PROJECT SUMMARY

PROJECT TEAM

VICINITY MAP

SCALE: NOT TO SCALE



NET LOT AREA:	± 914,700 sf 21.00 acres
TOTAL BUILDING AREA:	442,575 sf
BUILDING A:	148,600 sf
BUILDING B:	142,550 sf
BUILDING C:	151,425 sf

SITE COVERAGE (on NET): 48.13 %

DOCK DOOR RATIO:	
BUILDING A:	1 / 8,255 sf
BUILDING B:	1 / 5,483 sf
BUILDING C:	1 / 5,608 sf

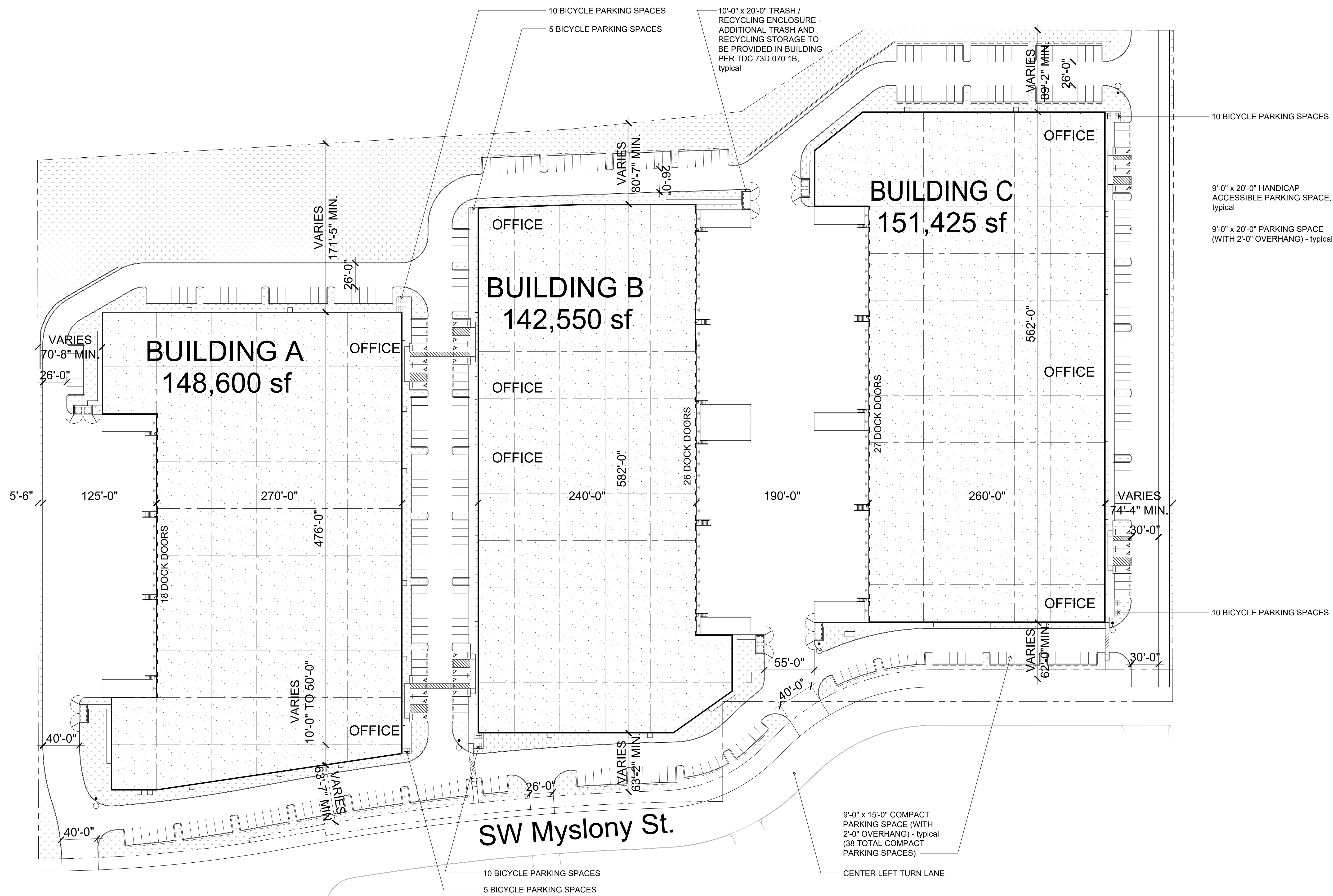
PARKING REQUIRED	308 spaces
BUILDING A:	104 spaces
WAREHOUSE (70%) at .3 per 1,000:	32 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	72 spaces
BUILDING B:	99 spaces
WAREHOUSE (70%) at .3 per 1,000:	30 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	69 spaces
BUILDING C:	105 spaces
WAREHOUSE (70%) at .3 per 1,000:	32 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	73 spaces

PARKING PROVIDED: 335 spaces

LANDSCAPE REQUIRED: 137,205 sf (15%)

LANDSCAPE PROVIDED: 143,321 sf (15.67%)

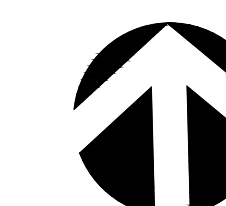
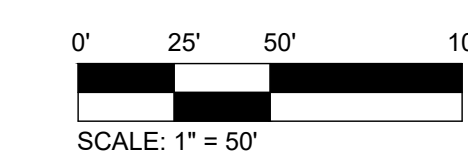
21 April 2022 p:\2019\19500 phelan development\19500.36-walgraave property, or new road schemes\19500.36 site plan - ar package - 04212022.dwg

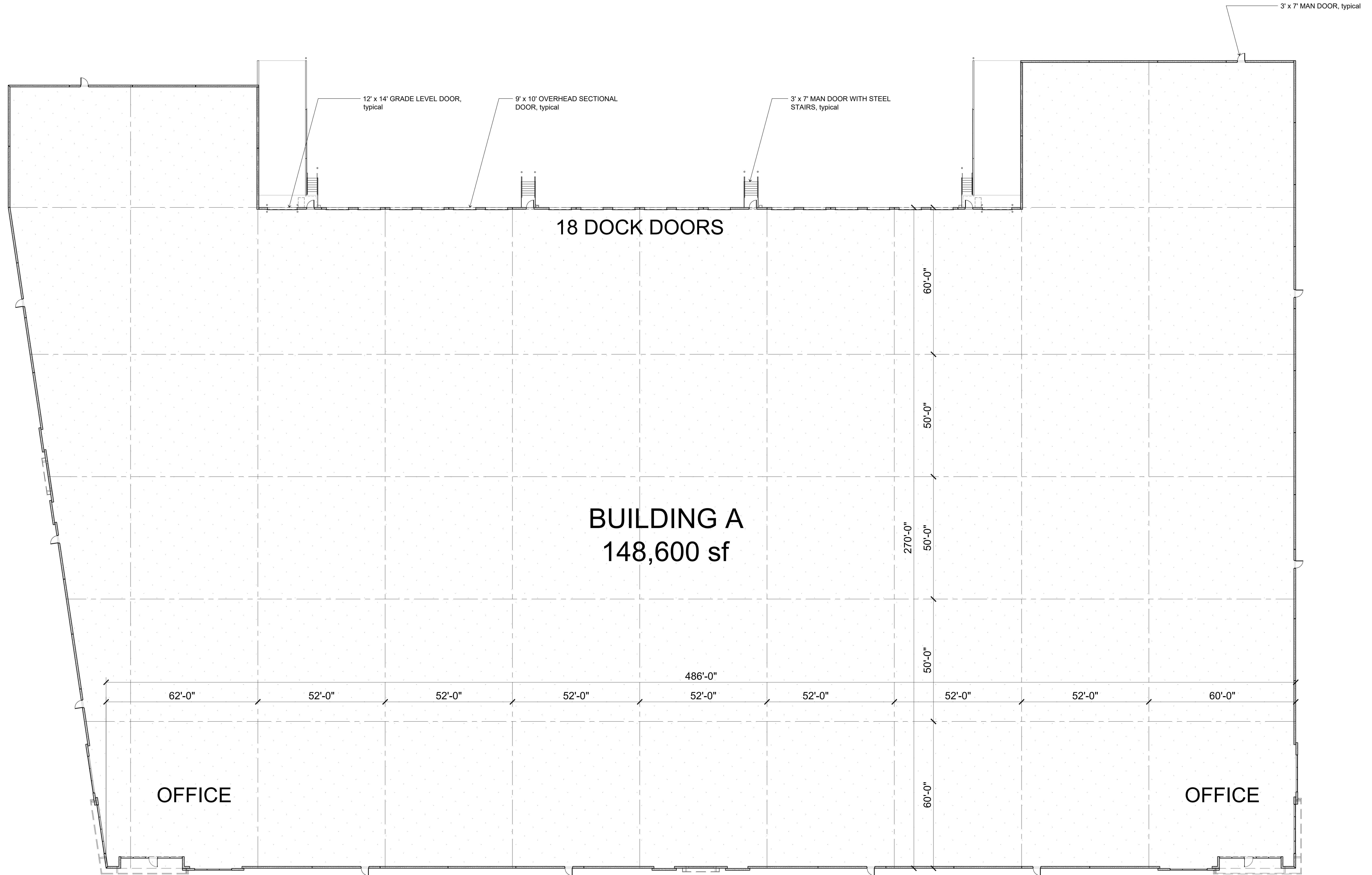


PRELIMINARY SITE PLAN

21 April 2022

Hedges Creek
11345 SW Herman Road
Tualatin, Oregon

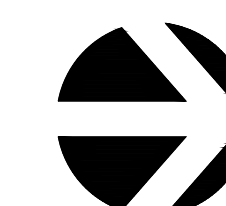


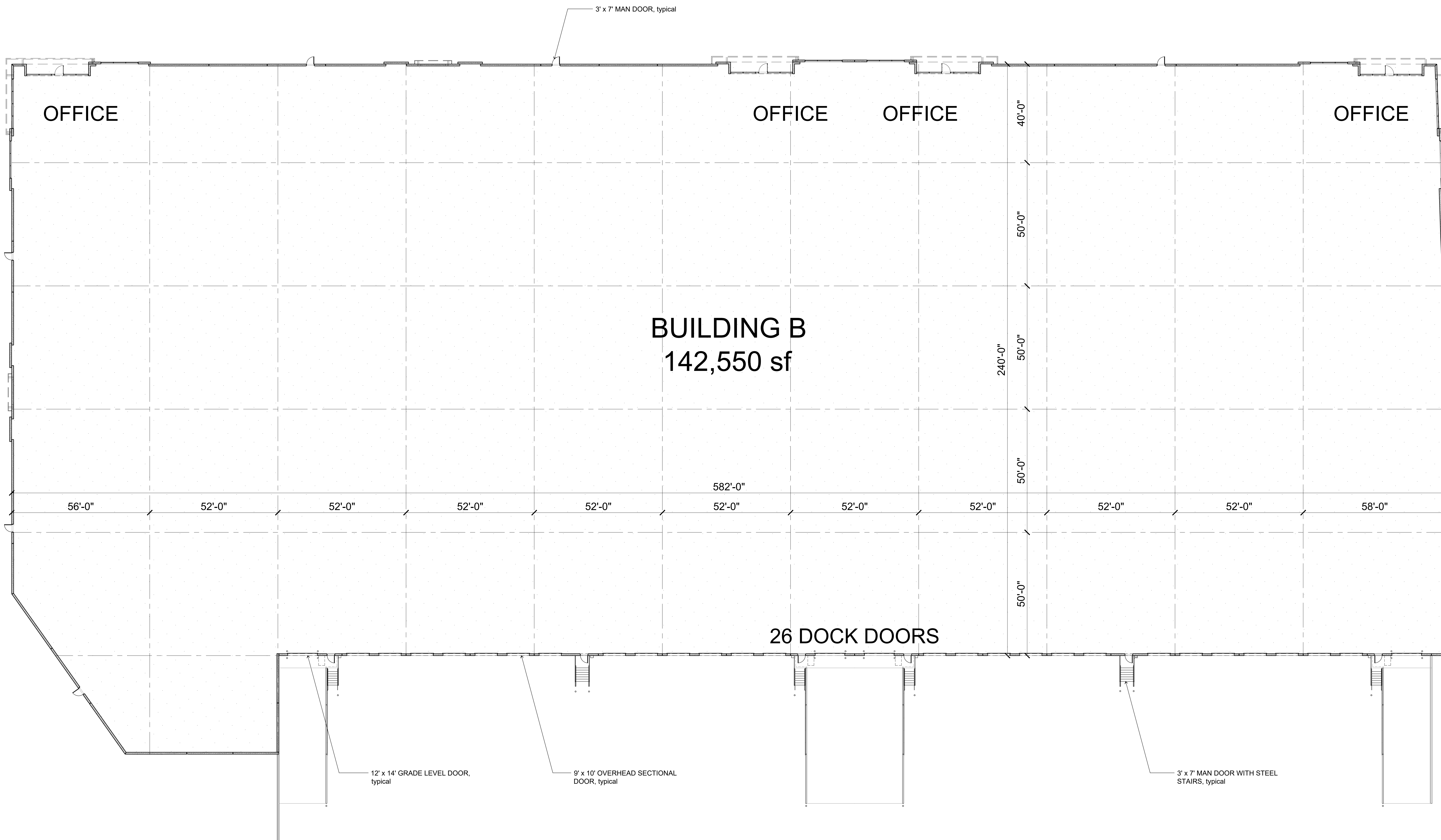


BUILDING A FLOOR PLAN

15 February 2022

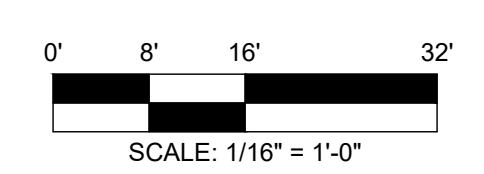
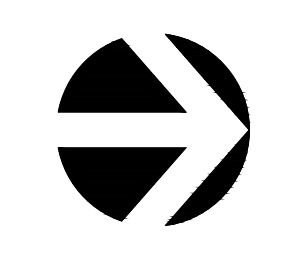
Hedges Creek
11345 SW Herman Road
Tualatin, Oregon

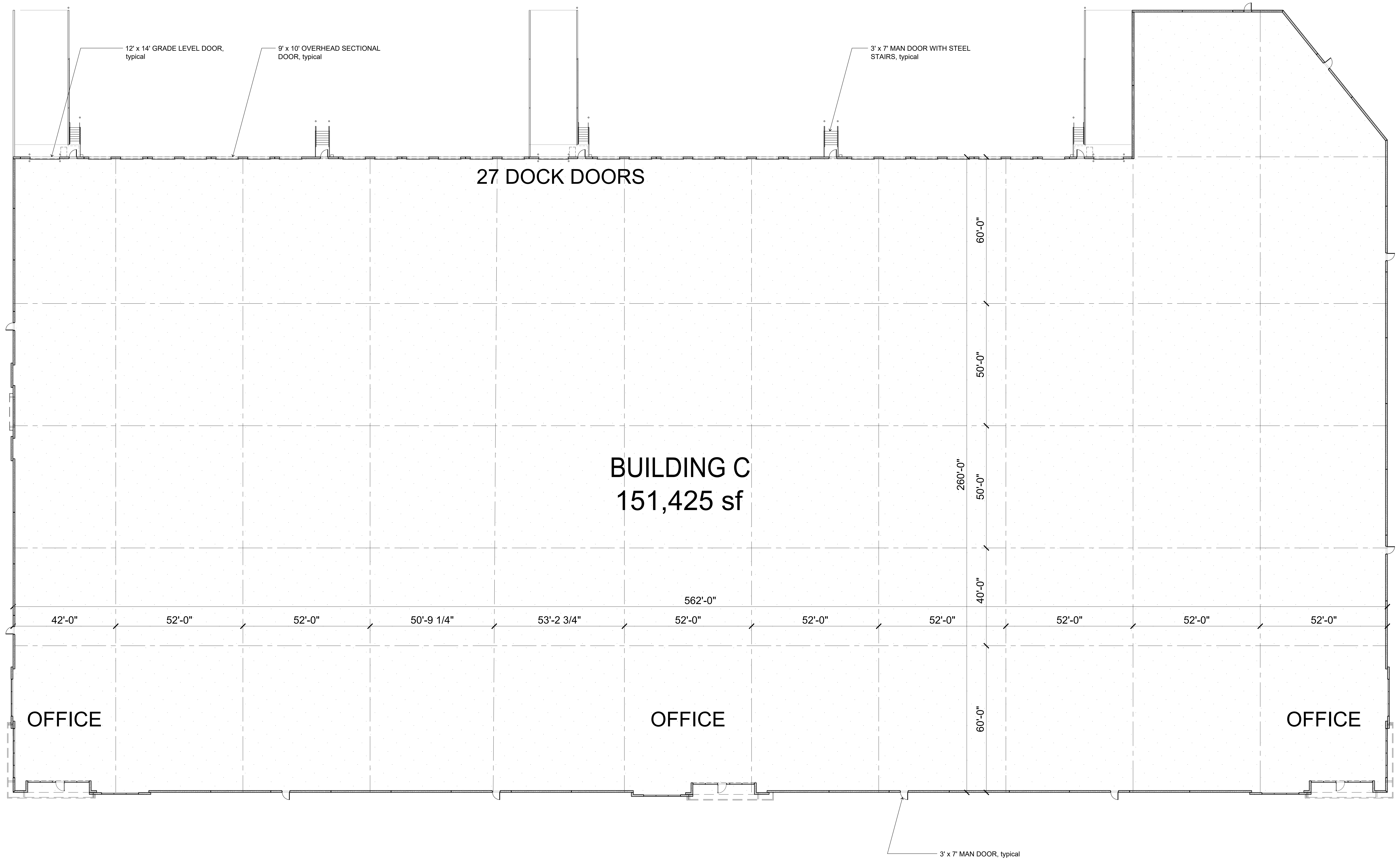




BUILDING B FLOOR PLAN
15 February 2022

Hedges Creek
11345 SW Herman Road
Tualatin, Oregon

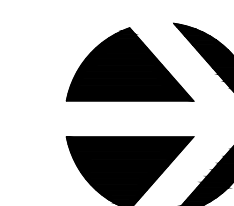


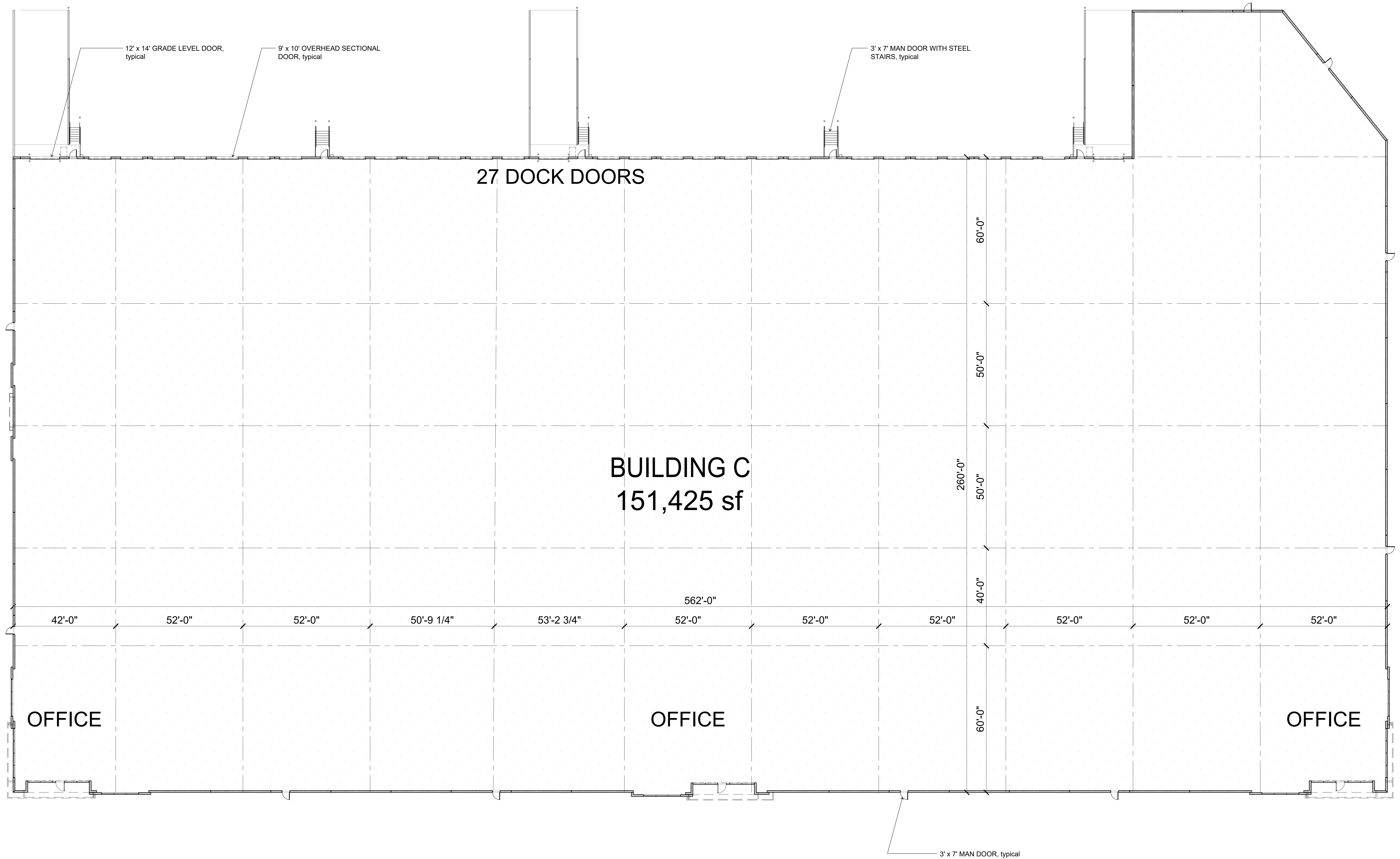


BUILDING C FLOOR PLAN

15 February 2022

Hedges Creek
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Tualatin, Oregon

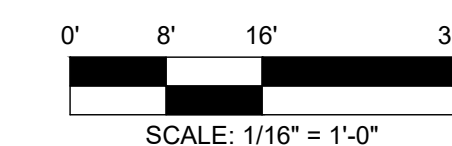
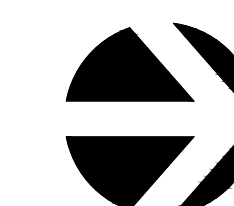


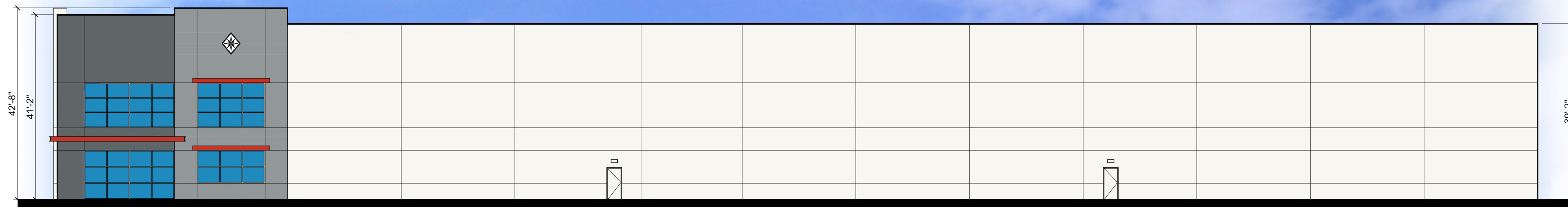


BUILDING C FLOOR PLAN

15 February 2022

Hedges Creek
11345 SW Herman Road
Tualatin, Oregon

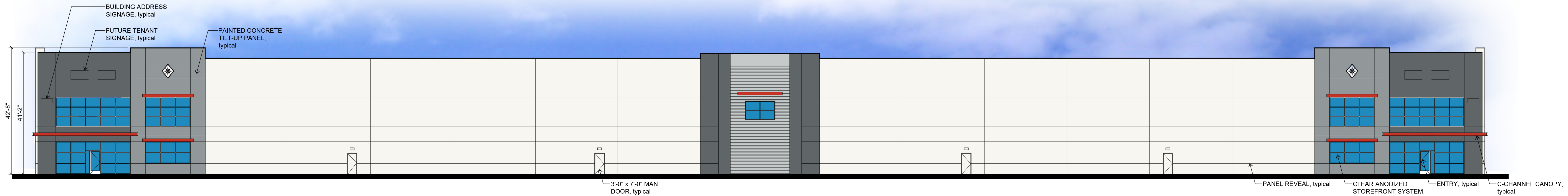




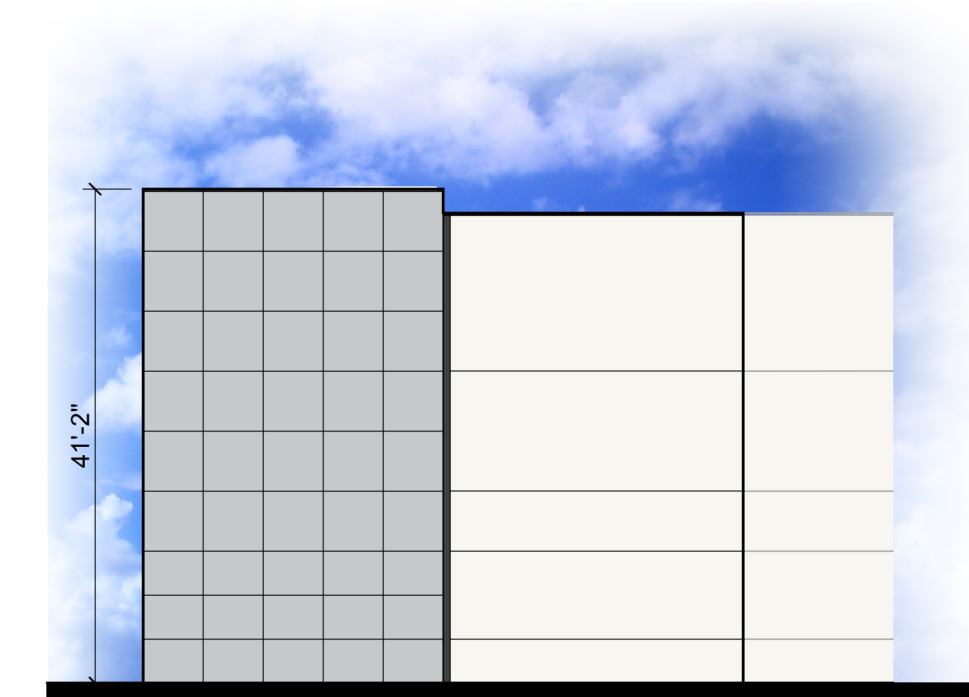
NORTH ELEVATION

	TILT-UP CONCRETE WALL PANEL WALL PANEL FIELD COLOR SHERWIN WILLIAMS - #7005 - PURE WHITE
	TILT-UP CONCRETE WALL PANEL WALL PANEL FIELD COLOR SHERWIN WILLIAMS - #7071 - GRAY SCREEN
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR SHERWIN WILLIAMS - #7073 - NETWORK GRAY
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR SHERWIN WILLIAMS - #7074 - SOFTWARE
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR CLARION RED - PANTONE 7529C
	1" INSULATED DUAL PANE MEDIUM PERFORMANCE PPG VISTACOL PACIFICA GLAZING CLEAR ANODIZED ALUMINUM MULLIONS

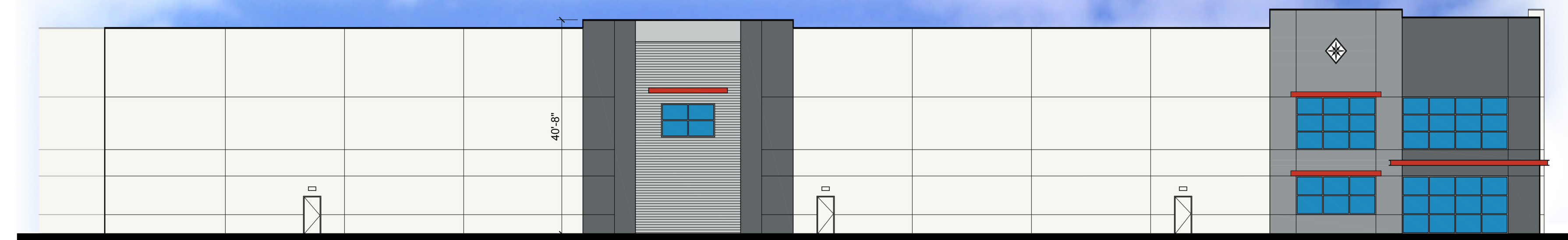
LEGEND



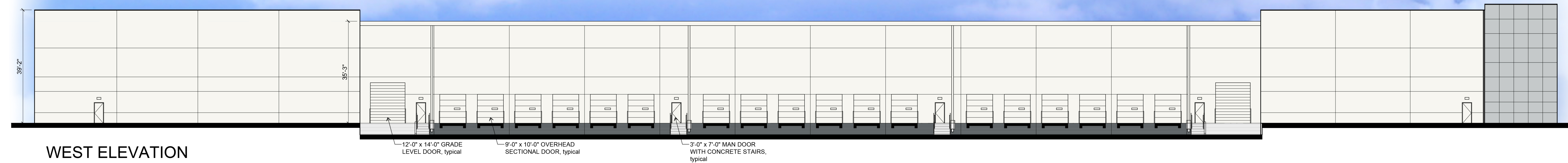
EAST ELEVATION



PARTIAL SOUTH ELEVATION



PARTIAL SOUTH ELEVATION



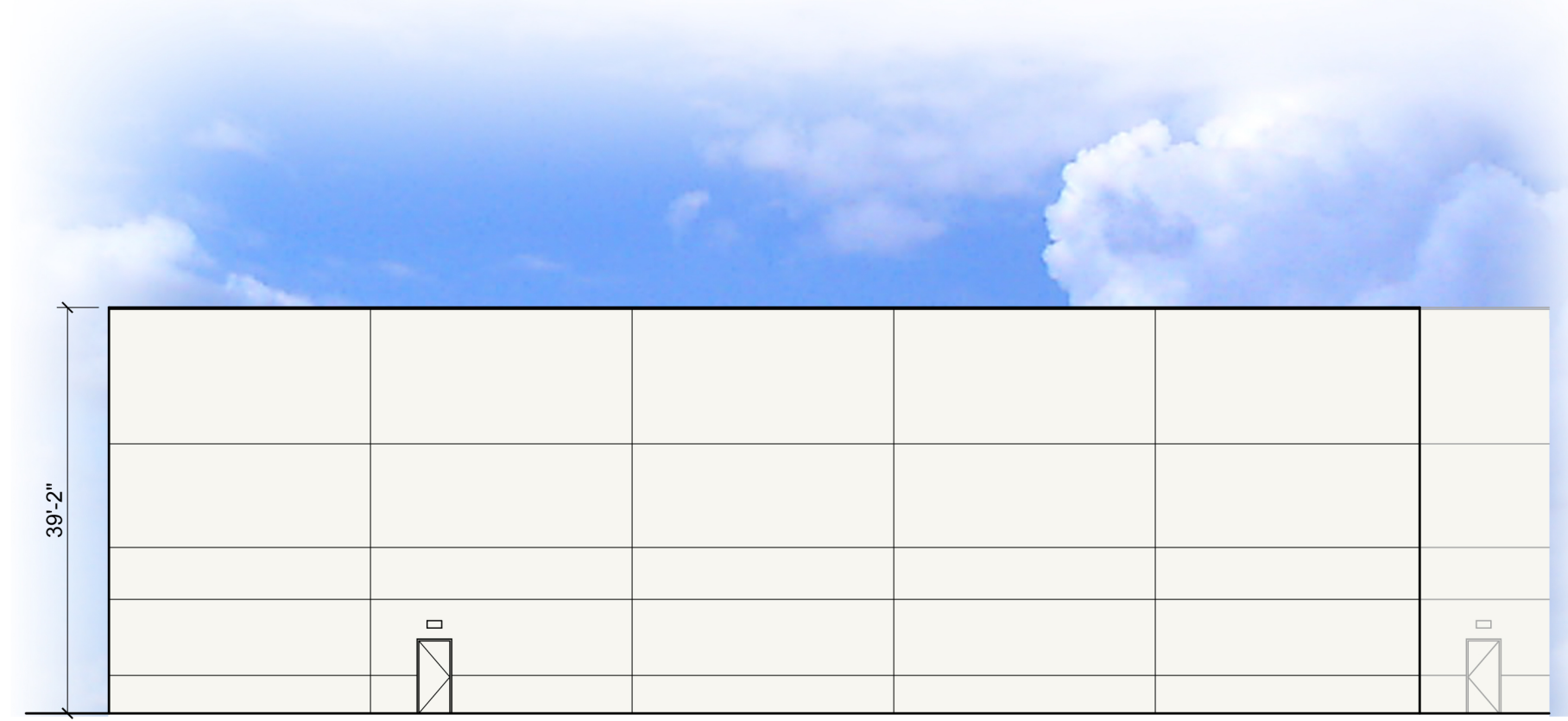
WEST ELEVATION

BUILDING A EXTERIOR ELEVATIONS

15 February 2022

Hedges Creek
11345 SW Herman Road
Tualatin, Oregon





PARTIAL NORTH ELEVATION



PARTIAL NORTH ELEVATION

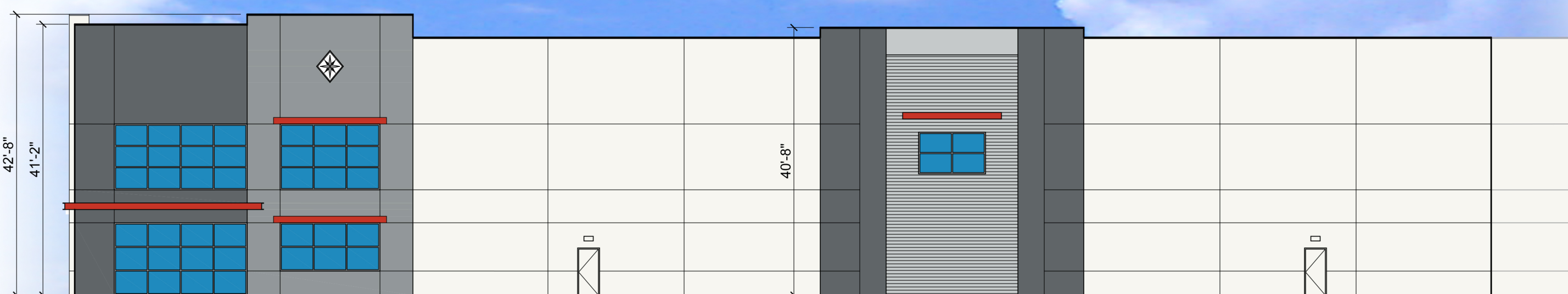
	TILT-UP CONCRETE WALL PANEL WALL PANEL FIELD COLOR SHERWIN WILLIAMS - #7005 - PURE WHITE
	TILT-UP CONCRETE WALL PANEL WALL PANEL FIELD COLOR SHERWIN WILLIAMS - #7071 - GRAY SCREEN
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR SHERWIN WILLIAMS - #7073 - NETWORK GRAY
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR SHERWIN WILLIAMS - #7074 - SOFTWARE
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR CLARION RED - PANTONE 7526C
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR PPG VISTACOO PACIFICA MEDIUM PERFORMANCE CLEAR ANODIZED ALUMINUM MULLIONS

LEGEND

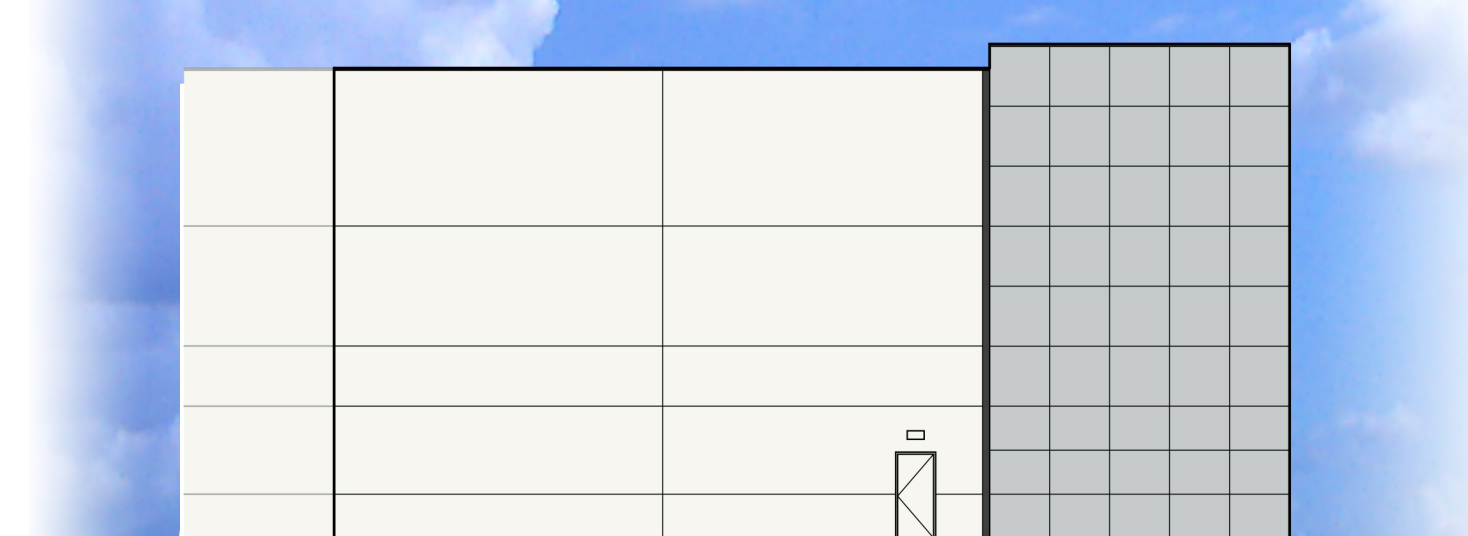


EAST ELEVATION

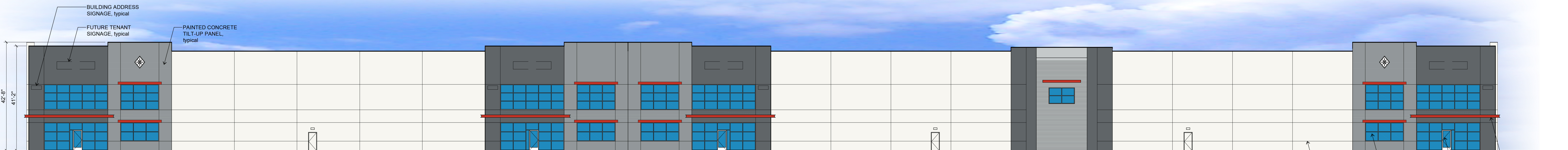
12'-0" x 14'-0" GRADE LEVEL DOOR, typical
9'-0" x 10'-0" OVERHEAD SECTIONAL DOOR, typical
3'-0" x 7'-0" MAN DOOR WITH CONCRETE STAIRS, typical



PARTIAL SOUTH ELEVATION



PARTIAL SOUTH ELEVATION



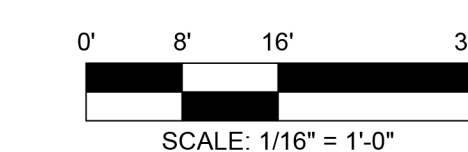
WEST ELEVATION

BUILDING ADDRESS SIGNAGE, typical
FUTURE TENANT SIGNAGE, typical
PAINTED CONCRETE TILT-UP PANEL, typical
PANEL REVEAL, typical
CLEAR ANODIZED STOREFRONT SYSTEM, typical
ENTRY, typical
C-CHANNEL CANOPY, typical

BUILDING B EXTERIOR ELEVATIONS

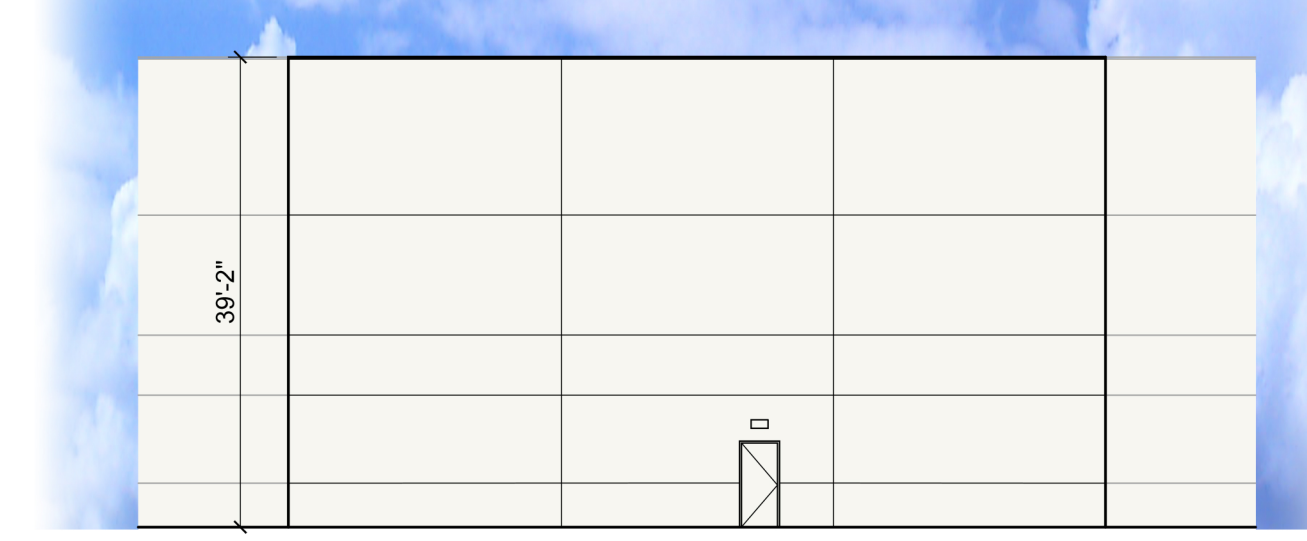
15 February 2022

Hedges Creek
11345 SW Herman Road
Tualatin, Oregon





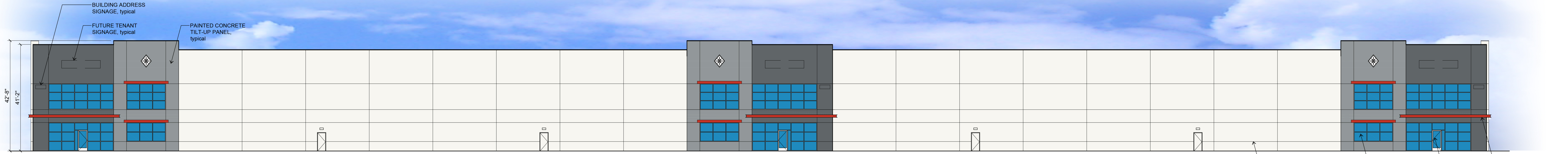
PARTIAL NORTH ELEVATION



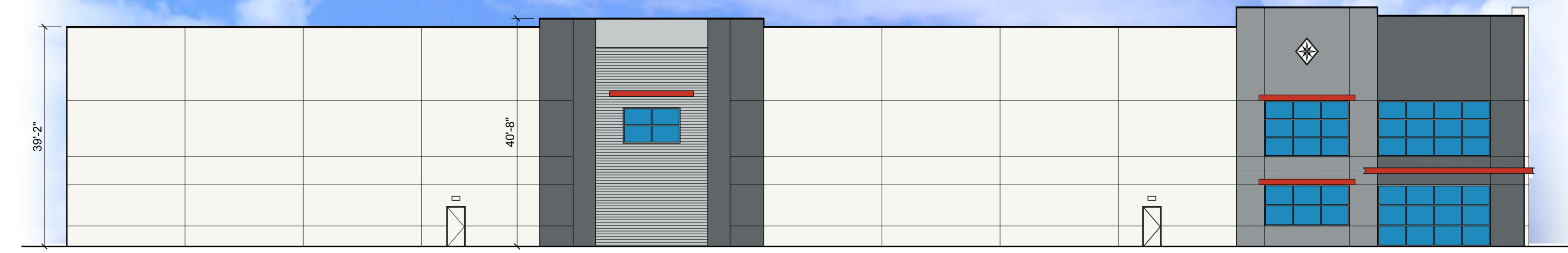
PARTIAL NORTH ELEVATION

	TILT-UP CONCRETE WALL PANEL WALL PANEL FIELD COLOR SHERWIN WILLIAMS - #7005 - PURE WHITE
	TILT-UP CONCRETE WALL PANEL WALL PANEL FIELD COLOR SHERWIN WILLIAMS - #7071 - GRAY SCREEN
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR SHERWIN WILLIAMS - #7073 - NETWORK GRAY
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR SHERWIN WILLIAMS - #7074 - SOFTWARE
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR CLARION RED - PANTONE 7529C
	TILT-UP CONCRETE WALL PANEL WALL PANEL ACCENT COLOR PPG VISTACOLOR PACIFICA GLAZING CLEAR ANODIZED ALUMINUM MULLIONS

LEGEND



EAST ELEVATION



SOUTH ELEVATION



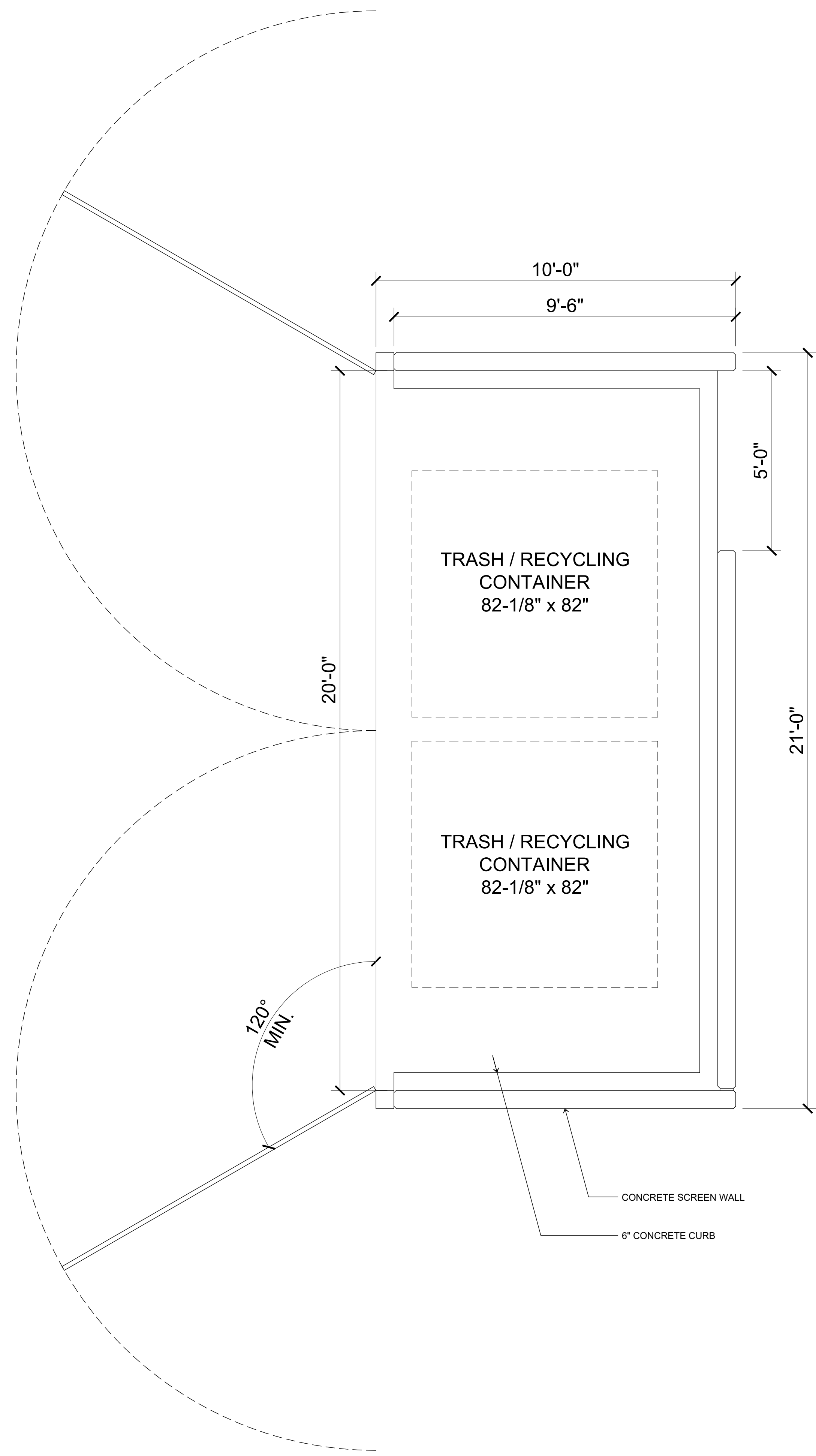
WEST ELEVATION

BUILDING C EXTERIOR ELEVATIONS

15 February 2022

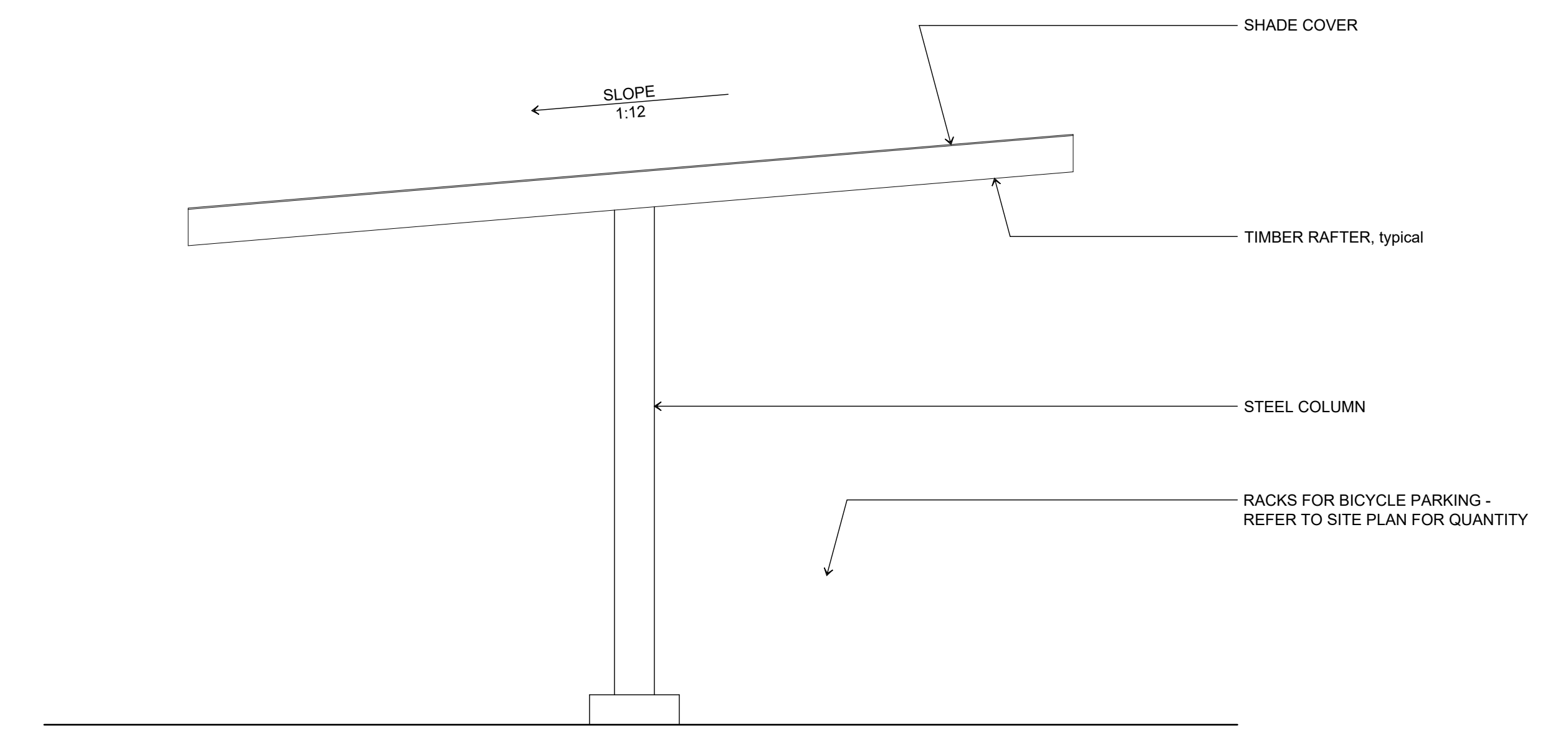
Hedges Creek
11345 SW Herman Road
Tualatin, Oregon





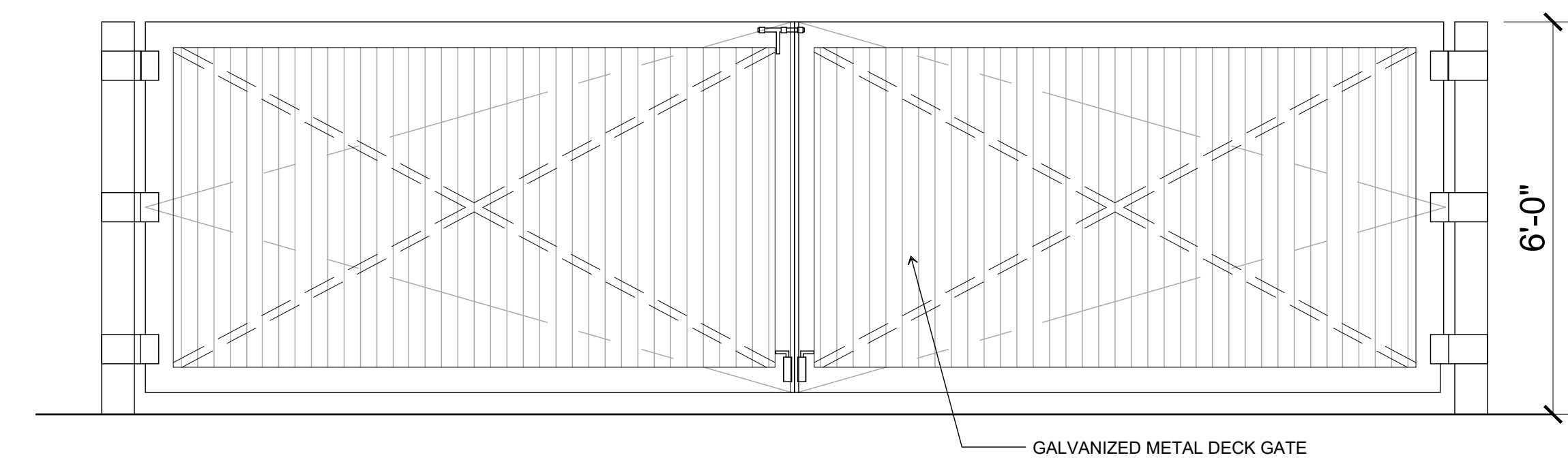
TRASH / RECYCLING ENCLOSURE PLAN

SCALE: 1/2" = 1'-0"



COVERED BICYCLE PARKING ELEVATION

SCALE: 1/2" = 1'-0"

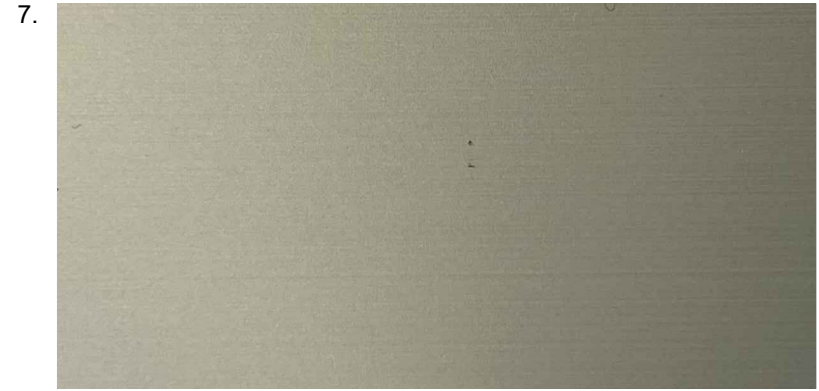


TRASH / RECYCLING ENCLOSURE ELEVATION

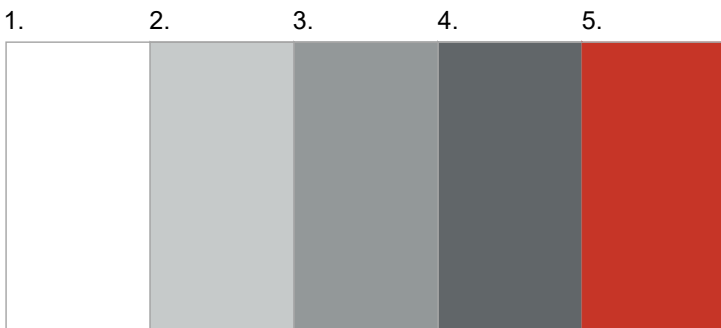
SCALE: 1/2" = 1'-0"

**TRASH / RECYCLING ENCLOSURE PLANS AND ELEVATIONS &
COVERED BIKE PARKING ELEVATIONS**

Hedges Creek
11345 SW Herman Road
Tualatin, Oregon



1. SHERWIN WILLIAMS - #7005 - PURE WHITE
2. SHERWIN WILLIAMS - #7071 - GRAY SCREEN
3. SHERWIN WILLIAMS - #7073 - NETWORK GRAY
4. SHERWIN WILLIAMS - #7074 - SOFTWARE
5. SHERWIN WILLIAMS - PANTONE 7626C - CLARION RED
6. PPG VISTACOOOL PACIFICA GLAZING
7. KAWNEER CLEAR ANODIZED ALUMINUM MULLION



LUMINAIRE MOUNTING HEIGHTS

EXTERIOR:
 TYPE SB - +31'-0" AFF
 TYPE SC - RECESSED
 TYPE SD - +8'-7" ABOVE DOOR

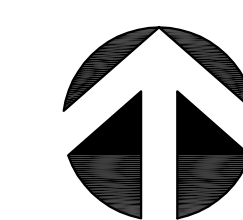
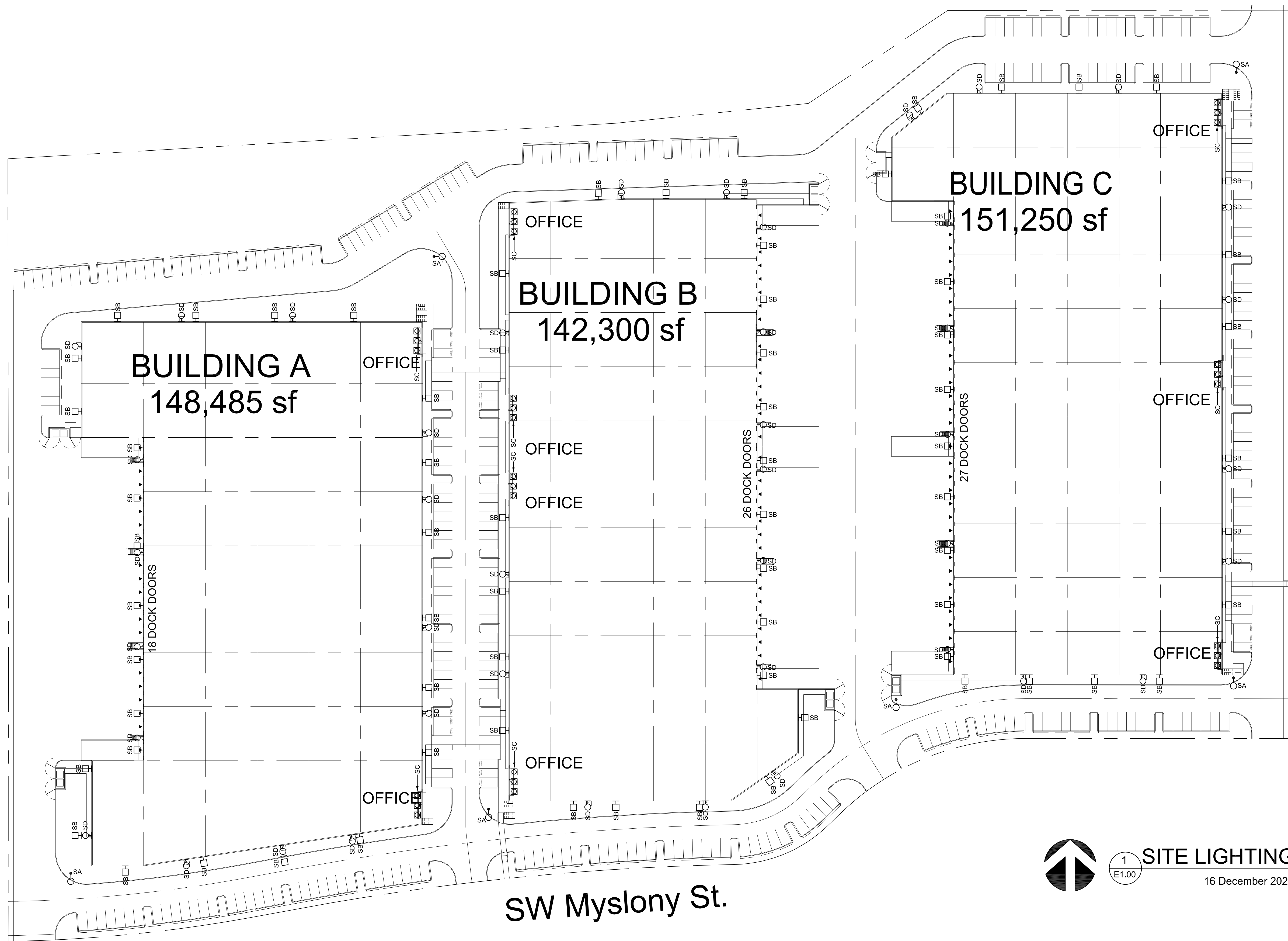
- NOTE:
- HEIGHT IS TO CENTER LINE OF LUMINAIRE UNLESS OTHERWISE NOTED.
 - SEE ARCHITECTURAL ELEVATIONS FOR LUMINAIRE LOCATIONS

GENERAL NOTES

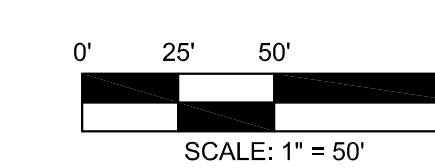
- CONTRACTOR IS RESPONSIBLE TO ASSURE THAT THE LIMITING BRANCH CIRCUIT VOLTAGE DROP TO LESS THAN OR EQUAL TO 3% AND TO 2% FOR FEEDERS AT DESIGN LOADS AS REQUIRED BY NEC. THE CONTRACTOR SHALL REVIEW SCHEDULES TO VERIFY LOADS & WIRE/CONDUIT SIZE REQUIRED.

LUMINAIRE SCHEDULE

<p>TYPE: SA DESCRIPTION: LED - SINGLE POLE MOUNTED AREA LIGHT BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 18,000 LUMENS - 1250mA OPTIONS: MOTION SENSOR - DIMS TO 37% MT HEIGHT: PARKING +22'-0" ABOVE FINISH GRADE POLES: SQUARE ALUMINUM, PROVIDE CONCRETE POLE BASE 3' AFG MANUFACTURER: LITHONIA DSK1 LED-P8-30K-TSM-MV-SPA-PRH-FC3V-HS-DBXKD OR APPROVED EQUIVALENT</p>	<p>BUG RATING: 4 / 0 / 2 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: GLASS REFLECTOR: TYPE V DISTRIBUTION: FINISH: BLACK WATTAGE: 163</p>
<p>TYPE: SA1 DESCRIPTION: LED - SINGLE POLE MOUNTED AREA LIGHT BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 23,000 LUMENS - 1050mA OPTIONS: MOTION SENSOR - DIMS TO 37% MT HEIGHT: PARKING +30'-0" ABOVE FINISH GRADE POLES: SQUARE ALUMINUM, PROVIDE CONCRETE POLE BASE 3' AFG MANUFACTURER: LITHONIA DSK1 LED-P8-30K-TSM-MV-SPA-PRH-FC3V-HS-DBXKD OR APPROVED EQUIVALENT</p>	<p>BUG RATING: 5 / 0 / 3 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: GLASS REFLECTOR: TYPE V DISTRIBUTION: FINISH: BLACK WATTAGE: 207</p>
<p>TYPE: SB DESCRIPTION: LED - WALL MOUNT BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 10,000 LUMENS, 1000mA OPTIONS: MOTION SENSOR - DIMS TO 37% MANUFACTURER: LITHONIA DSKV2 LED-30C-1000-30K-T4M-PIRH-FC3V-DBXKD OR APPROVED EQUIVALENT</p>	<p>BUG RATING: 2 / 0 / 2 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: GLASS REFLECTOR: TYPE 4M DISTRIBUTION: FINISH: BLACK WATTAGE: 109</p>
<p>TYPE: SC DESCRIPTION: LED - RECESSED DOWNLIGHT 6" ROUND BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 1000 LUMENS OPTIONS: WET LOCATION MANUFACTURER: LITHONIA EVO-30/10-6AR-MD-LSS-MV-GZ1 SERIES OR APPROVED EQUIVALENT</p>	<p>BUG RATING: 4 / 0 / 2 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: ACRYLIC LENS REFLECTOR: CLEAR DISTRIBUTION: MEDIUM FINISH: SEMI-SPECULAR WATTAGE: 12</p>
<p>TYPE: SD DESCRIPTION: LED - EXTERIOR WALL MOUNT BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 2000 LUMENS OPTIONS: CR - 80 WET LOCATION MANUFACTURER: LITHONIA WIDGE2 LED-P2-30K-80CRI-VW-MV-SRM-DBXKD SERIES OR APPROVED EQUIVALENT</p>	<p>BUG RATING: 1 / 0 / 0 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: ACRYLIC LENS REFLECTOR: CLEAR DISTRIBUTION: WIDE FINISH: BLACK WATTAGE: 10</p>



1 SITE LIGHTING PLAN
 E1.00
 16 December 2021



LUMINAIRE MOUNTING HEIGHTS

EXTERIOR:
 TYPE SB - +3'-0" AFF
 TYPE SC - RECESSED
 TYPE SD - +8'-7" ABOVE DOOR

- NOTE:
- HEIGHT IS TO CENTER LINE OF LUMINAIRE UNLESS OTHERWISE NOTED.
 - SEE ARCHITECTURAL ELEVATIONS FOR LUMINAIRE LOCATIONS

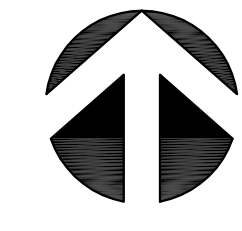
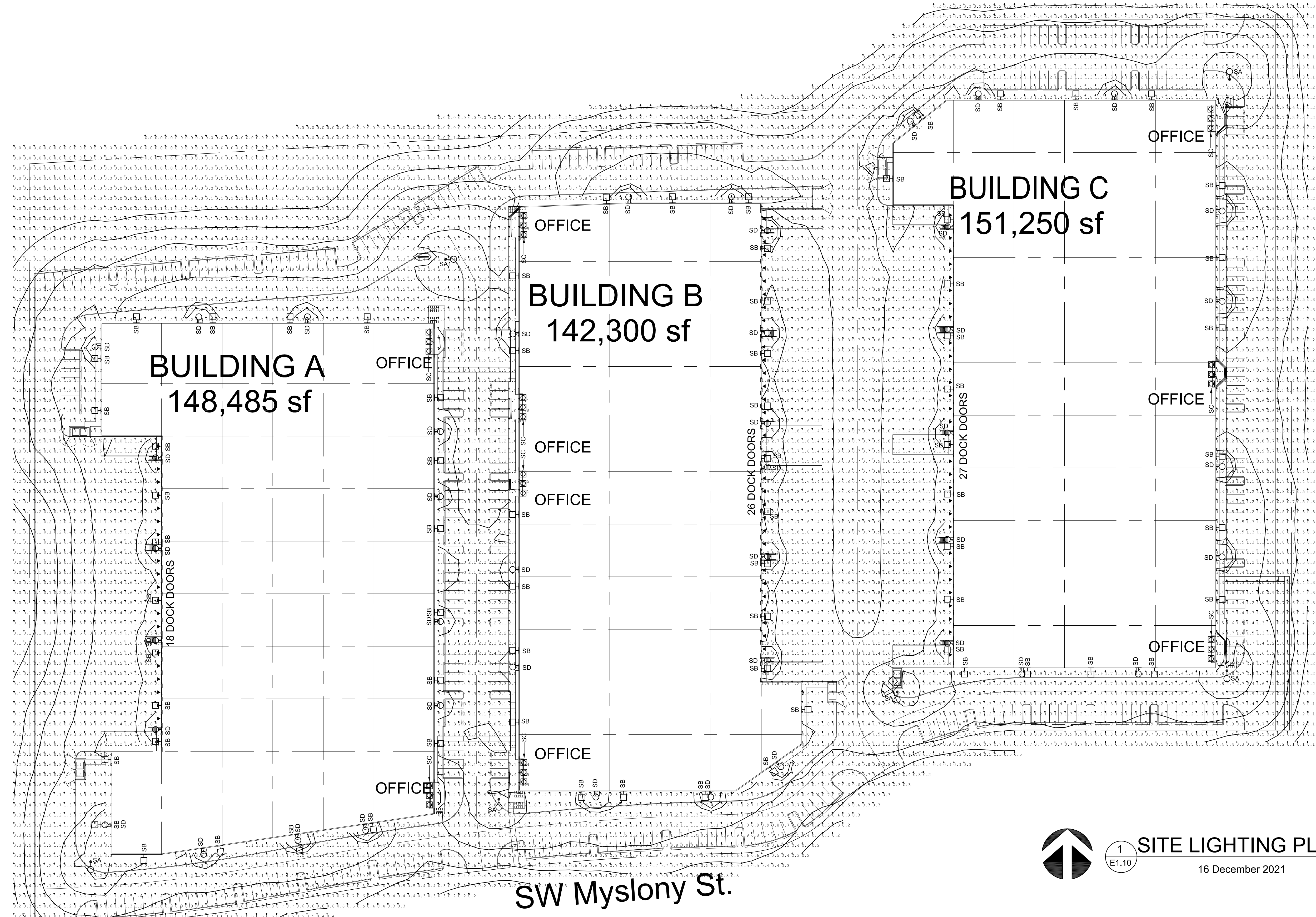
GENERAL NOTES

- CONTRACTOR IS RESPONSIBLE TO ASSURE THAT THE LIMITING BRANCH CIRCUIT VOLTAGE DROP TO LESS THAN OR EQUAL TO 3% AND TO 2% FOR FEEDERS AT DESIGN LOADS AS REQUIRED BY NEC. THE CONTRACTOR SHALL REVIEW SCHEDULES TO VERIFY LOADS & WIRE/CONDUIT SIZE REQUIRED.

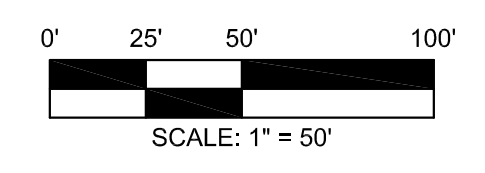
Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Blg A Loading Area	Illuminance	Fc	1.99	6.1	0.9	2.21	9.00
Blg A Parking	Illuminance	Fc	2.15	4.3	1.2	1.79	3.58
Blg B Loading Area	Illuminance	Fc	2.13	10.5	0.9	2.37	11.67
Blg B Parking	Illuminance	Fc	2.08	7.7	1.0	2.08	7.70
Blg C Loading Area	Illuminance	Fc	1.81	7.7	0.7	2.58	11.00
Blg C Parking	Illuminance	Fc	1.41	5.8	0.6	2.35	9.67

LUMINAIRE SCHEDULE

<p>TYPE: SA DESCRIPTION: LED - SINGLE POLE MOUNTED AREA LIGHT BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 18,000 LUMENS - 1250mA OPTIONS: MOTION SENSOR - DIMS TO 37% MT HEIGHT: PARKING - 22'0" ABOVE FINISH GRADE POLES: SQUARE ALUMINUM, PROVIDE CONCRETE POLE BASE 3" AFG</p>	<p>BUG RATING: 4 / 0 / 2 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: GLASS REFLECTOR: TYPE V DISTRIBUTION: FINISH: BLACK WATTAGE: 183</p>
<p>MANUFACTURER: LITHONIA DSX1 LED-P8-30K-TSM-MV-SPA-PIRH1FC3V-HS-DBXD OR APPROVED EQUIVALENT</p>	
<p>TYPE: SA1 DESCRIPTION: LED - SINGLE POLE MOUNTED AREA LIGHT BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 23,000 LUMENS - 1050mA OPTIONS: MOTION SENSOR - DIMS TO 37% MT HEIGHT: PARKING - 20'0" ABOVE FINISH GRADE POLES: SQUARE ALUMINUM, PROVIDE CONCRETE POLE BASE 3" AFG</p>	<p>BUG RATING: 5 / 0 / 3 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: GLASS REFLECTOR: TYPE V DISTRIBUTION: FINISH: BLACK WATTAGE: 207</p>
<p>MANUFACTURER: LITHONIA DSX1 LED-P8-30K-TSM-MV-SPA-PIRH1FC3V-HS-DBXD OR APPROVED EQUIVALENT</p>	
<p>TYPE: SB DESCRIPTION: LED - WALL MOUNT BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 10,000 LUMENS - 1000mA OPTIONS: MOTION SENSOR - DIMS TO 37%</p>	<p>BUG RATING: 2 / 0 / 2 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: GLASS REFLECTOR: TYPE 4M DISTRIBUTION: FINISH: BLACK WATTAGE: 109</p>
<p>MANUFACTURER: LITHONIA DSXW2 LED-30C-1000-30K-14M-MV-PIRH1FC3V-DBXD OR APPROVED EQUIVALENT</p>	
<p>TYPE: SC DESCRIPTION: LED - RECESSED DOWNLIGHT 8" ROUND BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 1000 LUMENS OPTIONS: WET LOCATION</p>	<p>HOUSING: DIE CAST ALUMINUM LENS / OPTICS: ACRYLIC LENS REFLECTOR: CLEAR DISTRIBUTION: MEDIUM FINISH: SEMI-SPECULAR WATTAGE: 12</p>
<p>MANUFACTURER: LITHONIA EVO-3010-6AR-MD-LSS-MV-G21 SERIES OR APPROVED EQUIVALENT</p>	
<p>TYPE: SD DESCRIPTION: LED - EXTERIOR WALL MOUNT BALLAST: ELECTRONIC DRIVER - 0-10V DIMMING VOLTAGE: 120-277V LAMP TYPE: LED - 3000K LAMP QUANTITY: 1 EFFICIENCY: MIN 2000 LUMENS OPTIONS: CR1 - 80 WET LOCATION</p>	<p>BUG RATING: 1 / 0 / 0 HOUSING: DIE CAST ALUMINUM LENS / OPTICS: ACRYLIC LENS REFLECTOR: WIDE DISTRIBUTION: FINISH: BLACK WATTAGE: 10</p>
<p>MANUFACTURER: LITHONIA WDG2 LED-F8-30K-80CRI-VW-MV-SRM-DBXD SERIES OR APPROVED EQUIVALENT</p>	



1 SITE LIGHTING PLAN
 E1.10
 16 December 2021



EXISTING TREE SUMMARY

Prepared by: Peter van Oss PH-8145A NW SavATree 11/18/2021

Table with columns: Tree ID, Common Name, Latin Name, DBH, Health, Status, Action, Comments. Lists 27 trees for removal, including Douglas fir, English hawthorn, Oregon ash, and various species of Quercus, Fraxinus, and Prunus.

Prepared by: Peter van Oss PH-8145A NW SavATree 11/18/2021

Table with columns: Tree ID, Common Name, Latin Name, DBH, Health, Status, Action, Comments. Lists 43 trees for removal, including Pacific service berry, Scouler willow, Oregon white oak, and various species of Quercus, Fraxinus, and Pinus.

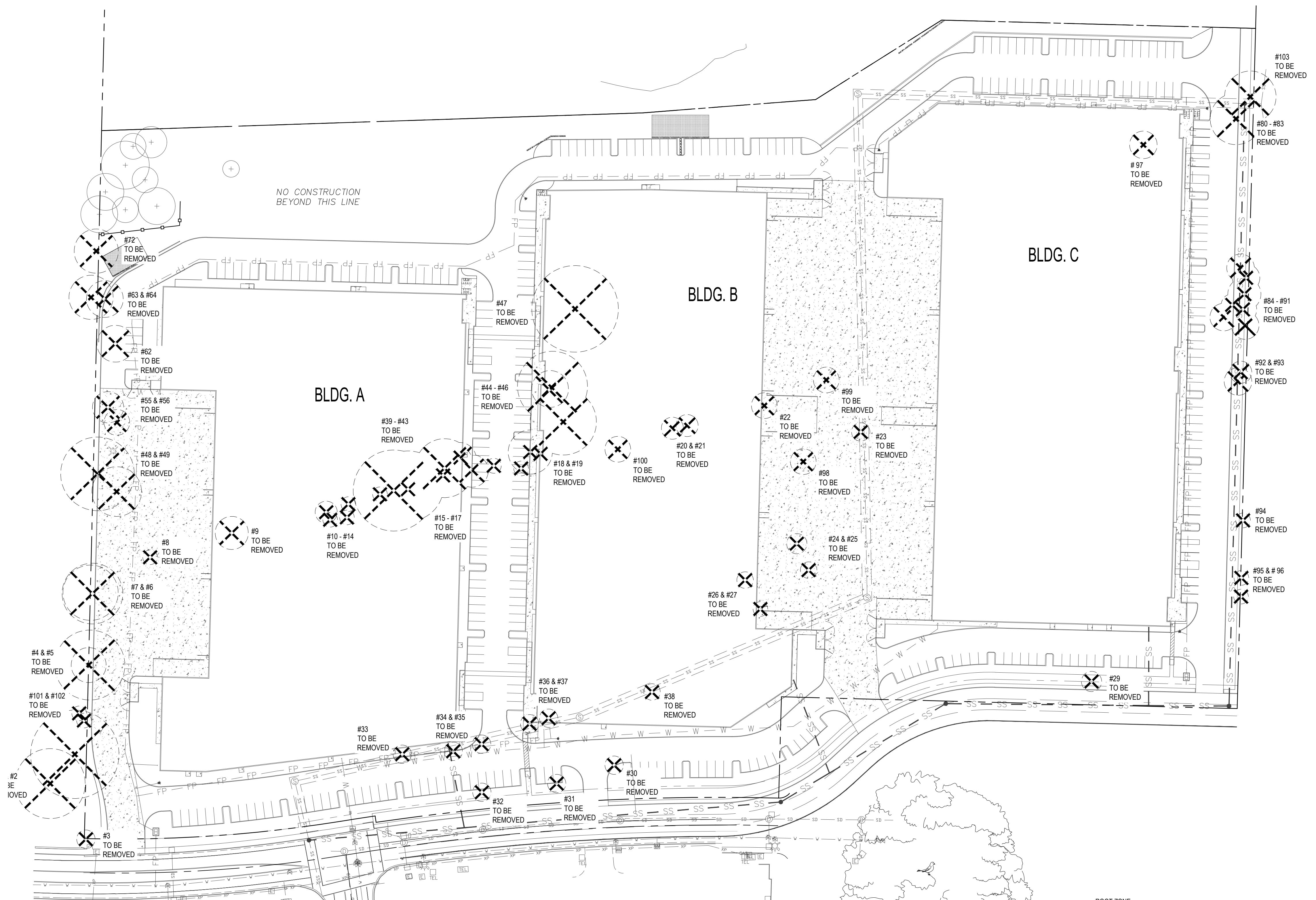
Prepared by: Peter van Oss PH-8145A NW SavATree 11/18/2021

Table with columns: Tree ID, Common Name, Latin Name, DBH, Health, Status, Action, Comments. Lists 33 trees for removal, including Douglas fir, Oregon ash, Fraxinus latifolia, and various species of Quercus and Fraxinus.

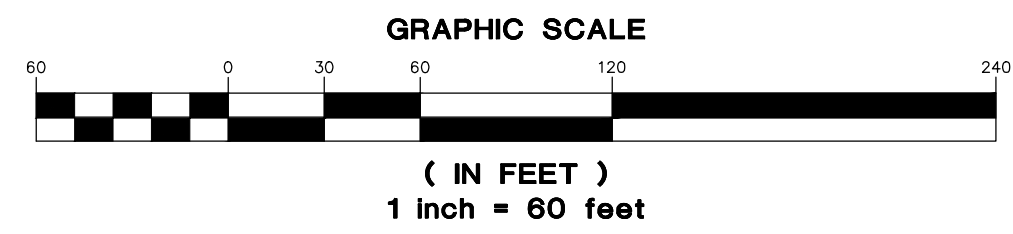
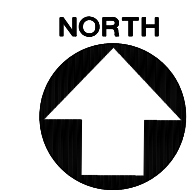
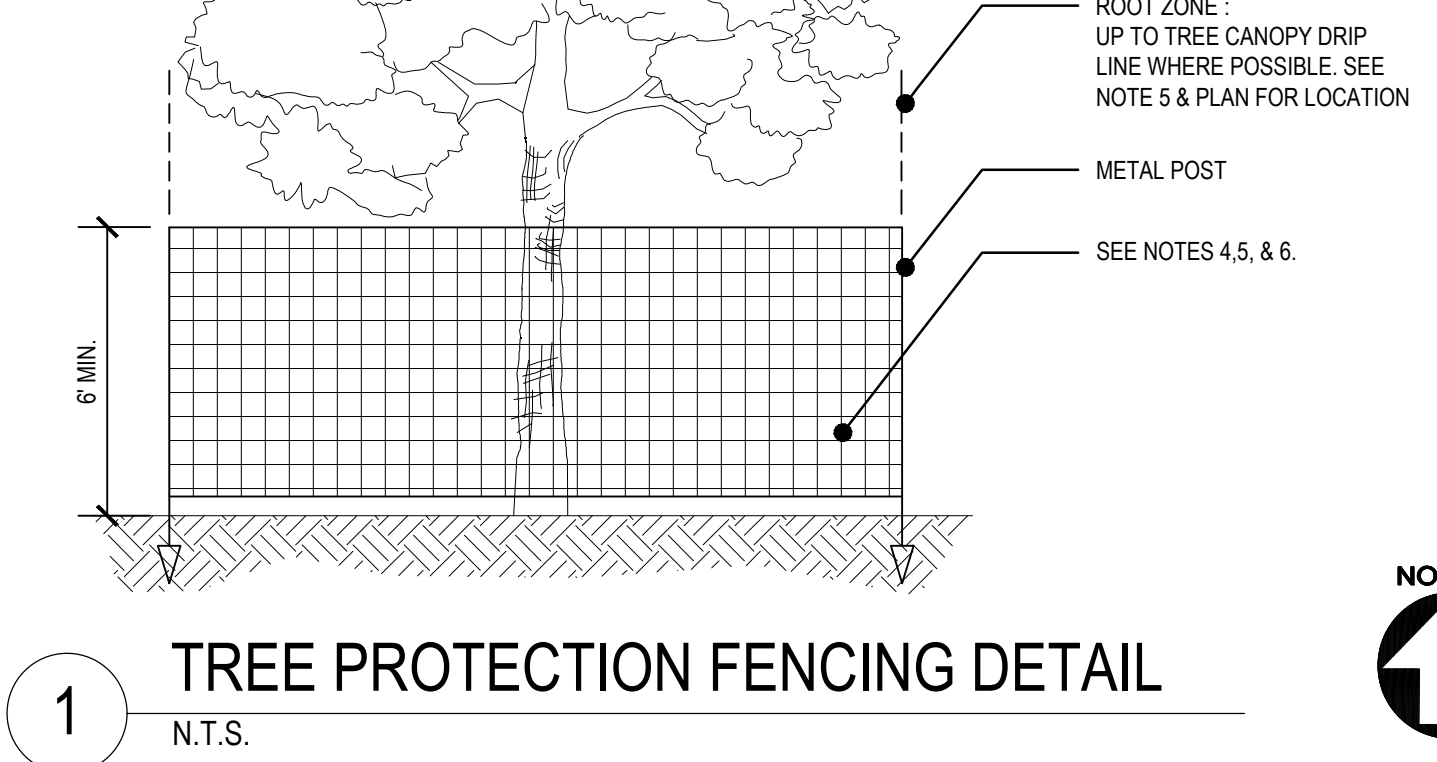
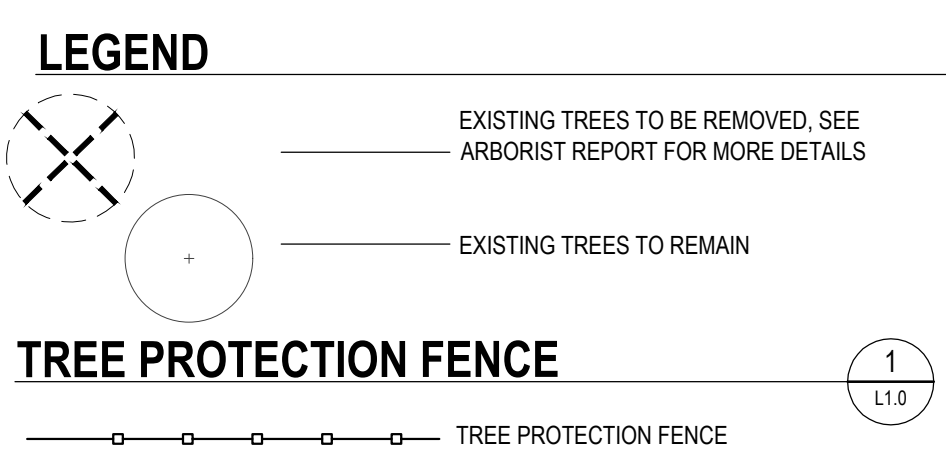
Prepared by: Peter van Oss PH-8145A NW SavATree 11/18/2021

Table with columns: Tree ID, Common Name, Latin Name, DBH, Health, Status, Action, Comments. Lists 9 trees for removal, including English hawthorn, Oregon ash, and Fraxinus latifolia.

NO CONSTRUCTION BEYOND THIS LINE



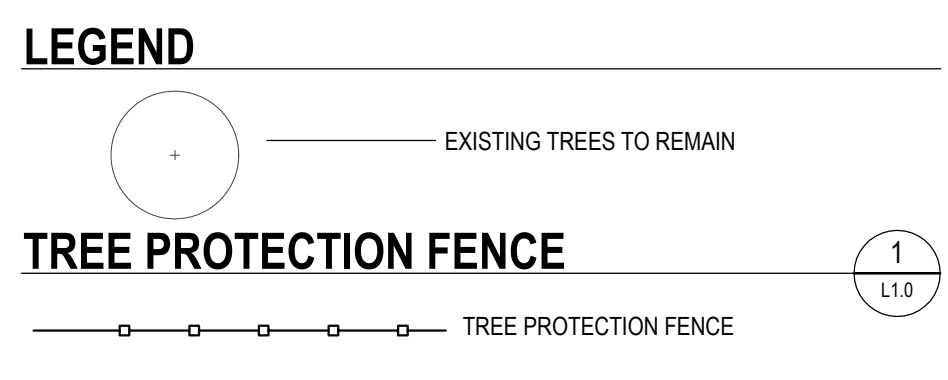
- TREE PROTECTION NOTES: 1. BEFORE WORK IS STARTED, INSTALL TREE PROTECTION FENCING... 2. NO ENCROACHMENT OF ANY KIND IS ALLOWED WITHIN THE TREE PROTECTION FENCE ZONE... 3. INSTALL FENCE ON TREE SIDE OF EXISTING CURB FOR ALL TREES TO BE PRESERVED... 4. FENCING SHALL BE 6-FOOT HIGH CHAIN LINK FENCE WITH METAL POSTS... 5. FENCE SHALL BE INSTALLED PRIOR TO LAND CLEARING... 6. NO EXCAVATION OR COMPACTION OF EARTH OR OTHER POTENTIALLY DAMAGING ACTIVITIES ALLOWED WITHIN THE PROTECTION FENCING... 7. WORK WITHIN PROTECTION FENCE SHALL BE DONE MANUALLY... 8. WITHIN CLEARING/GRADING LIMITS OR AT THE EDGE OF THE CLEARING/GRADING LIMITS, TREE PROTECTION MAY BE INSTALLED AROUND GROUPS OF TREES... 9. DURING WORK, ANY ROOTS GREATER THAN TWO INCHES FOUND DURING EXCAVATION SHALL BE CLEANLY CUT... 10. AFTER CONSTRUCTION IS COMPLETE, PROJECT ARBORIST SHALL VERIFY TREE PROTECTION FENCING CAN BE REMOVED.



E:\2020\A20120.10 - Woodgroves - LA\CAD\Sheets\A20120.20.dwg - May 18, 2022 - 3:49 PM - itong

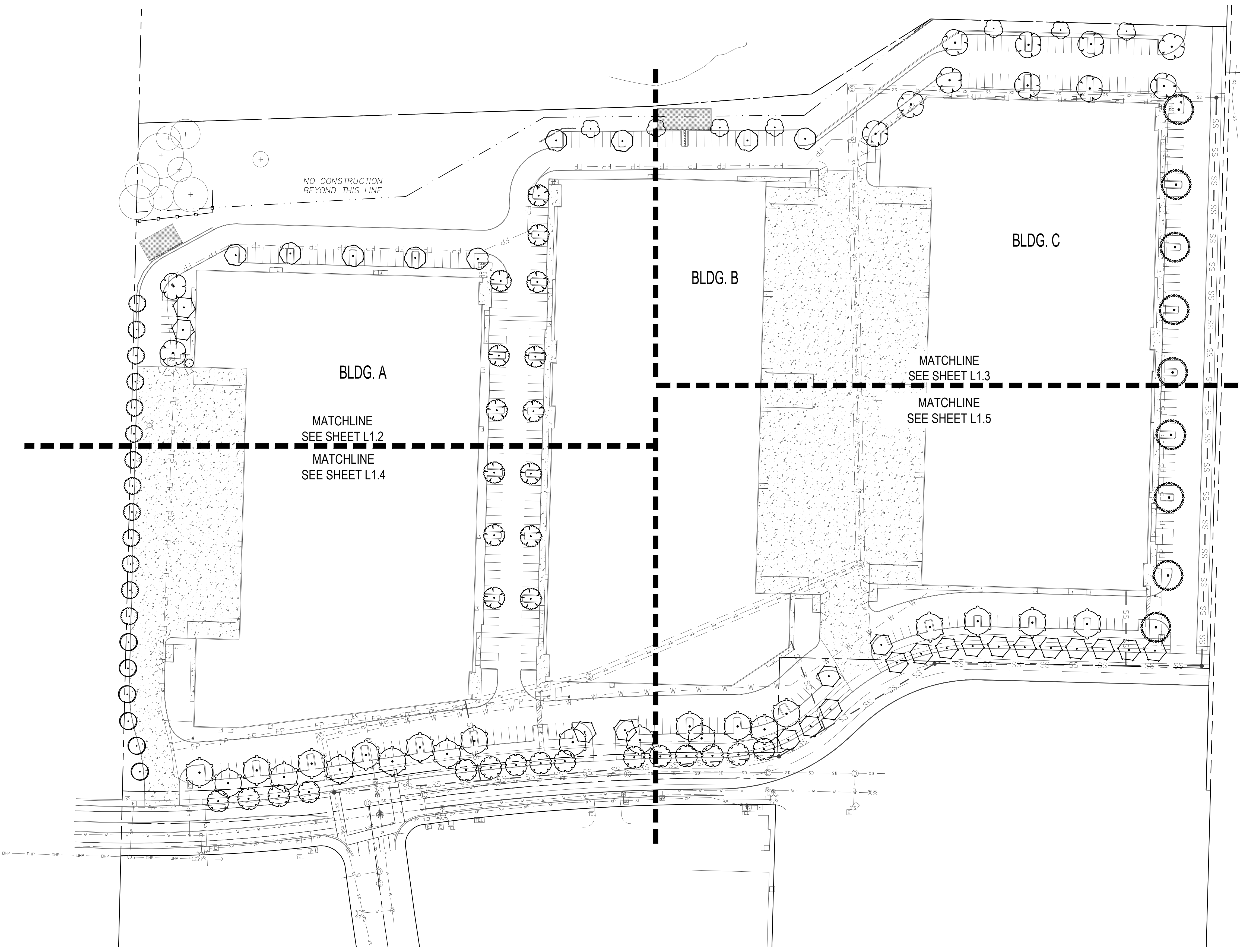
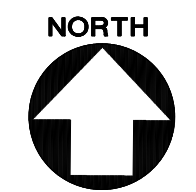
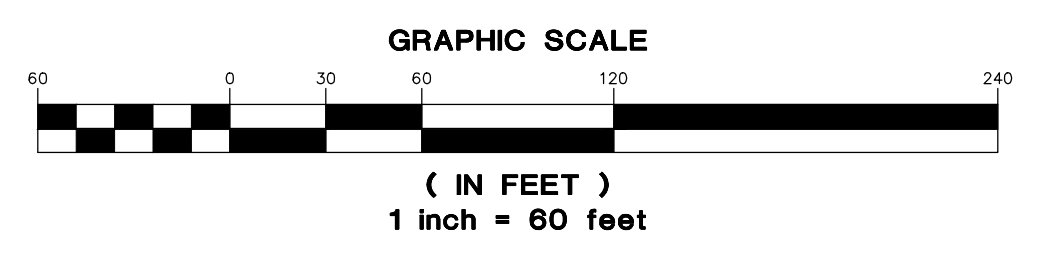
LANDSCAPE REQUIREMENTS

TOTAL SITE AREA	= 914,700 SF
LANDSCAPE AREA REQUIRED 15% OF SITE	= 135,610 SF
LANDSCAPE AREA PROPOSED 16.2% OF SITE	= 147,915 SF
INTERIOR PKG. LOT LANDSCAPING REQ.	= 25 SF PER PKG. SPACE
PKG. LOT TREES REQ.	= 1 TREE PER 4 PKG. SPACE
PKG. SPACES = 335	
PKG. LOT LANDSCAPING REQ.	= 8,375 SF
PKG. LOT LANDSCAPING PROVIDED	= 17,748 SF
PKG. LOT TREES REQ.	= 84
PKG. LOT TREES PROVIDED	= 86



PLANT SCHEDULE

TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	AF	28	ACER RUBRUM 'FRANKSRED'™ MEDIUM	RED SUNSET MAPLE	1.5' CAL.
	CB	14	CARPINUS BETULUS	EUROPEAN HORNBEECH	1.5' CAL.
	CO	14	CELTIS OCCIDENTALIS LARGE	COMMON HACKBERRY	1.5' CAL.
	GI	12	GLEDITSIA TRIACANTHOS INERMIS 'TRUESHADE' SMALL	THORNLESS HONEY LOCUST	1.5' CAL.
	HM	6	HALESIA MONTRICOLA SMALL	SNOWDROP TREE	1.5' CAL.
	NH	13	NYSSA SYLVATICA 'HAYMAN'S RED' MEDIUM	RED RAGE TUPELO	1.5' CAL.
	PT3	15	POPULUS TREMULOIDES	QUAKING ASPEN	1.5' CAL.
	QR	15	QUERCUS RUBRA LARGE	RED OAK	1.5' CAL.
	RP2	18	RHAMNUS PURSHIANA	CASCARA	1.5' CAL.
	UC	11	ULMUS X 'FRONTIER' MEDIUM	AMERICAN ELM	1.5' CAL.
	ZV	22	ZELKOVA SERRATA 'VILLAGE GREEN' LARGE	SAWLEAF ZELKOVA	1.5' CAL.
EVERGREEN TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	CL	1	X CUPRESSOCYPARIS LEYLANDII LARGE	LEYLANDI CYPRESS	5' HT.



SHEET TITLE
ENLARGED
LANDSCAPE
PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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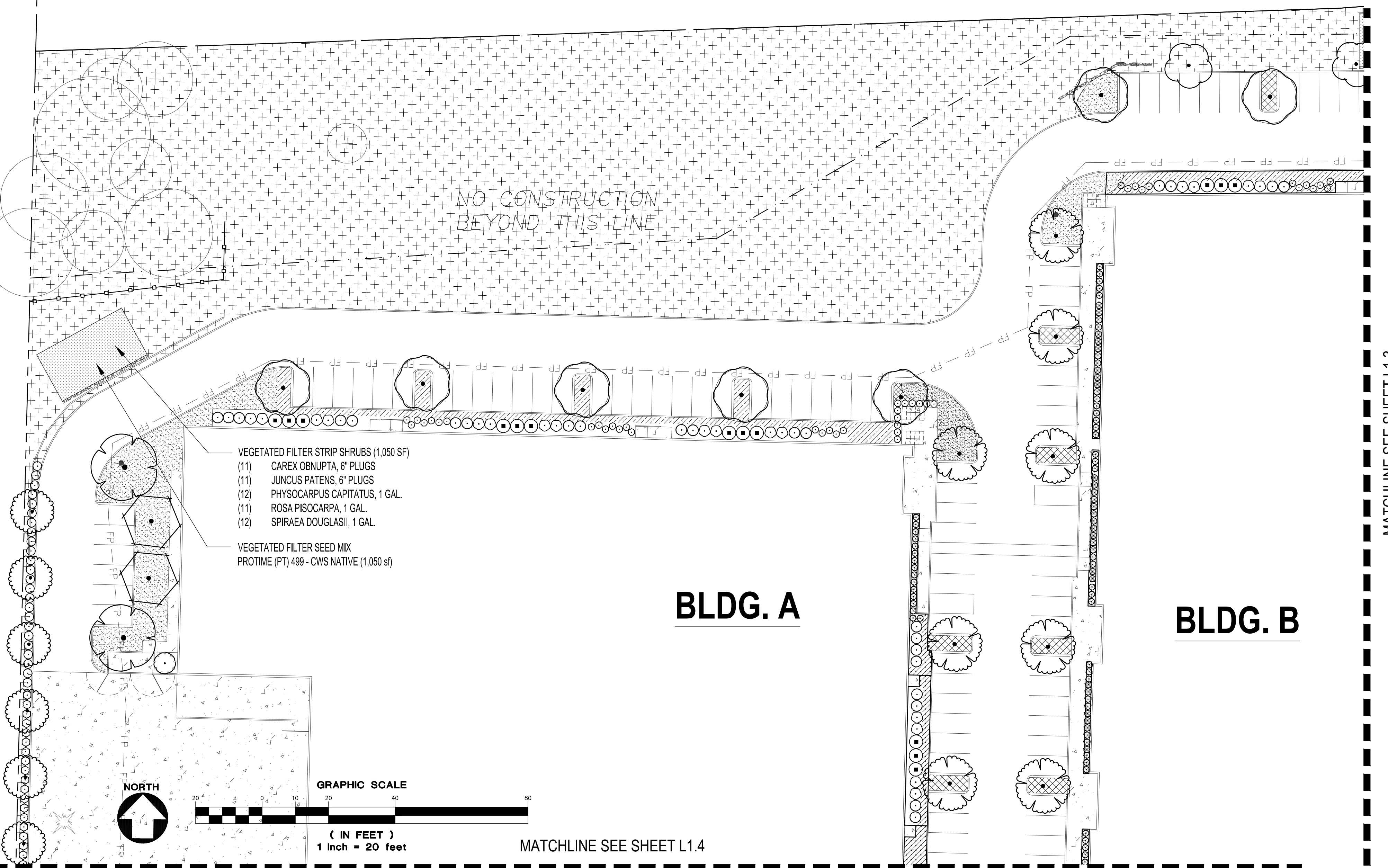
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SHEET NUMBER

L1.2

JOB NUMBER: A20120.10

TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	AF	28	ACER RUBRUM 'FRANKSRED' TM MEDIUM	RED SUNSET MAPLE	1.5" CAL.
	CB	14	CARPINUS BETULUS	EUROPEAN HORNBAM	1.5" CAL.
	CO	14	CELTIS OCCIDENTALIS LARGE	COMMON HACKBERRY	1.5" CAL.
	GI	12	GLEDITSIA TRIACANTHOS INERMIS 'TRUESHADE' SMALL	THORNLESS HONEY LOCUST	1.5" CAL.
	HM	6	HALESIA MONTRICOLA SMALL	SNOWDROP TREE	1.5" CAL.
	NH	13	NYSSA SYLVATICA 'HAYMAN'S RED' MEDIUM	RED RAGE TUPELO	1.5" CAL.
	PT3	15	POPULUS TREMULOIDES	QUAKING ASPEN	1.5" CAL.
	QR	15	QUERCUS RUBRA LARGE	RED OAK	1.5" CAL.
	RP2	18	RHAMNUS PURSHIANA	CASCARA	1.5" CAL.
	UC	11	ULMUS X 'FRONTIER' MEDIUM	AMERICAN ELM	1.5" CAL.
	ZV	22	ZELKOVA SERRATA 'VILLAGE GREEN' LARGE	SAWLEAF ZELKOVA	1.5" CAL.
EVERGREEN TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	CL	1	X CUPRESSOCYPARIS LEYLANDII LARGE	LEYLANDII CYPRESS	5' HT.
SHRUBS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	AE	79	ABELIA X GRANDIFLORA 'EDWARD GOUCHER'	GLOSSY ABELIA	1 GAL. 60" o.c.
	AC2	18	ARBUTUS UNEDO 'COMPACTA'	DWARF STRAWBERRY TREE	1 GAL. 120" o.c.
	CF	61	CEANOTHUS THYRSIFLORUS 'VICTORIA'	VICTORIA CEANOTHUS	1 GAL. 60" o.c.
	CT	52	CHOISYA TERNATA	MEXICAN ORANGE	1 GAL. 60" o.c.
	GS	227	GAULTHERIA SHALLON	SALAL	1 GAL. 48" o.c.
	MA	204	MAHONIA AQUIFOLIUM	OREGON GRAPE	1 GAL. 48" o.c.
	NA	66	NANDINA DOMESTICA 'FIRE POWER'	DWARF NANDINA	1 GAL. 36" o.c.
	NS	167	NANDINA DOMESTICA 'GULF STREAM'	HEAVENLY BAMBOO	1 GAL. 36" o.c.
	PA	112	PENNISETUM ALOPECUROIDES	FOUNTAIN GRASS	1 GAL. 36" o.c.
	PV	46	PIERIS JAPONICA 'VALLEY ROSE'	VALLEY ROSE JAPANESE PIERIS	1 GAL. 60" o.c.
	PL	136	PRUNUS LAUROCERASUS 'MOUNT VERNON'	MOUNT VERNON ENGLISH LAUREL	1 GAL. 36" o.c.
	RR	33	RHODODENDRON X 'JEAN MARIE DE MONTAGUE'	JEAN MARIE DE MONTAGUE RHODODENDRON	1 GAL. 72" o.c.
	RS	43	RIBES SANGUINEUM	RED FLOWERING CURRANT	1 GAL. 60" o.c.
	RG	65	ROSA GYMNOCARPA	DWARF ROSE	1 GAL. 48" o.c.
	VO	102	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	1 GAL. 48" o.c.
	VS	62	VIBURNUM TINUS 'SPRING BOUQUET'	SPRING BOUQUET LAURESTINUS	1 GAL. 60" o.c.
GROUND COVERS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE
	CD	1,017	COTONEASTER DAMMERI	BEARBERRY COTONEASTER	4" POT 24" o.c.
	FL	5,763	FRAGARIA CHILDENSIS 'LIPSTICK'	BEACH STRAWBERRY	1 GAL. 18" o.c.
	MR	1,148	MAHONIA REPENS	CREEPRNG MAHONIA	1 GAL. 24" o.c.
	RE2	191	RUBUS CALYCOIDES 'EMERALD CARPET'	EMERALD CARPET CREEPING RASPBERRY	1 GAL. 24" o.c.
		27,050 SF	LAWN		



LEGEND - CONT.



Walgreave

Botanical Name	Common Name	Minimum plant size	List by Planting Zone	
			Zone A (VC)	Zone B (wetland)
TREES				
<i>Acer circinatum</i>	Vine maple	2'	X	
<i>Acer macrophyllum</i>	Big leaf maple	3'	X	
<i>Crataegus douglasii</i>	Douglas hawthorn	2'	X	X
<i>Fragaria purshiana</i>	Cascara	2'	X	
<i>Fraxinus latifolia</i>	Oregon ash	3'		X
<i>Malus fusca</i>	Pacific crabapple	2'		X
<i>Pseudotsuga menziesii</i>	Douglas fir	3'	X	
<i>Thuja plicata</i>	Western red cedar	2'	X	
SHRUBS				
<i>Amelanchier alnifolia</i>	Serviceberry	2'	X	
<i>Cornus sericea</i>	Red-osier dogwood	2'		X
<i>Mahonia aquifolium</i>	Tall Oregon grape	6'	X	X
<i>Oemeria cerasiformis</i>	Indian plum	2'	X	
<i>Physocarpus capitatus</i>	Pacific ninebark	2'		X
<i>Polystichum munitum</i>	Sword fern	2 gallon	X	
<i>Rosa nutkana</i>	Nootka rose	1.5'	X	X
<i>Salix sitchensis</i>	Sitka willow	3'		X
<i>Spiraea douglasii</i>	Douglas' spirea	1.5'		X
<i>Symphoricarpos albus</i>	Snowberry	1.5'	X	
HERBACEOUS				
<i>Agrostis exarata</i>	Spike bentgrass	Broadcast seed	in all areas of disturbed soil or bare areas greater than 25 sq ft in size following invasive species removal	
<i>Elymus glaucus</i>	Blue wild-rye			
<i>Bromus carinatus</i>	California brome			

Plant both zones at 100% CWS standard densities: Trees = sq ft X 0.01; Shrubs = sq ft X 0.05

PLANTING NOTES

- ALL CONSTRUCTION SHALL BE PERFORMED IN ACCORDANCE WITH CURRENT CITY OF TUALATIN STANDARDS AND THE OREGON STRUCTURAL SPECIALTY CODE.
- CONTRACTOR SHALL CONTACT LANDSCAPE ARCHITECT AT LEAST TWO WEEKS PRIOR TO START OF LANDSCAPE WORK TO REVIEW PLANT SUBSTITUTIONS & JURISDICTIONAL REQUIREMENTS.
- SUBSTITUTIONS WILL NOT BE ACCEPTED UNLESS SPECIFICALLY ACCEPTED IN WRITING BY THE OWNER OR OWNER'S REPRESENTATIVE.
- VERIFY ALL EXISTING CONDITIONS, INCLUDING LOCATION OF PROPERTY LINES, PRIOR TO BEGINNING ANY WORK. REPORT ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE IMMEDIATELY. DO NOT WILLFULLY PROCEED WITH CONSTRUCTION WHEN UNKNOWN OBSTRUCTIONS AND/OR DIFFERENCES EXIST THAT MAY NOT HAVE BEEN KNOWN DURING DESIGN. IMMEDIATELY NOTIFY OWNER'S REPRESENTATIVE OF UNKNOWN OBSTRUCTIONS AND/OR DIFFERENCES. PRIOR TO REMOVING ANY EXISTING FEATURES, REVIEW AND CONFIRM EXTENT OF DEMOLITION WITH OWNERS REPRESENTATIVE.
- PROTECT EXISTING ITEMS TO REMAIN DURING CONSTRUCTION. ANY DAMAGE TO EXISTING ITEMS DESIGNATED TO REMAIN I.E. CURBS, WALKS, PLANT MATERIAL, LAWN OR FENCES SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
- VERIFY THE LOCATION OF ALL UNDERGROUND UTILITIES, LINES, PIPES, VAULTS, OR BOXES PRIOR TO EXCAVATION. MARK AND PROTECT ALL UTILITIES. SITE FEATURES AND VEGETATION TO REMAIN IN PLACE. ANY DAMAGE TO ANY KNOWN EXISTING UTILITY ELEMENTS SHALL BE REPAIRED PROPERLY AND IMMEDIATELY.
- REMOVE FROM THE SITE AND LEGALLY DISPOSE OF ALL DEBRIS AND EXCAVATED MATERIAL NOT REQUIRED FOR FILL. NO RUBBISH OR DEBRIS SHALL BE BURIED ON THE SITE.
- MAINTAIN ALL ROADWAYS AND PAVED PATHWAYS CLEAN AND FREE OF CONSTRUCTION MATERIALS AND DEBRIS, PROVIDING NECESSARY DUST CONTROL WHERE REQUIRED.
- COORDINATE AND SCHEDULE ALL WORK WITH THE OWNERS REPRESENTATIVE.
- INSTALL EROSION CONTROL SYSTEMS IN ACCORDANCE WITH CITY OF XXXXXXXX STANDARDS PRIOR TO SITE WORK AND LANDSCAPE INSTALLATION.
- CONTRACTOR SHALL PROVIDE TOPSOIL, SOIL AMENDMENTS, AND EROSION CONTROL.
- CONTRACTOR SHALL SUBMIT IDENTIFIED TOPSOIL ANALYSIS REPORT FOR OWNER'S APPROVAL PRIOR TO FINAL INSTALLATION. SEE SPECS.
- CONTRACTOR IS RESPONSIBLE FOR ANY AMENDMENTS TO SOIL PH FERTILITY AND/OR DRAINAGE CONDITIONS NECESSARY TO ENSURE PROPER GROWING CONDITIONS FOR PROPOSED PLANTINGS. SEE

- SPECS.
- CONTRACTOR SHALL FOLLOW PROVIDER'S INSTRUCTIONS AND RECOMMENDATIONS FOR SEEDING.
- ALL PLANTS SHALL BE IRRIGATED BY A FULLY AUTOMATED, PERMANENT IRRIGATION SYSTEM UNLESS OTHERWISE NOTED. SEE SPECS.
- PRIOR TO FINAL ACCEPTANCE, CONTRACTOR SHALL PROVIDE OWNER WITH AS-BUILT PLANS OF THE INSTALLATION, COPIES OF ALL OPERATION MANUALS AND WARRANTY DOCUMENTS.
- ALL NEW PLANTS IN LANDSCAPE AREAS SHALL BE WARRANTED FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE.
- COORDINATE INSTALLATION PLANTING MATERIALS WITH IRRIGATION. PLANT ONLY IN AREAS WHERE THE IRRIGATION SYSTEM IS COMPLETE AND FULLY OPERATIONAL.

- PLANT HEALTH AND REPLACEMENT**
- PROVIDE PLANT MATERIAL THAT IS HEALTHY NURSERY STOCK, WELL BRANCHED, AND FULL FOLIATED, WHEN IN LEAF, AND FREE FROM DISEASE, INJURY, INSECTS, WEEDS AND WEED ROOTS.
 - PLANT MATERIALS NOT MEETING SPECIFICATION REQUIREMENTS WILL BE REJECTED.

- INITIAL INSPECTION OF PLANT MATERIAL**
- ASSEMBLE ALL PLANTS FOR EACH INSPECTION AT ONE LOCATION FOR INSPECTION TO BE COMPLETED IN ONE VISIT. ANY FURTHER INSPECTION REQUIRED DUE TO PLANTS BEING UNAVAILABLE, REJECTED, AND OR NOT MEETING SPECIFICATIONS SHALL BE CHARGED TO THE CONTRACTOR AT THE CURRENT HOURLY RATE FOR THE LANDSCAPE ARCHITECT PERFORMING THE INSPECTION.
 - OWNER RETAINS RIGHT TO OBSERVE TREES AND SHRUBS FURTHER FOR SIZE AND CONDITION OF BALLS AND ROOT SYSTEMS, INSECTS, INJURIES, AND LATENT DEFECTS AND TO REJECT UNSATISFACTORY OR DEFECTIVE MATERIAL AT ANY TIME DURING PROGRESS OF WORK.
 - REMOVE REJECTED TREES OR SHRUBS FROM PROJECT SITE WITHIN 24 HOURS.
 - REPLACE PLANT MATERIALS REJECTED BY OWNER AT NO ADDITIONAL EXPENSE TO OWNER.

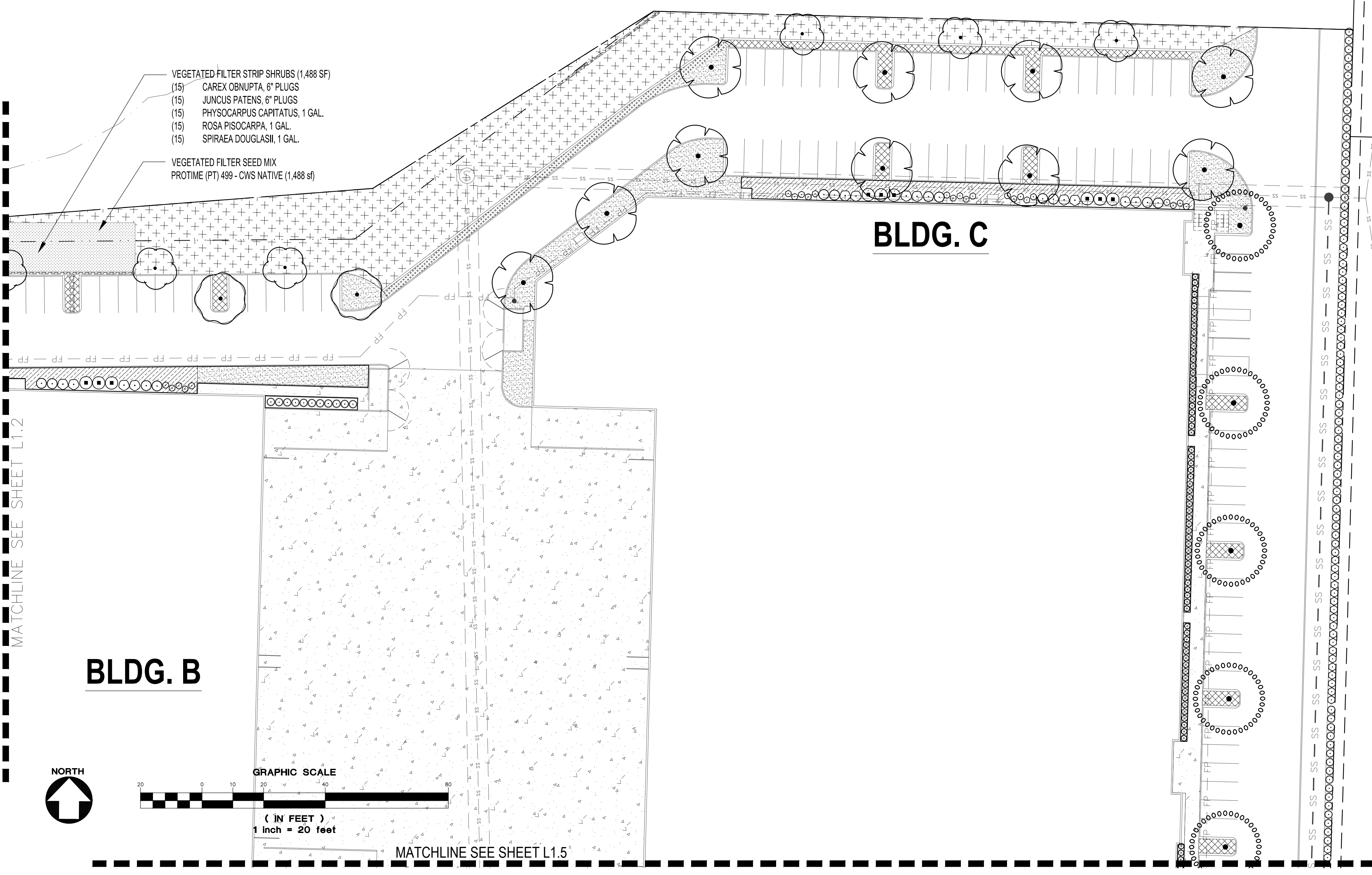
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- ALL PLANTS SHALL BE INSTALLED ACCORDING TO AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1) AS WELL AS DETAIL DRAWINGS AND SPECIFICATIONS.
 - LAYOUT OF MAJOR PLANTING AREAS AS INDICATED IN THE DRAWINGS

- ARE APPROXIMATE ONLY; OUTLINE IN THE FIELD LOCATIONS AND IDENTITY OF ALL TREES, SHRUBS AND GROUND COVERS, SUBJECT TO REVIEW AND APPROVAL.
- INSPECTION: NOTIFY THE OWNER 48 HOURS PRIOR TO BEGINNING PLANTING. THE OWNER MAY ADJUST PLANT MATERIAL LOCATION TO MEET FIELD CONDITIONS.
 - DO NOT COMMENCE WITH PLANTING UNTIL OWNER HAS APPROVED THE LOCATION AND LAYOUT OF ALL PLANT BEDS.
 - IF WORK IS NOT PROMPTLY OR PROPERLY PERFORMED BY THE CONTRACTOR, THE OWNER WILL, AT THEIR DISCRETION, HAVE THE WORK PERFORMED BY OTHERS. THE COST OF THE WORK BY OTHERS WILL BE DEDUCTED FROM THE CONTRACT AMOUNT.
 - MULCH ALL SHRUBS AND GROUND COVER PLANTING BEDS WITH A 2 INCH LAYER OF IMPORTED MULCH MATERIAL WITHIN 2 DAYS AFTER PLANTING.
 - COVER ENTIRE BED AREAS; APPLY EVENLY.

- EDGING INSTALLATION**
- SHOVEL-CUT EDGING: SEPARATE MULCHED AREAS FROM TURF AREAS, CURBS, AND PAVING WITH A 45 DEGREE, 4 TO 6 INCH DEEP, SHOVEL-CUT EDGE.
- MAINTENANCE**
- MAINTAIN LANDSCAPE PLANTINGS FROM INSTALLATION UNTIL FINAL ACCEPTANCE.
 - KEEP ALL LANDSCAPE AREAS CLEAN AND WEED FREE. KEEP ALL BUILDINGS, PAVEMENTS, AND OTHER EXTERIOR IMPROVEMENTS CLEAN AND FREE OF SOIL AND DEBRIS.
 - WEED ALL BEDS WEEKLY.
 - APPLY A 2 INCH LAYER OF MULCH MATERIAL TO SAUCER AREAS OF TREES AND SHRUBS LOCATED OUTSIDE OF PLANTING BEDS. PLACE MULCH NO CLOSER THAN 4 INCHES FROM TRUNKS OF WOODY PLANT MATERIAL AND AWAY FROM THE CROWNS OF HERBACEOUS PLANTS.

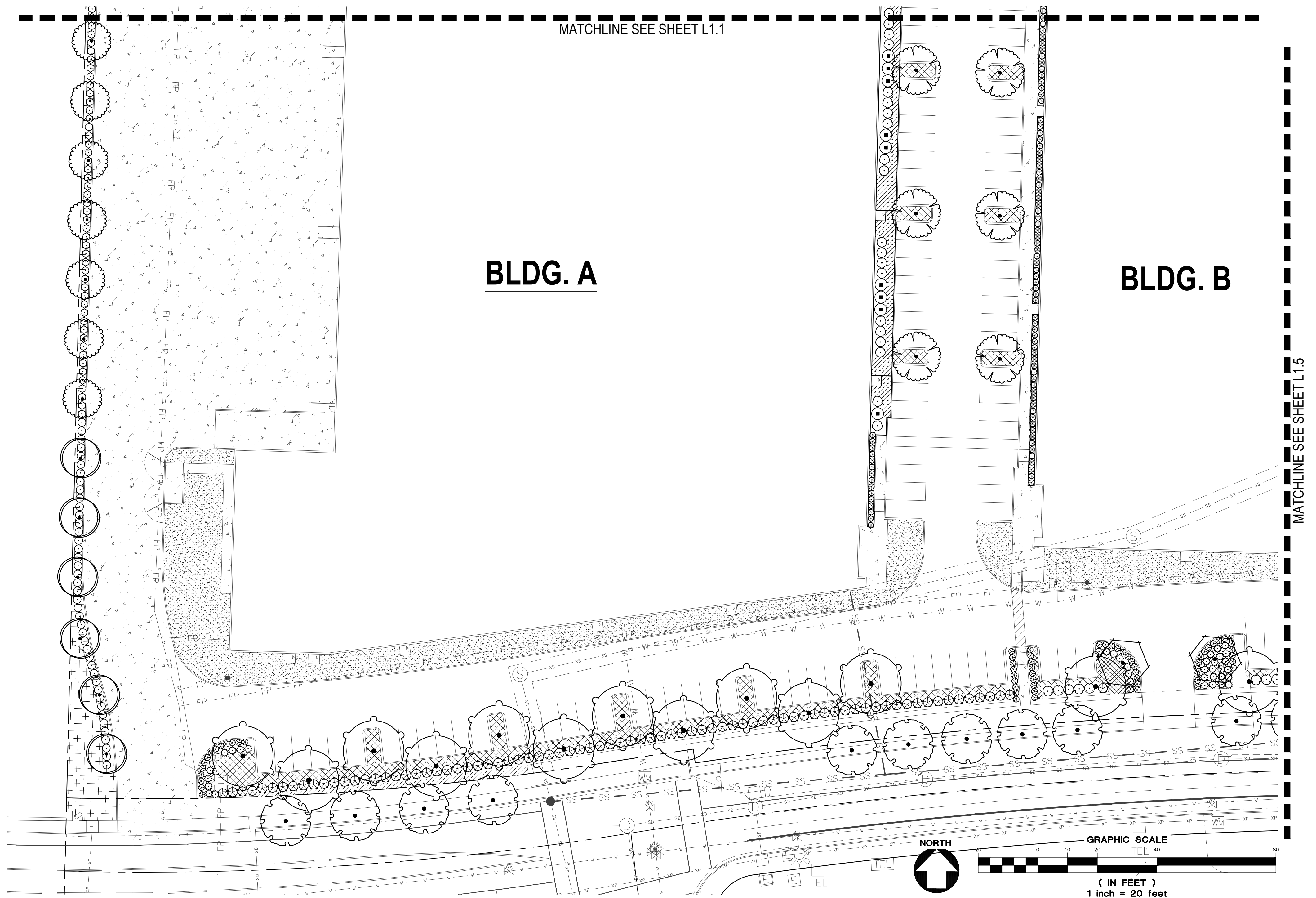
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		27,050 SF	LAWN			



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- SHOVEL-CUT EDGING: SEPARATE MULCHED AREAS FROM TURF AREAS, CURBS, AND PAVING WITH A 45 DEGREE, 4 TO 6 INCH DEEP, SHOVEL-CUT EDGE.
- MAINTENANCE**
- MAINTAIN LANDSCAPE PLANTINGS FROM INSTALLATION UNTIL FINAL ACCEPTANCE.
 - MAINTAIN TREES, SHRUBS, AND GROUND COVER BY TRIMMING, PRUNING, CULTIVATING, WATERING, WEEDING, FERTILIZING, RESTORING PLANTING SAUCERS, TIGHTENING AND REPAIRING STAKES AND GUY SUPPORTS, AND RESETTING TO PROPER GRADES OR VERTICAL POSITION, AS REQUIRED TO ESTABLISH HEALTHY, VIABLE PLANTINGS.
 - WATER TREES BY DEEP ROOT WATERING METHOD.
- WEEDING AND CLEANUP**
- KEEP ALL LANDSCAPE AREAS CLEAN AND WEED FREE. KEEP ALL BUILDINGS, PAVEMENTS, AND OTHER EXTERIOR IMPROVEMENTS CLEAN AND FREE OF SOIL AND DEBRIS.
 - WEED ALL BEDS WEEKLY.
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PLANT SCHEDULE						
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NH	13	NYSSA SYLVATICA 'HAYMAN'S RED' MEDIUM	RED RAGE TUPELO	1.5' CAL.		
PT3	15	POPULUS TREMULOIDES	QUAKING ASPEN	1.5' CAL.		
QR	15	QUERCUS RUBRA LARGE	RED OAK	1.5' CAL.		
RP2	18	RHAMNUS PURSHIANA	CASCARA	1.5' CAL.		
UC	11	ULMUS X 'FRONTIER' MEDIUM	AMERICAN ELM	1.5' CAL.		
ZV	22	ZELKOYA SERRATA 'VILLAGE GREEN' LARGE	SAWLEAF ZELKOYA	1.5' CAL.		
EVERGREEN TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
CL	1	X CUPRESSOCYPARIS LEYLANDII LARGE	LEYLANDII CYPRESS	5' HT.		
SHRUBS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
AE	79	ABELIA X GRANDIFLORA 'EDWARD GOUCHER'	GLOSSY ABELIA	1 GAL	60" o.c.	
AC2	18	ARBUTUS UNEDO 'COMPACTA'	DWARF STRAWBERRY TREE	1 GAL	120" o.c.	
CF	81	CEANOTHUS THYRSIFLORUS 'VICTORIA'	VICTORIA CEANOTHUS	1 GAL	60" o.c.	
CT	52	CHOISYA TERNATA	MEXICAN ORANGE	1 GAL	60" o.c.	
GS	227	GAULTHERIA SHALLOW	SALAL	1 GAL	48" o.c.	
MA	204	MAHONIA AQUIFOLIUM	OREGON GRAPE	1 GAL	48" o.c.	
NA	66	NANDINA DOMESTICA 'FIRE POWER'	DWARF NANDINA	1 GAL	36" o.c.	
NS	167	NANDINA DOMESTICA 'GULF STREAM'	HEAVENLY BAMBOO	1 GAL	36" o.c.	
PA	112	PENNISETUM ALOPECUROIDES	FOUNTAIN GRASS	1 GAL	36" o.c.	
PV	46	PIERIS JAPONICA 'VALLEY ROSE'	VALLEY ROSE JAPANESE PIERIS	1 GAL	60" o.c.	
PL	136	PRUNUS LAUROCERASUS 'MOUNT VERNON'	MOUNT VERNON ENGLISH LAUREL	1 GAL	36" o.c.	
RR	33	RHODODENDRON X 'JEAN MARIE DE MONTAGUE'	JEAN MARIE DE MONTAGUE RHODODENDRON	1 GAL	72" o.c.	
RS	43	RIBES SANGUINEUM	RED FLOWERING CURRANT	1 GAL	60" o.c.	
RG	65	ROSA GYMNOCARPA	DWARF ROSE	1 GAL	48" o.c.	
VO	102	VACCINIUM OVATUM	EVERGREEN HUCKLEBERRY	1 GAL	48" o.c.	
VS	62	VIBURNUM TINUS 'SPRING BOUQUET'	SPRING BOUQUET LAURESTINUS	1 GAL	60" o.c.	
GROUND COVERS	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	SPACING
CD	1,017	COTONEASTER DAMMERI	BEARBERRY COTONEASTER	4" POT	24" o.c.	
FL	5,763	FRAGARIA CHILOENSIS 'LIPSTICK'	BEACH STRAWBERRY	1 GAL	18" o.c.	
MR	1,148	MAHONIA REPENS	CREeping MAHONIA	1 GAL	24" o.c.	
RE2	191	RUBUS CALYNOIDES 'EMERALD CARPET'	EMERALD CARPET CREEPING RASPBERRY	1 GAL	24" o.c.	
		27,050 SF	LAWN			

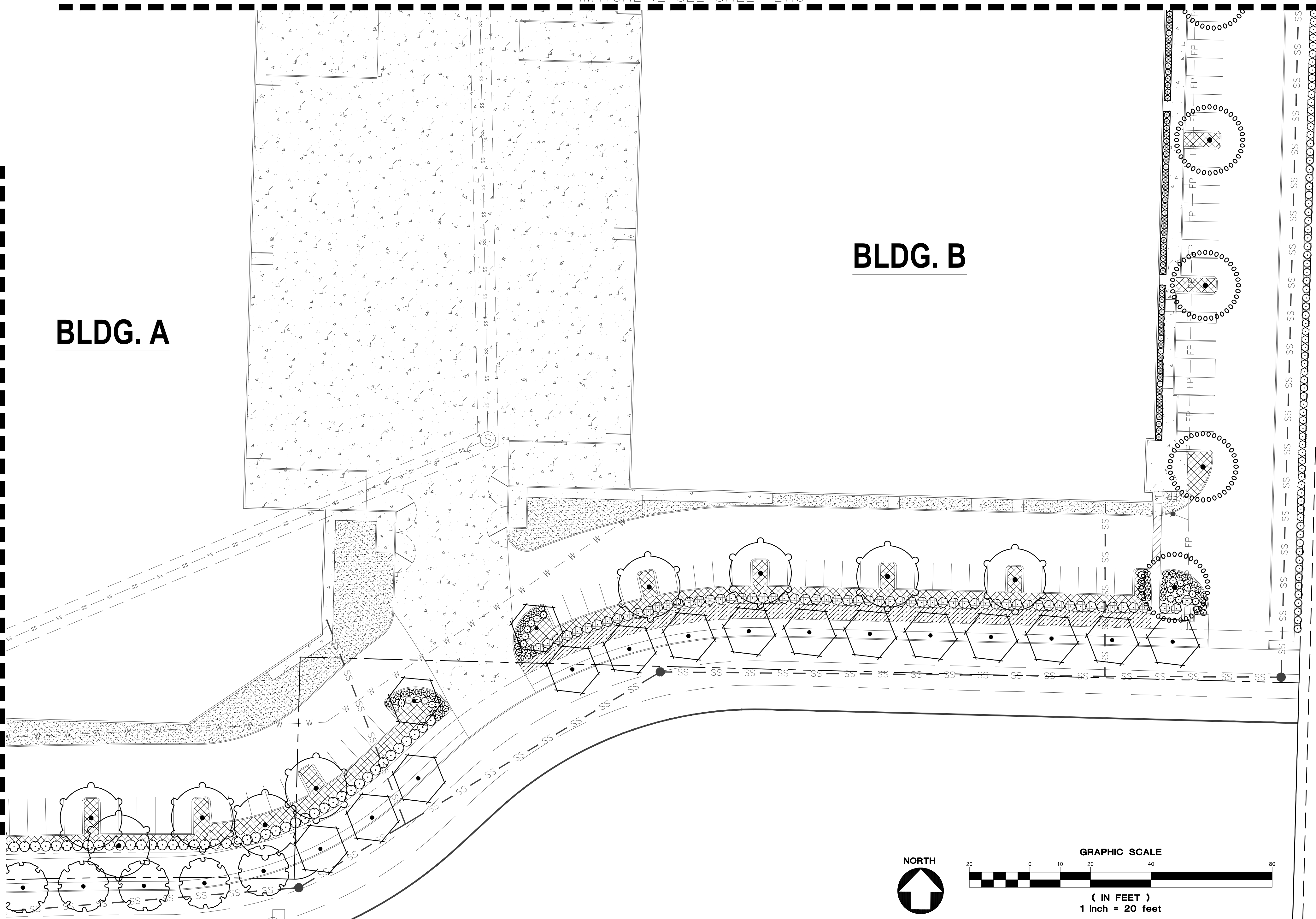
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 - VERIFY ALL EXISTING CONDITIONS, INCLUDING LOCATION OF PROPERTY LINES. PRIOR TO BEGINNING ANY WORK, REPORT ANY DISCREPANCIES TO THE OWNER'S REPRESENTATIVE IMMEDIATELY. DO NOT WILLFULLY PROCEED WITH CONSTRUCTION WHEN UNKNOWN OBSTRUCTIONS AND/OR DIFFERENCES EXIST THAT MAY NOT HAVE BEEN KNOWN DURING DESIGN. IMMEDIATELY NOTIFY OWNER'S REPRESENTATIVE OF UNKNOWN OBSTRUCTIONS AND/OR DIFFERENCES. PRIOR TO REMOVING ANY EXISTING FEATURES, REVIEW AND CONFIRM EXTENT OF DEMOLITION WITH OWNER'S REPRESENTATIVE. PROTECT EXISTING ITEMS TO REMAIN DURING CONSTRUCTION. ANY DAMAGE TO EXISTING ITEMS DESIGNATED TO REMAIN I.E. CURBS, WALKS, PLANT MATERIAL, LAWN OR FENCES SHALL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO THE OWNER.
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 - COORDINATE AND SCHEDULE ALL WORK WITH THE OWNER'S REPRESENTATIVE.
 - INSTALL EROSION CONTROL SYSTEMS IN ACCORDANCE WITH CITY OF XXXXXXXX STANDARDS PRIOR TO SITE WORK AND LANDSCAPE INSTALLATION.
 - CONTRACTOR SHALL PROVIDE TOPSOIL, SOIL AMENDMENTS, AND EROSION CONTROL.
 - CONTRACTOR SHALL SUBMIT CERTIFIED TOPSOIL ANALYSIS REPORT FOR OWNER'S APPROVAL PRIOR TO PLANT INSTALLATION. SEE SPECS.
 - CONTRACTOR IS RESPONSIBLE FOR ANY AMENDMENTS TO SOIL PH FERTILITY AND/OR DRAINAGE CONDITIONS NECESSARY TO ENSURE PROPER GROWING CONDITIONS FOR PROPOSED PLANTINGS. SEE SPECS.
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 - COORDINATE INSTALLATION PLANTING MATERIALS WITH IRRIGATION. PLANT ONLY IN AREAS WHERE THE IRRIGATION SYSTEM IS COMPLETE AND FULLY OPERATIONAL.
- PLANT HEALTH AND REPLACEMENT**
- PROVIDE PLANT MATERIAL THAT IS HEALTHY NURSERY STOCK, WELL BRANCHED, AND FULL FOLIATED WHEN IN LEAF, AND FREE FROM DISEASE, INJURY, INSECTS, WEEDS AND WEED ROOTS.
 - PLANT MATERIALS NOT MEETING SPECIFICATION REQUIREMENTS WILL BE REJECTED.
- INITIAL INSPECTION OF PLANT MATERIAL**
- ASSEMBLE ALL PLANTS FOR EACH INSPECTION AT ONE LOCATION FOR INSPECTION TO BE COMPLETED IN ONE VISIT. ANY FURTHER INSPECTION REQUIRED DUE TO PLANTS BEING UNAVAILABLE, REJECTED, AND OR NOT MEETING SPECIFICATIONS SHALL BE CHARGED TO THE CONTRACTOR AT THE CURRENT HOURLY RATE FOR THE LANDSCAPE ARCHITECT PERFORMING THE INSPECTION.
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 - REMOVE REJECTED TREES OR SHRUBS FROM PROJECT SITE WITHIN 24 HOURS.
 - REPLACE PLANT MATERIALS REJECTED BY OWNER AT NO ADDITIONAL EXPENSE TO OWNER.
- PLANT LAYOUT AND INSPECTION**
- ALL PLANTS SHALL BE INSTALLED ACCORDING TO AMERICAN STANDARD FOR NURSERY STOCK (ANSI Z60.1) AS WELL AS DETAIL DRAWINGS AND SPECIFICATIONS.
 - LAYOUT OF MAJOR PLANTING AREAS AS INDICATED IN THE DRAWINGS ARE APPROXIMATE ONLY; OUTLINE IN THE FIELD LOCATIONS AND IDENTITY OF ALL TREES, SHRUBS AND GROUND COVERS, SUBJECT TO

- REVIEW AND APPROVAL.
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 - MULCH ALL SHRUBS AND GROUND COVER PLANTING BEDS WITH A 2 INCH LAYER OF IMPORTED MULCH MATERIAL WITHIN 2 DAYS AFTER PLANTING.
 - COVER ENTIRE BED AREAS; APPLY EVENLY.
- EDGING INSTALLATION**
- SHOVEL-CUT EDGING: SEPARATE MULCHED AREAS FROM TURF AREAS, CURBS, AND PAVING WITH A 45 DEGREE, 4 TO 6 INCH DEEP, SHOVEL-CUT EDGE.
- MAINTENANCE**
1. MAINTAIN LANDSCAPE PLANTINGS FROM INSTALLATION UNTIL FINAL ACCEPTANCE.
 - MAINTAIN TREES, SHRUBS, AND GROUND COVER BY TRIMMING, PRUNING, CULTIVATING, WATERING, WEEDING, FERTILIZING, RESTORING PLANTING SAUCERS, TIGHTENING AND REPAIRING STAKES AND GUY SUPPORTS, AND RESETTING TO PROPER GRADES OR VERTICAL POSITION, AS REQUIRED TO ESTABLISH HEALTHY, VIABLE PLANTINGS.
 - WATER TREES BY DEEP ROOT WATERING METHOD.
- WEEDING AND CLEANUP**
- KEEP ALL LANDSCAPE AREAS CLEAN AND WEED FREE. KEEP ALL BUILDINGS, PAVEMENTS, AND OTHER EXTERIOR IMPROVEMENTS CLEAN AND FREE OF SOIL AND DEBRIS.
 - WEED ALL BEDS WEEKLY.
 - APPLY A 2 INCH LAYER OF MULCH MATERIAL TO SAUCER AREAS OF TREES AND SHRUBS LOCATED OUTSIDE OF PLANTING BEDS. PLACE MULCH NO CLOSER THAN 4 INCHES FROM TRUNKS OF WOODY PLANT MATERIAL AND AWAY FROM THE CROWNS OF HERBACEOUS PLANTS.

MATCHLINE SEE SHEET L1.3

MATCHLINE SEE SHEET L1.4

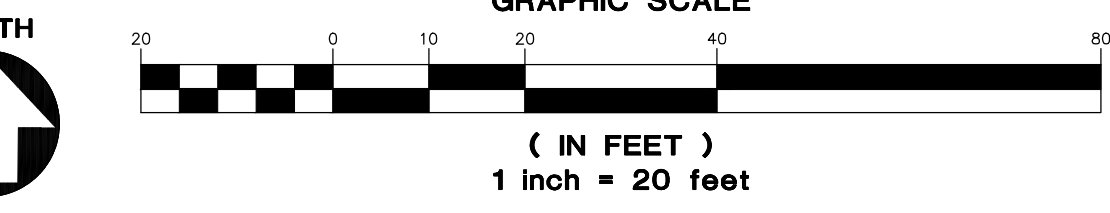


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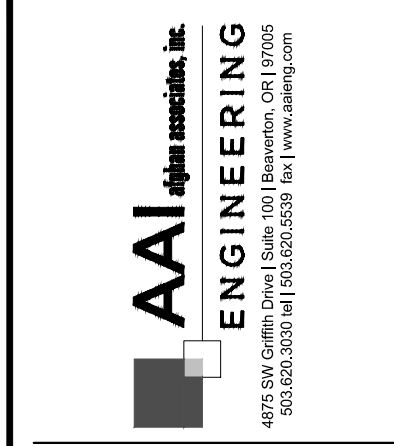
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PLANT SCHEDULE						
TREES	CODE	QTY	BOTANICAL NAME	COMMON NAME	SIZE	
	AF	28	ACER RUBRUM 'FRANKSRED' TM MEDIUM	RED SUNSET MAPLE	1.5' CAL.	
	CB	14	CARPINUS BETULUS	EUROPEAN HORNBAM	1.5' CAL.	
	CO	14	CELTIS OCCIDENTALIS LARGE	COMMON HACKBERRY	1.5' CAL.	
	GI	12	GLEDITSIA TRIACANTHOS INERMIS 'TRUESHADE' SMALL	THORNLESS HONEY LOCUST	1.5' CAL.	
	HM	6	HALESIA MONTRICOLA SMALL	SNOWDROP TREE	1.5' CAL.	
	NH	13	NYSSA SYLVATICA 'HAYMAN'S RED' MEDIUM	RED RAGE TUPELO	1.5' CAL.	
	PT3	15	POPULUS TREMULOIDES	QUAKING ASPEN	1.5' CAL.	
	QR	15	QUERCUS RUBRA LARGE	RED OAK	1.5' CAL.	
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		27,050 SF	LAWN			



HEDGES CREEK
TUALATIN, OR

SHEET TITLE
ENLARGED
LANDSCAPE
PLAN

DATE: 08/02/2021
DRAWN: KPM
CHECKED: CNH
REVISIONS:

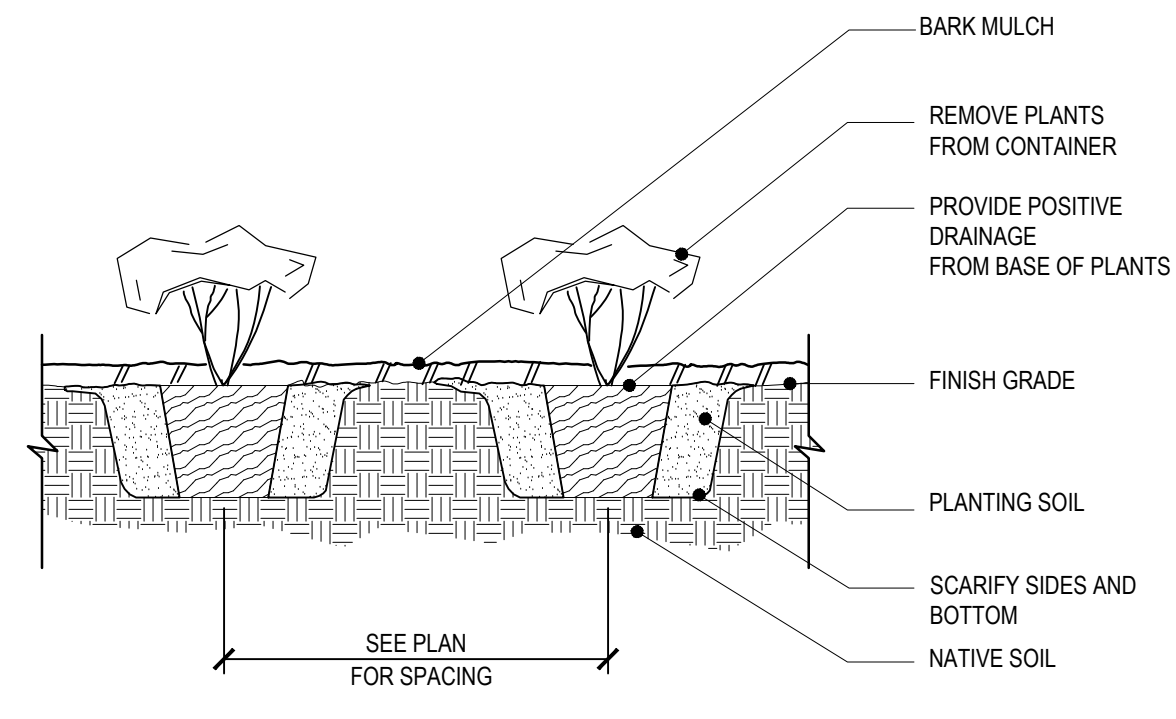
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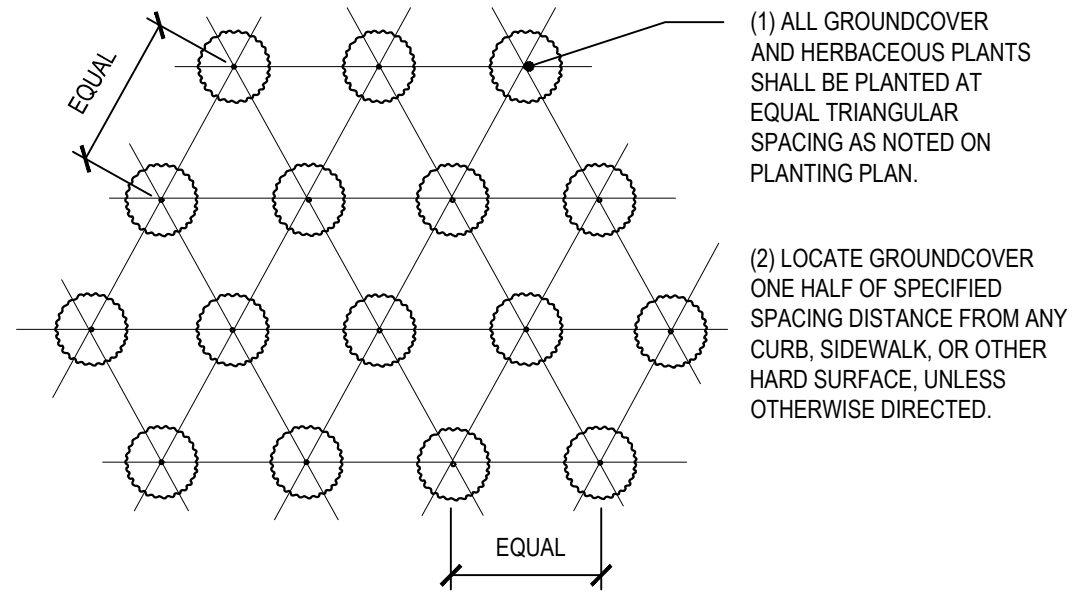
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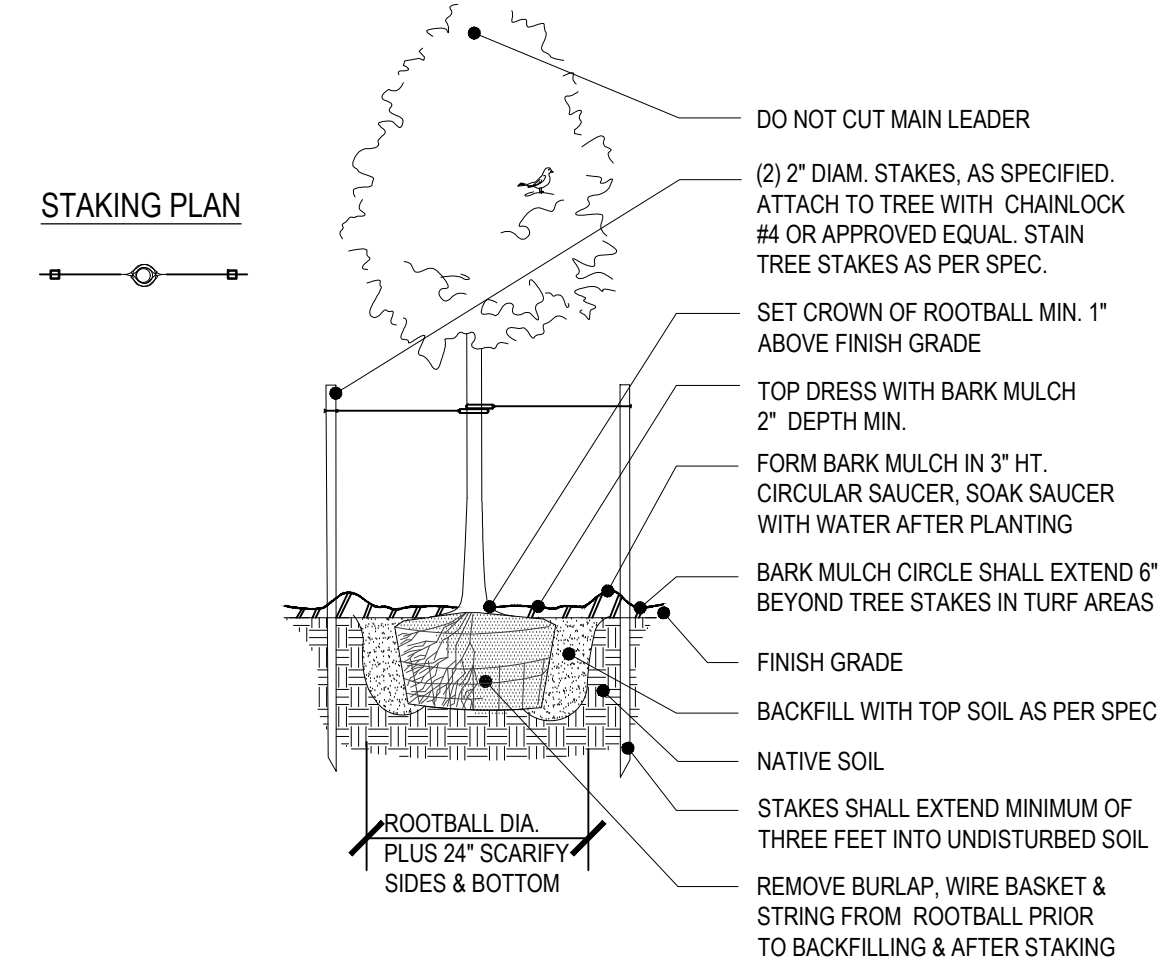
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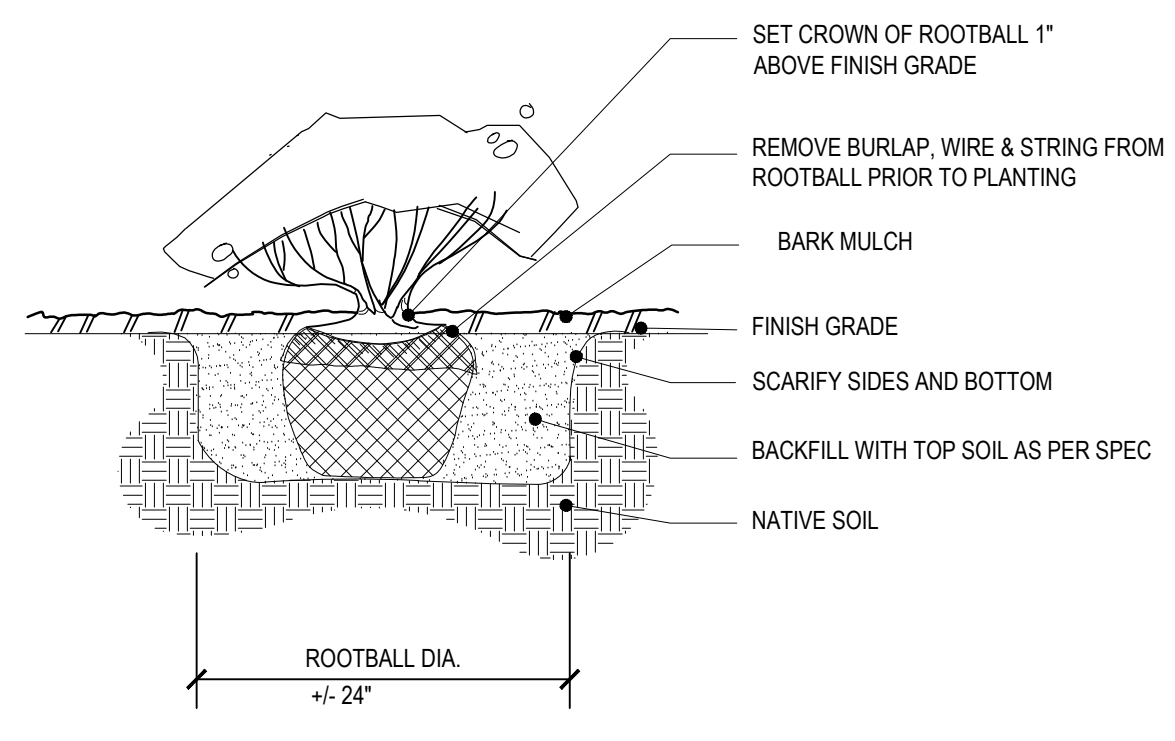
1 GROUNDCOVER & HERBACEOUS PLANT PLANTING DETAIL
L2.0 SCALE: NTS



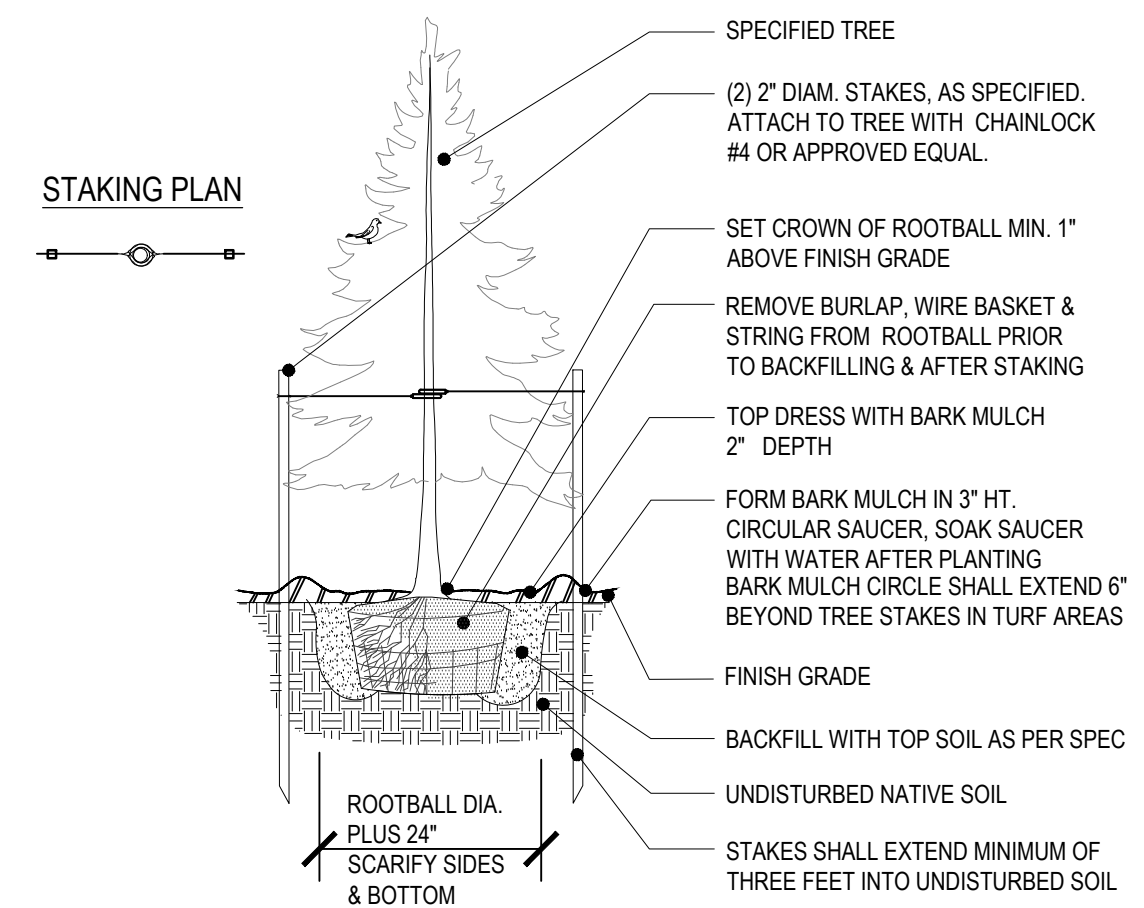
2 GROUNDCOVER & HERBACEOUS PLANT PLANTING PLAN
L2.0 SCALE: NTS



3 DECIDUOUS TREE PLANTING DETAIL
L2.0 SCALE: NTS



4 SHRUB PLANTING
L2.0 SCALE: NTS



5 CONIFER TREE PLANTING DETAIL
L2.0 SCALE: NTS



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489 S. 21st St. Ste. 101
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PHELAN
D E V E L O P M E N T
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660

HEDGES CREEK
TUALATIN, OR

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LANDSCAPE DETAILS
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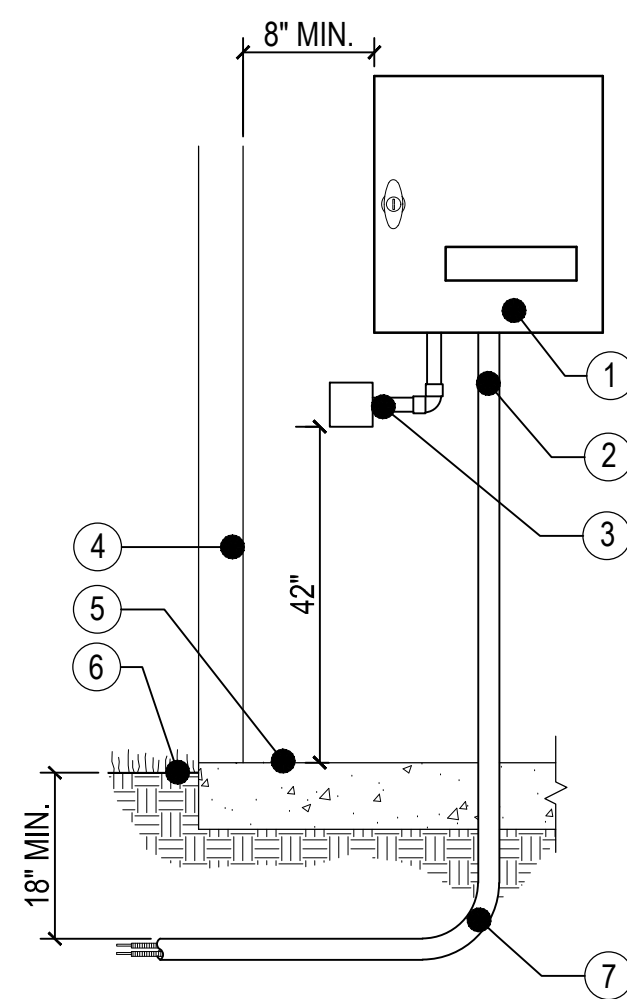
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SHEET NUMBER
L2.0

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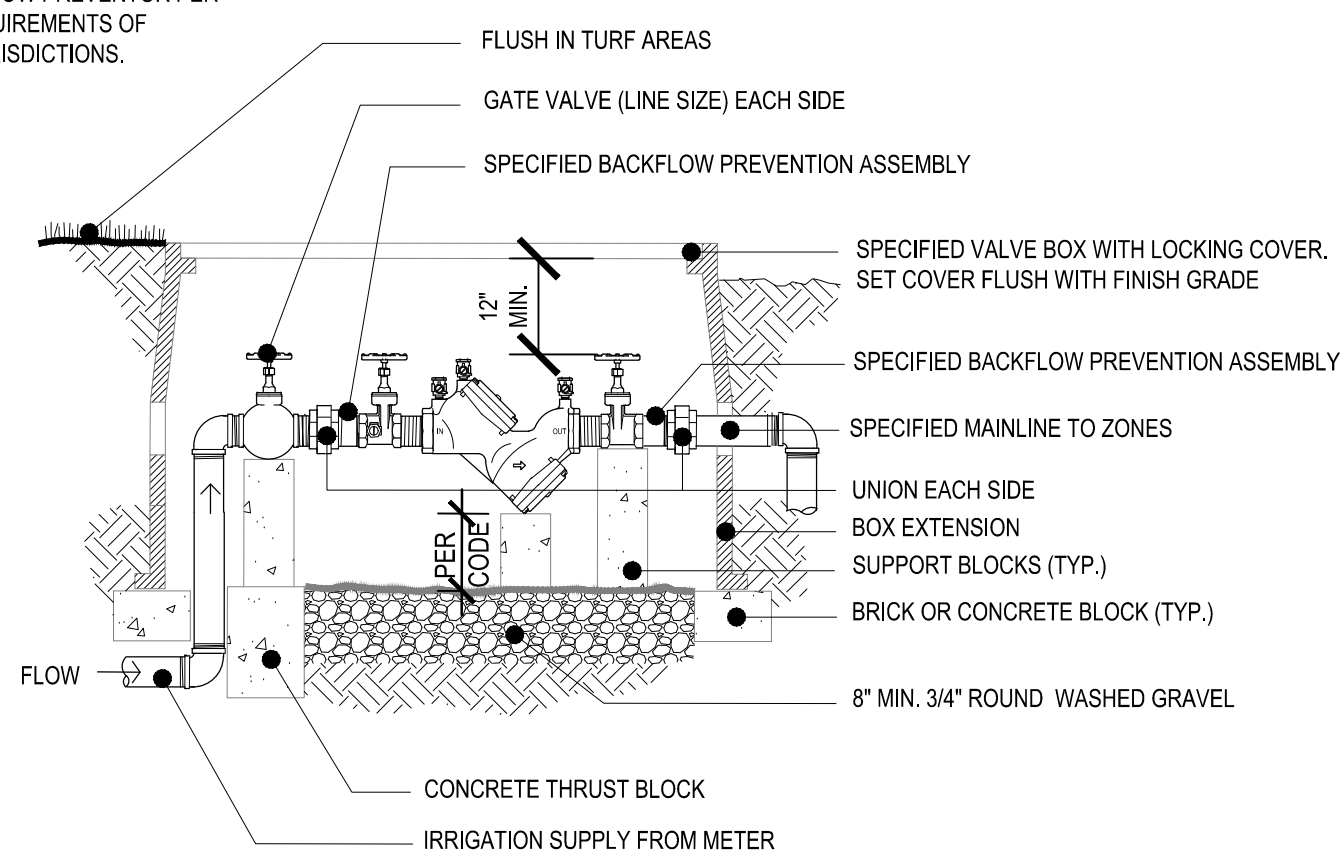
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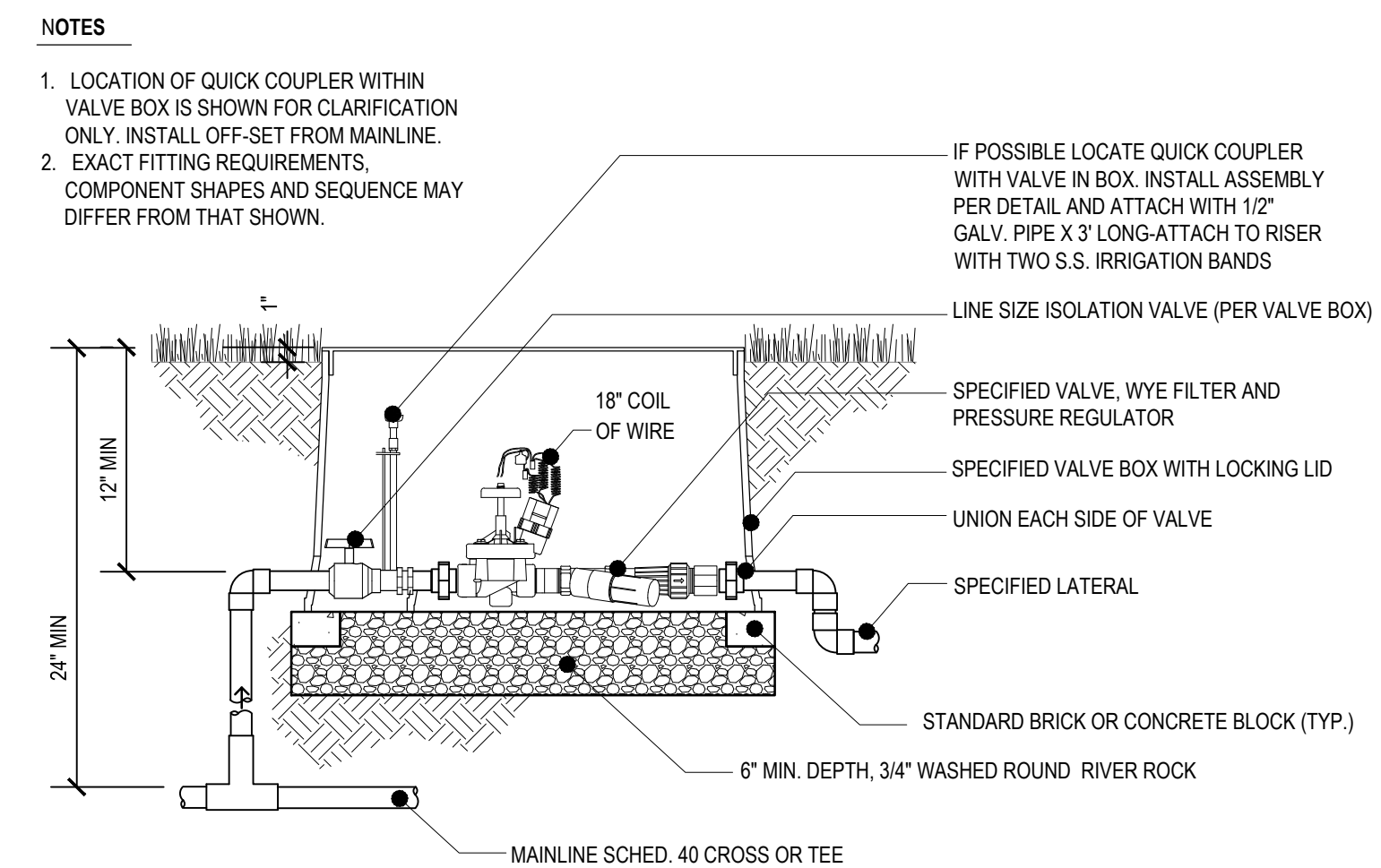
- LEGEND**
- ① AUTOMATIC CONTROLLER WITH LOCKING ACCESS DOOR.
 - ② 2" DIA. P.V.C. CONDUIT FOR COMMON AND CONTROL WIRES TO 5' BEYOND EDGE OF BUILDING.
 - ③ CONDUIT FOR 120 VOLT ELECTRICAL SERVICE WITH JUNCTION BOX.
 - ④ BUILDING WALL.
 - ⑤ BUILDING FLOOR.
 - ⑥ FINISH GRADE.
 - ⑦ SWEEP EL ON ALL ELECTRICAL CONDUIT.
- NOTES**
- 1 ALL WIRES TO BE INSTALLED AS PER LOCAL CODE.
 - 2 VERIFY LOCATION PRIOR TO INSTALLATION.
 - 3 INSTALL CONTROLLER PER MANUFACTURER'S INSTRUCTIONS.

1 WALL MOUNTED CONTROLLER
SCALE: NTS



NOTE:
INSTALL BACKFLOW PREVENTOR PER CODE AND REQUIREMENTS OF PREVAILING JURISDICTIONS.

2 BACKFLOW PREVENTION DEVICE ASSEMBLY
SCALE: NTS



NOTES

- 1. LOCATION OF QUICK COUPLER WITHIN VALVE BOX IS SHOWN FOR CLARIFICATION ONLY. INSTALL OFF-SET FROM MAINLINE.
- 2. EXACT FITTING REQUIREMENTS, COMPONENT SHAPES AND SEQUENCE MAY DIFFER FROM THAT SHOWN.

IF POSSIBLE LOCATE QUICK COUPLER WITH VALVE IN BOX. INSTALL ASSEMBLY PER DETAIL AND ATTACH WITH 1/2" GALV. PIPE X 3' LONG-ATTACH TO RISER WITH TWO S.S. IRRIGATION BANDS

LINE SIZE ISOLATION VALVE (PER VALVE BOX)

SPECIFIED VALVE, WYE FILTER AND PRESSURE REGULATOR

SPECIFIED VALVE BOX WITH LOCKING LID

UNION EACH SIDE OF VALVE

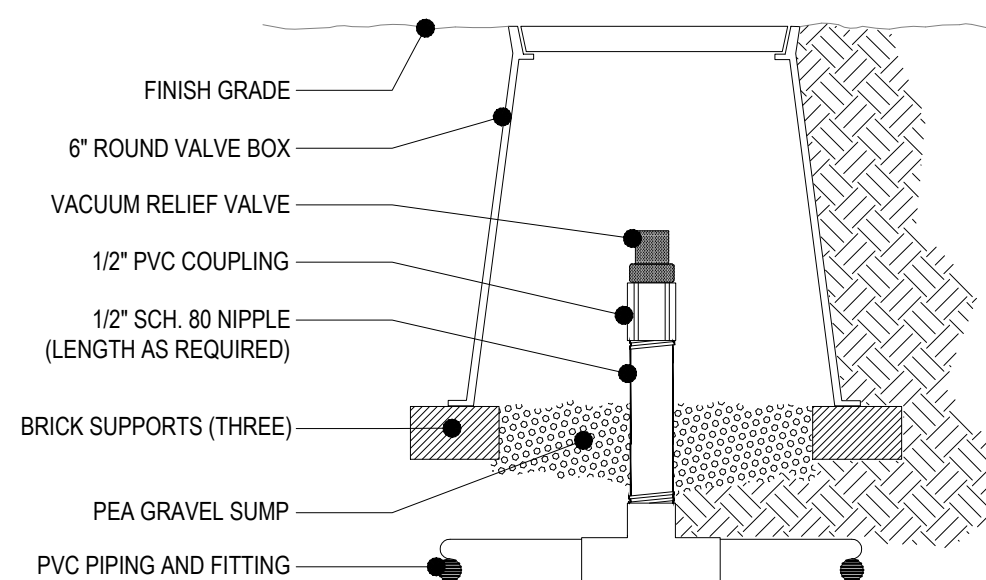
SPECIFIED LATERAL

STANDARD BRICK OR CONCRETE BLOCK (TYP.)

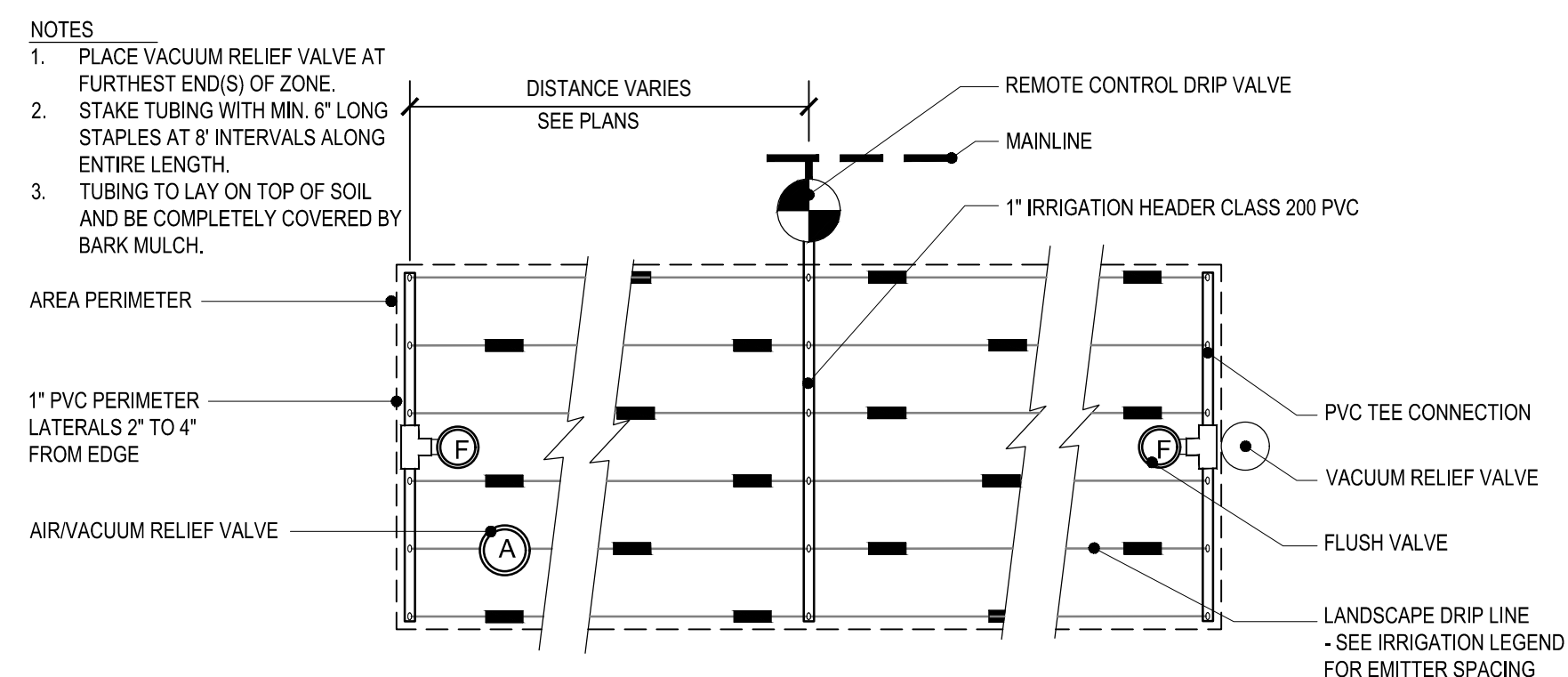
6" MIN. DEPTH, 3/4" WASHED ROUND RIVER ROCK

MAINLINE SCHED. 40 CROSS OR TEE

3 DRIP IR CONTROL VALVE ASSEMBLY
SCALE: NTS



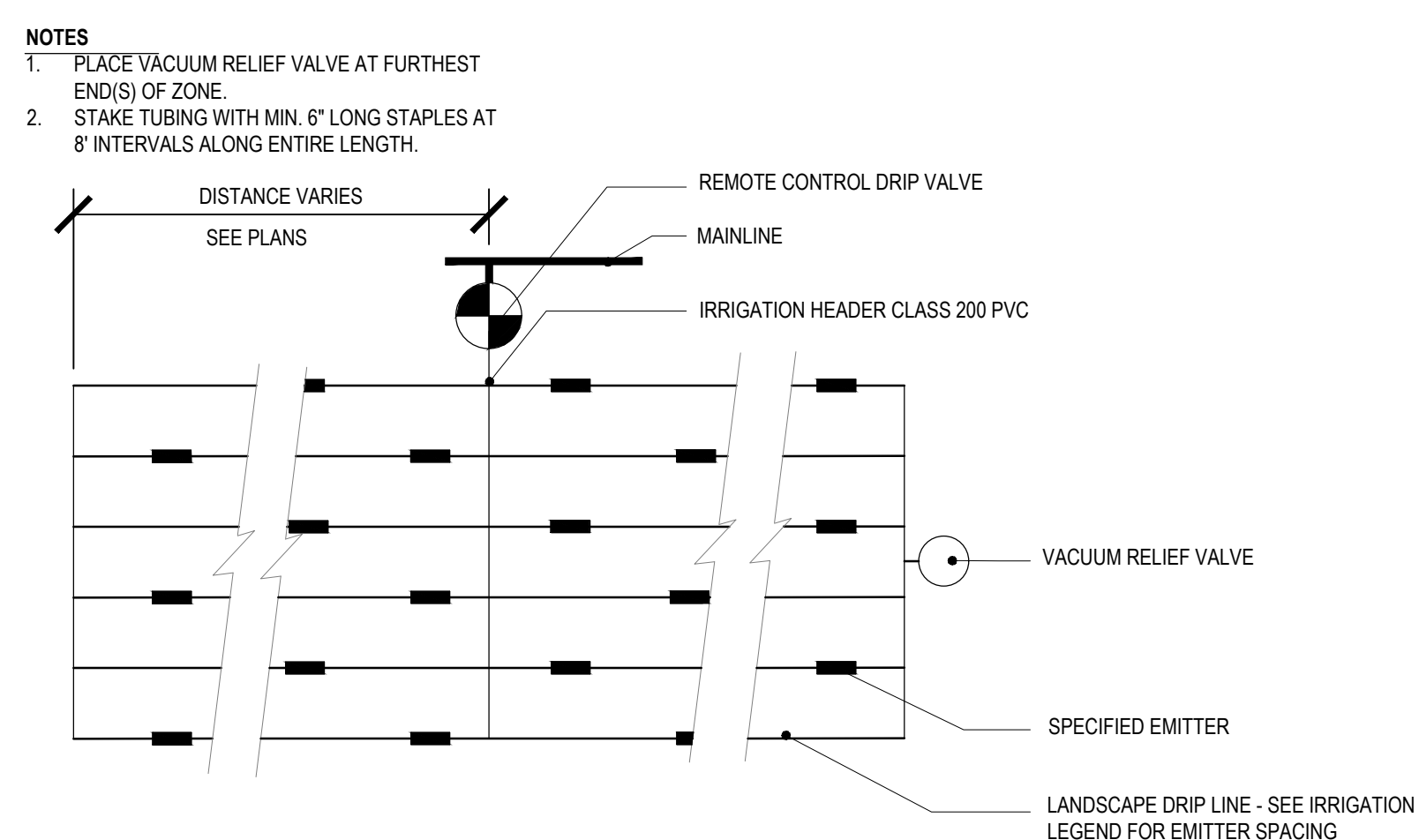
4 VACUUM RELIEF VALVE
SCALE: NTS



NOTES

- 1. PLACE VACUUM RELIEF VALVE AT FURTHEST END(S) OF ZONE.
- 2. STAKE TUBING WITH MIN. 6" LONG STAPLES AT 8' INTERVALS ALONG ENTIRE LENGTH.
- 3. TUBING TO LAY ON TOP OF SOIL AND BE COMPLETELY COVERED BY BARK MULCH.

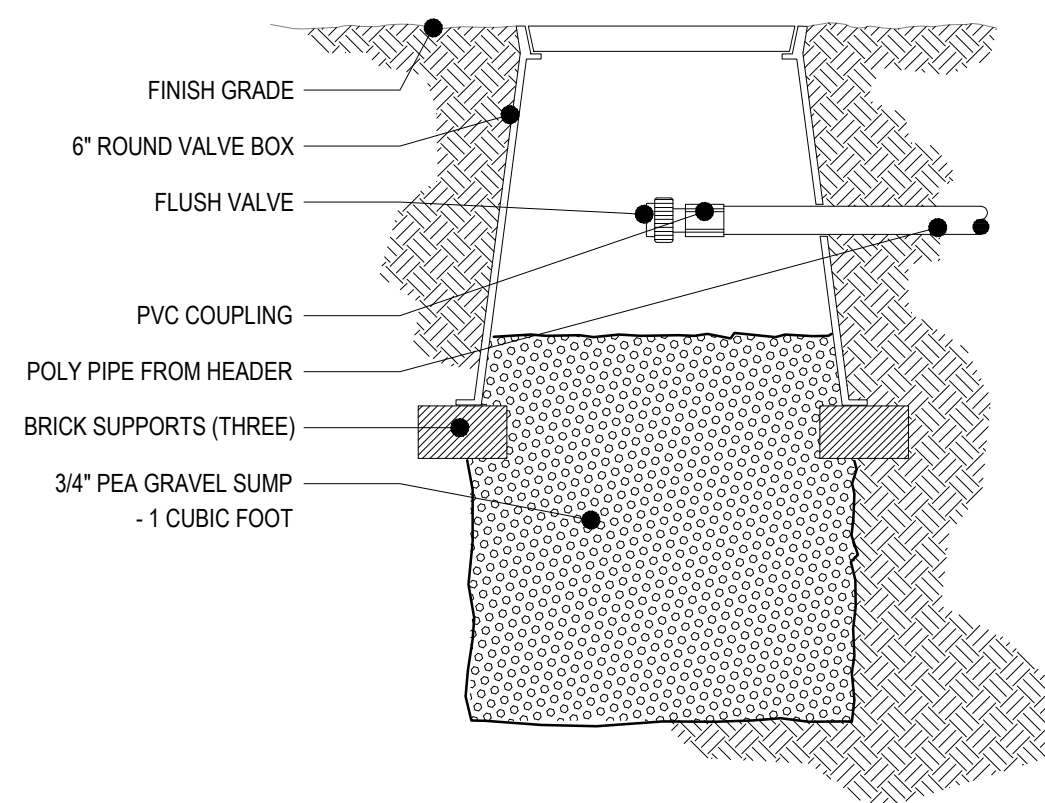
5 DRIPLINE LAYOUT DIAGRAM
SCALE: NTS



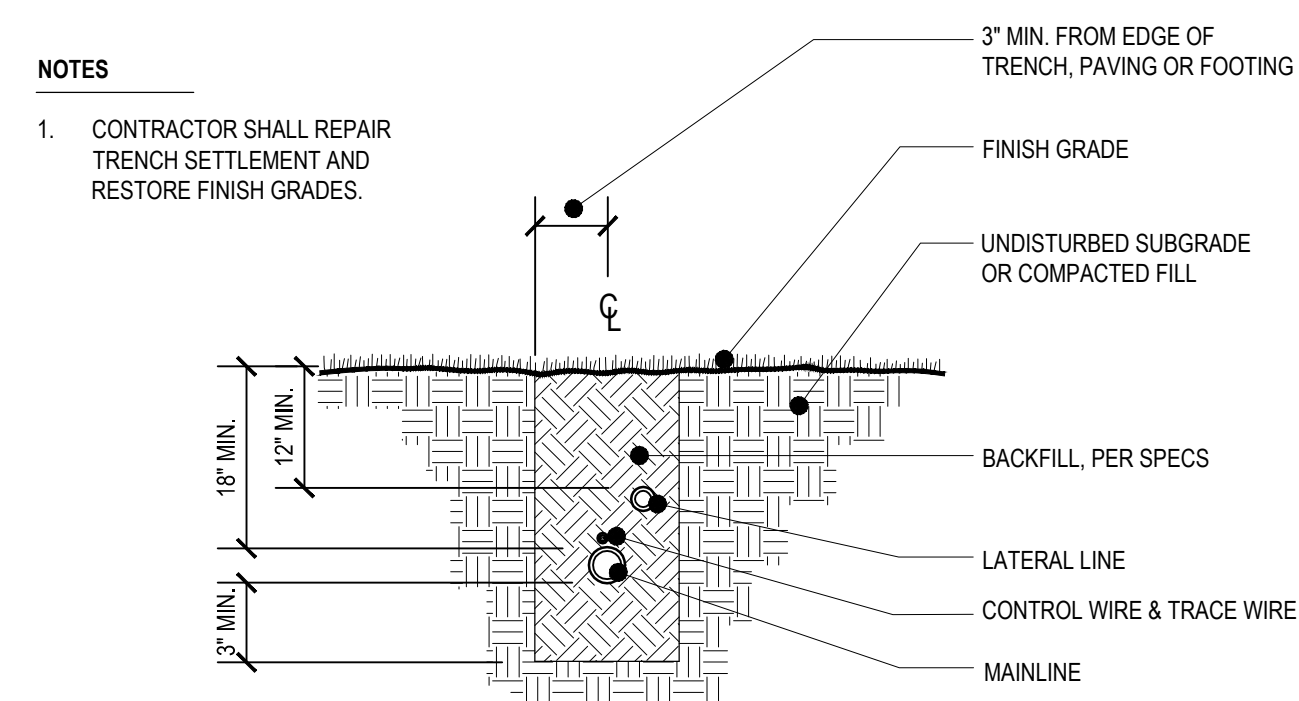
NOTES

- 1. PLACE VACUUM RELIEF VALVE AT FURTHEST END(S) OF ZONE.
- 2. STAKE TUBING WITH MIN. 6" LONG STAPLES AT 8' INTERVALS ALONG ENTIRE LENGTH.

6 INLINE EMITTER TUBING INSTALLATION
SCALE: NTS



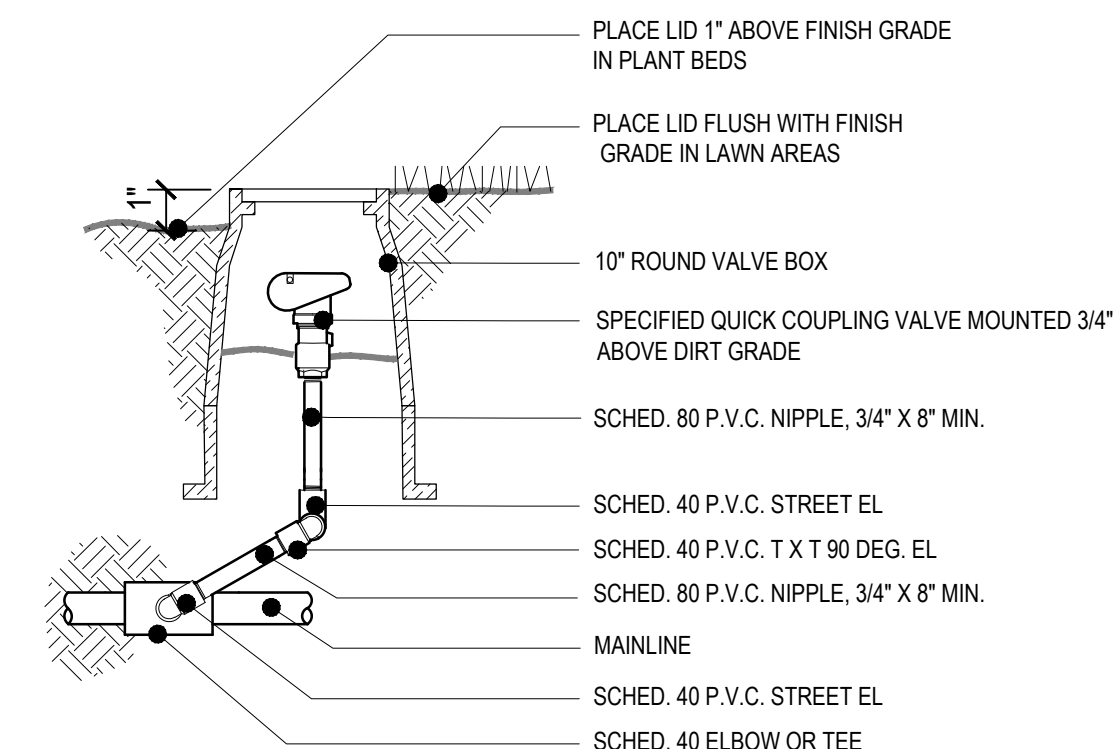
7 FLUSH VALVE
SCALE: NTS



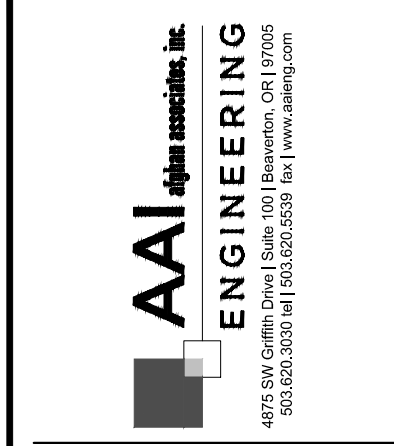
NOTES

- 1. CONTRACTOR SHALL REPAIR TRENCH SETTLEMENT AND RESTORE FINISH GRADES.

8 IR TRENCHING DETAIL
SCALE: NTS



9 QUICK COUPLER VALVE DETAIL
SCALE: NTS



HEDGES CREEK
TUALATIN, OR

SHEET TITLE
IRRIGATION DETAILS

DATE: 08/02/2021
DRAWN: KPM
CHECKED: CNH
REVISIONS:

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SHEET NUMBER

L2.1

JOB NUMBER: A20120.10

5/18/2022

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General

1. Municipal, County, State and Federal laws, regarding uses and regulations governing or relating to any portion of the work depicted on these plans are hereby incorporated into and made part of these specifications, and their provisions shall be carried out by the contractor.
2. The Contractor shall verify the locations of all existing utilities, structures, and services before commencing work. The location of utilities, structures, services shown on these plans are approximate only. Any discrepancies between these plans and the actual field conditions shall be reported to the Owner's representative.
3. The Contractor shall locate and protect all existing utilities, features and plants on and adjacent to the project site during construction. Contractor shall repair, at his own expense, all damage resulting from his operations or negligence.
4. The Contractor shall obtain all necessary valid licenses, permits, and insurance required to perform the work indicated herein before commencing work, and shall be responsible for coordinating work with all parties involved, including jurisdictional agencies.
5. The Contractor shall use all means necessary to protect the public at all times during the construction process.
6. In the event of conflict between pertinent codes, regulations, structural notes, and/or requirements, or the referenced standards of these Specifications, the provisions of the more stringent shall govern.
7. Weather Limitations: Soil work shall be performed only when the weather conditions do not detrimentally affect the quality of work.

Mandatory Site Inspection Schedule

1. Schedule for Mandatory site inspection procedures. The mandatory site inspections include but are not limited to the following:

Pre-Construction Site Meeting

Contractor shall be notified a minimum of 48 hours prior to meeting to review site conditions, proposed construction and construction schedule, and review construction specifications prior to commencement of construction operations.

Rough Grading Inspection

Contractor shall notify Owner's Representative a minimum 48 hours prior to request for inspection of rough soil grades. All rough grading operations shall be completed per specifications and prepared for inspection. No topsoil placement or backfilling in areas to be landscaped should occur until written approval by Owner's Representative has been issued.

Open Trench Irrigation Inspection

Contractor shall notify Owner's Representative 24 hours prior to inspection for written approval of irrigation trench depths, piping conditions, and pressure testing. (Refer to Irrigation Specification for inspection procedures)

Plant Material Inspection

Plant material quality and layout inspection and written approval shall occur with 24 hours notice to Owner's Representative prior to installation of any plant material. (Refer to Planting Specification for inspection procedures)

Final Landscape Areas and Irrigation Performance Inspection

Contractor shall notify Owner's Representative 48 hours prior to inspection for approval of landscape and irrigation work. Irrigation operations and coverage shall be inspected. Plant quality and layout shall be inspected. Written approval shall be issued upon inspection approval of specified construction. (Refer to relative specification sections)

Erosion Control

1. Provide and maintain positive drainage patterns throughout the construction process, and as directed by the Owner's Representative if weather or construction activity creates drainage conflicts detrimental to construction process or environmental conditions. Comply with jurisdictional requirements.
2. Maintain erosion measures throughout the landscaping process. Restore erosion control measures disturbed by landscaping operations. Remove only upon approval of Owner's Representative.

Invasive Weed Control Prior to Construction

1. Verify and identify conditions requiring eradication of invasive weeds and grasses prior to existing soil surface disturbance as directed by Owner's Representative. Stockpiled topsoil shall be treated to eradicate weeds prior to soil ripping and stockpiling. Weed eradication shall include herbicide and non-herbicide methods only administered by a currently licensed applicator. Eradication shall include and is not limited to elimination of the following invasive species from areas to be landscaped:

Cirsium arvense (Canadian Thistle) Lotus corniculatus (Bird's foot Trefoil)
Convolvulus spp. (Morning Glory) Lythrium salicaria (Purple Loosestrife)
Cytisus scoparius (Scotch Broom) Melilotus spp. (Sweet Clover)
Dipsacus sylvestris (Common Teasel) Myriophyllum spicatum (Eurasian Milfoil)
Equisetum spp. (Horsetail) Phalaris arundinaceae (Reed Canary Grass)
Festuca arundinaceae (Tall Fescue) Rubus discolor (Himalayan Blackberry)
Hedera helix (English Ivy) Solanum spp. (Nightshade)
Holcus canatus (Velvet Grass) Trifolium spp. (Clovers)
Lolium spp. (Rye Grasses)

Rough Grade Inspection

1. Conditions and quality of rough grade shall be inspected and approved by Owner's Representative prior to the commencement of specified work in areas to be landscaped. The contractor shall then be responsible for completion of activities specified herein, and defined on the plan.
2. In all plant bed areas the sub-grade shall be free of unsuitable material such as stumps, roots, rocks, concrete, asphalt, or metals, for a minimum depth of 24 inches, and in all lawn or seeded areas the sub-grade shall be free of unsuitable material for a minimum depth of 12 inches
3. The Owner's Representative, at their discretion, shall direct further rough grading or soil preparation if specified activities have not created a surface satisfactory for further work to commence. Compensation for additional surface work created by conditions unknown at the outset and as directed in writing by the Owner's Representative shall be negotiated at the time of the directive, and prior to the commencement of particular construction activities.

Finish Grading

1. Verify that rough grade in landscape areas is sufficiently below proposed final grade for planting beds and lawn areas to allow for placement of topsoil mix. Refer to grading plans for finish grade references. Verify that grades provide positive drainage at all landscape areas, and slope away from structures at a minimum of 2% slope. Final grades in all landscape areas shall be crowned at center to facilitate proposed drainage.

Installation Of Irrigation Slewing

1. Slewing conduit shall be installed at existing and proposed paved areas as per specifications, as directed by the Owner's Representative, or as irrigation installation requirements, prior to preparation for paving construction. Set piping to provide minimum covers of:

18-inch for slewing beneath walkways;
24-inch for slewing beneath vehicular traffic or structures.

Mark each end of slewing with a 2 x 4 stake with 24" exposed, clearly marked 'SLEEVE LOCATION'. Contractor shall maintain staking identification and location throughout construction process. Protect all existing paving when installing slewing. Restore all paving damaged by sleeve installation.

2. Size of slewing conduit pipe shall be a minimum of two times the diameter of the bell end of the pipe that is to be fed into the sleeve.
3. Set slewing in a compacted bed of material that will not damage the pipe during compaction of surface backfill material.

Design / Build Irrigation Specification

1.1 DESIGN BUILD SUBMITTALS AND REQUIREMENTS

- A. Design Criteria: Submitted plan shall meet the following criteria and shall be approved for construction only upon verification that all required criteria have been met.

1. Drawings submitted for design approval:
 - a. Must clearly illustrate irrigation heads, dripline, valve, controller and point of connection locations. Individual valves and controllers shall be numbered sequentially. The size and maximum flow through each valve and capacity of each controller shall be clearly noted.
 - b. Must clearly illustrate pipe sizes from all laterals and mainline pipe.
 - c. Drawings must be to a standard measurable engineering scale that is at a minimum of 1"=30'-0".
 - d. Drawings must be CAD generated.
 - e. Drawings must include a legend that describes all symbols and materials represented on the plan.
 - f. Drawings must clearly illustrate that the proposed irrigation system meets all performance criteria described by these specifications.
 - g. Must utilize graphics that clearly distinguish between lateral and mainline pipe and sleeves under pavement; dripline; manual or automatic control valves, isolation valves and drain valves; irrigation controllers and all other equipment located on the plan.
- B. Irrigation system as designed and installed shall perform within the tolerances and specification of the specified manufacturers.
- C. The system shall be fully adjustable to fine-tune the system performance for specific zones. Indicate water pressure and gallonage parameters at available water source on the required submittal.
- D. Irrigation system shall be designed so that planting beds, sloped banks and lawn zones are on separate control valves to facilitate the different water requirements of each area.
- E. System shall be designed to supply manufacturer's specified minimum operating pressure to furthest emitter from water meter. Water flow through piping shall not exceed a velocity of 5 feet per second.
- F. System shall furnish components to allow operation within manufacturer's specified tolerances for optimum performance. Undersized components shall not be approved for installation.

5. Upon completion of the irrigation system installation and as a condition of its acceptance, deliver to the Owner's representative the following 'As- built' drawings; Three prints and one reproducible sepia of all changes to the irrigation system including a Controller Zone Reference chart. Instruct owner of system components operation, system winterization, and controller adjustment processes. Instruct owner of precipitation requirements and schedule of anticipated controller adjustments as landscape matures.

6. Protect existing buildings, walls, pavements, reference points, monuments, and markers on this site. Verify location of and protect all utilities. Protect adjacent property. Protect work and materials of other trades. Protect irrigation system materials before, during, and after installation. In the event of damage, repair or replace items as necessary to the approval of the Owner's representative and at no additional cost to the Owner. Use all means necessary to protect the public from injury at all times.

7. Provide warranty for all installed materials and work for one year beyond the date of final acceptance of the irrigation system installation.

8. Verify gallonage, pressure, size, and location of service water line. The Contractor shall guarantee an irrigation system that functions to manufacturer's specifications with the source volume and pressure afforded to site. Make arrangements for water shut-off during construction if necessary, notify owner 24 hours prior to suspension of water service.

9. Irrigation trenches shall be a depth to provide a minimum cover of 18 inches for slewing beneath walkways; 18 inches for all pressurized main lines; 36 inches for slewing beneath asphalt paving, and 12 inches for all lateral lines. Backfill with clean fill void of material injurious to system components. All slewing under vehicular traffic to be Class 200 PVC, all other slewing shall be class 200 PVC Locate top of zone valves a minimum of 6" below finish grade.

10. Combine wire and piping where possible.

11. Contractor shall follow manufacturer's instructions for solvent welding of PVC pipe and fittings to achieve tight and inseparable joints. Utilize single wrap Teflon tape at all threaded joints.

12. Install all valves with fittings that facilitate maintenance removal and place valve boxes at location that are easily serviced but not in conspicuous locations. Locate in planting beds wherever possible, away from mower, edger, or de-thatcher operations.

13. Contractor shall install one manual drain valve at discharge side of each remote control valve and at all low points in mainline pipe so as to allow for complete drainage of all main lines. Mark with a painted sleeve cover and indicate locations on As-Built drawings.

14. Contractor shall provide backflow prevention as required per local and state codes, installed as per manufacturer's specifications.

15. Contractor shall install irrigation controller in accordance with manufacturer's specifications. Verify a 120 V.A.C. electrical source and a min. 1 1/2" conduit from controller location open to all electrical zone valves in field. Weatherproof any exterior wall penetrations.

16. Automatic Controller: Rainbird or Hunter capable of meeting Water Sense EPA Criteria or approved equal. Controller shall have ability for all zones to fully operate and meet both normal and specified low volume system requirements as specified herein, and as required by site conditions. Coordinate location in field with owner's representative.

17. Install all wire in accordance with manufacturer's specifications with a minimum of 18 inch looped inside valve box at each remote control valve and at the controller. All splices shall occur within valve boxes with water-proof connectors.

18. Contractor shall install all sprinkler heads with flexible risers, using flexible polyethylene pipe not to exceed 18 inches in length or PVC swing joints. Tee fittings shall extend horizontally from pipe.

19. Contractor shall thoroughly flush irrigation system after piping, risers, and valves are installed but prior to installing sprinkler heads. Thoroughly clean, adjust and balance the installed irrigation system. Adjust spray pattern of nozzles to minimize throw of water onto buildings, walls, roads and parking lots. Adjust controller for optimum performance and precipitation rates utilizing proper water conservation measures.

Topsoil Placement and Soil Preparation

1. Contractor shall submit certified topsoil analysis report for owner's approval prior to plant installation.
2. Contractor is responsible for any amendments to soil PH, fertility and/or drainage conditions necessary to ensure proper growing conditions for proposed planting.

3. Topsoil shall be friable soil from existing stockpiled material or imported, with added soil amendments as specified. It shall not be delivered while in a frozen or muddy condition. Protect from erosion at all times. Utilize existing stockpiled topsoil only under the direction of the Owner's Representative. Do not place topsoil in areas that have not been cleared of weeds listed herein. Topsoil shall meet the following requirements:

- a. Free of roots and rocks larger than 1/2 inch,
- b. Free of subsoil, debris, large weeds, foreign matter and any other material deleterious to plant material health.
- c. Acidity range (pH) of 5.5 to 7.5.
- d. Containing a minimum of 4 percent and a maximum of 25 percent inorganic matter with decaying matter of 25 percent content by volume or less.
- e. Textural gradations shall be sand: 45-75%, silt: 15-35%, clay: 05-20%.

4. Commercial fertilizer shall be an organic base, complete fertilizer containing in available form by within a minimum of 10N 10P 5K - with 50 percent of the available nitrogen in slow-release formula, Webfoot Organic Delux, or approved equal.a

5. Compost shall be yard debris compost meeting industry and jurisdictional standards.

6. Contractor shall remove all debris, rocks one inch in diameter or larger, sticks, mortar, concrete, asphalt, paper, contaminated soil and any material harmful to plant life, in all planting areas.

7. Contractor shall rototill subgrade six (6) inches deep before placing topsoil. Specified imported topsoil shall be placed at a minimum depth of **12"** in all planting areas. Do not place material during wet conditions. Do not work saturated soils in any manner. floated to a level, sloped or mounded grade between any existing or constructed point on the site, such as curbs, walls, walks, paving and the like. Final soil grades in planting beds shall be 2" below adjacent paving and curbs for mulch application.

8. Distribute following soil amendments to all landscape areas in even layers and power rototill or spade to a minimum depth of six (6) inches into topsoil, as follows;

- Planting Beds:
- a. Compost: Apply nine cubic yards per 1000 sq. ft.
 - b. Commercial Fertilizer: Apply 50 pounds per 1000 sq. ft.

9. Preparation of backfill planting soil mix shall be as follows:

- Thoroughly blend and mix the following proportion of materials while in a moist condition:
- Three cubic yards topsoil
 - 1 1/2 cubic yards compost
 - 1 1/2 cubic yards medium bark,
 - 10 pounds commercial fertilizer
 - Five pounds bonemeal

10. Keep project free from accumulation of debris, topsoil and other material. At completion of each area of work, remove debris, equipment and surplus materials. Any paved area or surfaces stained or soiled from landscaping materials shall be cleaned with a power sweeper using water under pressure. Building surfaces shall be washed with proper equipment and materials as approved by the Owner's representative.

Seed Installation

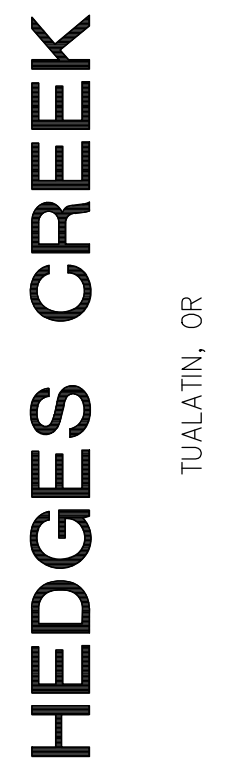
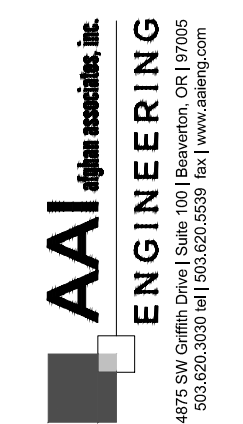
1. Seeding operations shall occur only between March 15 and October 15.
2. Seeding is not permitted during cold weather (less than 32 degrees F), hot weather (greater than 80 degrees F), when soil temperature is less than 55 degrees F, when ground is saturated, or when wind velocity is greater than 10 mph.
3. Contractor shall float rough graded seedbed. Do not disturb natural drainage patterns. Remove rocks, clumps, or debris at surface. Lightly scarify surface.
4. Contractor shall apply 10 pounds commercial fertilizer per 1,000 square feet of surface area before spreading seed.
5. Lawn Seed: Contractor shall manually broadcast or hydro-seed eight pounds of Sunmark "Northwest Supreme Lawn Mix" grass seed per 1,000 square feet.
6. The Contractor shall protect and maintain the seeded area by fencing, watering, feeding, reseeding, mowing and repairing as necessary to establish a thick, uniform stand of grass acceptable to the Owner's representative. Contractor to maintain lawn for a minimum of 3 mowings.

Trees, Shrubs, & Groundcover Installation

1. Contractor shall guarantee materials and workmanship in general landscape areas for one year from date of conditional acceptance. Plant material shall be in accordance with American Standard for Nursery Stock (ANSI Z60.1) , shall comply with State and Federal laws with respect to inspection for insect infestation and plant diseases and shall be free of insect pests and plant diseases.
2. Plant materials shall have a minimum of 6 inches of prepared soil under the root ball, and a minimum of 6 inches on each side of the root ball. Tree roots or root ball shall have a minimum of 12 inches of plant soil under the root ball and a minimum of 12 inches on each side of the root ball, or roots. Final grade should maintain root ball slightly above surrounding grade (not to exceed one inch) for bark mulch installation.
3. Root control barrier shall be installed in trenches, alongside hardscape structures and utility lines such as sidewalks, curbs, pavement, walls, and concrete located within 5 feet of new trees measured from the trunk. Root barrier is to be 40 - 60 mil HDPE, minimum 18" deep and extend 10' in either direction measured from the center of the trunk.
4. Mulch all planting beds after planting, final raking, grading and leveling of the planting beds with a layer of Hem/Fir medium screened bark mulch as specified on the plans.
5. Balled and burlapped trees, boxed trees or bare root trees shall be either guyed or staked as detailed on the plans.
6. Remove all dead or dying branches and criss-crossing branches from trees. Do not cut leader.
7. Keep project free from accumulation of debris, topsoil and other material. At completion of each area of work, remove debris, equipment and surplus material. All paved areas or surfaces stained or soiled from landscape material shall be cleaned with a water-pressure power sweeper. Building surfaces shall be washed with proper equipment and materials as approved by the Owner.
8. River Rock Mulch:
River rock mulch shall be minimum 3/4" to maximum 1-1/2" diameter washed round river rock, uniform in size. All fines shall be screened from the aggregate within a one-quarter inch (1/4") tolerance. Color shall be white to light brown. Contractor shall provide the owner with samples of river rocks for approval prior to installation.

Maintenance

1. Contractor shall maintain general landscape areas for one year after accepted completion of project.
2. Maintenance shall include; all grade resettlement, weeding, policing and removal of plant material debris during maintenance period. Remove and replace dead plant material as needed at no cost to owner for maintenance period. Seasonal leaf fall removal is outside the scope of this maintenance specification.
3. Any unsatisfactory condition arising during this maintenance period shall be brought to the attention of the Owner's Representative immediately.



SHEET TITLE

LANDSCAPE & IR SPECS

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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SHEET NUMBER

L3.0

TREE PROTECTION AND REMOVAL PLAN

For

HEDGES CREEK

PHELON DEVELOPMENT

For Service At



December 21, 2021

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City of Tualatin, Oregon – Hedges Creek Arboricultural Assessment and Tree Protection/ Removal Plan

Report Summary.

This report includes the location and status of the trees that fall within the perimeters of the proposed development of the project. The trees are marked on the site plan (Appendix C), including their location and corresponding number. This report is created following the development code of the City of Tualatin. The City Code pertaining to this site is:

- TDC-74.720 Protection of trees during development

General Information.

Project Location and Identification

The property is in the City of Tualatin, Oregon. The physical address is:

- 11345 SW Herman Road, Oregon

Proposal

The project proposes the development of the south side of the lot with 3 commercial buildings. The construction proposed includes site improvements in the form of utilities and new landscaping.

Assignment:

- Locate and identify the trees that will be affected based on the proposed construction according to the provided site plan (Appendix C)
- Assess the overall condition of the trees and provide a rating associated with the individual trees. Ratings are determined by comparing the structural integrity, abnormalities and expected growth habits versus current growth habits.
- Provide findings/ recommendations pertaining to the trees.

The data collected in the field is used to determine the viability and survivability of the trees during and after construction.

Tree Inventory and assessment

On 11/15/2021 a pre- construction site visit was conducted. The trees in question were evaluated for the impacts by the construction project, their overall condition, and verified in comparison to the site plan provided by Phelan Development which indicates the site improvements (Appendix C). The data collected for each tree includes the tree number, trunk diameter (DBH), tree health and condition, comments if applicable and removal recommendations.

Purpose and Use of this Report.

The purpose of this report is to establish a Tree Protection Plan that will serve as directions that need to be followed during the construction project. This report documents this information and is intended to be used by the owner, construction contractor, the sub-contractors, the tree care, and landscape professionals who are involved in the construction project.

Limits of the report

The trees were visually assessed above ground only, no tools were used. The field data was collected using an iPadOS 15.1 and a blue tooth connected GNSS Surveyor for GPS function. Although the location of the trees is accurate, the location of the trees is not up to NSPS (National Society of Surveyor) standards and are meant as a visual aid only. The survey points collected should not be used for architectural drawings.

The site was not yet surveyed, and the conclusion of my findings are made by visually comparing the landmarks to the provided site plan. The proposed buildings and amenities are planned at the southern half of the 20 Acre property. For the purpose of this report only the trees within the disturbance area are inventoried and documented.

Observations

Site observations

The site is situated between Herman Road and Myslony Street and is 20.30 Acres. The property has various overlay zone designations with a large portion dedicated as a Wetland Conservation District. The other overlay zones are: Open Space Preservation and a Greenway Location and are comparatively much smaller in area. The creek running from the SW corner of the property to the NE corner feeds a protected wetland area to the east of the property.

The planned development is proposed on the southern half of the property which is the least vegetated. Most of the large, high value trees are located on the north side of the property. The southern portion of the property is comprised of mostly smaller trees.

Tree Removal Recommendations

The trees that are recommended for removal are within the direct footprint or in the vicinity of the site improvements. The trees that are not within the direct footprint of the improvements are recommended for removal due to the impacts of the project.

Trees 1 through 7 and 50 through 68

The trees are proposed for removal because the proposed parking lot encroaches on the root systems of the trees located along the creek. The likelihood of failure post construction will be magnified due to grade changes and subgrade amendment. The proposed layout would likely require the removal of large roots which could make the trees hazardous due to the increased rotational failure potential.

Trees 8 through 49 and 65

The trees are in the direct footprint of the proposed building.

Trees 92 and 94

Tree 92 is dying. Tree 94 is in poor condition.

Trees 95 through 102

The trees are in the footprint of the parking lot and the proposed building.

Discussion and Tree Protection

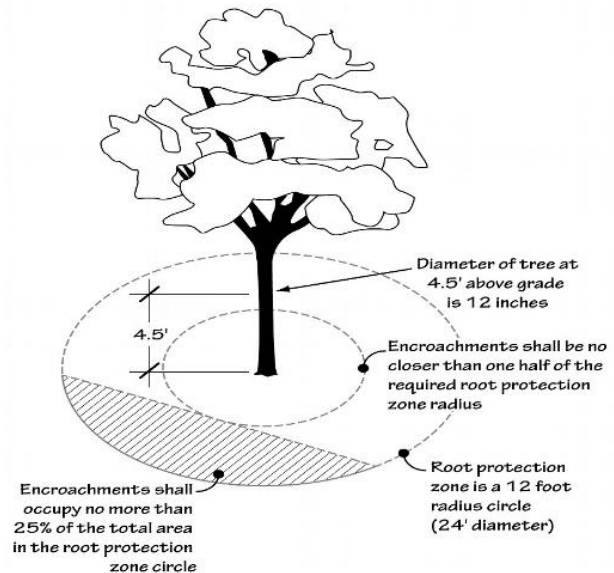
The area to the north of the disturbance area should remain undisturbed. Grading and fill in this area could change the hydrology of the property significantly and have a negative impact on the remaining trees.

The critical root zone is typically calculated at 6-inches per diameter inch of the trunk measured at 54" from the original grade. For example: a 12-inch DBH tree should have a tree protection zone radius of 6-feet. Depending on the plant species profile the fencing may need to be adjusted to accommodate the tree's construction tolerance.

The City of Tualatin Code TDC-74.720- Protection of Trees During Construction states that:

"During excavation and construction, the person must guard the tree within 6-feet and all building materials and/or debris must be kept at least 4-feet from any tree".

Given the sensitive nature of the property and the mature stature of the trees being retained, the tree protection fencing shall be kept outside the critical root zone of the trees.



The use of waddles instead of silt fencing is highly recommended to prevent trenching through the root systems of the trees being retained.

The Fencing Shall Be Placed as Prescribed in Appendix C. Refer to the inventory for CRZ (Critical Root Zone) distances.

The tree protection fencing shall be placed at the edge of the critical root zone of trees 73, 74, 78 and 79 in circumference of the tree on the east side of the creek.

The trees on the east side of the property to be retained shall be protected by placing fencing 5-feet from the proposed edge of the parking lot asphalt. The fencing shall be placed at tree 93 and from tree 91 through 85. The fencing should be placed from dripline to dripline running north to south.

Tree Protection Recommendation

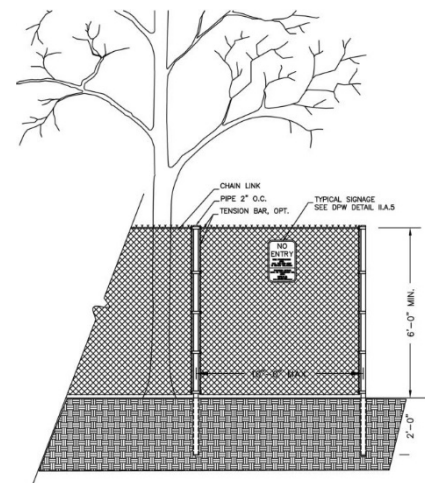
It is recommended to hold a site meeting with the contractors involved in the project to go over the tree plan and have the contractors sign a memorandum. The memorandum should show the provision and the penalty for violation of the Tree Plan. The penalty should include the cost of the appraised tree, fines incurred by the municipalities. The penalties should be made payable to the owner.

Excavation near the TPZ (Tree Protection Zone)

- All excavation, demolition, install of concrete forms.... etc. within 1 foot per diameter inch shall be monitored by one of our Certified Arborists assigned to the project to ensure that the impacts are minimal to the trees to be preserved. Techniques used by the project arborist will follow arboricultural guidelines and best management practices to preserve the trees (such as: City code, ANSI a300 standards... etc.)
- The excavator and/ or equipment shall stay outside the critical root zone/ drip line (tips of the branches) and carefully remove layers of soil while the project arborist probes the soil for roots 2" and larger.
- Exploratory pneumatic excavation may be necessary to determine the exact location of roots 2" diameter and larger, if found the project arborist may deem them to be substantially significant in the retention of the trees. Alternative construction measures may be recommended if large roots are found.
- Trees scheduled for removal located in proximity of the RPZ of the trees to be retained, should be cut, and not pulled over by excavator to minimize root impacts. Use of a stump grinder is recommended to remove stumps.

Tree Protection Fencing

- The tree protection fencing shall be a minimum of 4-feet tall and should be placed as far away from the tree as possible, while still allowing the construction project to commence. The fencing shall be metal.
- The temporary fencing shall be secured with 6-foot metal posts placed 8 feet apart, two feet deep at the edge of the tree protection zone.
- The sign 'Vegetation/ Tree Protection Zone' shall be placed prominently on the fence designated for the tree protection zone and list the penalties for violation.
- The fencing shall be installed prior to any ground disturbance taking place, including clearing, grading, or construction.
- The tree protection fencing may be removed after the final inspection is completed and the project arborist has met with the landscape contractor to go over their plans.



Prohibited Activities Inside the Tree Protection Zone

Construction activities are prohibited inside any part of the Tree Protection Zone. Should access be required due to unforeseen circumstances, prior approval from the project arborist is mandated and he/ she shall be onsite to determine mitigation to the proposed activity.

Prohibited activities include but are not limited to:

- Ground disturbance
- Construction activity involving vehicular or equipment access.
- Storage of equipment and materials (including soil and gravel)
- Temporary or permanent stockpiling
- Proposed buildings
- Impervious surfaces such as pavement
- Underground utilities
- Excavation or fill
- Trenching
- In ground irrigation system installations

Violations of the provisions may result in liability for damages and applicable fines.

Conclusion:

The trees are in poor to good condition taking species and age into consideration. Provided with the information I received, it is in my professional opinion that the tree plan will suffice from an arboricultural standpoint. Care should be taken to follow the recommendations and provisions laid out in this TPP to ensure the success of the retention efforts. I highly recommend a job site walkthrough prior to the start of the project.

Recommendations

Based on my findings and conclusions I am recommending the following course of action regarding the retention efforts:

- Establishing a Plant Health Care Program to ensure the retention efforts are a success. i.e., soil amelioration, the application of liquid organic fertilizers and watering during the dry months.
- Hold a site meeting to discuss the methods of approach.

<i>Appendix A</i>	Assumptions and Limitations
<i>Appendix B</i>	Certification of Performance
<i>Appendix C</i>	Site plan with tree locations, RPZ and TPZ

Appendix A - Assumptions and Limitations

1. A field examination of the site was made. My observations and conclusions are as of that date.
2. Care has been taken to obtain all information from a reliable source, however the Arborist can neither guarantee nor be responsible for accuracy of information provided by others.
3. Unless stated otherwise, information contained in this report covers only those trees that were examined and reflects the condition of those trees at the time of inspection. The inspection is limited to visual examination of the subject trees without dissection, excavation, probing, or coring. There is no warranty or guarantee that problems or deficiencies of the subject tree may not arise in the future.
4. All trees possess the risk of failure. Trees can fail at any time, with or without obvious defects or applied stress. Trees are living biological organisms, and I cannot predict nor guarantee their stability or failure.
5. Sketches or drawings in this report are intended as visual aids and are not necessarily to scale and should not be used as engineering or architectural reports or surveys.
6. This report and any values/opinions expressed herein represents my opinion as an arborist. Inaction on the part of those receiving the report is not the responsibility of the Arborist.
7. Loss or alteration of this report invalidates the entire report.
8. *It is the contractor's/ owner's responsibility to contact us in a timely matter to ensure that a project arborist is available when inspections and/ or observations are required. Please allow two weeks for scheduling purposes.*
9. Any legal description provided to the consultant/ appraiser is assumed to be correct. Any titles and ownerships to any property are assumed to be good and marketable. No responsibility is assumed for matters legal in character. All property is appraised or evaluated as though free and clear, under responsible ownership and competent management.
10. The consultant/ appraiser shall not be required to give testimony or attend court by reason of this report unless subsequent contractual arrangements are made, including payment for such services.
11. Possession of this report does not imply right of publication or use for any other purpose by any other than the person to whom it is addressed, without the prior expressed written consent of the consultant/ appraiser.

Appendix B - Certification of Performance

I, Peter van Oss, certify that:

- I have personally inspected the trees and the property referred to in this report and have stated my findings accurately. The extent of the evaluation or appraisal is stated in the attached report and the Terms of the Assignment.
- I have no current or prospective interest in the vegetation or the property that is subject of this report and have no personal interest or bias with respect to the parties involved.
- The analysis, opinions and conclusions stated herein are my own and are based on current scientific procedures and facts.
- My analysis, opinions and conclusions were developed, and this report has been prepared according to commonly accepted arboricultural practices.
- No one provided significant professional assistance to me, except as indicated in the report.
- My compensation is not contingent upon reporting of a predetermined conclusion that favors the cause of the client or any other party nor upon the results of the assessment, the attainment of stipulated results, or the occurrence of any subsequent events.

I further certify that I am a member of, and certified by the ISA. I have been involved in the arboricultural field in a full-time capacity for a period of 15 years.

Sincerely,



Peter van Oss
NW Tree Specialists
Certified Arborist PN-8145A
ISA Qualified Tree Risk Assessor
ASCA Member
503-512-3826 (Direct/ Cell)
peter@nwtreespecialists.com

 **AMERICAN SOCIETY of
CONSULTING ARBORISTS**

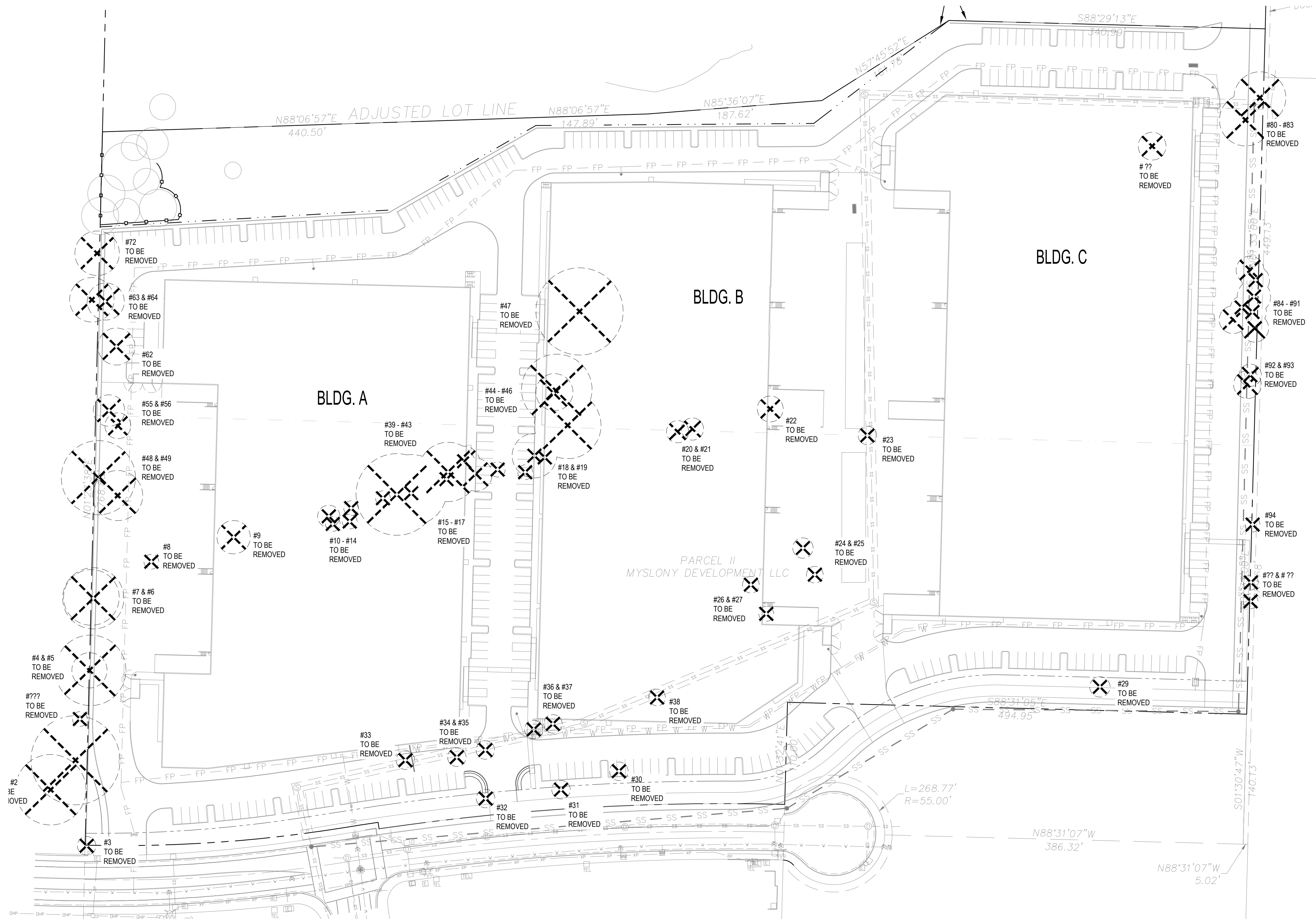
Glossary

DBH	The diameter of the tree measured at 54" from the ground.
TPP	Tree Protection Plan
TPZ	Tree Protection Zone
RPZ	Root Protection Zone
TPF	Tree Protection Fencing
Soil Amelioration	Enriching the soil with nutrients.

LEGEND

EXISTING TREES TO BE REMOVED, SEE ARBORIST REPORT FOR MORE DETAILS
 EXISTING TREES TO REMAIN
 TREE PROTECTION FENCE

1
L1.0



REGISTERED
552
Teresa Katherine Long
OREGON
5-14-04
LANDSCAPE ARCHITECT

AAI ENGINEERING INC.
4975 SW Gemini Drive, Suite 100, Beaverton, OR 97005
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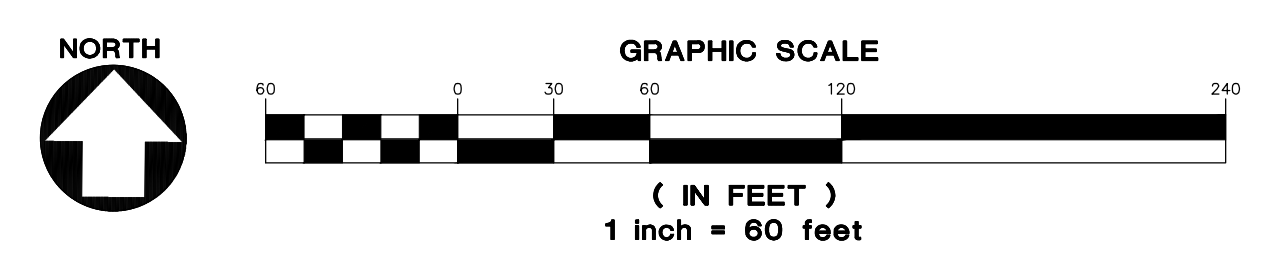
HEDGES CREEK
TUALATIN, OR

SHEET TITLE
TREE REMOVAL & PROTECTION PLAN
DATE: 08/02/2021
DRAWN: KPM
CHECKED: CNH
REVISIONS:

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SHEET NUMBER

L1.0

JOB NUMBER: A20120.10



DESIGN REVIEW - 12/17/2021

F:\2020\A20120.20 - Walgroves - LA\CAD\Sheets\A20120.20.dwg - Dec. 21, 21 - 9:40 AM - ltong

Tree Id	Common Name	Latin Name	DBH	Condition (Health)	Status	Condition (Structure)	Observation Comments
1	Douglas fir	<i>Pseudotsuga menziesii</i>	38	Very Poor	Dying	Failed/Failing	
2	Douglas fir	<i>Pseudotsuga menziesii</i>	48	Good	Proposed Tree Removal	Good	
3	English hawthorn	<i>Crataegus monogyna</i>	9.85	Good	Proposed Tree Removal	Good	
4	Douglas fir	<i>Pseudotsuga menziesii</i>	38	Good	Proposed Tree Removal	Good	
5	Oregon ash	<i>Fraxinus latifolia</i>	18.44	Fair	Proposed Tree Removal	Very Poor	Damaged trunk
6	Oregon ash	<i>Fraxinus latifolia</i>	33.11	Fair	Proposed Tree Removal	Very Poor	Damaged trunk
7	Oregon ash	<i>Fraxinus latifolia</i>	30.33	Fair	Proposed Tree Removal	Very Poor	Damaged trunk
8	Sweet cherry	<i>Prunus avium</i>	8	Fair	Proposed Tree Removal	Fair	
9	Oregon white oak	<i>Quercus garryana</i>	18	Fair	Proposed Tree Removal	Fair	
10	English hawthorn	<i>Crataegus monogyna</i>	11.18	Fair	Proposed Tree Removal	Fair	
11	English hawthorn	<i>Crataegus monogyna</i>	7.81	Fair	Proposed Tree Removal	Fair	
12	Oregon white oak	<i>Quercus garryana</i>	12.04	Good	Proposed Tree Removal	Good	
13	BDS OTHER	Broadleaf Deciduous Small	9.85	Good	Proposed Tree Removal	Poor	
14	Oregon white oak	<i>Quercus garryana</i>	8		Proposed Tree Removal		
15	Oregon white oak	<i>Quercus garryana</i>	7	Good	Proposed Tree Removal	Good	
16	English hawthorn	<i>Crataegus monogyna</i>	8.37	Good	Proposed Tree Removal	Poor	
17	English hawthorn	<i>Crataegus monogyna</i>	8	Good	Proposed Tree Removal	Poor	
18	English hawthorn	<i>Crataegus monogyna</i>	8	Good	Proposed Tree Removal	Poor	
19	English hawthorn	<i>Crataegus monogyna</i>	7.21	Good	Proposed Tree Removal	Poor	
20	Apple	<i>Malus spp.</i>	12	Fair	Proposed Tree Removal	Fair	
21	BDS OTHER	Broadleaf Deciduous Small	10.82	Fair	Proposed Tree Removal	Fair	
22	Oregon ash	<i>Fraxinus latifolia</i>	14	Good	Proposed Tree Removal	Good	
23	Oregon ash	<i>Fraxinus latifolia</i>	10	Fair	Proposed Tree Removal	Fair	
24	Pine	<i>Pinus spp.</i>	11	Good	Proposed Tree Removal	Good	
25	Pine	<i>Pinus spp.</i>	9	Good	Proposed Tree Removal	Good	
26	Pine	<i>Pinus spp.</i>	9	Good	Proposed Tree Removal	Good	
27	Pine	<i>Pinus spp.</i>	8	Good	Proposed Tree Removal	Good	

28	Pacific service berry	Amelanchier alnifolia	6.71	Good	Proposed Tree Removal	Good
29	Scouler willow	Salix scouleriana	9.85	Good	Proposed Tree Removal	Good
30	Oregon white oak	Quercus garryana	8.25	Good	Proposed Tree Removal	Good
31	Oregon white oak	Quercus garryana	8.25	Good	Proposed Tree Removal	Good
32	Oregon white oak	Quercus garryana	6	Good	Proposed Tree Removal	Good
33	English hawthorn	Crataegus monogyna	8.77	Fair	Proposed Tree Removal	Fair
34	English hawthorn	Crataegus monogyna	8.77	Fair	Proposed Tree Removal	Fair
35	Oregon ash	Fraxinus latifolia	7.55	Fair	Proposed Tree Removal	Fair
36	Sweet cherry	Prunus avium	10	Good	Proposed Tree Removal	Fair
37	Sweet cherry	Prunus avium	10	Fair	Proposed Tree Removal	Fair
38	Pine	Pinus spp.	8	Fair	Proposed Tree Removal	Fair
39	Oregon white oak	Quercus garryana	44	Good	Proposed Tree Removal	Good
40	Oregon white oak	Quercus garryana	38	Good	Proposed Tree Removal	Good
41	Oregon white oak	Quercus garryana	31.58	Good	Proposed Tree Removal	Good
42	Apple	Malus spp.	18.36	Good	Proposed Tree Removal	Good
43	Apple	Malus spp.	18.36	Good	Proposed Tree Removal	Good
44	Oregon white oak	Quercus garryana	23	Good	Proposed Tree Removal	Good
45	Madrone	Arbutus menziesii	35.79	Fair	Proposed Tree Removal	Failed/Failing
46	Port orford cedar	Chamaecyparis lawsoniana	44.34	Good	Proposed Tree Removal	Good
47	Port orford cedar	Chamaecyparis lawsoniana	38	Fair	Proposed Tree Removal	Fair
48	Oregon white oak	Quercus garryana	27.5	Good	Proposed Tree Removal	Good
49	Oregon white oak	Quercus garryana	41	Good	Proposed Tree Removal	Good
50	Oregon white oak	Quercus garryana	30	Good	Proposed Tree Removal	Good
51	Oregon ash	Fraxinus latifolia	10	Good	Proposed Tree Removal	Good
52	Black locust	Robinia pseudoacacia	19	Fair	Proposed Tree Removal	Fair
53	Oregon ash	Fraxinus latifolia	8	Fair	Proposed Tree Removal	Fair
54	English hawthorn	Crataegus monogyna	10	Fair	Proposed Tree Removal	Fair
55	Oregon white oak	Quercus garryana	14	Fair	Proposed Tree Removal	Fair
56	Oregon ash	Fraxinus latifolia	17	Fair	Proposed Tree Removal	Fair
57	Oregon ash	Fraxinus latifolia	12.21	Fair	Proposed Tree Removal	Fair
58	Oregon ash	Fraxinus latifolia	13.89	Fair	Proposed Tree Removal	Fair
59	Oregon ash	Fraxinus latifolia	10	Fair	Proposed Tree Removal	Fair
60	Oregon ash	Fraxinus latifolia	9	Fair	Proposed Tree Removal	Fair
61	Oregon ash	Fraxinus latifolia	11	Fair	Proposed Tree Removal	Fair
62	Oregon white oak	Quercus garryana	20	Fair	Proposed Tree Removal	Fair

63	Douglas fir	Pseudotsuga menziesii	20	Fair	Proposed Tree Removal	Fair	
64	Oregon ash	Fraxinus latifolia	24	Poor	Proposed Tree Removal	Fair	Neighboring property
65	Oregon ash	Fraxinus latifolia	18	Fair	Proposed Tree Removal	Fair	Neighboring property
66	Oregon ash	Fraxinus latifolia	20	Fair	Proposed Tree Removal	Fair	
67	Oregon ash	Fraxinus latifolia	14	Very Poor	Proposed Tree Removal	Failed/Failing	
68	Oregon ash	Fraxinus latifolia	26	Poor	Proposed Tree Removal	Failed/Failing	
69	Oregon ash	Fraxinus latifolia	19.8	Fair	Proposed Tree Removal	Fair	
70	Oregon ash	Fraxinus latifolia	19.8	Fair	Proposed Tree Removal	Fair	
71	Oregon ash	Fraxinus latifolia	14	Fair	Proposed Tree Removal	Fair	
72	Douglas fir	Pseudotsuga menziesii	24	Very Poor	Proposed Tree Removal	Failed/Failing	Blow down
73	Oregon ash	Fraxinus latifolia	17	Good	Protected Tree	Good	
74	Oregon ash	Fraxinus latifolia	17	Good	Protected Tree	Good	
75	Oregon ash	Fraxinus latifolia	9	Good	Proposed Tree Removal	Good	
76	Oregon ash	Fraxinus latifolia	10	Good	Protected Tree	Good	
77	Oregon ash	Fraxinus latifolia	8	Good	Protected Tree	Good	
78	Oregon ash	Fraxinus latifolia	22	Good	Protected Tree	Good	
79	Oregon ash	Fraxinus latifolia	14	Good	Protected Tree	Good	
80	Oregon white oak	Quercus garryana	28	Good	Protected Tree	Good	
81	Oregon white oak	Quercus garryana	28	Good	Protected Tree	Good	
82	Oregon white oak	Quercus garryana	18	Good	Protected Tree	Good	
83	Oregon ash	Fraxinus latifolia	14	Fair	Protected Tree	Good	
84	Oregon ash	Fraxinus latifolia	14	Fair	Protected Tree	Good	
85	Oregon ash	Fraxinus latifolia	16.88	Fair	Protected Tree	Good	
86	Oregon ash	Fraxinus latifolia	18	Fair	Protected Tree	Good	
87	Oregon ash	Fraxinus latifolia	12	Good	Protected Tree	Good	
88	Oregon ash	Fraxinus latifolia	12	Good	Protected Tree	Good	
89	Oregon ash	Fraxinus latifolia	16	Fair	Protected Tree	Good	
90	Oregon ash	Fraxinus latifolia	16	Good	Protected Tree	Good	
91	Oregon ash	Fraxinus latifolia	14	Good	Protected Tree	Good	
92	Oregon ash	Fraxinus latifolia	12	Dead/Dying	Dying	Failed/Failing	
93	Oregon ash	Fraxinus latifolia	15	Poor	Protected Tree	Fair	
94	Oregon ash	Fraxinus latifolia	8	Poor	Proposed Tree Removal	Fair	
95	Oregon ash	Fraxinus latifolia	9	Poor	Proposed Tree Removal	Fair	
96	Pacific service berry	Amelanchier alnifolia	7	Good	Proposed Tree Removal	Good	
97	Oregon ash	Fraxinus latifolia	15	Good	Proposed Tree Removal	Good	

Prepared by:
Peter van Oss PN-8145A

NW SavAtree

11/18/2021

98	English hawthorn	Crataegus monogyna	7	Fair	Proposed Tree Removal	Poor
99	English hawthorn	Crataegus monogyna	8	Fair	Proposed Tree Removal	Poor
100	English hawthorn	Crataegus monogyna	6	Fair	Proposed Tree Removal	Poor
101	English hawthorn	Crataegus monogyna	7	Fair	Proposed Tree Removal	Poor
102	Oregon ash	Fraxinus latifolia	8	Fair	Proposed Tree Removal	Fair
103	Oregon ash	Fraxinus latifolia	7	Good	Proposed Tree Removal	Good



lancaster
moblely

Hedges Creek Industrial Transportation Impact Study Tualatin, Oregon

Date:

January 6, 2022

Prepared for:

Sarah Every
Phelan Development

Prepared by:

Daniel Stumpf, PE



RENEWS: 6/30/2022

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Executive Summary

1. The proposed Hedges Creek Industrial project will include the construction of three industrial buildings, totaling approximately 442,035 square feet, where approximately 40 percent of the development will consist of manufacturing land uses while the remaining 60 percent will consist of warehousing space. The site is located at 11345 SW Herman Road (lot 2S122D000550) where the development will access the transportation system via four driveways along SW Myslony Street.
2. The trip generation calculations show that the proposed use is projected to generate a total of 165 morning peak hour trips, 179 evening peak hour trips, and 1,294 average weekday trips. Of these trips, the proposed use is projected to generate 10 morning peak hour truck trips, 13 evening peak hour truck trips, and 240 average weekday truck trips.
3. Based on a review of the most recent five years of available crash data, the study intersections of SW Tualatin-Sherwood Road at SW 124th Avenue and SW Tualatin-Sherwood Road at SW 112th Avenue were identified to have crash rates in excess of 1.00 CMEV. Upon closer inspection, the predominate crash type reported at both intersections were rear-end collisions that occurred along the SW Tualatin-Sherwood Road intersection approaches. Washington County is planning to widen SW Tualatin-Sherwood Road, which will add capacity to these intersection approaches and subsequently reduce the number of future recurring rear-end collisions at each intersection. No additional mitigation is necessary or recommended at these intersections and all other study intersections are expected to operate safely based on the available crash data.
4. Adequate intersection sight distances are available at the two westernmost site access intersections (i.e. Intersections 2 and 4) to allow safe and efficient operation along SW Myslony Street. Accordingly, no sight distance related mitigation is necessary or recommended at these two access intersections. Once the extension of SW Myslony Street along the rest of the site frontage has been completed, the two easternmost site access intersections (Intersections 5 and 6) should be designed in a manner to safely accommodate vehicles turning to and from these accesses.
5. Left-turn lane warrants are not projected to be met for the applicable site access intersections along SW Myslony Street under any analysis scenario through year 2024, regardless of whether or not the proposed development is constructed.
6. Traffic signal warrants are met at the intersection of SW Myslony Street at SW 124th Avenue under existing year conditions. As part of a 2018 Tualatin Bond Issue for the SW Myslony Street extension project, the intersection of SW Myslony Street at SW 124th Avenue was approved and currently planned for installation of a traffic signal. Therefore, no mitigation as part of the proposed development is necessary. Traffic signal warrants are not projected to be met at the intersection of SW Myslony Street at SW 112th Avenue under any of the analysis scenarios.
7. All study intersections are currently operating acceptably per jurisdictional standards and are projected to continue operating acceptably through the 2024 site buildout year.

Project Description

Introduction

The proposed Hedges Creek Industrial project will include the construction of three industrial buildings, totaling approximately 442,035 square feet, where approximately 40 percent of the development will consist of manufacturing land uses while the remaining 60 percent will consist of warehousing space. The site is located at 11345 SW Herman Road (lot 2S122D000550) where the development will access the transportation system via four driveways along SW Myslony Street.

Based on correspondence with City of Tualatin staff and their transportation consultant, the report conducts safety and capacity/level of service analyses at the following intersections during the morning and evening peak hours:

1. SW Myslony Street at SW 124th Avenue;
2. West Truck Access at SW Myslony Street;
3. SW Myslony Street at SW 112th Avenue;
4. West General Access at SW Myslony Street;
5. East Truck Access at SW Myslony Street;
6. East General Access at SW Myslony Street;
7. SW Tualatin-Sherwood Road at SW 124th Avenue; and
8. SW Tualatin-Sherwood Road at SW 112th Avenue.

The purpose of this study is to determine whether the transportation system within the vicinity of the site is capable of safely and efficiently supporting the existing and proposed uses, and to determine any mitigation that may be necessary to do so. Detailed information on traffic counts, trip generation calculations, safety analyses, and level of service calculations is included in the appendix to this report.

Location Description

The site is located north of SW Myslony Street and east of SW 118th Avenue in Tualatin, Oregon. The subject site is located within a predominately industrial area of the City, with industrial uses and undeveloped land surrounding the site in all directions.

The project site includes the southern portion of tax lot 550, where the net site area encompasses an approximate 19.6 acres. The project site is currently undeveloped but following buildout of the proposed development the site will take access to Myslony Street via four driveways.

Figure 1 presents an aerial image of the nearby vicinity with the project site outlined in yellow and tax lot 550 outlined in red.

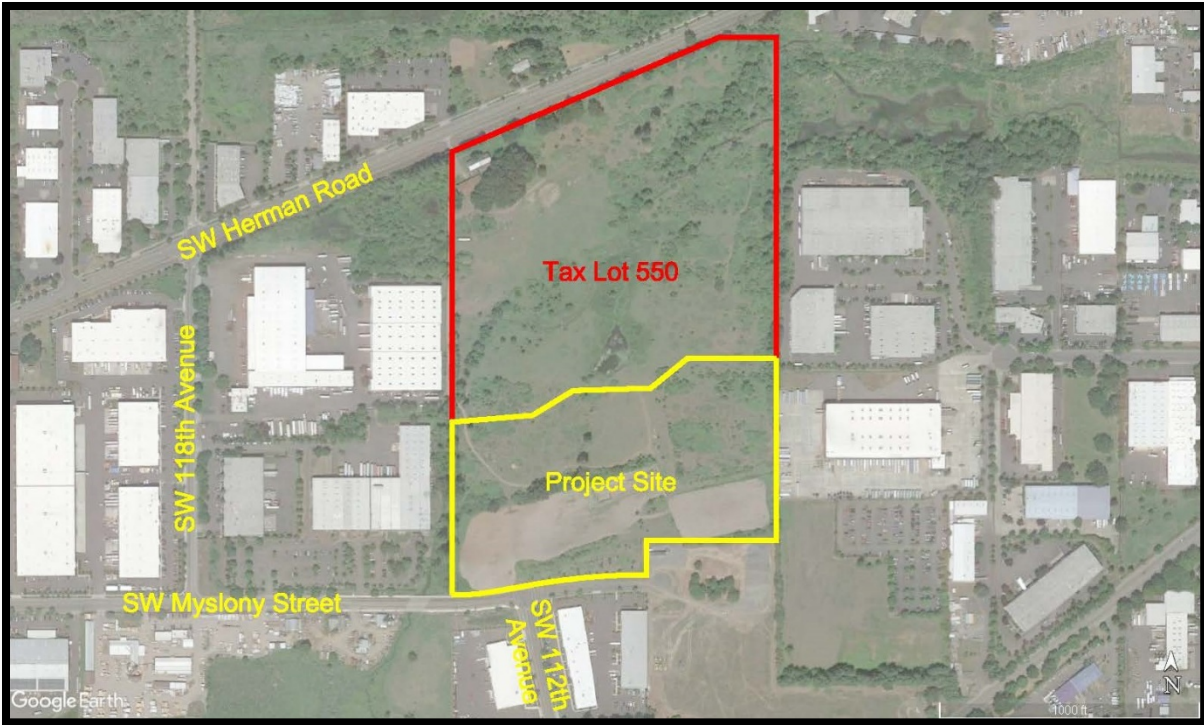


Figure 1: Aerial Photo of Site Vicinity (Image from Google Earth)

Vicinity Streets

The proposed development is expected to impact five roadways near the site. Table 1 provides a description of each vicinity roadway.

Table 1: Vicinity Roadway Descriptions

Street Name	Jurisdiction	Functional Classification	Speed (MPH)	On-Street Parking	Curbs & Sidewalks	Bicycle Lanes
SW Myslony Street	City of Tualatin	Major Collector	25	Partially Permitted	Partial Both Sides	Partial Both Sides
SW Tualatin-Sherwood Road	Washington County	Major Arterial	45	Not Permitted	Both Sides	Both Sides
SW 124th Avenue	City of Tualatin	Major Arterial	45	Not Permitted	Partial Both Sides	Partial Both Sides
SW 112th Avenue	City of Tualatin	Major Collector	25	Not Permitted	Both Sides	Both Sides
SW Avery Street	City of Tualatin	Major Collector	35	Not Permitted	Both Sides	Both Sides

Table Notes: Functional classification based on City of Tualatin TSP.

Study Intersections

Based on coordination with City of Tualatin and Washington County staff, four existing intersections were identified for analysis. A summarized description of these study intersections, under their existing lane configurations, is provided in Table 2.

Table 2: Study Intersection Descriptions

Number	Intersection	Geometry	Traffic Control	Phasing/Stopped Approaches
1	SW Myslony Street at SW 124th Avenue	Four-Legged	Stop-Controlled	Stop-Controlled EB/WB Approaches, Center Two-Way Left-turn Lane
3	SW Myslony Street at SW 112th Avenue	Three-Legged	Stop-Controlled	All-Way Stop-Controlled (Except EB Right-turn)
7	SW Tualatin-Sherwood Road at SW 124th Avenue	Four-Legged	Signalized	FYA NB/SB/EB/WB Left-turns, Overlap SB/EB/WB Right-turns
8	SW Tualatin-Sherwood Road at SW 112th Avenue	Four-Legged	Signalized	FYA NEB/SWB Left-turns, Protected NWB/SEB Left-turns, Overlap NEB/SWB Right-turns

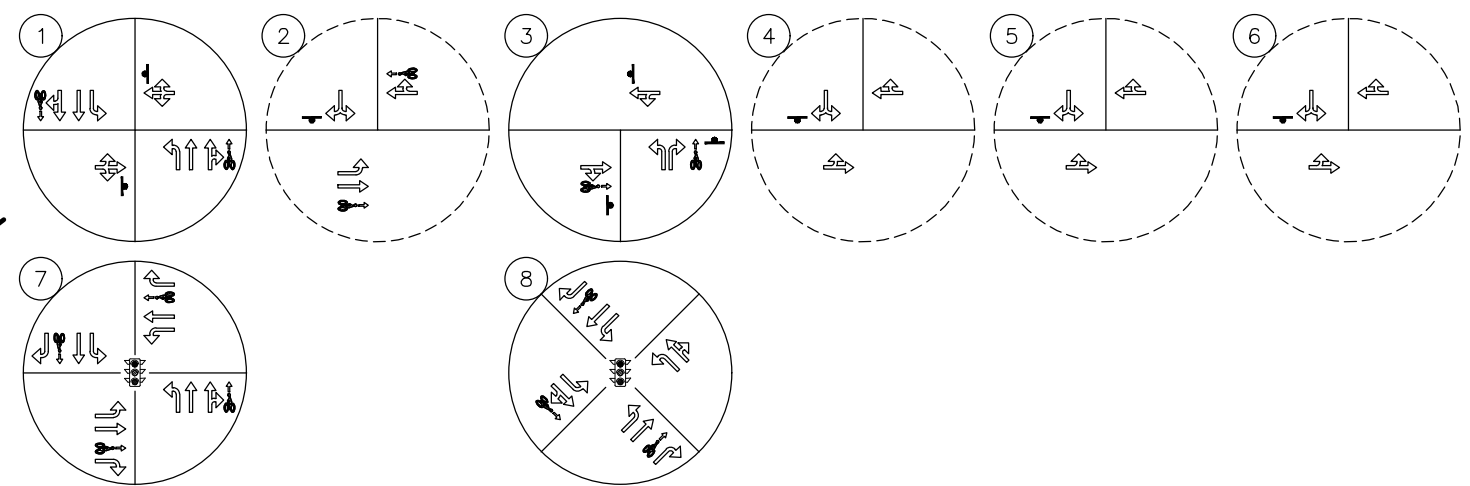
Table Notes: Flashing-Yellow-Arrow denoted as FYA.

Based on correspondence with City of Tualatin staff as well as referencing the *Four-S Corp Distribution Center Transportation Impact Study (TIS)*, dated August 28th, 2018, the intersection of SW Myslony Street at SW 124th Avenue is planned for signalization in the near-future. For the purposes of this analysis, the intersection was analyzed assuming operation under two-way stop-control and traffic signal control for future year 2024 conditions.

Transit

The project site is located near bus line 97 – *Tualatin-Sherwood Road*, which has stops located within a half-mile walking/biking distance of the project site. The nearest transit stops to the site are located at the intersection of SW Tualatin-Sherwood Road at SW 112th Avenue. Complete sidewalks and marked crossings at intermittent public intersections are available between the site and these transit stops. Weekday morning service is scheduled between approximately 6:20 AM to 9:30 AM while afternoon service is scheduled between approximately 3:10 PM to 7:00 PM, with typical headways off approximately 60 to 70 minutes. Weekend bus service is not provided for this transit route.

A vicinity map showing the project site, vicinity streets, and study intersection configurations is shown in Figure 2.



LEGEND

STUDY INTERSECTION (EXISTING)	PROJECT SITE
STUDY INTERSECTION (PROPOSED)	ARTERIAL ROADWAY
STOP SIGN	COLLECTOR ROADWAY
TRAFFIC SIGNAL	LOCAL ROADWAY
BIKE LANE	FUTURE/PROPOSED ROADWAY



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VICINITY MAP

Site Trips

Trip Generation

The proposed Hedges Creek Industrial development will include the construction of three industrial buildings, totaling approximately 442,035 square feet, where approximately 40 percent of the development will consist of manufacturing land uses while the remaining 60 percent will consist of warehousing space. To estimate the number of trips that will be generated by the proposed use, trip rates from the *Trip Generation Manual*¹ were used. Specifically, data from land use codes 140, *Manufacturing*, and 150, *Warehousing*, were used based on the square-footage of the gross building floor area.

The trip generation calculations show that the proposed use is projected to generate a total of 165 morning peak hour trips, 179 evening peak hour trips, and 1,294 average weekday trips. Of these trips, the proposed use is projected to generate 10 morning peak hour truck trips, 13 evening peak hour truck trips, and 240 average weekday truck trips. The trip generation estimates associated with the proposed development are summarized in Table 3 and detailed trip generation calculations are included in the appendix.

Table 3: Trip Generation Summary

	ITE Code	Size	Morning Peak Hour			Evening Peak Hour			Weekday Total
			Enter	Exit	Total	Enter	Exit	Total	
Total Trip Generation									
Manufacturing	140	176,814 SF	91	29	120	41	90	131	840
Warehousing	150	265,221 SF	35	10	45	13	35	48	454
Total Trips		442,035 SF	126	39	165	54	125	179	1,294
Truck Trip Generation									
Manufacturing	140	176,814 SF	3	2	5	2	3	5	80
Warehousing	150	265,221 SF	3	2	5	4	4	8	160
Total Trips		442,035 SF	6	4	10	6	7	13	240
Passenger Vehicle Trip Generation									
Manufacturing	140	176,814 SF	88	27	115	39	87	126	760
Warehousing	150	265,221 SF	32	8	40	9	31	40	294
Total Trips		442,035 SF	120	35	155	48	118	166	1,054

¹ Institute of Transportation Engineers (ITE), *Trip Generation Manual*, 11th Edition, 2021.

Trip Distribution

The directional distribution of site trips to/from the project site was estimated based on the locations of likely trip destinations, locations of major transportation facilities in the site vicinity, and existing travel patterns at the study intersections. Based on correspondence with City of Tualatin staff and their consulting transportation engineer, the following trip distribution was confirmed and utilized:

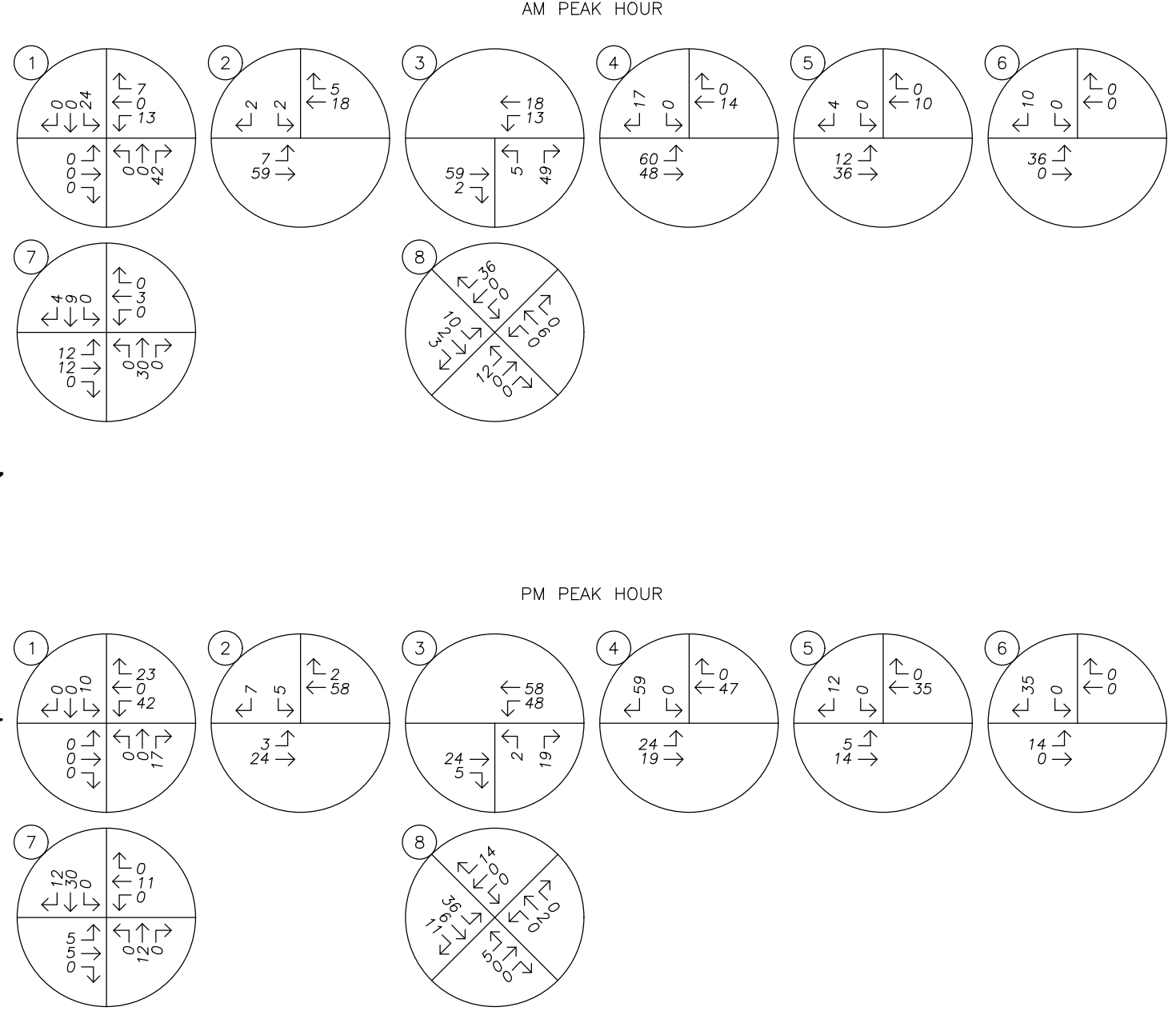
- Approximately 30 percent of site trips will travel to/from the east along SW Tualatin-Sherwood Road;
- Approximately 25 percent of site trips will travel to/from the south along SW 124th Avenue (via SW Myslony Street);
- Approximately 20 percent of site trips will travel to/from the west along SW Tualatin-Sherwood Road (split distribution between SW 124th Avenue/SW Myslony Street and SW 112th Avenue);
- Approximately 20 percent of site trips will travel to/from the north along SW 124th Avenue (via Myslony); and
- Approximately 5 percent of site trips will travel to/from the east along SW Avery Street.

Based on the site plan layout, site trip as assumed to utilize the site access driveways as follows:

2. West Truck Access at SW Myslony Street:
 - Approximately 25 percent of truck trips will utilize this access.
 - Approximately 10 percent of passenger vehicle trips will utilize this access.
4. West General Access at SW Myslony Street:
 - Approximately 50 percent of passenger vehicle trips will utilize this access.
5. East Truck Access at SW Myslony Street:
 - Approximately 75 percent of truck trips will utilize this access.
 - Approximately 10 percent of passenger vehicle trips will utilize this access.
6. East General Access at SW Myslony Street:
 - Approximately 30 percent of passenger vehicle trips will utilize this access.

The trip distribution and assignment for the site trips generated during the morning and evening peak hours is shown in the following figures:

- Figure 3 – Passenger Vehicle Trips
- Figure 4 – Truck Trips
- Figure 5 – Total Trips



LEGEND

XX% PERCENT OF PROJECT TRIPS

PASSENGER VEHICLE TRIP GENERATION			
	IN	OUT	TOTAL
AM	120	35	155
PM	48	118	166



No Scale



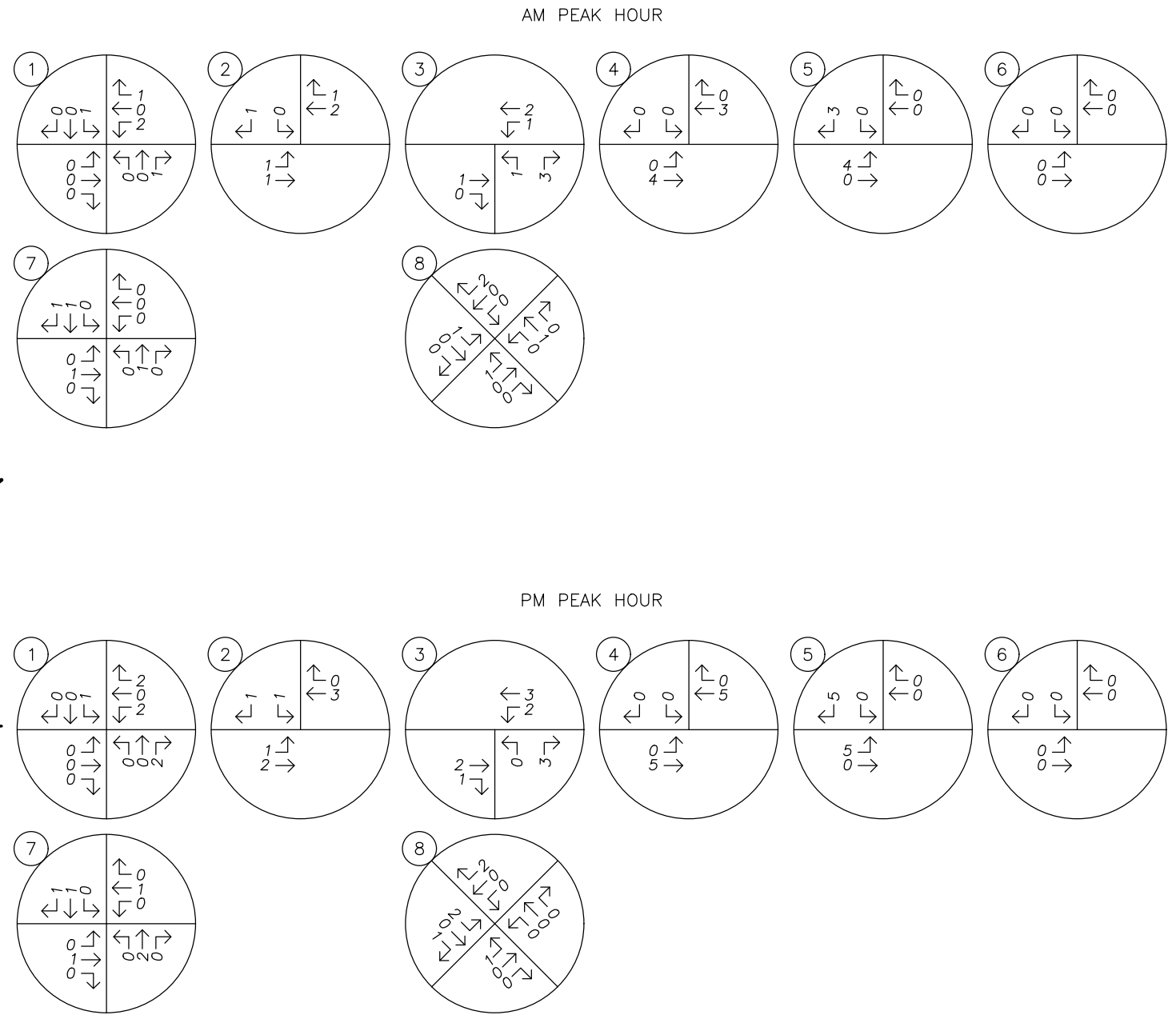
SITE TRIP DISTRIBUTION & ASSIGNMENT
 Proposed Development Plan - Passenger Vehicle Trips
 AM & PM Peak Hours



LEGEND

XX% PERCENT OF PROJECT TRIPS

TRUCK TRIP GENERATION			
	IN	OUT	TOTAL
AM	6	4	10
PM	6	7	13



SITE TRIP DISTRIBUTION & ASSIGNMENT

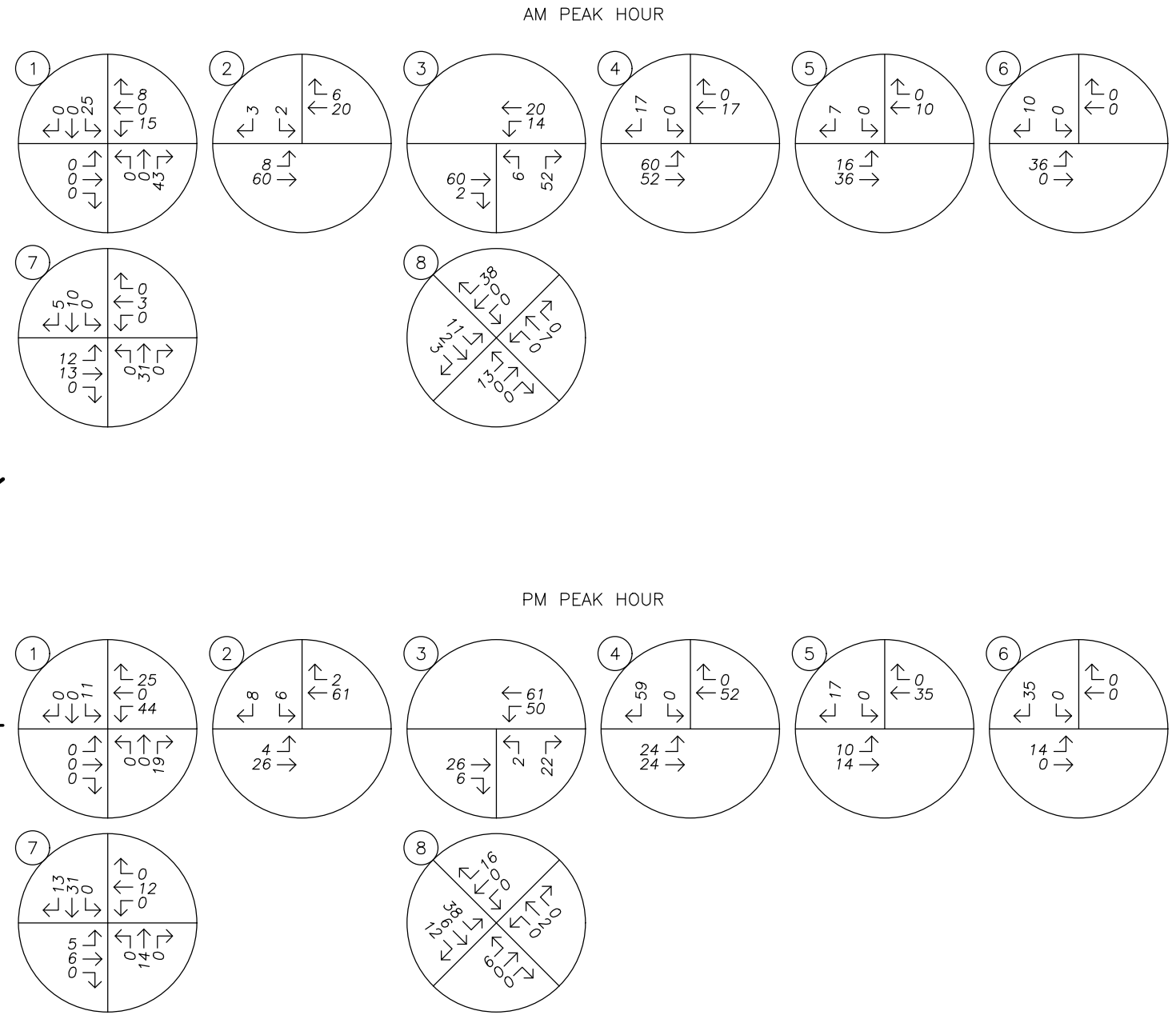
Proposed Development Plan - Truck Trips
AM & PM Peak Hours



LEGEND

XX% PERCENT OF PROJECT TRIPS

TOTAL TRIP GENERATION			
	IN	OUT	TOTAL
AM	126	39	165
PM	54	125	179



SITE TRIP DISTRIBUTION & ASSIGNMENT

Proposed Development Plan - Total Trips
AM & PM Peak Hours

Traffic Volumes

Existing Conditions

Due to the ongoing COVID-19 viral pandemic, traffic volumes around Oregon have been depressed relative to normal conditions. A review of available traffic count data yielded historical traffic counts at the following intersections:

1. SW Myslony Street at SW 124th Avenue on Tuesday, October 8, 2019, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM.
3. SW Myslony Street at SW 112th Avenue on Tuesday, October 8, 2019, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM.
7. SW Tualatin-Sherwood Road at SW 124th Avenue on Thursday, February 7, 2019, from 7:00 AM to 9:00 AM and on Wednesday, February 6, 2019, from 4:00 PM to 6:00 PM.
8. SW Tualatin-Sherwood Road at SW 112th Avenue on Tuesday, October 8, 2019, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM.

Given these available counts and at the direction of the City of Tualatin's transportation consultant, the following methodology for data collection and volume adjustment was used:

- The historical 2019 intersection traffic counts were grown to reflect 2021 existing conditions by applying a conservative two percent per year compounded growth factor over a two-year period to the intersection volumes.
- At the direction of the City's transportation consultant, year 2021 intersection traffic counts were collected at the study intersections. These counts were collected on Tuesday, December 7, 2021, from 7:00 AM to 9:00 AM and from 4:00 PM to 6:00 PM.
- The 2019 historical count data (grown to reflect 2021 conditions) and the recently collected 2021 counts were compared. Based on the difference in total entering volumes at each of the study intersections during the morning and evening peak hours, adjustment factors were calculated. These adjustment factors are intended to estimate normal traffic conditions without impacts from the COVID-19 virus (i.e. normal commuter patterns, businesses open, school in session, etc).
- The calculated adjustment factors were applied to the collected 2021 morning and evening peak hour traffic counts.

Table 4 presents the calculated adjustment factors for each of the study intersections. Figure 6 shows the existing traffic volumes at the study intersections during the morning and evening peak hours.

Table 4: COVID-19 Adjustment Factor Calculations

	AM Peak Hour	PM Peak Hour
1. SW Myslony Street at SW 124th Avenue		
Collected 2021 Peak Hour Volumes	751	967
Historical 2019 Peak Hour Volumes	1,029	1,067
Compounded Growth Factor (2% Per Year Over 2 Years)	1.0404	1.0404
Historical 2019 Peak Hour Volumes (Grown to 2021)	1,071	1,110
New Volumes > Grown Historical Volumes?	No	No
Adjustment Factor	1.4261	1.1479
3. SW Myslony Street at SW 112th Avenue		
Collected 2021 Peak Hour Volumes	203	228
Historical 2019 Peak Hour Volumes	153	197
Compounded Growth Factor (2% Per Year Over 2 Years)	1.0404	1.0404
Historical 2019 Peak Hour Volumes (Grown to 2021)	159	205
New Volumes > Grown Historical Volumes?	Yes	Yes
Adjustment Factor	1.0000	1.0000
7. SW Tualatin-Sherwood Road at SW 124th Avenue		
Collected 2021 Peak Hour Volumes	2,121	2,584
Historical 2019 Peak Hour Volumes	2,274	2,492
Compounded Growth Factor (2% Per Year Over 2 Years)	1.0404	1.0404
Historical 2019 Peak Hour Volumes (Grown to 2021)	2,366	2,593
New Volumes > Grown Historical Volumes?	No	No
Adjustment Factor	1.1155	1.0035
8. SW Tualatin-Sherwood Road at SW 112th Avenue		
Collected 2021 Peak Hour Volumes	1,740	2,058
Historical 2019 Peak Hour Volumes	1,898	1,950
Compounded Growth Factor (2% Per Year Over 2 Years)	1.0404	1.0404
Historical 2019 Peak Hour Volumes (Grown to 2021)	1,975	2,029
New Volumes > Grown Historical Volumes?	No	Yes
Adjustment Factor	1.1351	1.0000



Background Conditions

To provide analysis of the impact of the proposed development on the nearby transportation facilities, an estimate of future traffic volumes is required. It is expected that the proposed development will be constructed and in operation by year 2024. In order to approximate the future year 2024 traffic volumes at the study intersections, a compounded growth rate of two percent per year for an assumed buildout condition of three years was applied to the adjusted 2021 existing traffic volumes.

In addition to the traffic volume growth described above, trips associated with several in-process developments within the site vicinity, there are currently approved but not yet fully constructed or occupied, were added to the existing volumes in addition to the calculated volume growth. The following projects were assumed to be completed and occupied prior to year 2024:

- Columbia Roofing Building Expansion (18525 SW 126th Place)
- API Expansion (12505 SW Herman Road)
- Tualatin Logistics (20400 SW Cipole Road)
- Lucky Foods Addition (11847 SW Itel Street)
- Tualatin Industrial Park (11045 SW Tualatin-Sherwood Road)
- Mutual Materials (10700 SW Tualatin-Sherwood Road)

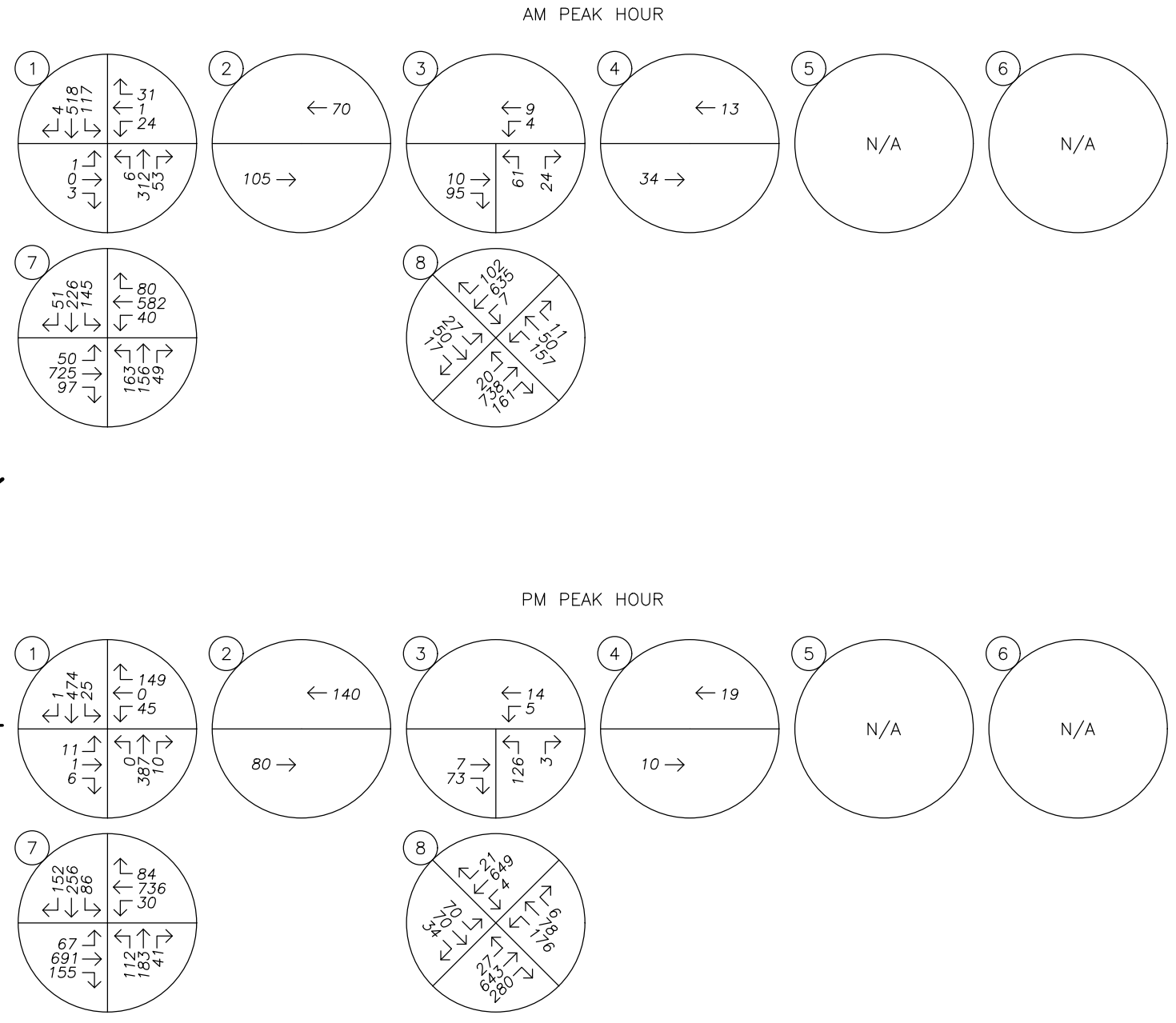
The in-process developments are currently not fully contributing trips to the transportation system but may potentially be by the assumed 2024 buildout year of the proposed development. Additional trips corresponding to each in-process development were added to the 2021 existing year traffic volumes in addition to the three years of traffic growth at each of the applicable study intersections. To maintain a conservative analysis of operation at the study intersections, the in-process developments were assumed to be fully built-out by year 2024.

Figure 7 shows the projected year 2024 background traffic volumes at the study intersections during the morning and evening peak hours. A figure depicting in-process trips is included in the appendix to this report.

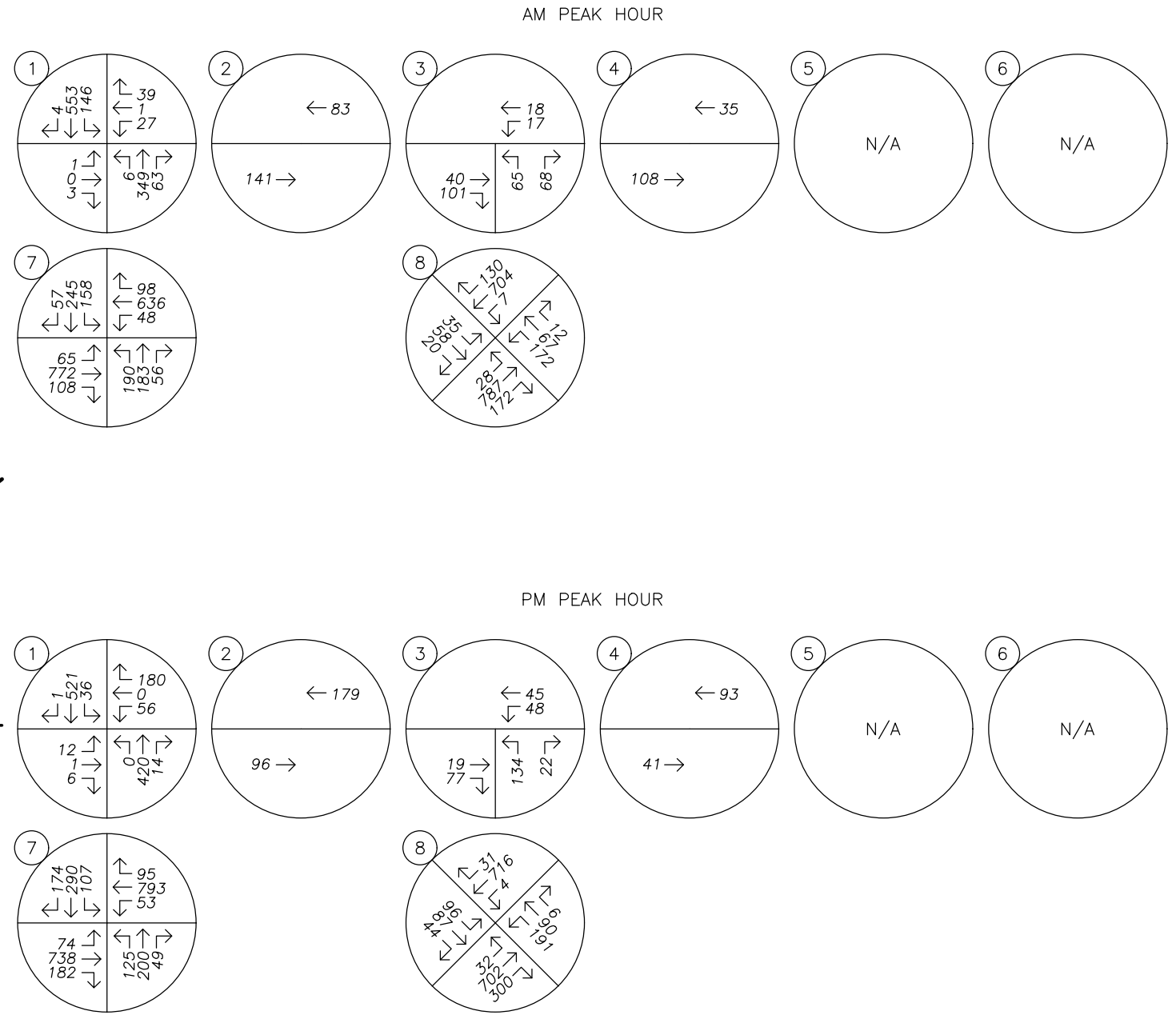
Buildout Conditions

Peak hour trips calculated to be generated by the proposed development, as described earlier within the *Site Trips* section, were added to the projected year 2024 background traffic volumes to obtain the expected 2024 site buildout volumes.

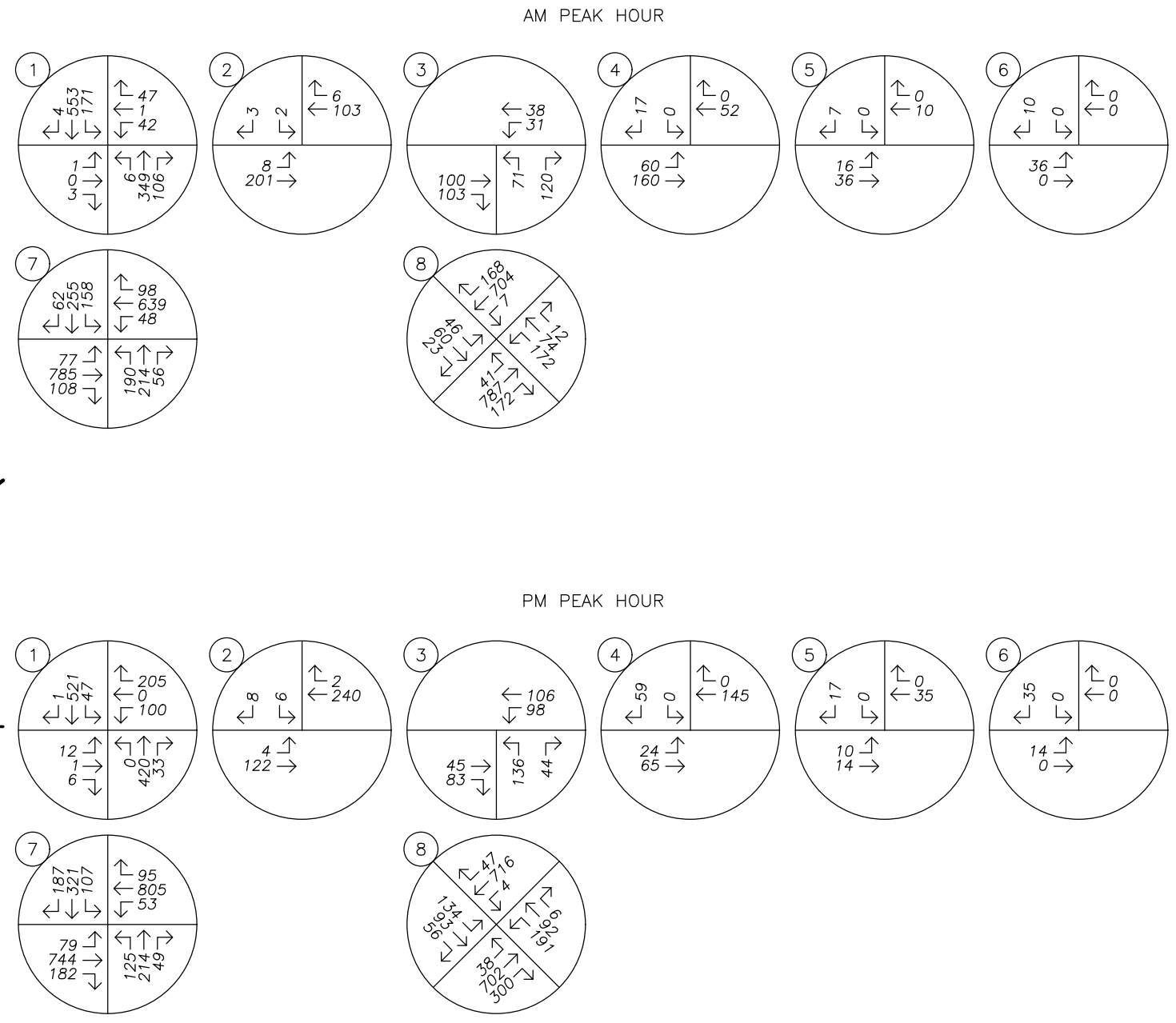
Figure 8 shows year 2024 buildout traffic volumes at the study intersections during the morning and evening peak hours.



TRAFFIC VOLUMES
 Year 2021 Existing Conditions
 AM & PM Peak Hours



TRAFFIC VOLUMES
 Year 2024 Background Conditions
 AM & PM Peak Hours



TRAFFIC VOLUMES
Year 2024 Buildout Conditions
AM & PM Peak Hours

Safety Analysis

Crash History Review

Using data obtained from ODOT’s Crash Analysis and Reporting Unit, a review was performed of the most recent five years of available crash data at the study intersections (January 2015 through December 2019). The crash data was evaluated based on the number of crashes, the type of collisions, the severity of the collisions, and the resulting crash rate for each intersection. Crash rates provide the ability to compare safety risks at different intersections by accounting for both the number of crashes that have occurred during the study period and the number of vehicles that typically travel through the intersection. Crash rates were calculated under the common assumption that traffic counted during the evening peak hour represents approximately ten percent of annual average daily traffic (AADT) at each intersection. Crash rates in excess of 1.00 crashes per million entering vehicles (CMEV) may be indicative of design deficiencies and therefore require a need for further investigation and possible mitigation.

With regard to crash severity, ODOT classifies crashes in the following categories:

- Property Damage Only (PDO);
- Possible Injury – Complaint of Pain (Injury C);
- Non-Incapacitating Injury (Injury B);
- Incapacitating Injury – Bleeding, Broken Bones (Injury A); and
- Fatality or Fatal Injury.

Table 5 provides a summary of crash types while Table 6 summarizes crash severities and rates for each of the study intersections. Detailed crash data is provided in the appendix to this report.

Table 5: Crash Type Summary

Number	Intersection	Crash Type						Total
		Rear End	Turn/ Angle	Fixed Object	Side swipe	Ped/ Bike	Other	
1	SW Myslony Street at SW 124th Avenue	0	2	0	1	0	0	3
3	SW Myslony Street at SW 112th Avenue	0	0	0	0	0	0	0
7	SW Tualatin-Sherwood Road at SW 124th Avenue	58	6	1	1	0	0	66
8	SW Tualatin-Sherwood Road at SW 112th Avenue	54	9	0	1	1	0	65



Table 6: Crash Severity and Rate Summary

Number	Intersection	Crash Severity						Total Crashes	AADT	Crash Rate
		PDO	C	B	A	Fatal	Unknown			
1	SW Myslony Street at SW 124th Avenue	1	1	1	0	0	0	3	11,090	0.148
3	SW Myslony Street at SW 112th Avenue	0	0	0	0	0	0	0	2,280	0.000
7	SW Tualatin-Sherwood Road at SW 124th Avenue	31	32	3	0	0	0	66	25,930	1.395
8	SW Tualatin-Sherwood Road at SW 112th Avenue	27	30	7	1	0	0	65	20,580	1.731

Table Notes: **BOLDED** text indicates a crash rate in excess of 1.00 CMEV or ODOT's 90th percentile rate.

There were two crashes at the intersection of SW Tualatin-Sherwood Road at SW 112th Avenue that involved either a bicyclist or was classified as Injury A.

- The bicycle-related collision occurred when a southwest-bound bicyclist failed to decrease their speed of travel and collided with a southwest-bound passenger car. The bicyclist sustained injuries consistent with Injury C classification while the occupant of the passenger car was uninjured.
- The crash that was classified as Injury A occurred when the driver of a southwest-bound passenger car rear-ended another passenger car stopped at the intersection. A third passenger car was struck after the initial collision occurred. Of the six occupants in the three vehicles, two people sustained injuries classified as Injury C, one person as Injury B, and one person as Injury A.

The intersections of SW Tualatin-Sherwood Road at SW 124th Avenue and SW Tualatin-Sherwood Road at SW 112th Avenue were identified to have crash rates in excess of 1.00 CMEV. Both intersections are included on the Washington County's Safety Priority Index System (SPIS) list and the following improvement per the City's Transportation System Plan (TSP) and Washington County website² is planned:

- Widen SW Tualatin-Sherwood Road to five lanes between SW Teton Avenue and SW Langer Farms Parkway.
 - Estimated construction start and completion dates: Summer 2022 to Fall 2025 (timing subject to change).
 - Project Cost: \$31.5 million, funding through Major Streets Transportation Improvement Program (MSTIP) Phase 3e.

² [Tualatin-Sherwood Road \(Langer Farms Parkway to Teton Avenue\) \(washington.or.us\)](https://www.washington.or.us/transportation/planning/transportation-system-plan)



Upon closer inspection, the predominate crash type reported at both intersections were rear-end collisions that occurred along the SW Tualatin-Sherwood Road intersection approaches (approximately 81 to 83 percent of intersection crashes). All other crash types at each intersection were relatively infrequent. Rear-end collisions are relatively common at signalized intersections, may result from limited capacity at the intersection or applicable roadway approaches, and are generally difficult to mitigate. In the case of the study intersections, the SW Tualatin-Sherwood Road approaches generally serve high volumes of traffic during the morning and evening peak hours via a single through lane in the eastbound and westbound directions of travel. As described above, the roadway widening project is expected to increase capacity and reduce congestion at the SW Tualatin-Sherwood Road study intersections, which is expected to subsequently reduce the frequency of recurring rear-end collisions along the SW Tualatin-Sherwood Road approaches of each intersection. No additional mitigation is necessary or recommended at these intersections.

No significant trends or crash patterns were identified at any of the other study intersections that were indicative of safety concerns.

Sight Distance Evaluation

Intersection sight distances were measured at two of the proposed site access locations along SW Myslony Street (Intersections 2 and 4) and evaluated in accordance with the standards established in *A Policy of Geometric Design of Highways and Streets*³. Note that field measurements were not conducted at the other two access intersections due to ongoing construction related to the Tualatin Industrial Park (11045 SW Tualatin-Sherwood Road) and the extension of SW Myslony Street occurring. Therefore, these site access driveways along the extension of SW Myslony Street should be designed to provide adequate sight distances to allow safe operation of these intersections.

Sight Distance Methodology

According to AASHTO, the driver's eye is assumed to be approximately 15 feet from the near edge of the nearest travel lane of the intersecting street and at a height of 3.5 feet above the minor-street approach pavement (7.6 feet for trucks). The vehicle driver's eye height along the major-street approach is assumed to be 3.5 feet above the cross-street pavement. Based on the assumed statutory/design speed of 25 mph along SW Myslony Street, the minimum recommended intersection sight distances include the following:

- 280 feet to the east for left-turn vehicles (425 feet for trucks).
- 240 feet to the west for right-turn vehicles (390 feet for trucks).

Note that for the segment of SW Myslony Street to the west of SW 112th Avenue, the roadway has a three-lane cross-section with a center two-way left-turn lane which could serve minor-street left-turn vehicles as a receiving lane. For Intersection 2 where left-turning vehicles are not required to immediately travel across more than one lane of traffic to enter the major-street (i.e. they can first enter the center two-way left-turn lane, or TWLTL) a time gap of 7.5 seconds (11.5 seconds for trucks) was utilized in lieu of 8.0 seconds (12.0 seconds for trucks) for a typical three-lane cross-section without a TWLTL.

³ American Association of State Highway and Transportation Officials (AASHTO), *A Policy on Geometric Design of Highways and Streets*, 6th Edition, 2011.

Per the AASHTO manual intersection sight distance is an operation measure intended to provide sufficient line of sight along the major-street so that a driver could turn from the minor-street approach without impeding traffic flow. Conversely, stopping sight distance is considered the minimum requirement to ensure safe operation of an intersection. This is the distance that allows an oncoming driver to see a hazard on the roadway, react, and come to a complete stop, if necessary, to avoid a collision. Based on the assumed statutory/design speed of 25 mph along SW Myslony Street, the minimum required stopping sight distance is 155 feet, assuming a major-street approach roadway grade of 3 percent or less.

2. West Truck Access at SW Myslony Street

At the west truck access intersection along SW Myslony Street, sight distances to the east and west were measured to be in excess of 300 feet for passenger vehicles and in excess of 450 feet for trucks. No sight distance related mitigation is necessary at this access intersection.

4. West General Access at SW Myslony Street

At the west general use access intersection along SW Myslony Street, sight distance to the east and west were measured to be in excess of 300 feet for passenger vehicles. No sight distance related mitigation is necessary at this access intersection.

Analysis Findings

Based on the above measurements, adequate intersection sight distances are available at the two westernmost site access intersections (i.e. Intersections 2 and 4) to allow safe and efficient operation along SW Myslony Street. Accordingly, no sight distance related mitigation is necessary or recommended at these two access intersections. Once the extension of SW Myslony Street has been completed along the rest of the site frontage, the two easternmost site access intersections (Intersections 5 and 6) should be designed in a manner to safely accommodate vehicles turning to and from these accesses.

Warrant Analysis

Left-turn lane and preliminary traffic signal warrants were examined at the study intersections where such treatments would be applicable.

Left-turn Lane Warrant

A left-turn refuge lane is primarily a safety consideration for the major-street, removing left-turning vehicles from the through traffic stream at unsignalized intersections. The left-turn lane warrants used were developed from the *National Cooperative Highway Research Project's (NCHRP) Report 457*. Turn lane warrants were evaluated based on the number of advancing and opposing vehicles as well as the number of turning vehicles, the travel speed, and the number of through lanes.

Left-turn lane warrants are not projected to be met for the applicable site access intersections along SW Myslony Street under any analysis scenario through year 2024, regardless of whether or not the proposed development is constructed. Accordingly, no new turn lanes are necessary or recommended.

Preliminary Traffic Signal Warrant

Preliminary traffic signal warrants were examined for the unsignalized study intersections of SW Myslony Street at SW 124th Avenue and SW Myslony Street at SW 112th Avenue to determine whether the installation of a new traffic signal will be warranted at the intersections by the 2024 buildout year of the site. Based on the analysis, traffic signal warrants are met at the intersection of SW Myslony Street at SW 124th Avenue under existing year conditions. As part of a 2018 Tualatin Bond Issue for the SW Myslony Street extension project, the intersection of SW Myslony Street at SW 124th Avenue was approved and currently planned for installation of a traffic signal. Therefore, no mitigation as part of the proposed development is necessary.

Traffic signal warrants are not projected to be met at the intersection of SW Myslony Street at SW 112th Avenue under any of the analysis scenarios.

Operational Analysis

Intersection Capacity Analysis

A capacity and delay analysis were conducted for each of the study intersections per the signalized and unsignalized intersection analysis methodologies in the *Highway Capacity Manual (HCM)*⁴. Intersections are generally evaluated based on the average control delay experienced by vehicles and are assigned a grade according to their operation. The level of service (LOS) of an intersection can range from LOS A, which indicates very little or no delay experienced by vehicles, to LOS F, which indicates a high degree of congestion and delay. The volume-to-capacity (v/c) ratio is a measure that compares the traffic volumes (demand) against the available capacity of an intersection.

Performance Standards

The operating standards adopted by the City of Tualatin and Washington County are summarized below.

City of Tualatin

The City of Tualatin requires signalized intersections to operate at a minimum LOS D or better and unsignalized intersections operate at LOS E or better. For both LOS and delay related to the analysis of unsignalized intersections, the reported result applies to the worst minor-street approach lane.

Washington County

Washington County requires intersections operate with a v/c ratio of 0.99 or less.

Delay & Capacity Analysis

As part of a 2018 Tualatin Bond Issue for the SW Myslony Street extension project, the intersection of SW Myslony Street at SW 124th Avenue was approved and currently planned for installation of a traffic signal. As such, the analysis of SW Myslony Street at SW 124th Avenue reflects intersection operation assuming both two-way stop-control and signal control for year 2024 analysis scenarios.

The LOS, delay, and v/c results of the capacity analysis are shown in Table 7 for the morning and evening peak hours. The TrafficWare Synchro software utilized for analysis does not report the overall v/c ratio of signalized intersections in the HCM 6th Edition capacity reports. For these intersections, the v/c ratio was calculated based on methods detailed in ODOT's *APM Section 13 Signalized Intersection Analysis*. Detailed calculations as well as tables showing the relationship between delay and LOS are included in the appendix to this report.

⁴ Transportation Research Board, *Highway Capacity Manual 6th Edition*, 2016.

Table 7: Capacity Analysis Summary

	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c	LOS	Delay (s)	v/c
1. SW Myslony Street at SW 124th Avenue						
2021 Existing Conditions	B	15	0.14	B	13	0.31
2024 Background Conditions (TWSC)	C	16	0.18	B	14	0.40
2024 Buildout Conditions (TWSC)	C	19	0.28	C	18	0.55
2024 Background Conditions (Signal)	A	7	0.35	A	6	0.31
2024 Buildout Conditions (Signal)	A	7	0.41	A	8	0.40
2. West Truck Access at SW Myslony Street						
2024 Buildout Conditions	A	10	0.01	B	11	0.03
3. SW Myslony Street at SW 112th Avenue						
2021 Existing Conditions	A	8	0.15	A	9	0.24
2024 Background Conditions	A	9	0.22	A	9	0.27
2024 Buildout Conditions	A	10	0.34	B	11	0.40
4. West General Access at SW Myslony Street						
2024 Buildout Conditions	A	9	0.05	A	10	0.09
5. East Truck Access at SW Myslony Street						
2024 Buildout Conditions	A	9	0.01	A	9	0.02
6. East General Access at SW Myslony Street						
2024 Buildout Conditions	A	8	0.03	A	8	0.04
7. SW Tualatin-Sherwood Road at SW 124th Avenue						
2021 Existing Conditions	C	34	0.84	C	30	0.81
2024 Background Conditions	D	40	0.92	C	34	0.89
2024 Buildout Conditions	D	40	0.94	D	37	0.92
8. SW Tualatin-Sherwood Road at SW 112th Avenue						
2021 Existing Conditions	C	24	0.73	C	23	0.64
2024 Background Conditions	C	28	0.79	C	27	0.71
2024 Buildout Conditions	C	29	0.79	C	29	0.73

Table Notes: **BOLDED** text indicates intersection operation above jurisdictional standards.

Based on the results of the operational analysis, all study intersections are currently operating acceptably per jurisdictional standards and are projected to continue operating acceptably through the 2024 site buildout year. Accordingly, no operational mitigation is necessary or recommended at the study intersections.

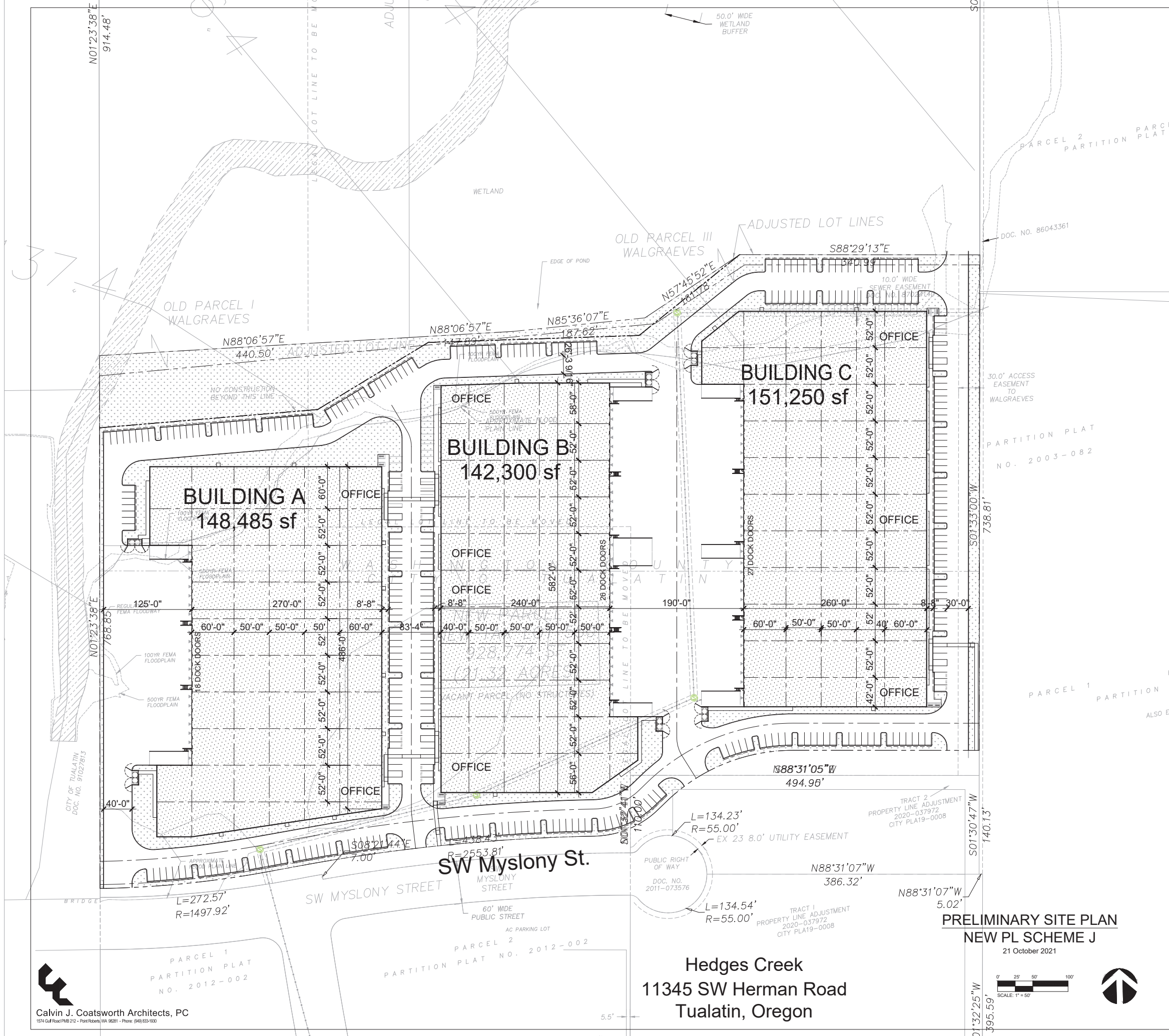
Conclusions

- Based on a review of the most recent five years of available crash data, the study intersections of SW Tualatin-Sherwood Road at SW 124th Avenue and SW Tualatin-Sherwood Road at SW 112th Avenue were identified to have crash rates in excess of 1.00 CMEV. Upon closer inspection, the predominate crash type reported at both intersections were rear-end collisions that occurred along the SW Tualatin-Sherwood Road intersection approaches. Washington County is planning to widen SW Tualatin-Sherwood Road, which will add capacity to these intersection approaches and subsequently reduce the number of future recurring rear-end collisions at each intersection. No additional mitigation is necessary or recommended at these intersections and all other study intersections are expected to operate safely based on the available crash data.
- Adequate intersection sight distances are available at the two westernmost site access intersections (i.e. Intersections 2 and 4) to allow safe and efficient operation along SW Myslony Street. Accordingly, no sight distance related mitigation is necessary or recommended at these two access intersections. Once the extension of SW Myslony Street along the rest of the site frontage has been completed, the two easternmost site access intersections (Intersections 5 and 6) should be designed in a manner to safely accommodate vehicles turning to and from these accesses.
- Left-turn lane warrants are not projected to be met for the applicable site access intersections along SW Myslony Street under any analysis scenario through year 2024, regardless of whether or not the proposed development is constructed.
- Traffic signal warrants are met at the intersection of SW Myslony Street at SW 124th Avenue under existing year conditions. As part of a 2018 Tualatin Bond Issue for the SW Myslony Street extension project, the intersection of SW Myslony Street at SW 124th Avenue was approved and currently planned for installation of a traffic signal. Therefore, no mitigation as part of the proposed development is necessary. Traffic signal warrants are not projected to be met at the intersection of SW Myslony Street at SW 112th Avenue under any of the analysis scenarios.
- All study intersections are currently operating acceptably per jurisdictional standards and are projected to continue operating acceptably through the 2024 site buildout year.

Appendix A

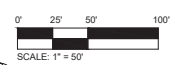
Site Plan





GROSS LOT AREA:	TBD
NET LOT AREA:	? sf
TOTAL BUILDING AREA:	442,035 sf
BUILDING A:	148,485 sf
BUILDING B:	142,300 sf
BUILDING C:	151,250 sf
SITE COVERAGE (on NET):	? %
DOCK DOOR RATIO:	
BUILDING A:	1 / 8,249 sf
BUILDING B:	1 / 5,473 sf
BUILDING C:	1 / 5,403 sf
PARKING REQUIRED:	336 spaces
BUILDING A:	113 spaces
WAREHOUSE (65%) at .3 per 1,000:	29 spaces
MANUFACTURING (35%) at 1.6 per 1,000:	84 spaces
BUILDING B:	108 spaces
WAREHOUSE (65%) at .3 per 1,000:	28 spaces
MANUFACTURING (35%) at 1.6 per 1,000:	80 spaces
BUILDING C:	115 spaces
WAREHOUSE (65%) at .3 per 1,000:	30 spaces
MANUFACTURING (35%) at 1.6 per 1,000:	85 spaces
PARKING PROVIDED:	344 spaces
BUILDING A:	119 spaces
0.80 per 1,000 sf	
BUILDING B:	102 spaces
0.72 per 1,000 sf	
BUILDING C:	123 spaces
0.81 per 1,000 sf	
LANDSCAPE REQUIRED:	? sf
LANDSCAPE PROVIDED:	TBD

PRELIMINARY SITE PLAN
NEW PL SCHEME J
 21 October 2021



Appendix B

Trip Generation Calculations





TRIP GENERATION CALCULATIONS - TOTAL VEHICLES

Land Use: Manufacturing
Land Use Code: 140
Setting/Location: General Urban/Suburban
Variable: 1,000 Square Feet
Variable Quantity: 176.814

AM PEAK HOUR

Trip Rate: 0.68

	Enter	Exit	Total
Directional Distribution	76%	24%	
Trip Ends	91	29	120

PM PEAK HOUR

Trip Rate: 0.74

	Enter	Exit	Total
Directional Distribution	31%	69%	
Trip Ends	41	90	131

WEEKDAY

Trip Rate: 4.75

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	420	420	840

SATURDAY

Trip Rate: 1.49

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	132	132	264



TRIP GENERATION CALCULATIONS - TRUCKS

Land Use: Manufacturing

Land Use Code: 140

Variable: 1,000 Square Feet of Gross Floor Area

Variable Quantity: 176.814

AM PEAK HOUR

Trip Rate: 0.03

	Enter	Exit	Total
Directional Distribution	56%	44%	
Trip Ends	3	2	5

PM PEAK HOUR

Trip Rate: 0.03

	Enter	Exit	Total
Directional Distribution	41%	59%	
Trip Ends	2	3	5

WEEKDAY

Trip Rate: 0.45

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	40	40	80



TRIP GENERATION CALCULATIONS - TOTAL VEHICLES

Land Use: Warehousing
Land Use Code: 150
Variable: 1,000 Square Feet
Variable Quantity: 265.221

AM PEAK HOUR

Trip Rate: 0.17

	Enter	Exit	Total
Directional Distribution	77%	23%	
Trip Ends	35	10	45

PM PEAK HOUR

Trip Rate: 0.18

	Enter	Exit	Total
Directional Distribution	28%	72%	
Trip Ends	13	35	48

WEEKDAY

Trip Rate: 1.71

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	227	227	454

SATURDAY

Trip Rate: 0.15

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	20	20	40



TRIP GENERATION CALCULATIONS - TRUCKS

Land Use: Warehousing
Land Use Code: 150
Variable: 1,000 Square Feet
Variable Quantity: 265.221

AM PEAK HOUR

Trip Rate: 0.02

	Enter	Exit	Total
Directional Distribution	52%	48%	
Trip Ends	3	2	5

PM PEAK HOUR

Trip Rate: 0.03

	Enter	Exit	Total
Directional Distribution	52%	48%	
Trip Ends	4	4	8

WEEKDAY

Trip Rate: 0.60

	Enter	Exit	Total
Directional Distribution	50%	50%	
Trip Ends	80	80	160

Appendix C

Traffic Counts

In-Process Development Trips





ALL TRAFFIC DATA SERVICES

(303) 216-2439

www.alltrafficdata.net

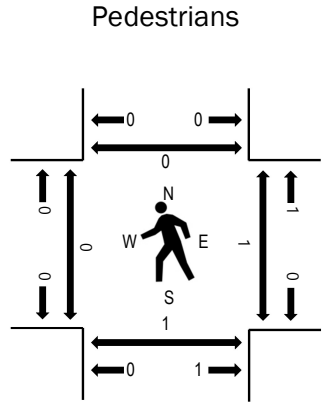
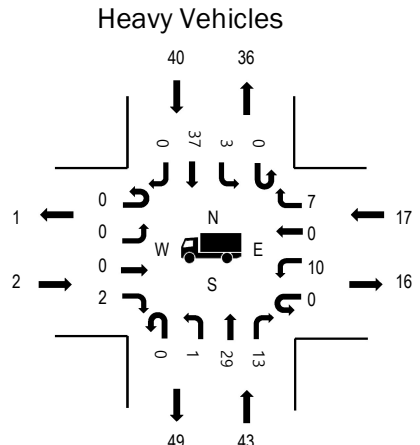
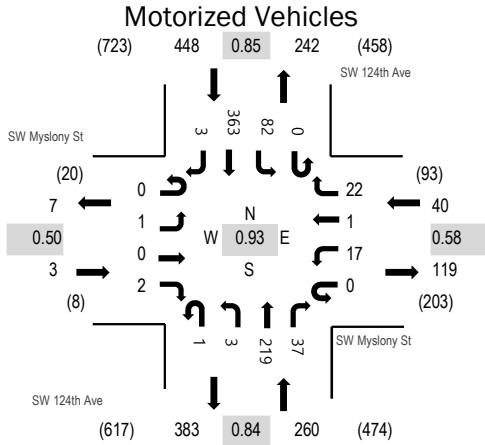
Location: 1 SW 124th Ave & SW Myslony St AM

Date: Tuesday, December 7, 2021

Peak Hour: 07:45 AM - 08:45 AM

Peak 15-Minutes: 08:15 AM - 08:30 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	66.7%	0.50
WB	42.5%	0.58
NB	16.5%	0.84
SB	8.9%	0.85
All	13.6%	0.93

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Myslony St Eastbound				SW Myslony St Westbound				SW 124th Ave Northbound				SW 124th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	0	0	0	0	1	2	0	1	16	3	0	5	18	0	46	621
7:05 AM	0	0	0	0	0	1	0	1	0	0	17	1	0	7	19	0	46	635
7:10 AM	0	1	0	0	0	2	2	3	0	1	9	2	0	7	13	0	40	646
7:15 AM	0	0	0	1	0	3	0	2	0	0	18	6	0	2	19	1	52	660
7:20 AM	0	1	0	0	0	3	0	2	0	0	12	5	0	2	14	1	40	679
7:25 AM	0	0	1	0	0	0	0	5	0	1	16	5	0	4	13	0	45	696
7:30 AM	0	1	0	0	0	1	0	0	0	0	18	2	0	7	13	2	44	724
7:35 AM	0	0	0	0	0	3	0	2	0	0	19	4	0	6	31	1	66	743
7:40 AM	0	0	0	0	0	1	0	2	0	0	18	1	0	5	24	1	52	742
7:45 AM	0	0	0	0	0	1	0	3	0	0	23	2	0	15	26	0	70	751
7:50 AM	0	0	0	0	0	1	0	1	0	1	19	5	0	6	15	2	50	736
7:55 AM	0	0	0	0	0	1	0	4	0	0	26	2	0	14	23	0	70	747
8:00 AM	0	0	0	0	0	2	0	1	0	1	10	3	0	10	32	1	60	
8:05 AM	0	0	0	0	0	2	1	1	0	0	19	3	0	7	24	0	57	
8:10 AM	0	1	0	1	0	2	0	3	0	0	17	3	0	2	25	0	54	
8:15 AM	0	0	0	0	0	3	0	2	0	0	17	4	0	5	40	0	71	
8:20 AM	0	0	0	1	0	1	0	2	0	0	17	3	0	6	27	0	57	
8:25 AM	0	0	0	0	0	1	0	3	0	1	18	3	0	5	42	0	73	
8:30 AM	0	0	0	0	0	0	0	2	0	0	20	2	0	2	37	0	63	
8:35 AM	0	0	0	0	0	2	0	0	0	0	14	4	0	2	43	0	65	
8:40 AM	0	0	0	0	0	1	0	0	1	0	19	3	0	8	29	0	61	
8:45 AM	0	0	0	0	0	2	0	8	0	0	16	1	0	3	24	1	55	
8:50 AM	0	0	0	0	0	2	0	5	0	0	22	0	0	5	27	0	61	
Count Total	0	4	1	3	0	35	4	54	1	6	400	67	0	135	578	10	1,298	
Peak Hour	0	1	0	2	0	17	1	22	1	3	219	37	0	82	363	3	751	

Location: 1 SW 124th Ave & SW Myslony St AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	0	2	1	2	5	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	0	1	1	4	6	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	0	4	4	2	10	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	0	4	1	4	9	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	1	1
7:20 AM	1	5	2	3	11	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	1	3	2	2	8	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	1	1
7:30 AM	1	2	1	2	6	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	0	4	2	9	15	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	0	2	3	2	7	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	0	2	1	3	6	7:45 AM	0	0	0	0	0	7:45 AM	0	1	1	0	2
7:50 AM	0	4	1	2	7	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	3	3	1	7	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	0	5	2	6	13	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	0	4	1	5	10	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	1	5	2	1	9	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	0	3	3	5	11	8:15 AM	0	0	0	0	0	8:15 AM	0	0	0	0	0
8:20 AM	1	1	1	3	6	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	0	8	2	6	16	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	0	1	0	5	6	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	0	3	0	2	5	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	0	4	1	1	6	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	0	4	4	4	12	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	0	3	3	3	9	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
Count Total	5	77	41	77	200	Count Total	0	0	0	0	0	Count Total	0	1	1	2	4
Peak Hour	2	43	17	40	102	Peak Hour	0	0	0	0	0	Peak Hour	0	1	1	0	2

Location: 2 SW 112th Ave & SW Myslony St AM



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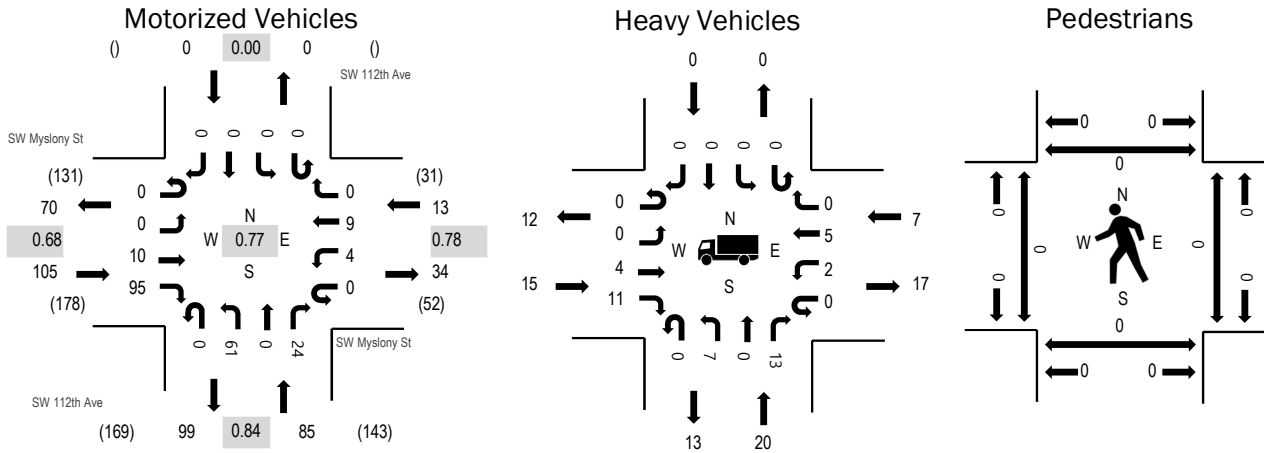
Location: 2 SW 112th Ave & SW Myslony St AM

Date: Tuesday, December 7, 2021

Peak Hour: 07:10 AM - 08:10 AM

Peak 15-Minutes: 07:50 AM - 08:05 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	14.3%	0.68
WB	53.8%	0.78
NB	23.5%	0.84
SB	0.0%	0.00
All	20.7%	0.77

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Myslony St Eastbound				SW Myslony St Westbound				SW 112th Ave Northbound				SW 112th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	0	0	8	0	0	0	0	0	5	0	1	0	0	0	0	14	191
7:05 AM	0	0	2	3	0	0	1	0	0	4	0	2	0	0	0	0	12	200
7:10 AM	0	0	0	4	0	0	0	0	0	6	0	5	0	0	0	0	15	203
7:15 AM	0	0	0	4	0	1	2	0	0	6	0	3	0	0	0	0	16	200
7:20 AM	0	0	0	6	0	0	0	0	0	4	0	1	0	0	0	0	11	196
7:25 AM	0	0	2	0	0	0	0	0	0	7	0	5	0	0	0	0	14	198
7:30 AM	0	0	1	12	0	0	1	0	0	5	0	2	0	0	0	0	21	198
7:35 AM	0	0	0	7	0	0	1	0	0	3	0	2	0	0	0	0	13	185
7:40 AM	0	0	1	4	0	0	0	0	0	4	0	2	0	0	0	0	11	186
7:45 AM	0	0	2	15	0	0	0	0	0	3	0	1	0	0	0	0	21	190
7:50 AM	0	0	1	17	0	1	1	0	0	10	0	2	0	0	0	0	32	188
7:55 AM	0	0	2	4	0	0	1	0	0	3	0	1	0	0	0	0	11	172
8:00 AM	0	0	0	15	0	0	3	0	0	5	0	0	0	0	0	0	23	
8:05 AM	0	0	1	7	0	2	0	0	0	5	0	0	0	0	0	0	15	
8:10 AM	0	0	0	6	0	0	0	0	0	6	0	0	0	0	0	0	12	
8:15 AM	0	0	2	5	0	0	2	0	0	3	0	0	0	0	0	0	12	
8:20 AM	0	0	2	0	0	3	0	0	0	7	0	1	0	0	0	0	13	
8:25 AM	0	0	0	8	0	1	2	0	0	3	0	0	0	0	0	0	14	
8:30 AM	0	0	1	2	0	1	0	0	0	3	0	1	0	0	0	0	8	
8:35 AM	0	0	0	8	0	3	0	0	0	2	0	1	0	0	0	0	14	
8:40 AM	0	0	3	7	0	0	1	0	0	4	0	0	0	0	0	0	15	
8:45 AM	0	0	0	10	0	0	2	0	0	7	0	0	0	0	0	0	19	
8:50 AM	0	0	1	5	0	0	2	0	0	7	0	1	0	0	0	0	16	
Count Total	0	0	21	157	0	12	19	0	0	112	0	31	0	0	0	0	352	
Peak Hour	0	0	10	95	0	4	9	0	0	61	0	24	0	0	0	0	203	

Location: 2 SW 112th Ave & SW Myslony St AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	1	1	0	0	2	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	1	1	1	0	3	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	0	1	0	0	1	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	1	1	0	0	2	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	1	5	0	0	6	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	3	1	1	0	5	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	1	2	0	0	3	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	1	3	0	0	4	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	3	2	0	0	5	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	3	3	0	0	6	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	0	1	1	0	2	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	2	1	3	0	6	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	0	0	2	0	2	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	1	0	0	0	1	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	2	0	2	0	4	8:15 AM	0	0	0	0	0	8:15 AM	0	0	2	0	2
8:20 AM	0	1	2	0	3	8:20 AM	0	0	0	0	0	8:20 AM	1	0	0	0	1
8:25 AM	0	0	2	0	2	8:25 AM	0	0	0	0	0	8:25 AM	0	1	2	0	3
8:30 AM	1	1	1	0	3	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	2	0	3	0	5	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	3	2	0	0	5	8:40 AM	0	0	0	0	0	8:40 AM	0	2	0	0	2
8:45 AM	3	3	1	0	7	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	1	2	2	0	5	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
Count Total	30	31	21	0	82	Count Total	0	0	0	0	0	Count Total	1	3	4	0	8
Peak Hour	15	20	7	0	42	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0

Location: 3 SW 124th Ave & SW Tualatin Sherwood Rd AM



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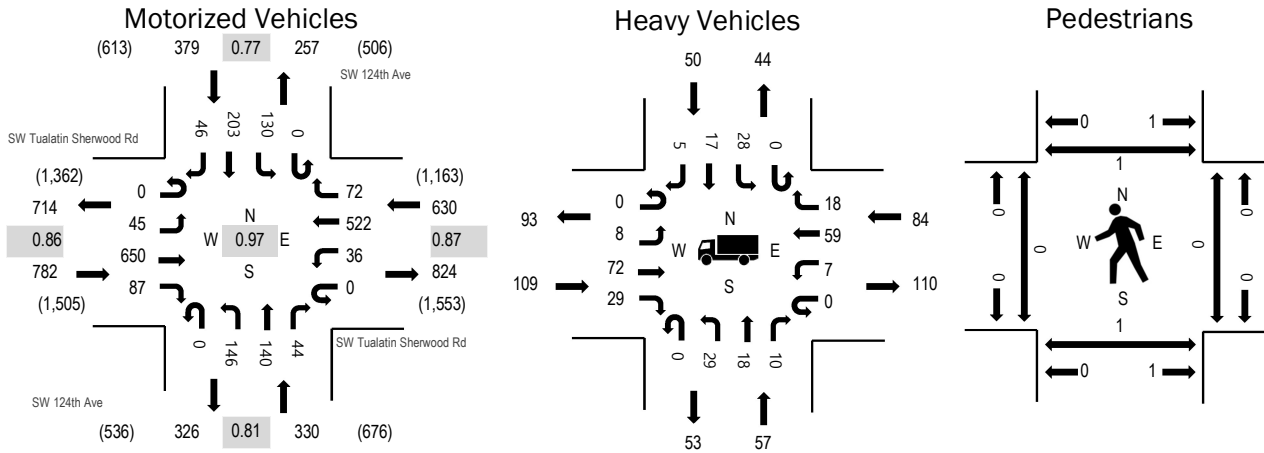
Location: 3 SW 124th Ave & SW Tualatin Sherwood Rd AM

Date: Tuesday, December 7, 2021

Peak Hour: 07:50 AM - 08:50 AM

Peak 15-Minutes: 08:30 AM - 08:45 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	13.9%	0.86
WB	13.3%	0.87
NB	17.3%	0.81
SB	13.2%	0.77
All	14.1%	0.97

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Tualatin Sherwood Rd Eastbound				SW Tualatin Sherwood Rd Westbound				SW 124th Ave Northbound				SW 124th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	5	45	6	0	3	49	6	0	11	11	9	0	4	7	5	161	2,046
7:05 AM	0	5	57	8	0	1	40	3	0	20	13	4	0	9	10	3	173	2,050
7:10 AM	0	4	68	10	0	3	38	5	0	13	6	0	0	7	6	5	165	2,051
7:15 AM	0	6	66	11	0	5	35	5	0	7	14	4	0	6	6	4	169	2,058
7:20 AM	0	3	52	5	0	2	37	3	0	10	11	4	0	4	8	4	143	2,061
7:25 AM	0	6	57	3	0	7	54	3	0	18	15	6	0	3	8	1	181	2,092
7:30 AM	0	4	59	5	0	1	48	4	0	20	11	5	0	7	19	4	187	2,079
7:35 AM	0	4	51	4	0	5	35	5	0	10	15	3	0	8	13	10	163	2,070
7:40 AM	0	5	61	4	0	3	43	4	0	7	14	2	0	5	9	5	162	2,089
7:45 AM	0	7	43	4	0	4	42	1	0	17	20	12	0	7	11	5	173	2,116
7:50 AM	0	3	62	9	0	2	51	4	0	16	23	1	0	11	6	7	195	2,121
7:55 AM	0	4	51	5	0	8	51	6	0	9	14	5	0	8	11	2	174	2,085
8:00 AM	0	0	57	6	0	2	35	9	0	15	8	6	0	12	9	6	165	
8:05 AM	0	6	57	2	0	2	41	11	0	13	8	3	0	11	17	3	174	
8:10 AM	0	4	50	6	0	0	57	3	0	18	10	3	0	9	10	2	172	
8:15 AM	0	7	53	9	0	5	37	2	0	8	11	4	0	11	19	6	172	
8:20 AM	0	4	54	10	0	2	35	5	0	13	11	4	0	18	14	4	174	
8:25 AM	0	7	55	5	0	3	19	7	0	14	16	3	0	12	25	2	168	
8:30 AM	0	4	51	10	0	3	41	7	0	7	7	3	0	13	29	3	178	
8:35 AM	0	3	48	5	0	5	43	4	0	12	14	7	0	13	26	2	182	
8:40 AM	0	2	55	9	0	2	56	9	0	9	7	2	0	10	25	3	189	
8:45 AM	0	1	57	11	0	2	56	5	0	12	11	3	0	2	12	6	178	
8:50 AM	0	4	49	2	0	1	33	5	0	10	22	2	0	10	16	5	159	
Count Total	0	98	1,258	149	0	71	976	116	0	289	292	95	0	200	316	97	3,957	
Peak Hour	0	45	650	87	0	36	522	72	0	146	140	44	0	130	203	46	2,121	

Location: 3 SW 124th Ave & SW Tualatin Sherwood Rd AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	11	2	3	3	19	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	12	3	6	6	27	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	11	5	7	4	27	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	11	3	6	3	23	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	9	7	3	6	25	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	8	9	11	1	29	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	8	5	6	2	21	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	7	5	4	8	24	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	9	1	3	4	17	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	11	6	6	1	24	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	9	5	10	4	28	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	10	2	11	1	24	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	8	8	3	7	26	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	8	5	8	8	29	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	14	2	11	2	29	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	11	3	1	3	18	8:15 AM	0	0	0	0	0	8:15 AM	0	1	0	0	1
8:20 AM	8	5	3	7	23	8:20 AM	0	0	0	0	0	8:20 AM	0	0	0	0	0
8:25 AM	3	10	6	6	25	8:25 AM	0	0	1	0	1	8:25 AM	0	0	0	0	0
8:30 AM	7	2	5	4	18	8:30 AM	0	0	0	0	0	8:30 AM	0	0	0	0	0
8:35 AM	7	5	11	3	26	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	1	1
8:40 AM	16	5	5	3	29	8:40 AM	0	0	1	0	1	8:40 AM	0	0	0	0	0
8:45 AM	8	5	10	2	25	8:45 AM	0	0	0	0	0	8:45 AM	0	0	0	0	0
8:50 AM	6	7	6	3	22	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
Count Total	212	110	145	91	558	Count Total	0	0	2	0	2	Count Total	0	1	0	1	2
Peak Hour	109	57	84	50	300	Peak Hour	0	0	2	0	2	Peak Hour	0	1	0	1	2

Location: 4 SW 112th Ave & SW Tualatin Sherwood Rd AM



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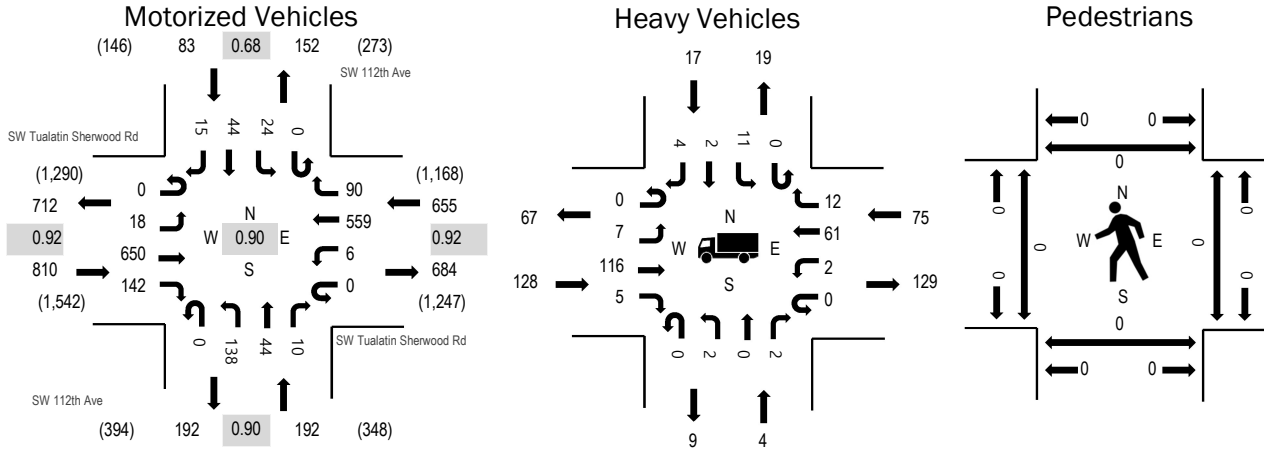
Location: 4 SW 112th Ave & SW Tualatin Sherwood Rd AM

Date: Tuesday, December 7, 2021

Peak Hour: 07:15 AM - 08:15 AM

Peak 15-Minutes: 07:50 AM - 08:05 AM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	15.8%	0.92
WB	11.5%	0.92
NB	2.1%	0.90
SB	20.5%	0.68
All	12.9%	0.90

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Tualatin Sherwood Rd Eastbound				SW Tualatin Sherwood Rd Westbound				SW 112th Ave Northbound				SW 112th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
7:00 AM	0	2	48	13	0	1	52	8	0	15	4	1	0	2	1	1	148	1,678
7:05 AM	0	2	40	9	0	3	42	2	0	10	6	0	0	0	1	0	115	1,683
7:10 AM	0	1	56	17	0	0	32	8	0	7	4	0	0	1	1	0	127	1,721
7:15 AM	0	0	61	13	0	0	35	8	0	10	7	0	0	1	3	1	139	1,740
7:20 AM	0	1	44	13	0	1	53	8	0	17	6	0	0	5	3	1	152	1,704
7:25 AM	0	2	50	11	0	0	45	12	0	11	3	1	0	1	3	1	140	1,684
7:30 AM	0	2	47	9	0	0	44	6	0	12	5	0	0	0	7	0	132	1,692
7:35 AM	0	2	36	13	0	0	54	8	0	9	1	1	0	2	1	0	127	1,689
7:40 AM	0	1	61	19	0	0	36	3	0	12	4	0	0	0	3	1	140	1,706
7:45 AM	0	2	53	8	0	0	41	4	0	12	2	1	0	4	3	0	130	1,713
7:50 AM	0	3	50	9	0	3	55	8	0	15	7	1	0	4	9	3	167	1,703
7:55 AM	0	2	71	12	0	1	46	6	0	8	5	1	0	3	4	2	161	1,687
8:00 AM	0	1	66	15	0	0	39	6	0	15	1	1	0	3	5	1	153	
8:05 AM	0	0	56	7	0	0	57	16	0	11	3	1	0	0	1	1	153	
8:10 AM	0	2	55	13	0	1	54	5	0	6	0	3	0	1	2	4	146	
8:15 AM	0	0	42	12	0	0	31	4	0	6	4	1	0	2	0	1	103	
8:20 AM	0	2	49	16	0	2	33	6	0	14	2	1	0	4	2	1	132	
8:25 AM	0	0	52	27	0	0	38	3	0	15	3	0	0	1	6	3	148	
8:30 AM	0	2	48	21	0	1	38	4	0	10	2	0	0	1	1	1	129	
8:35 AM	0	4	49	12	0	1	50	3	0	14	0	0	0	5	3	3	144	
8:40 AM	0	1	47	20	0	0	52	10	0	6	3	2	0	2	1	3	147	
8:45 AM	0	9	36	11	0	0	30	4	0	15	5	1	0	7	0	2	120	
8:50 AM	0	4	62	18	0	1	48	6	0	2	3	0	0	3	1	3	151	
Count Total	0	45	1,179	318	0	15	1,005	148	0	252	80	16	0	52	61	33	3,204	
Peak Hour	0	18	650	142	0	6	559	90	0	138	44	10	0	24	44	15	1,740	

Location: 4 SW 112th Ave & SW Tualatin Sherwood Rd AM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
7:00 AM	4	1	7	1	13	7:00 AM	0	0	0	0	0	7:00 AM	0	0	0	0	0
7:05 AM	10	0	9	0	19	7:05 AM	0	0	0	0	0	7:05 AM	0	0	0	0	0
7:10 AM	14	0	4	1	19	7:10 AM	0	0	0	0	0	7:10 AM	0	0	0	0	0
7:15 AM	10	0	7	1	18	7:15 AM	0	0	0	0	0	7:15 AM	0	0	0	0	0
7:20 AM	6	0	10	4	20	7:20 AM	0	0	0	0	0	7:20 AM	0	0	0	0	0
7:25 AM	10	0	4	1	15	7:25 AM	0	0	0	0	0	7:25 AM	0	0	0	0	0
7:30 AM	7	0	3	1	11	7:30 AM	0	0	0	0	0	7:30 AM	0	0	0	0	0
7:35 AM	10	1	3	0	14	7:35 AM	0	0	0	0	0	7:35 AM	0	0	0	0	0
7:40 AM	12	0	5	1	18	7:40 AM	0	0	0	0	0	7:40 AM	0	0	0	0	0
7:45 AM	18	0	11	0	29	7:45 AM	0	0	0	0	0	7:45 AM	0	0	0	0	0
7:50 AM	10	0	5	3	18	7:50 AM	0	0	0	0	0	7:50 AM	0	0	0	0	0
7:55 AM	14	1	10	1	26	7:55 AM	0	0	0	0	0	7:55 AM	0	0	0	0	0
8:00 AM	13	1	2	3	19	8:00 AM	0	0	0	0	0	8:00 AM	0	0	0	0	0
8:05 AM	8	1	8	1	18	8:05 AM	0	0	0	0	0	8:05 AM	0	0	0	0	0
8:10 AM	10	0	7	1	18	8:10 AM	0	0	0	0	0	8:10 AM	0	0	0	0	0
8:15 AM	11	1	1	2	15	8:15 AM	0	0	0	0	0	8:15 AM	1	1	0	0	2
8:20 AM	9	1	5	1	16	8:20 AM	0	0	0	0	0	8:20 AM	0	1	0	0	1
8:25 AM	14	1	5	2	22	8:25 AM	0	0	0	0	0	8:25 AM	0	0	0	0	0
8:30 AM	6	0	5	1	12	8:30 AM	0	0	0	0	0	8:30 AM	0	0	1	1	2
8:35 AM	6	3	7	4	20	8:35 AM	0	0	0	0	0	8:35 AM	0	0	0	0	0
8:40 AM	10	1	6	2	19	8:40 AM	0	0	0	0	0	8:40 AM	0	0	0	0	0
8:45 AM	9	4	3	1	17	8:45 AM	0	0	0	0	0	8:45 AM	0	1	0	1	2
8:50 AM	8	0	9	3	20	8:50 AM	0	0	0	0	0	8:50 AM	0	0	0	0	0
Count Total	229	16	136	35	416	Count Total	0	0	0	0	0	Count Total	1	3	1	2	7
Peak Hour	128	4	75	17	224	Peak Hour	0	0	0	0	0	Peak Hour	0	0	0	0	0



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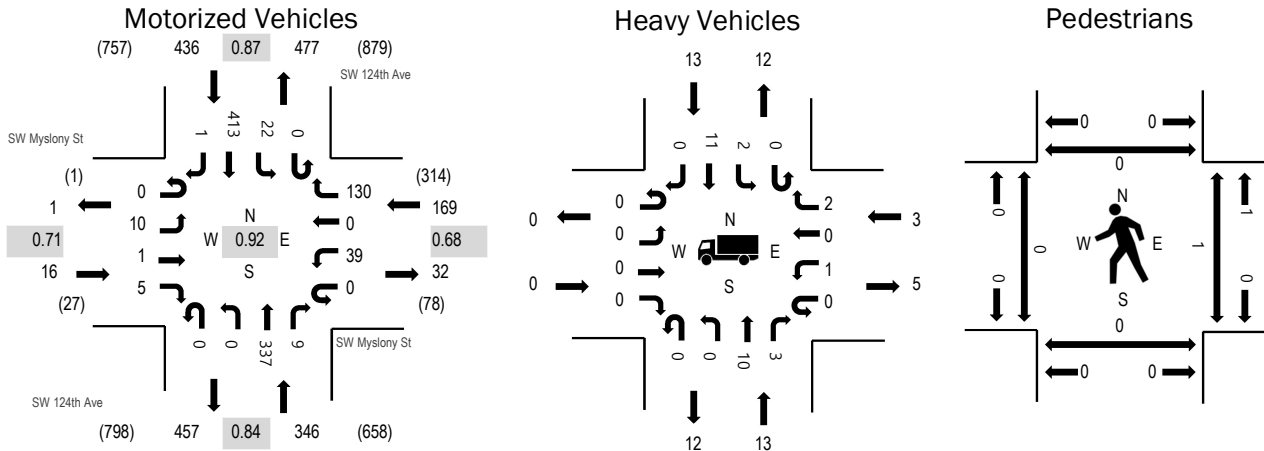
Location: 1 SW 124th Ave & SW Myslony St PM

Date: Tuesday, December 7, 2021

Peak Hour: 04:35 PM - 05:35 PM

Peak 15-Minutes: 05:00 PM - 05:15 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	0.0%	0.71
WB	1.8%	0.68
NB	3.8%	0.84
SB	3.0%	0.87
All	3.0%	0.92

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Myslony St Eastbound				SW Myslony St Westbound				SW 124th Ave Northbound				SW 124th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	0	0	1	0	8	0	16	0	0	34	3	0	5	30	0	97	937
4:05 PM	0	0	1	2	0	7	0	17	0	0	36	0	0	2	29	0	94	913
4:10 PM	0	0	0	0	0	7	0	8	0	0	34	0	0	1	30	0	80	915
4:15 PM	0	1	0	0	0	7	0	13	0	0	21	2	0	5	27	0	76	929
4:20 PM	0	0	1	0	0	6	0	5	0	0	24	1	0	1	19	0	57	924
4:25 PM	0	1	0	1	0	4	0	7	0	0	32	0	0	3	16	0	64	946
4:30 PM	0	0	0	0	0	2	0	6	0	0	19	1	0	1	32	0	61	947
4:35 PM	0	0	0	1	0	0	0	14	0	0	28	2	0	2	39	0	86	967
4:40 PM	0	1	0	0	0	5	0	9	0	0	24	1	0	2	45	0	87	937
4:45 PM	0	0	0	0	0	2	0	8	0	0	25	2	0	4	34	0	75	908
4:50 PM	0	3	0	0	0	0	0	8	0	0	31	2	0	2	38	1	85	895
4:55 PM	0	1	0	0	0	1	0	11	0	0	38	0	0	0	24	0	75	852
5:00 PM	0	0	0	1	0	5	0	12	0	0	26	0	0	3	26	0	73	819
5:05 PM	0	3	1	0	0	8	0	22	0	0	26	0	0	3	33	0	96	
5:10 PM	0	0	0	0	0	4	0	8	0	0	31	0	0	0	51	0	94	
5:15 PM	0	1	0	0	0	3	0	8	0	0	27	0	0	2	30	0	71	
5:20 PM	0	1	0	0	0	3	0	7	0	0	31	2	0	3	32	0	79	
5:25 PM	0	0	0	1	0	4	0	10	0	0	24	0	0	0	26	0	65	
5:30 PM	0	0	0	2	0	4	0	13	0	0	26	0	0	1	35	0	81	
5:35 PM	0	0	1	0	0	1	0	4	0	0	18	0	0	2	30	0	56	
5:40 PM	0	0	0	0	0	1	0	6	0	0	27	1	0	3	20	0	58	
5:45 PM	0	2	0	0	0	4	0	5	0	0	19	2	0	6	24	0	62	
5:50 PM	0	0	0	0	0	1	0	7	0	0	15	0	0	3	16	0	42	
5:55 PM	0	0	0	0	0	1	0	2	0	0	23	0	0	1	15	0	42	
Count Total	0	14	4	9	0	88	0	226	0	0	639	19	0	55	701	1	1,756	
Peak Hour	0	10	1	5	0	39	0	130	0	0	337	9	0	22	413	1	967	

Location: 1 SW 124th Ave & SW Myslony St PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	0	1	4	3	8	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	0	4	2	1	7	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	2	1	2	5	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	0	2	3	2	7	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	0	1	2	2	5	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	0	2	1	1	4	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	2	0	2	4	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	0	1	0	2	3	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	0	3	0	1	4	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	0	1	0	1	2	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	2	0	1	3	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	1	1	1	3	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0	5:00 PM	0	0	1	0	1
5:05 PM	0	1	0	2	3	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	0	2	1	2	5	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	0	2	0	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	0	0	1	0	1	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	3	3	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	0	0	0	2	2	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	1	1	0	2	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	0	0	0	1	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	0	0	1	1	2	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	0	28	18	30	76	Count Total	0	0	0	0	0	Count Total	0	0	1	0	1
Peak Hour	0	13	3	13	29	Peak Hour	0	0	0	0	0	Peak Hour	0	0	1	0	1

Location: 2 SW 112th Ave & SW Myslony St PM



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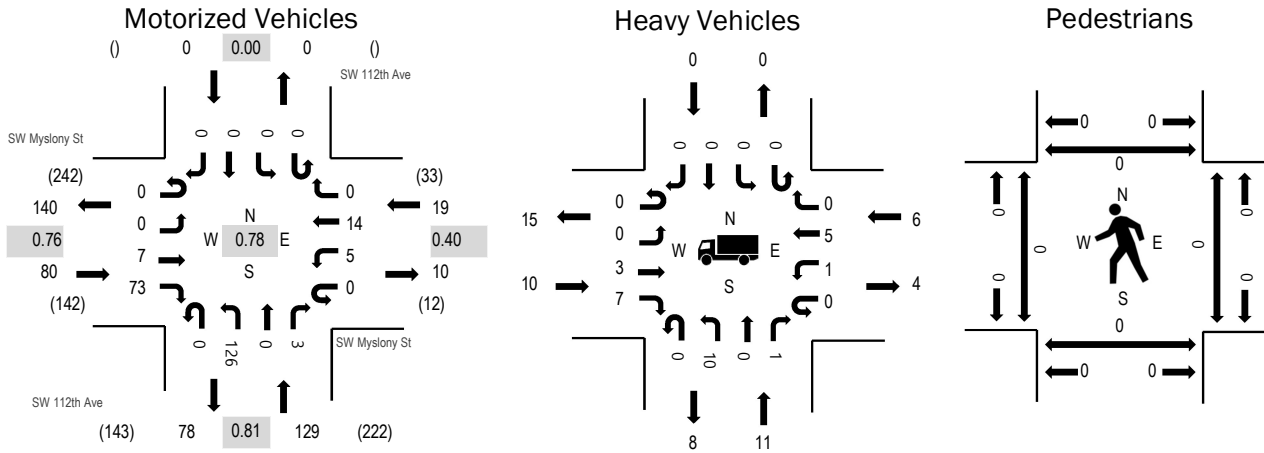
Location: 2 SW 112th Ave & SW Myslony St PM

Date: Tuesday, December 7, 2021

Peak Hour: 04:00 PM - 05:00 PM

Peak 15-Minutes: 04:50 PM - 05:05 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	12.5%	0.76
WB	31.6%	0.40
NB	8.5%	0.81
SB	0.0%	0.00
All	11.8%	0.78

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Myslony St Eastbound				SW Myslony St Westbound				SW 112th Ave Northbound				SW 112th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	0	4	8	0	2	5	0	0	14	0	1	0	0	0	0	34	228
4:05 PM	0	0	1	6	0	0	2	0	0	9	0	2	0	0	0	0	20	223
4:10 PM	0	0	0	3	0	0	3	0	0	7	0	0	0	0	0	0	13	224
4:15 PM	0	0	0	6	0	0	1	0	0	11	0	0	0	0	0	0	18	221
4:20 PM	0	0	0	7	0	1	1	0	0	5	0	0	0	0	0	0	14	213
4:25 PM	0	0	0	9	0	1	0	0	0	10	0	0	0	0	0	0	20	217
4:30 PM	0	0	0	5	0	0	0	0	0	5	0	0	0	0	0	0	10	210
4:35 PM	0	0	0	4	0	0	0	0	0	18	0	0	0	0	0	0	22	217
4:40 PM	0	0	1	7	0	0	0	0	0	14	0	0	0	0	0	0	22	200
4:45 PM	0	0	0	3	0	0	0	0	0	8	0	0	0	0	0	0	11	190
4:50 PM	0	0	0	10	0	0	0	0	0	11	0	0	0	0	0	0	21	193
4:55 PM	0	0	1	5	0	1	2	0	0	14	0	0	0	0	0	0	23	185
5:00 PM	0	0	1	8	0	2	1	0	0	17	0	0	0	0	0	0	29	169
5:05 PM	0	0	0	12	0	1	0	0	0	8	0	0	0	0	0	0	21	
5:10 PM	0	0	0	2	0	0	0	0	0	8	0	0	0	0	0	0	10	
5:15 PM	0	0	0	2	0	0	0	0	0	8	0	0	0	0	0	0	10	
5:20 PM	0	0	0	6	0	0	3	0	0	9	0	0	0	0	0	0	18	
5:25 PM	0	0	0	3	0	0	2	0	0	8	0	0	0	0	0	0	13	
5:30 PM	0	0	0	2	0	0	2	0	0	13	0	0	0	0	0	0	17	
5:35 PM	0	0	0	4	0	0	0	0	0	1	0	0	0	0	0	0	5	
5:40 PM	0	0	0	5	0	0	1	0	0	6	0	0	0	0	0	0	12	
5:45 PM	0	0	1	5	0	0	0	0	0	8	0	0	0	0	0	0	14	
5:50 PM	0	0	0	6	0	2	0	0	0	5	0	0	0	0	0	0	13	
5:55 PM	0	0	0	5	0	0	0	0	0	2	0	0	0	0	0	0	7	
Count Total	0	0	9	133	0	10	23	0	0	219	0	3	0	0	0	0	397	
Peak Hour	0	0	7	73	0	5	14	0	0	126	0	3	0	0	0	0	228	

Location: 2 SW 112th Ave & SW Myslony St PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	2	2	1	0	5	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	1	3	1	0	5	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	0	1	2	0	3	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	1	1	0	0	2	4:15 PM	1	0	0	0	1	4:15 PM	0	0	0	0	0
4:20 PM	0	0	2	0	2	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	1	1	0	0	2	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	1	0	0	0	1	4:35 PM	0	0	0	0	0	4:35 PM	0	0	0	0	0
4:40 PM	2	1	0	0	3	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	2	0	0	0	2	4:45 PM	0	0	0	0	0	4:45 PM	0	0	0	0	0
4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	0	2	0	0	2	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	0	1	0	0	1	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	0	1	0	0	1	5:05 PM	0	0	0	0	0	5:05 PM	0	0	1	0	1
5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	2	0	0	0	2	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	1	1	0	0	2	5:25 PM	0	1	0	0	1	5:25 PM	0	0	0	0	0
5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	1	0	0	0	1	5:35 PM	0	0	0	0	0	5:35 PM	0	0	1	0	1
5:40 PM	0	1	0	0	1	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	1	0	0	0	1	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	1	0	0	0	1	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	16	15	6	0	37	Count Total	1	1	0	0	2	Count Total	0	0	2	0	2
Peak Hour	10	11	6	0	27	Peak Hour	1	0	0	0	1	Peak Hour	0	0	0	0	0

Location: 3 SW 124th Ave & SW Tualatin Sherwood Rd PM



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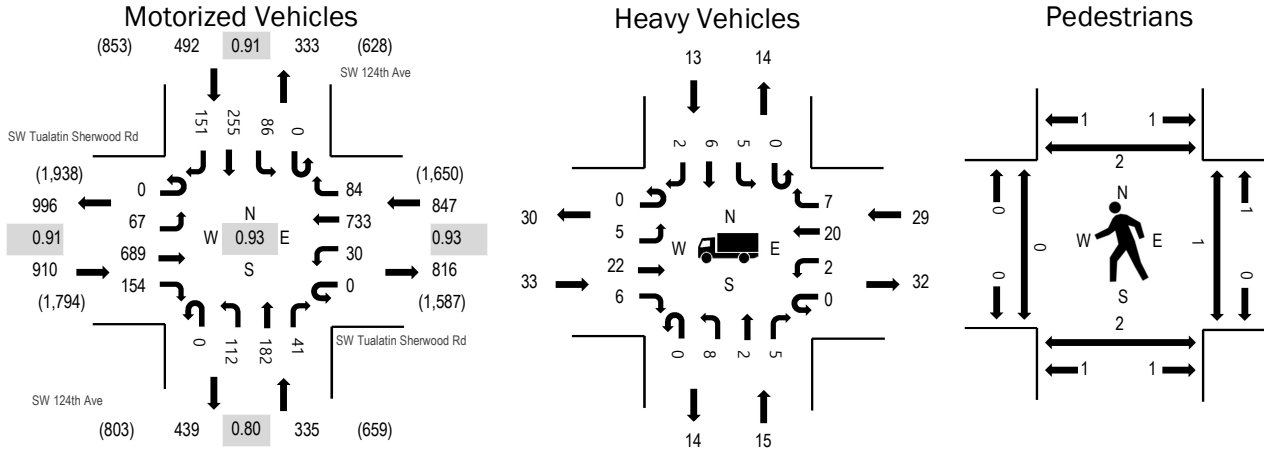
Location: 3 SW 124th Ave & SW Tualatin Sherwood Rd PM

Date: Tuesday, December 7, 2021

Peak Hour: 04:35 PM - 05:35 PM

Peak 15-Minutes: 05:10 PM - 05:25 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.6%	0.91
WB	3.4%	0.93
NB	4.5%	0.80
SB	2.6%	0.91
All	3.5%	0.93

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Tualatin Sherwood Rd Eastbound				SW Tualatin Sherwood Rd Westbound				SW 124th Ave Northbound				SW 124th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	5	51	10	0	2	54	6	0	9	22	2	0	5	22	13	201	2,485
4:05 PM	0	4	44	13	0	6	38	12	0	12	24	1	0	5	28	14	201	2,502
4:10 PM	0	0	64	12	0	2	56	7	0	14	26	3	0	7	25	12	228	2,506
4:15 PM	0	5	65	16	0	5	70	3	0	5	8	1	0	2	8	9	197	2,513
4:20 PM	0	5	55	20	0	3	57	3	0	12	18	6	0	3	13	13	208	2,550
4:25 PM	0	8	62	7	0	2	52	3	0	6	24	2	0	8	16	6	196	2,570
4:30 PM	0	3	61	19	0	4	52	5	0	9	7	2	0	3	13	9	187	2,583
4:35 PM	0	6	42	11	0	4	55	13	0	10	16	7	0	7	32	14	217	2,584
4:40 PM	0	8	58	6	0	1	57	3	0	11	13	3	0	3	14	11	188	2,564
4:45 PM	0	6	69	14	0	4	63	3	0	6	9	2	0	9	34	11	230	2,582
4:50 PM	0	6	55	15	0	6	60	10	0	7	15	3	0	12	19	8	216	2,545
4:55 PM	0	9	51	14	0	0	54	7	0	12	25	9	0	8	15	12	216	2,513
5:00 PM	0	6	53	16	0	5	68	7	0	9	15	3	0	6	15	15	218	2,471
5:05 PM	0	3	65	10	0	0	60	11	0	6	9	1	0	4	26	10	205	
5:10 PM	0	6	71	13	0	1	67	7	0	12	12	1	0	13	22	10	235	
5:15 PM	0	3	65	18	0	3	65	10	0	10	16	2	0	5	19	18	234	
5:20 PM	0	5	69	9	0	3	67	5	0	9	18	1	0	8	20	14	228	
5:25 PM	0	5	58	13	0	2	63	4	0	11	15	6	0	4	15	13	209	
5:30 PM	0	4	33	15	0	1	54	4	0	9	19	3	0	7	24	15	188	
5:35 PM	0	1	57	16	0	1	55	2	0	10	9	5	0	18	11	12	197	
5:40 PM	0	6	63	20	0	0	59	13	0	12	11	2	0	1	12	7	206	
5:45 PM	0	1	48	8	0	5	71	7	0	4	14	3	0	5	11	16	193	
5:50 PM	0	5	52	8	0	2	75	1	0	11	10	1	0	6	7	6	184	
5:55 PM	0	7	51	12	0	1	67	2	0	8	8	3	0	4	4	7	174	
Count Total	0	117	1,362	315	0	63	1,439	148	0	224	363	72	0	153	425	275	4,956	
Peak Hour	0	67	689	154	0	30	733	84	0	112	182	41	0	86	255	151	2,584	

Location: 3 SW 124th Ave & SW Tualatin Sherwood Rd PM

Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	6	2	3	4	15	4:00 PM	0	0	1	0	1	4:00 PM	0	0	0	0	0
4:05 PM	3	6	2	3	14	4:05 PM	0	0	0	0	0	4:05 PM	0	0	0	0	0
4:10 PM	1	3	3	2	9	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	5	2	5	2	14	4:15 PM	0	0	0	0	0	4:15 PM	0	0	0	0	0
4:20 PM	3	1	4	1	9	4:20 PM	0	0	0	0	0	4:20 PM	0	1	0	0	1
4:25 PM	5	2	2	2	11	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	5	1	3	1	10	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	2	1	7	1	11	4:35 PM	0	0	0	0	0	4:35 PM	0	1	0	0	1
4:40 PM	5	5	0	0	10	4:40 PM	0	0	0	0	0	4:40 PM	0	0	1	0	1
4:45 PM	0	1	2	1	4	4:45 PM	0	0	0	0	0	4:45 PM	0	1	0	1	2
4:50 PM	3	1	3	1	8	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	3	2	2	1	8	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	3	0	4	0	7	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	1	0	2	2	5	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	2	1	3	1	7	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	1	1
5:15 PM	4	0	2	2	8	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	0	0
5:20 PM	2	2	1	0	5	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	5	1	0	0	6	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	3	1	3	4	11	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	4	0	1	2	7	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	2	1	2	0	5	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	4	2	1	0	7	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	3	0	3	0	6	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	4	1	3	0	8	5:55 PM	0	0	0	0	0	5:55 PM	0	0	0	0	0
Count Total	78	36	61	30	205	Count Total	0	0	1	0	1	Count Total	0	3	1	2	6
Peak Hour	33	15	29	13	90	Peak Hour	0	0	0	0	0	Peak Hour	0	2	1	2	5

Location: 4 SW 112th Ave & SW Tualatin Sherwood Rd PM



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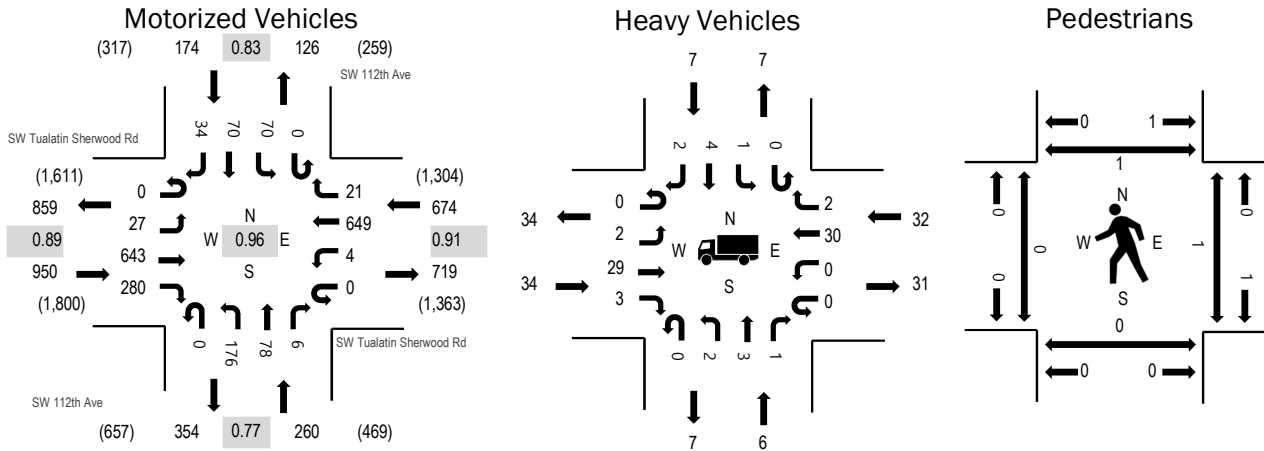
Location: 4 SW 112th Ave & SW Tualatin Sherwood Rd PM

Date: Tuesday, December 7, 2021

Peak Hour: 04:30 PM - 05:30 PM

Peak 15-Minutes: 04:30 PM - 04:45 PM

Peak Hour



Note: Total study counts contained in parentheses.

	HV%	PHF
EB	3.6%	0.89
WB	4.7%	0.91
NB	2.3%	0.77
SB	4.0%	0.83
All	3.8%	0.96

Traffic Counts - Motorized Vehicles

Interval Start Time	SW Tualatin Sherwood Rd Eastbound				SW Tualatin Sherwood Rd Westbound				SW 112th Ave Northbound				SW 112th Ave Southbound				Total	Rolling Hour
	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right	U-Turn	Left	Thru	Right		
4:00 PM	0	4	53	19	0	0	45	7	0	9	7	0	0	2	4	2	152	1,940
4:05 PM	0	2	39	20	0	0	47	3	0	23	7	1	0	10	11	3	166	1,959
4:10 PM	0	3	56	26	0	0	40	5	0	11	5	0	0	7	5	2	160	1,979
4:15 PM	0	2	40	21	0	1	51	3	0	11	8	1	0	8	2	0	148	1,991
4:20 PM	0	5	54	18	0	0	55	2	0	9	2	0	0	4	2	0	151	2,008
4:25 PM	0	1	39	23	0	0	30	1	0	15	7	2	0	11	7	2	138	2,047
4:30 PM	0	1	44	33	0	1	64	2	0	15	1	1	0	4	7	3	176	2,058
4:35 PM	0	2	51	21	0	0	50	3	0	27	18	1	0	9	8	3	193	2,036
4:40 PM	0	2	57	24	0	0	54	1	0	8	6	1	0	6	3	3	165	1,982
4:45 PM	0	3	40	19	0	0	42	1	0	20	7	0	0	7	7	2	148	1,991
4:50 PM	0	4	64	25	0	1	42	1	0	14	7	0	0	4	7	3	172	1,991
4:55 PM	0	3	44	26	0	0	68	3	0	8	9	1	0	6	3	0	171	1,968
5:00 PM	0	5	47	23	0	0	57	3	0	14	10	2	0	6	2	2	171	1,950
5:05 PM	0	2	54	23	0	2	52	3	0	18	2	0	0	11	14	5	186	
5:10 PM	0	0	75	22	0	0	50	1	0	13	4	0	0	6	0	1	172	
5:15 PM	0	2	61	22	0	0	46	2	0	13	5	0	0	3	6	5	165	
5:20 PM	0	1	58	25	0	0	83	1	0	6	3	0	0	6	4	3	190	
5:25 PM	0	2	48	17	0	0	41	0	0	20	6	0	0	2	9	4	149	
5:30 PM	0	2	49	20	0	0	60	3	0	7	8	1	0	3	0	1	154	
5:35 PM	0	3	44	17	0	0	46	0	0	13	3	1	0	5	6	1	139	
5:40 PM	0	2	69	25	0	0	57	3	0	9	0	0	0	2	6	1	174	
5:45 PM	0	6	44	13	0	0	46	2	0	22	5	1	0	2	7	0	148	
5:50 PM	0	3	48	20	0	0	50	3	0	4	5	0	0	5	6	5	149	
5:55 PM	0	3	38	19	0	0	65	5	0	9	3	0	0	5	5	1	153	
Count Total	0	63	1,216	521	0	5	1,241	58	0	318	138	13	0	134	131	52	3,890	
Peak Hour	0	27	643	280	0	4	649	21	0	176	78	6	0	70	70	34	2,058	

Location: 4 SW 112th Ave & SW Tualatin Sherwood Rd PM

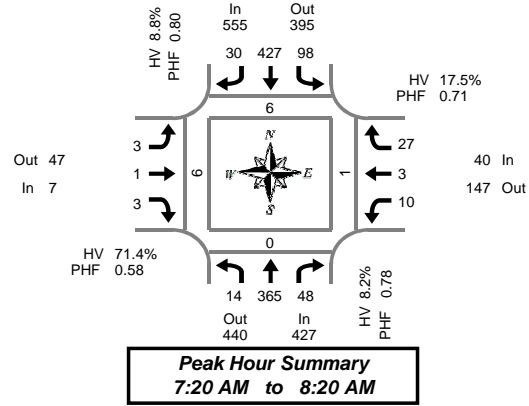
Traffic Counts - Heavy Vehicles, Bicycles on Road, and Pedestrians/Bicycles on Crosswalk

Interval Start Time	Heavy Vehicles					Interval Start Time	Bicycles on Roadway					Interval Start Time	Pedestrians/Bicycles on Crosswalk				
	EB	NB	WB	SB	Total		EB	NB	WB	SB	Total		EB	NB	WB	SB	Total
4:00 PM	5	1	4	0	10	4:00 PM	0	0	0	0	0	4:00 PM	0	0	0	0	0
4:05 PM	6	1	6	1	14	4:05 PM	0	0	0	0	0	4:05 PM	1	0	0	0	1
4:10 PM	2	1	2	0	5	4:10 PM	0	0	0	0	0	4:10 PM	0	0	0	0	0
4:15 PM	2	2	2	1	7	4:15 PM	0	0	0	1	1	4:15 PM	1	0	0	0	1
4:20 PM	4	0	4	0	8	4:20 PM	0	0	0	0	0	4:20 PM	0	0	0	0	0
4:25 PM	5	2	0	3	10	4:25 PM	0	0	0	0	0	4:25 PM	0	0	0	0	0
4:30 PM	4	0	2	0	6	4:30 PM	0	0	0	0	0	4:30 PM	0	0	0	0	0
4:35 PM	3	2	7	1	13	4:35 PM	0	1	0	0	1	4:35 PM	0	0	1	0	1
4:40 PM	5	1	2	0	8	4:40 PM	0	0	0	0	0	4:40 PM	0	0	0	0	0
4:45 PM	2	1	1	2	6	4:45 PM	0	0	0	0	0	4:45 PM	0	0	1	0	1
4:50 PM	2	0	3	2	7	4:50 PM	0	0	0	0	0	4:50 PM	0	0	0	0	0
4:55 PM	2	2	4	0	8	4:55 PM	0	0	0	0	0	4:55 PM	0	0	0	0	0
5:00 PM	3	0	2	1	6	5:00 PM	0	0	0	0	0	5:00 PM	0	0	0	0	0
5:05 PM	3	0	4	0	7	5:05 PM	0	0	0	0	0	5:05 PM	0	0	0	0	0
5:10 PM	3	0	2	0	5	5:10 PM	0	0	0	0	0	5:10 PM	0	0	0	0	0
5:15 PM	0	0	1	0	1	5:15 PM	0	0	0	0	0	5:15 PM	0	0	0	1	1
5:20 PM	4	0	1	0	5	5:20 PM	0	0	0	0	0	5:20 PM	0	0	0	0	0
5:25 PM	3	0	3	1	7	5:25 PM	0	0	0	0	0	5:25 PM	0	0	0	0	0
5:30 PM	4	1	2	0	7	5:30 PM	0	0	0	0	0	5:30 PM	0	0	0	0	0
5:35 PM	3	1	3	0	7	5:35 PM	0	0	0	0	0	5:35 PM	0	0	0	0	0
5:40 PM	4	0	2	1	7	5:40 PM	0	0	0	0	0	5:40 PM	0	0	0	0	0
5:45 PM	5	0	2	1	8	5:45 PM	0	0	0	0	0	5:45 PM	0	0	0	0	0
5:50 PM	4	0	2	0	6	5:50 PM	0	0	0	0	0	5:50 PM	0	0	0	0	0
5:55 PM	3	1	3	1	8	5:55 PM	1	0	0	0	1	5:55 PM	0	0	0	1	1
Count Total	81	16	64	15	176	Count Total	1	1	0	1	3	Count Total	2	0	2	2	6
Peak Hour	34	6	32	7	79	Peak Hour	0	1	0	0	1	Peak Hour	0	0	2	1	3

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 124th Ave & SW Myslony St

Tuesday, October 08, 2019

7:00 AM to 9:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	0	11	3	0	9	24	0	0	0	0	0	0	1	0	2	0	0	0	0	0	
7:05 AM	2	22	3	0	6	31	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
7:10 AM	2	20	2	0	5	30	1	0	0	0	0	0	3	2	0	0	0	0	0	0	
7:15 AM	2	19	5	0	8	26	1	0	0	0	1	0	1	1	0	0	0	0	0	1	
7:20 AM	1	20	4	0	11	28	3	0	1	0	1	0	1	0	5	0	0	0	0	0	
7:25 AM	1	17	2	0	6	37	1	0	1	0	0	0	1	0	1	0	0	0	0	5	
7:30 AM	2	22	4	0	7	51	1	0	0	0	0	0	2	0	2	0	0	0	0	1	
7:35 AM	0	31	5	0	7	41	3	0	0	0	0	0	0	0	4	0	0	0	0	0	
7:40 AM	1	27	3	0	11	48	4	0	0	0	0	0	2	0	2	0	0	0	0	0	
7:45 AM	0	43	8	1	10	39	2	0	0	0	0	0	0	1	1	0	0	0	0	0	
7:50 AM	2	32	3	0	9	38	4	0	0	1	0	0	0	0	0	0	0	0	0	0	
7:55 AM	1	44	3	0	7	22	5	0	0	0	0	0	1	1	4	0	0	0	0	0	
8:00 AM	2	34	5	0	13	32	1	0	1	0	0	0	1	1	2	0	0	0	0	0	
8:05 AM	1	43	3	0	7	28	3	0	0	0	1	0	1	0	3	0	0	0	0	0	
8:10 AM	3	17	3	0	5	36	1	0	0	0	0	0	1	0	3	0	0	0	0	0	
8:15 AM	0	35	5	0	5	27	2	0	0	0	1	0	0	0	0	0	0	0	0	0	
8:20 AM	3	21	6	0	3	28	2	0	1	0	0	0	1	0	0	0	0	0	0	0	
8:25 AM	0	21	3	0	5	27	0	0	1	0	0	0	1	0	0	0	0	0	0	0	
8:30 AM	2	30	2	0	2	15	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
8:35 AM	0	23	3	0	2	18	0	0	0	0	0	0	1	0	1	0	0	0	0	0	
8:40 AM	1	26	4	0	1	11	0	0	0	0	0	0	2	0	1	0	0	0	0	0	
8:45 AM	0	26	0	0	1	27	0	0	0	0	0	0	2	0	1	0	0	0	0	0	
8:50 AM	0	23	2	0	2	15	0	0	0	0	0	0	1	0	2	0	0	0	0	0	
8:55 AM	2	25	2	0	4	35	1	0	0	0	0	0	3	0	0	0	0	0	0	0	
Total Survey	28	632	83	1	146	714	35	0	5	1	4	0	28	6	36	0	1,718	8	0	1	7

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	4	53	8	0	20	85	1	0	0	0	0	0	5	2	3	0	181	0	0	0	0
7:15 AM	4	56	11	0	25	91	5	0	2	0	2	0	3	1	6	0	206	4	0	0	6
7:30 AM	3	80	12	0	25	140	8	0	0	0	0	0	4	0	8	0	280	0	0	0	1
7:45 AM	3	119	14	1	26	99	11	0	0	1	0	0	1	2	5	0	281	2	0	0	0
8:00 AM	6	94	11	0	25	96	5	0	1	0	1	0	3	1	8	0	251	0	0	0	0
8:15 AM	3	77	14	0	13	82	4	0	2	0	1	0	2	0	0	0	198	2	0	1	0
8:30 AM	3	79	9	0	5	44	0	0	0	0	0	0	4	0	3	0	147	0	0	0	0
8:45 AM	2	74	4	0	7	77	1	0	0	0	0	0	6	0	3	0	174	0	0	0	0
Total Survey	28	632	83	1	146	714	35	0	5	1	4	0	28	6	36	0	1,718	8	0	1	7

Peak Hour Summary

7:20 AM to 8:20 AM

By Approach	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	427	440	867	1	555	395	950	0	7	47	54	0	40	147	187	0	1,029	6	0	1	6
%HV	8.2%				8.8%				71.4%				17.5%				9.3%				
PHF	0.78				0.80				0.58				0.71				0.88				

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	14	365	48	427	98	427	30	555	3	1	3	7	10	3	27	40	1,029
%HV	0.0%	9.3%	2.1%	8.2%	3.1%	10.8%	0.0%	8.8%	66.7%	0.0%	##	71.4%	20.0%	0.0%	18.5%	17.5%	9.3%
PHF	0.58	0.75	0.75	0.78	0.82	0.76	0.68	0.80	0.38	0.25	0.38	0.58	0.63	0.38	0.75	0.71	0.88

Rolling Hour Summary

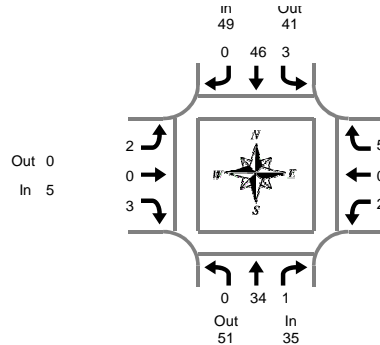
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	14	308	45	1	96	415	25	0	2	1	2	0	13	5	22	0	948	6	0	0	7
7:15 AM	16	349	48	1	101	426	29	0	3	1	3	0	11	4	27	0	1,018	6	0	0	7
7:30 AM	15	370	51	1	89	417	28	0	3	1	2	0	10	3	21	0	1,010	4	0	1	1
7:45 AM	15	369	48	1	69	321	20	0	3	1	2	0	10	3	16	0	877	4	0	1	0
8:00 AM	14	324	38	0	50	299	10	0	3	0	2	0	15	1	14	0	770	2	0	1	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
7:20 AM to 8:20 AM

SW 124th Ave & SW Myslony St

Tuesday, October 08, 2019

7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	0	1	1	2	0	3	0	0	0	0	0	0	0	0	4
7:05 AM	0	4	0	4	0	3	0	3	0	0	0	0	1	0	0	1	8
7:10 AM	0	1	0	1	0	4	0	4	0	0	0	0	2	2	0	4	9
7:15 AM	0	2	0	2	0	4	0	4	0	0	1	1	1	0	0	1	8
7:20 AM	0	1	0	1	0	2	0	2	1	0	1	2	0	0	0	0	5
7:25 AM	0	3	0	3	0	5	0	5	1	0	0	1	0	0	1	1	10
7:30 AM	0	3	0	3	0	4	0	4	0	0	0	0	0	0	0	0	7
7:35 AM	0	3	0	3	0	4	0	4	0	0	0	0	0	0	0	0	7
7:40 AM	0	1	0	1	1	3	0	4	0	0	0	0	1	0	1	2	7
7:45 AM	0	2	0	2	1	3	0	4	0	0	0	0	0	0	0	0	6
7:50 AM	0	1	0	1	0	5	0	5	0	0	0	0	0	0	0	0	6
7:55 AM	0	2	0	2	0	2	0	2	0	0	0	0	1	0	1	2	6
8:00 AM	0	3	0	3	1	4	0	5	0	0	0	0	0	0	1	1	9
8:05 AM	0	8	0	8	0	5	0	5	0	0	1	1	0	0	1	1	15
8:10 AM	0	3	1	4	0	5	0	5	0	0	0	0	0	0	0	0	9
8:15 AM	0	4	0	4	0	4	0	4	0	0	1	1	0	0	0	0	9
8:20 AM	0	5	1	6	0	3	0	3	0	0	0	0	0	0	0	0	9
8:25 AM	0	3	1	4	0	3	0	3	0	0	0	0	0	0	0	0	7
8:30 AM	0	6	0	6	0	2	0	2	0	0	0	0	0	0	0	0	8
8:35 AM	0	3	2	5	0	4	0	4	0	0	0	0	0	0	1	1	10
8:40 AM	0	4	2	6	1	1	0	2	0	0	0	0	1	0	0	1	9
8:45 AM	0	6	0	6	0	3	0	3	0	0	0	0	1	0	0	1	10
8:50 AM	0	1	0	1	0	4	0	4	0	0	0	0	0	0	1	1	6
8:55 AM	0	4	0	4	1	8	0	9	0	0	0	0	0	0	0	0	13
Total Survey	0	74	7	81	6	87	0	93	2	0	4	6	8	2	7	17	197

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	6	0	6	1	9	0	10	0	0	0	0	3	2	0	5	21
7:15 AM	0	6	0	6	0	11	0	11	2	0	2	4	1	0	1	2	23
7:30 AM	0	7	0	7	1	11	0	12	0	0	0	0	1	0	1	2	21
7:45 AM	0	5	0	5	1	10	0	11	0	0	0	0	1	0	1	2	18
8:00 AM	0	14	1	15	1	14	0	15	0	0	1	1	0	0	2	2	33
8:15 AM	0	12	2	14	0	10	0	10	0	0	1	1	0	0	0	0	25
8:30 AM	0	13	4	17	1	7	0	8	0	0	0	0	1	0	1	2	27
8:45 AM	0	11	0	11	1	15	0	16	0	0	0	0	1	0	1	2	29
Total Survey	0	74	7	81	6	87	0	93	2	0	4	6	8	2	7	17	197

Heavy Vehicle Peak Hour Summary 7:20 AM to 8:20 AM

By Approach	Northbound SW 124th Ave			Southbound SW 124th Ave			Eastbound SW Myslony St			Westbound SW Myslony St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	35	51	86	49	41	90	5	0	5	7	4	11	96
PHF	0.55			0.82			0.42			0.44			0.73

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	34	1	35	3	46	0	49	2	0	3	5	2	0	5	7	96
PHF	0.00	0.57	0.25	0.55	0.38	0.82	0.00	0.82	0.25	0.00	0.38	0.42	0.50	0.00	0.42	0.44	0.73

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	24	0	24	3	41	0	44	2	0	2	4	6	2	3	11	83
7:15 AM	0	32	1	33	3	46	0	49	2	0	3	5	3	0	5	8	95
7:30 AM	0	38	3	41	3	45	0	48	0	0	2	2	2	0	4	6	97
7:45 AM	0	44	7	51	3	41	0	44	0	0	2	2	2	0	4	6	103
8:00 AM	0	50	7	57	3	46	0	49	0	0	2	2	2	0	4	6	114

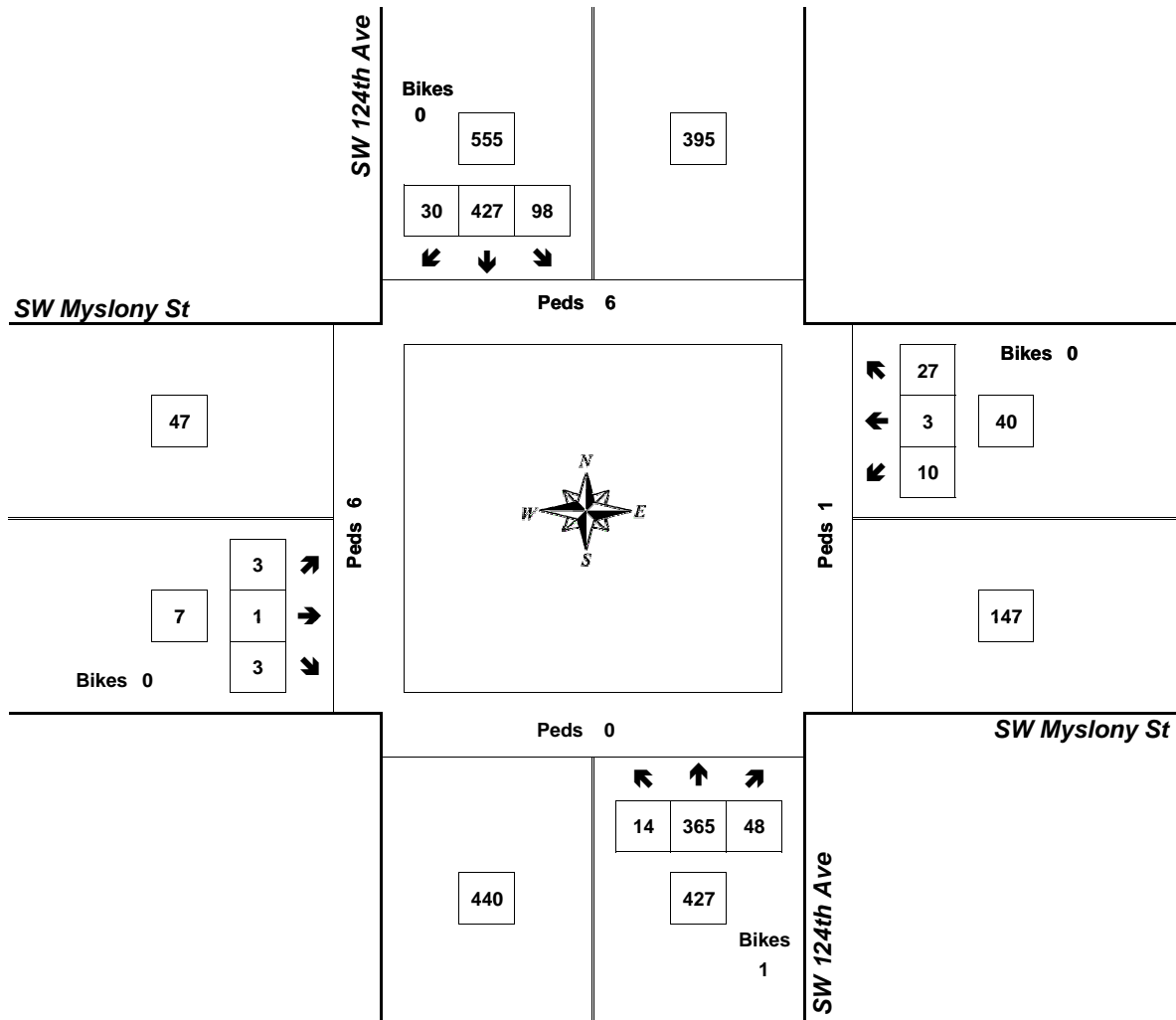
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 124th Ave & SW Myslony St

7:20 AM to 8:20 AM
Tuesday, October 08, 2019



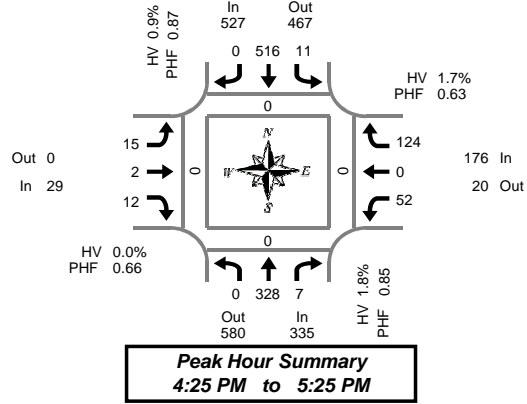
Approach	PHF	HV%	Volume
EB	0.58	71.4%	7
WB	0.71	17.5%	40
NB	0.78	8.2%	427
SB	0.80	8.8%	555
Intersection	0.88	9.3%	1,029

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 124th Ave & SW Myslony St

Tuesday, October 08, 2019

4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	0	13	0	0	0	44	0	0	4	0	1	0	16	0	14	0	0	0	0	2	
4:05 PM	0	13	2	0	0	47	1	0	1	0	4	0	14	0	7	0	0	0	0	0	
4:10 PM	1	30	0	0	3	44	0	0	1	0	2	0	11	0	4	0	0	0	0	0	
4:15 PM	0	21	1	0	1	39	0	0	2	0	4	0	4	0	9	0	0	0	0	0	
4:20 PM	0	17	1	0	1	32	1	0	0	1	1	0	6	0	10	0	0	0	0	0	
4:25 PM	0	23	1	0	1	41	0	0	0	0	0	0	5	0	6	0	0	0	0	0	
4:30 PM	0	19	0	0	1	49	0	0	4	1	2	0	2	0	5	0	0	0	0	0	
4:35 PM	0	17	1	0	0	51	0	0	1	0	1	0	2	0	12	0	0	0	0	0	
4:40 PM	0	25	0	0	0	51	0	0	1	0	1	0	5	0	14	0	0	0	0	0	
4:45 PM	0	38	1	0	2	42	0	0	1	0	2	0	5	0	10	0	0	0	0	0	
4:50 PM	0	28	1	0	1	36	0	0	0	0	1	0	1	0	5	0	0	0	0	0	
4:55 PM	0	30	0	0	2	41	0	0	0	0	1	0	1	0	9	0	0	0	0	0	
5:00 PM	0	23	1	0	0	35	0	0	2	0	1	0	9	0	13	0	0	0	0	0	
5:05 PM	0	39	1	0	2	52	0	0	1	0	2	0	10	0	20	0	0	0	0	0	
5:10 PM	0	24	1	0	1	46	0	0	1	0	1	0	7	0	11	0	0	0	0	0	
5:15 PM	0	32	0	0	1	30	0	0	3	1	0	0	3	0	13	0	0	0	0	0	
5:20 PM	0	30	0	0	0	42	0	0	1	0	0	0	2	0	6	0	0	0	0	0	
5:25 PM	0	19	0	0	1	44	0	0	3	1	0	0	2	0	3	0	0	0	0	0	
5:30 PM	0	23	0	0	0	48	0	0	1	0	0	0	1	0	2	0	1	0	0	0	
5:35 PM	0	19	0	0	1	33	1	0	1	0	1	0	4	0	5	0	0	0	0	0	
5:40 PM	0	27	0	0	2	48	0	0	0	0	1	0	0	0	6	0	0	0	0	0	
5:45 PM	0	19	1	0	0	30	0	0	0	0	0	0	3	0	4	0	0	0	0	0	
5:50 PM	0	33	0	0	0	34	0	0	1	0	0	0	2	1	1	0	0	0	0	0	
5:55 PM	0	23	0	0	0	33	0	0	1	0	2	0	1	0	3	0	0	0	0	0	
Total Survey	1	585	12	0	20	992	3	0	30	4	28	0	116	1	192	0	1,984	0	0	1	2

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	1	56	2	0	3	135	1	0	6	0	7	0	41	0	25	0	277	0	0	0	2
4:15 PM	0	61	3	0	3	112	1	0	2	1	5	0	15	0	25	0	228	0	0	0	0
4:30 PM	0	61	1	0	1	151	0	0	6	1	4	0	9	0	31	0	265	0	0	0	0
4:45 PM	0	96	2	0	5	119	0	0	1	0	4	0	7	0	24	0	258	0	0	0	0
5:00 PM	0	86	3	0	3	133	0	0	4	0	4	0	26	0	44	0	303	0	0	0	0
5:15 PM	0	81	0	0	2	116	0	0	7	2	0	0	7	0	22	0	237	0	0	0	0
5:30 PM	0	69	0	0	3	129	1	0	2	0	2	0	5	0	13	0	224	0	0	1	0
5:45 PM	0	75	1	0	0	97	0	0	2	0	2	0	6	1	8	0	192	0	0	0	0
Total Survey	1	585	12	0	20	992	3	0	30	4	28	0	116	1	192	0	1,984	0	0	1	2

Peak Hour Summary

4:25 PM to 5:25 PM

By Approach	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	335	580	915	0	527	467	994	0	29	0	29	0	176	20	196	0	1,067	0	0	0	0
%HV	1.8%				0.9%				0.0%				1.7%				1.3%				
PHF	0.85				0.87				0.66				0.63				0.88				

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	0	328	7	335	11	516	0	527	15	2	12	29	52	0	124	176	1,067
%HV	0.0%	1.8%	0.0%	1.8%	0.0%	1.0%	0.0%	0.9%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	2.4%	1.7%	1.3%
PHF	0.00	0.85	0.58	0.85	0.55	0.85	0.00	0.87	0.63	0.50	0.75	0.66	0.50	0.00	0.70	0.63	0.88

Rolling Hour Summary

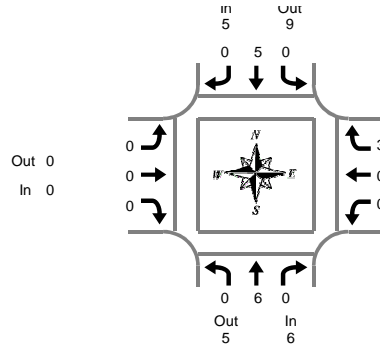
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	1	274	8	0	12	517	2	0	15	2	20	0	72	0	105	0	1,028	0	0	0	2
4:15 PM	0	304	9	0	12	515	1	0	13	2	17	0	57	0	124	0	1,054	0	0	0	0
4:30 PM	0	324	6	0	11	519	0	0	18	3	12	0	49	0	121	0	1,063	0	0	0	0
4:45 PM	0	332	5	0	13	497	1	0	14	2	10	0	45	0	103	0	1,022	0	0	1	0
5:00 PM	0	311	4	0	8	475	1	0	15	2	8	0	44	1	87	0	956	0	0	1	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
4:25 PM to 5:25 PM

SW 124th Ave & SW Myslony St

Tuesday, October 08, 2019

4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total	
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total		
4:00 PM	0	1	0	1	0	1	0	1	0	0	0	0	0	0	0	1	1	3
4:05 PM	0	0	1	1	0	3	0	3	0	0	0	0	0	0	0	0	0	4
4:10 PM	0	1	0	1	0	2	0	2	0	0	0	0	0	0	0	0	0	3
4:15 PM	0	5	1	6	0	0	0	0	0	0	0	0	0	0	0	1	1	7
4:20 PM	0	0	0	0	0	2	0	2	0	0	0	0	1	0	0	1	3	3
4:25 PM	0	2	0	2	0	3	0	3	0	0	0	0	0	0	0	0	0	5
4:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:35 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
4:40 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	0	1
4:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	1	1	2	2
4:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
5:00 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:05 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:10 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:15 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	1	1	2	2
5:20 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:25 PM	0	1	0	1	1	0	0	1	0	0	0	0	0	0	0	0	0	2
5:30 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:35 PM	0	0	0	0	0	3	0	3	0	0	0	0	0	0	0	0	0	3
5:40 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	1
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:50 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5:55 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	1
Total Survey	0	16	2	18	1	16	0	17	0	0	0	0	1	0	6	7	42	42

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave			Total	Southbound SW 124th Ave			Total	Eastbound SW Myslony St			Total	Westbound SW Myslony St			Total	
	L	T	R		L	T	R		L	T	R		L	T	R		
4:00 PM	0	2	1	3	0	6	0	6	0	0	0	0	0	0	1	1	10
4:15 PM	0	7	1	8	0	5	0	5	0	0	0	0	1	0	1	2	15
4:30 PM	0	2	0	2	0	1	0	1	0	0	0	0	0	0	0	0	3
4:45 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	2	2	3
5:00 PM	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
5:15 PM	0	2	0	2	1	0	0	1	0	0	0	0	0	0	1	1	4
5:30 PM	0	2	0	2	0	3	0	3	0	0	0	0	0	0	0	0	5
5:45 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1
Total Survey	0	16	2	18	1	16	0	17	0	0	0	0	1	0	6	7	42

Heavy Vehicle Peak Hour Summary

4:25 PM to 5:25 PM

By Approach	Northbound SW 124th Ave			Total	Southbound SW 124th Ave			Total	Eastbound SW Myslony St			Total	Westbound SW Myslony St			Total	
	In	Out	Total		In	Out	Total		In	Out	Total		In	Out	Total		
Volume	6	5	11		5	9	14		0	0	0		3	0	3		14
PHF	0.38				0.42				0.00				0.38				0.50

By Movement	Northbound SW 124th Ave			Total	Southbound SW 124th Ave			Total	Eastbound SW Myslony St			Total	Westbound SW Myslony St			Total	
	L	T	R		L	T	R		L	T	R		L	T	R		
Volume	0	6	0	6	0	5	0	5	0	0	0	0	0	0	3	3	14
PHF	0.00	0.38	0.00	0.38	0.00	0.42	0.00	0.42	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.38	0.50

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Myslony St				Westbound SW Myslony St				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	11	2	13	0	13	0	13	0	0	0	0	1	0	4	5	31
4:15 PM	0	10	1	11	0	7	0	7	0	0	0	0	1	0	3	4	22
4:30 PM	0	5	0	5	1	2	0	3	0	0	0	0	0	0	3	3	11
4:45 PM	0	5	0	5	1	4	0	5	0	0	0	0	0	0	3	3	13
5:00 PM	0	5	0	5	1	3	0	4	0	0	0	0	0	0	2	2	11

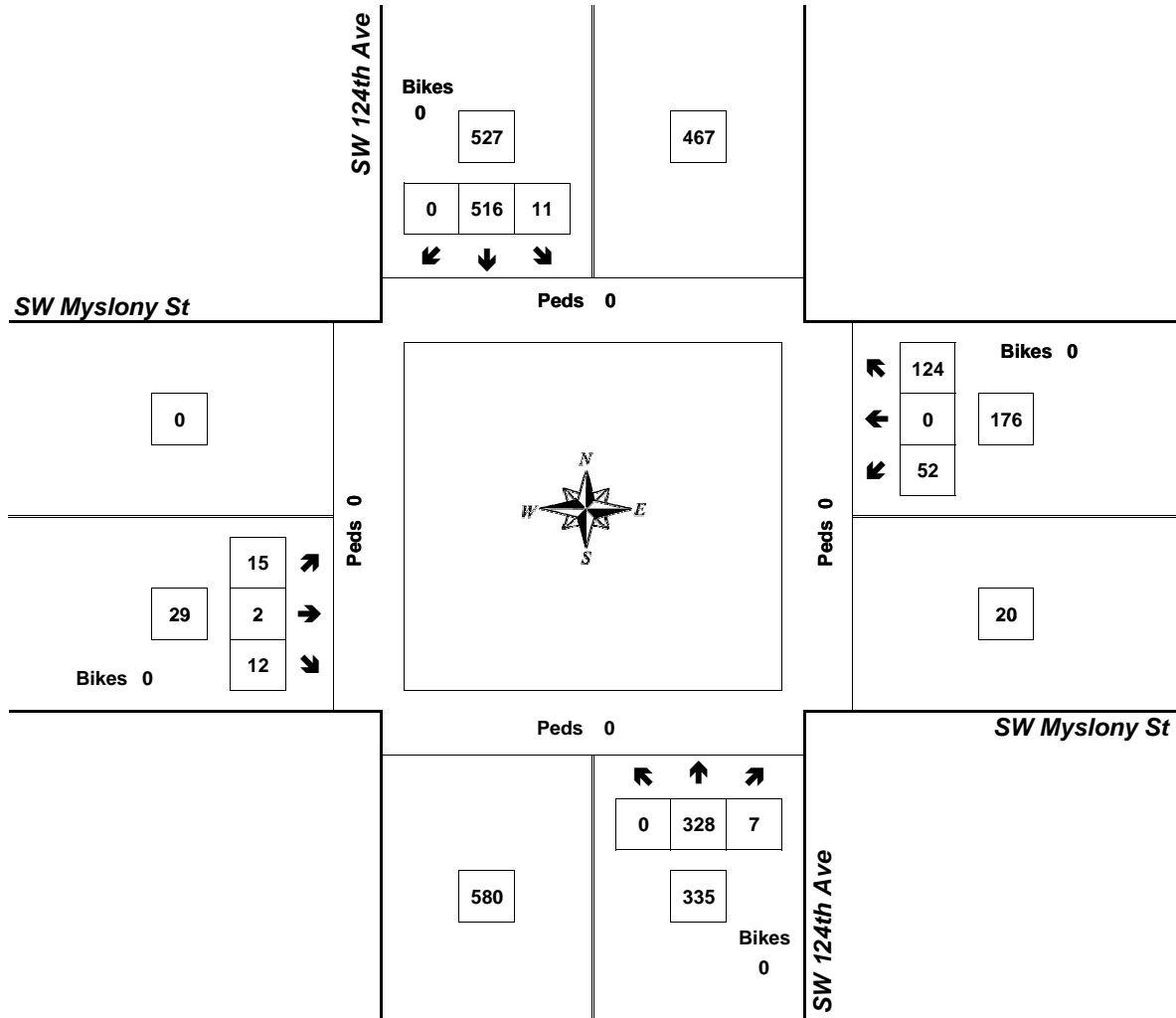
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 124th Ave & SW Myslony St

4:25 PM to 5:25 PM
Tuesday, October 08, 2019



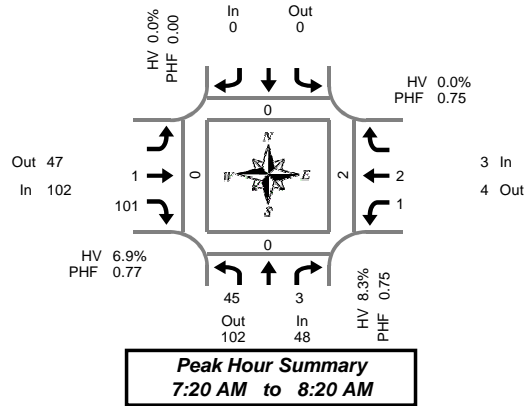
Approach	PHF	HV%	Volume
EB	0.66	0.0%	29
WB	0.63	1.7%	176
NB	0.85	1.8%	335
SB	0.87	0.9%	527
Intersection	0.88	1.3%	1,067

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 112th Ave & NW Myslony St

Tuesday, October 08, 2019

7:00 AM to 9:00 AM

Peak Hour Summary
7:20 AM to 8:20 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	3	0	0			0	0	4	0	0	0	0	7	0	0	0	0
7:05 AM	6	0	0			0	0	5	0	0	0	0	11	0	0	0	0
7:10 AM	3	0	0			0	0	3	0	0	0	0	6	0	0	0	0
7:15 AM	4	0	0			0	0	2	0	0	0	0	6	0	0	0	0
7:20 AM	6	0	0			0	0	10	0	0	0	0	16	0	0	0	0
7:25 AM	1	0	0			0	0	11	0	0	0	0	12	0	0	0	0
7:30 AM	3	0	0			0	0	5	0	0	1	0	9	0	0	0	0
7:35 AM	3	0	0			0	1	3	0	0	0	0	7	0	0	0	0
7:40 AM	2	0	0			0	0	9	0	0	0	0	11	0	0	0	0
7:45 AM	2	0	0			0	0	10	0	1	0	0	13	0	0	0	0
7:50 AM	6	0	0			0	0	9	0	0	0	0	15	0	0	0	0
7:55 AM	4	0	0			0	0	8	0	0	0	0	12	0	0	0	0
8:00 AM	4	2	0			0	0	10	0	0	1	0	17	0	0	0	0
8:05 AM	4	0	0			0	0	15	0	0	0	0	19	0	0	0	0
8:10 AM	4	0	0			0	0	4	0	0	0	0	8	0	0	0	0
8:15 AM	6	1	0			0	0	7	0	0	0	0	14	0	0	2	0
8:20 AM	2	0	0			0	0	5	0	0	0	0	7	0	0	2	0
8:25 AM	2	0	0			0	0	8	0	0	1	0	11	0	0	0	0
8:30 AM	0	0	0			0	0	1	0	0	0	0	1	0	0	0	0
8:35 AM	1	0	0			0	0	2	0	0	0	0	3	0	0	0	0
8:40 AM	3	0	0			0	0	4	0	0	0	0	7	0	0	0	0
8:45 AM	2	0	0			0	1	3	0	0	0	0	6	0	0	0	0
8:50 AM	2	0	0			0	0	2	0	0	0	0	4	0	0	0	0
8:55 AM	2	0	0			0	0	3	0	1	1	0	7	0	0	0	0
Total Survey	75	3	0			0	2	143	0	2	4	0	229	0	0	4	0

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	12	0	0			0	0	12	0	0	0	0	24	0	0	0	0
7:15 AM	11	0	0			0	0	23	0	0	0	0	34	0	0	0	0
7:30 AM	8	0	0			0	1	17	0	0	1	0	27	0	0	0	0
7:45 AM	12	0	0			0	0	27	0	1	0	0	40	0	0	0	0
8:00 AM	12	2	0			0	0	29	0	0	1	0	44	0	0	0	0
8:15 AM	10	1	0			0	0	20	0	0	1	0	32	0	0	4	0
8:30 AM	4	0	0			0	0	7	0	0	0	0	11	0	0	0	0
8:45 AM	6	0	0			0	1	8	0	1	1	0	17	0	0	0	0
Total Survey	75	3	0			0	2	143	0	2	4	0	229	0	0	4	0

Peak Hour Summary

7:20 AM to 8:20 AM

By Approach	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Total	Pedestrians Crosswalk							
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West				
Volume	48	102	150	0	0	0	0	102	47	149	0	3	4	7	0	153	0	0	2	0	
%HV	8.3%				0.0%				6.9%				0.0%			7.2%					
PHF	0.75				0.00				0.77				0.75			0.80					

By Movement	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Total				
	L	R	Total			Total	T	R	Total	L	T	Total					
Volume	45	3	48			0	1	101	102	1	2	3	153				
%HV	6.7%	NA	33.3%	8.3%	NA	NA	NA	0.0%	NA	0.0%	6.9%	6.9%	0.0%	0.0%	NA	0.0%	7.2%
PHF	0.80		0.38	0.75		0.00	0.25	0.77	0.77	0.25	0.50	0.75	0.80				

Rolling Hour Summary

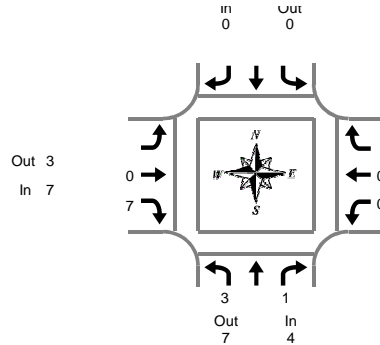
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
7:00 AM	43	0	0			0	1	79	0	1	1	0	125	0	0	0	0
7:15 AM	43	2	0			0	1	96	0	1	2	0	145	0	0	0	0
7:30 AM	42	3	0			0	1	93	0	1	3	0	143	0	0	4	0
7:45 AM	38	3	0			0	0	83	0	1	2	0	127	0	0	4	0
8:00 AM	32	3	0			0	1	64	0	1	3	0	104	0	0	4	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
7:20 AM to 8:20 AM

SW 112th Ave & NW Myslony St

Tuesday, October 08, 2019

7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	0	0	0			0	0	0	0	0	0	0	0
7:05 AM	1	0	1			0	0	0	0	0	0	0	1
7:10 AM	0	0	0			0	0	0	0	0	0	0	0
7:15 AM	0	0	0			0	0	0	0	0	0	0	0
7:20 AM	0	0	0			0	0	2	2	0	0	0	2
7:25 AM	0	0	0			0	0	1	1	0	0	0	1
7:30 AM	0	0	0			0	0	0	0	0	0	0	0
7:35 AM	0	0	0			0	0	0	0	0	0	0	0
7:40 AM	1	0	1			0	0	1	1	0	0	0	2
7:45 AM	0	0	0			0	0	0	0	0	0	0	0
7:50 AM	1	0	1			0	0	0	0	0	0	0	1
7:55 AM	0	0	0			0	0	0	0	0	0	0	0
8:00 AM	0	0	0			0	0	1	1	0	0	0	1
8:05 AM	0	0	0			0	0	1	1	0	0	0	1
8:10 AM	0	0	0			0	0	1	1	0	0	0	1
8:15 AM	1	1	2			0	0	0	0	0	0	0	2
8:20 AM	0	0	0			0	0	1	1	0	0	0	1
8:25 AM	0	0	0			0	0	0	0	0	1	1	1
8:30 AM	0	0	0			0	0	0	0	0	0	0	0
8:35 AM	1	0	1			0	0	0	0	0	0	0	1
8:40 AM	0	0	0			0	0	0	0	0	0	0	0
8:45 AM	2	0	2			0	0	1	1	0	0	0	3
8:50 AM	0	0	0			0	0	0	0	0	0	0	0
8:55 AM	1	0	1			0	0	0	0	0	1	1	2
Total Survey	8	1	9			0	0	9	9	0	2	2	20

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	1	0	1			0	0	0	0	0	0	0	1
7:15 AM	0	0	0			0	0	3	3	0	0	0	3
7:30 AM	1	0	1			0	0	1	1	0	0	0	2
7:45 AM	1	0	1			0	0	0	0	0	0	0	1
8:00 AM	0	0	0			0	0	3	3	0	0	0	3
8:15 AM	1	1	2			0	0	1	1	0	1	1	4
8:30 AM	1	0	1			0	0	0	0	0	0	0	1
8:45 AM	3	0	3			0	0	1	1	0	1	1	5
Total Survey	8	1	9			0	0	9	9	0	2	2	20

Heavy Vehicle Peak Hour Summary 7:20 AM to 8:20 AM

By Approach	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	4	7	11	0	0	0	7	3	10	0	1	1	11
PHF	0.50			0.00			0.58			0.00			0.69

By Movement	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Total
	L	R	Total			Total	T	R	Total	L	T	Total	
Volume	3	1	4			0	0	7	7	0	0	0	11
PHF	0.38	0.25	0.50			0.00	0.00	0.58	0.58	0.00	0.00	0.00	0.69

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total
	L	R	Total			Total	T	R	Total	L	T	Total	
7:00 AM	3	0	3			0	0	4	4	0	0	0	7
7:15 AM	2	0	2			0	0	7	7	0	0	0	9
7:30 AM	3	1	4			0	0	5	5	0	1	1	10
7:45 AM	3	1	4			0	0	4	4	0	1	1	9
8:00 AM	5	1	6			0	0	5	5	0	2	2	13

Peak Hour Summary



Clay Carney
(503) 833-2740

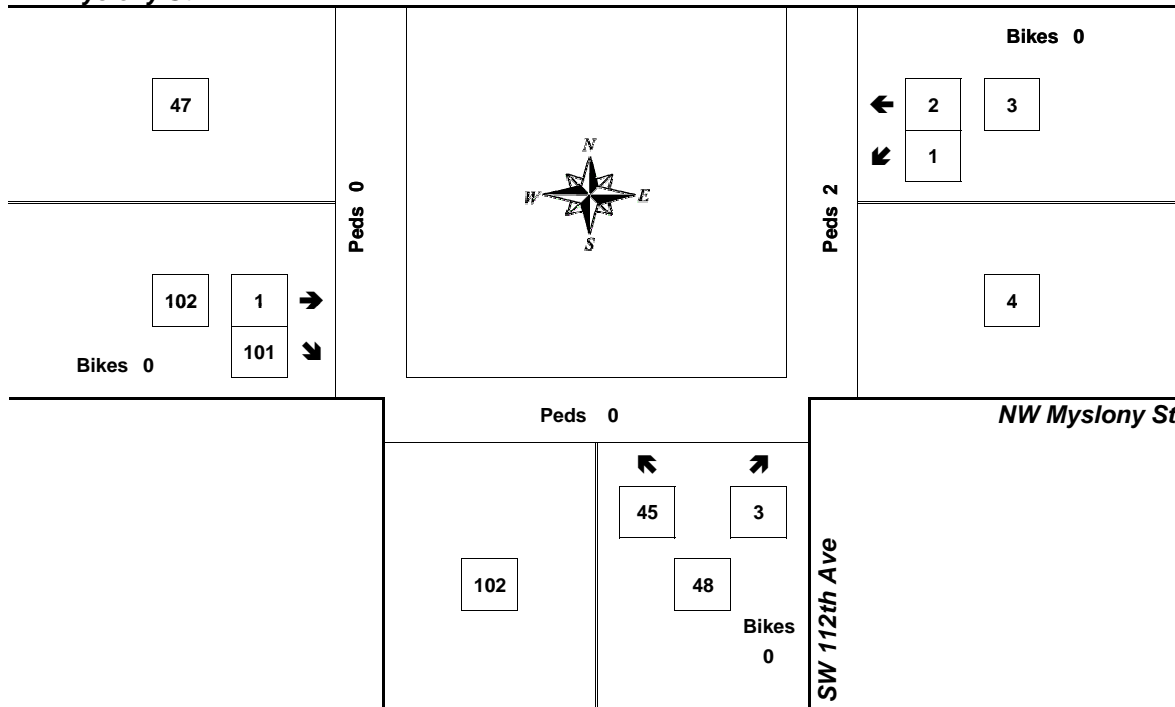
SW 112th Ave & NW Myslony St

7:20 AM to 8:20 AM
Tuesday, October 08, 2019

Bikes
0

NW Myslony St

Peds 0



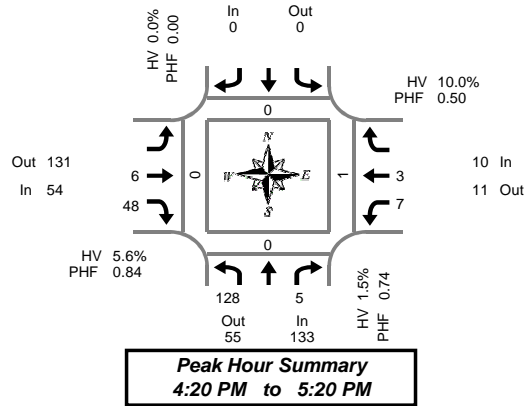
Approach	PHF	HV%	Volume
EB	0.77	6.9%	102
WB	0.75	0.0%	3
NB	0.75	8.3%	48
SB	0.00	0.0%	0
Intersection	0.80	7.2%	153

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 112th Ave & NW Myslony St

Tuesday, October 08, 2019

4:00 PM to 6:00 PM

5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	9	0	0			0	0	8	0	0	0	0	17	0	0	0	0
4:05 PM	7	0	0			0	0	8	0	1	0	0	16	0	0	2	0
4:10 PM	5	0	0			0	0	5	0	0	0	0	10	0	0	0	0
4:15 PM	4	0	0			0	0	4	0	0	0	0	8	0	0	0	0
4:20 PM	8	0	0			0	1	8	0	1	0	0	18	0	0	0	0
4:25 PM	6	0	0			0	0	3	0	0	0	0	9	0	0	0	0
4:30 PM	7	0	0			0	0	1	0	0	0	0	8	0	0	0	0
4:35 PM	15	0	0			0	1	4	0	0	0	0	20	0	0	0	0
4:40 PM	16	1	0			0	1	4	0	0	0	0	22	0	0	0	0
4:45 PM	11	0	0			0	1	5	0	1	0	0	18	0	0	0	0
4:50 PM	9	0	0			0	1	2	0	1	0	0	13	0	0	0	0
4:55 PM	4	0	0			0	0	3	0	1	1	0	9	0	0	0	0
5:00 PM	14	1	0			0	1	2	0	1	0	0	19	0	0	0	0
5:05 PM	13	0	0			0	0	10	0	1	1	0	25	0	0	0	0
5:10 PM	15	2	0			0	0	2	0	1	0	0	20	0	0	1	0
5:15 PM	10	1	0			0	0	4	0	0	1	0	16	0	0	0	0
5:20 PM	3	0	0			0	0	1	0	0	0	0	4	0	0	0	0
5:25 PM	2	0	0			0	0	4	0	0	0	0	6	0	0	0	0
5:30 PM	3	0	1			0	0	1	0	0	0	0	4	0	0	0	0
5:35 PM	7	0	0			0	0	5	0	0	0	0	12	0	0	0	0
5:40 PM	4	0	0			0	0	0	0	0	3	0	7	0	0	0	0
5:45 PM	7	0	0			0	0	3	0	0	2	0	12	0	0	0	0
5:50 PM	1	0	0			0	0	0	0	0	0	0	1	0	0	0	0
5:55 PM	4	0	0			0	0	1	0	0	0	0	5	0	0	0	0
Total Survey	184		5	1			0	6	88	0	8	8	299	0	0	3	0

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	21	0	0			0	0	21	0	1	0	0	43	0	0	2	0
4:15 PM	18	0	0			0	1	15	0	1	0	0	35	0	0	0	0
4:30 PM	38	1	0			0	2	9	0	0	0	0	50	0	0	0	0
4:45 PM	24	0	0			0	2	10	0	3	1	0	40	0	0	0	0
5:00 PM	42	3	0			0	1	14	0	3	1	0	64	0	0	1	0
5:15 PM	15	1	0			0	0	9	0	0	1	0	26	0	0	0	0
5:30 PM	14	0	1			0	0	6	0	0	3	0	23	0	0	0	0
5:45 PM	12	0	0			0	0	4	0	0	2	0	18	0	0	0	0
Total Survey	184		5	1			0	6	88	0	8	8	299	0	0	3	0

Peak Hour Summary

4:20 PM to 5:20 PM

By Approach	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Total	Pedestrians Crosswalk						
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West			
Volume	133	55	188	0	0	0	0	54	131	185	0	10	11	21	0	197	0	0	1	0
%HV	1.5%				0.0%				5.6%				10.0%				3.0%			
PHF	0.74				0.00				0.84				0.50				0.77			

By Movement	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Total				
	L	R	Total			Total	T	R	Total	L	T	Total					
Volume	128	5	133			0	6	48	54	7	3	10	197				
%HV	1.6%	NA	0.0%	1.5%	NA	NA	NA	0.0%	NA	16.7%	4.2%	5.6%	0.0%	33.3%	NA	10.0%	3.0%
PHF	0.76		0.42	0.74			0.00			0.50	0.75	0.84	0.58	0.38		0.50	0.77

Rolling Hour Summary

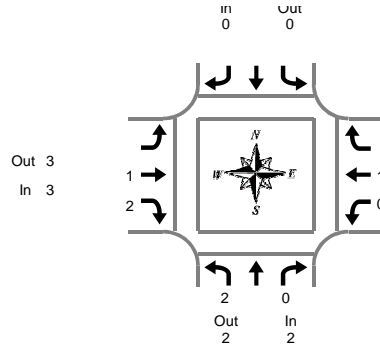
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total	Pedestrians Crosswalk			
	L	R	Bikes			Bikes	T	R	Bikes	L	T	Bikes		North	South	East	West
4:00 PM	101	1	0			0	5	55	0	5	1	0	168	0	0	2	0
4:15 PM	122	4	0			0	6	48	0	7	2	0	189	0	0	1	0
4:30 PM	119	5	0			0	5	42	0	6	3	0	180	0	0	1	0
4:45 PM	95	4	1			0	3	39	0	6	6	0	153	0	0	1	0
5:00 PM	83	4	1			0	1	33	0	3	7	0	131	0	0	1	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
4:20 PM to 5:20 PM

SW 112th Ave & NW Myslony St

Tuesday, October 08, 2019

4:00 PM to 6:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total		
	L	R	Total			Total	T	R	Total	L	T	Total			
4:00 PM	0	0	0			0			0	0	0	0	0		
4:05 PM	0	0	0			0			0	1	1	1	0		
4:10 PM	0	0	0			0			0	0	0	0	0		
4:15 PM	0	0	0			0			0	0	0	0	0		
4:20 PM	0	0	0			0			0	1	1	0	0		
4:25 PM	0	0	0			0			0	0	0	0	0		
4:30 PM	0	0	0			0			0	0	0	0	0		
4:35 PM	0	0	0			0			0	0	0	0	0		
4:40 PM	0	0	0			0			1	1	2	0	0		
4:45 PM	0	0	0			0			0	0	0	0	0		
4:50 PM	1	0	1			0			0	0	0	0	0		
4:55 PM	1	0	1			0			0	0	0	1	1		
5:00 PM	0	0	0			0			0	0	0	0	0		
5:05 PM	0	0	0			0			0	0	0	0	0		
5:10 PM	0	0	0			0			0	0	0	0	0		
5:15 PM	0	0	0			0			0	0	0	0	0		
5:20 PM	0	0	0			0			0	0	0	0	0		
5:25 PM	0	0	0			0			0	1	1	0	0		
5:30 PM	0	0	0			0			0	0	0	0	0		
5:35 PM	0	0	0			0			0	0	0	0	0		
5:40 PM	0	0	0			0			0	0	0	0	0		
5:45 PM	0	0	0			0			0	0	0	1	1		
5:50 PM	0	0	0			0			0	0	0	0	0		
5:55 PM	0	0	0			0			0	0	0	0	0		
Total Survey	2	0	2			0			1	4	5	1	2	3	10

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total		
	L	R	Total			Total	T	R	Total	L	T	Total			
4:00 PM	0	0	0			0			0	1	1	1	0		
4:15 PM	0	0	0			0			0	1	1	0	0		
4:30 PM	0	0	0			0			1	1	2	0	0		
4:45 PM	2	0	2			0			0	0	0	0	1		
5:00 PM	0	0	0			0			0	0	0	0	0		
5:15 PM	0	0	0			0			0	1	1	0	0		
5:30 PM	0	0	0			0			0	0	0	0	0		
5:45 PM	0	0	0			0			0	0	0	0	1		
Total Survey	2	0	2			0			1	4	5	1	2	3	10

Heavy Vehicle Peak Hour Summary

4:20 PM to 5:20 PM

By Approach	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	2	2	4	0	0	0	3	3	6	1	1	2	6
PHF	0.25			0.00			0.38			0.25			0.50

By Movement	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Total
	L	R	Total			Total	T	R	Total	L	T	Total	
Volume	2	0	2			0	1	2	3	0	1	1	6
PHF	0.25	0.00	0.25			0.00	0.25	0.50	0.38	0.00	0.25	0.25	0.50

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound NW Myslony St			Westbound NW Myslony St			Interval Total		
	L	R	Total			Total	T	R	Total	L	T	Total			
4:00 PM	2	0	2			0			1	3	4	1	1	2	8
4:15 PM	2	0	2			0			1	2	3	0	1	1	6
4:30 PM	2	0	2			0			1	2	3	0	1	1	6
4:45 PM	2	0	2			0			0	1	1	0	1	1	4
5:00 PM	0	0	0			0			0	1	1	0	1	1	2

Peak Hour Summary



Clay Carney
(503) 833-2740

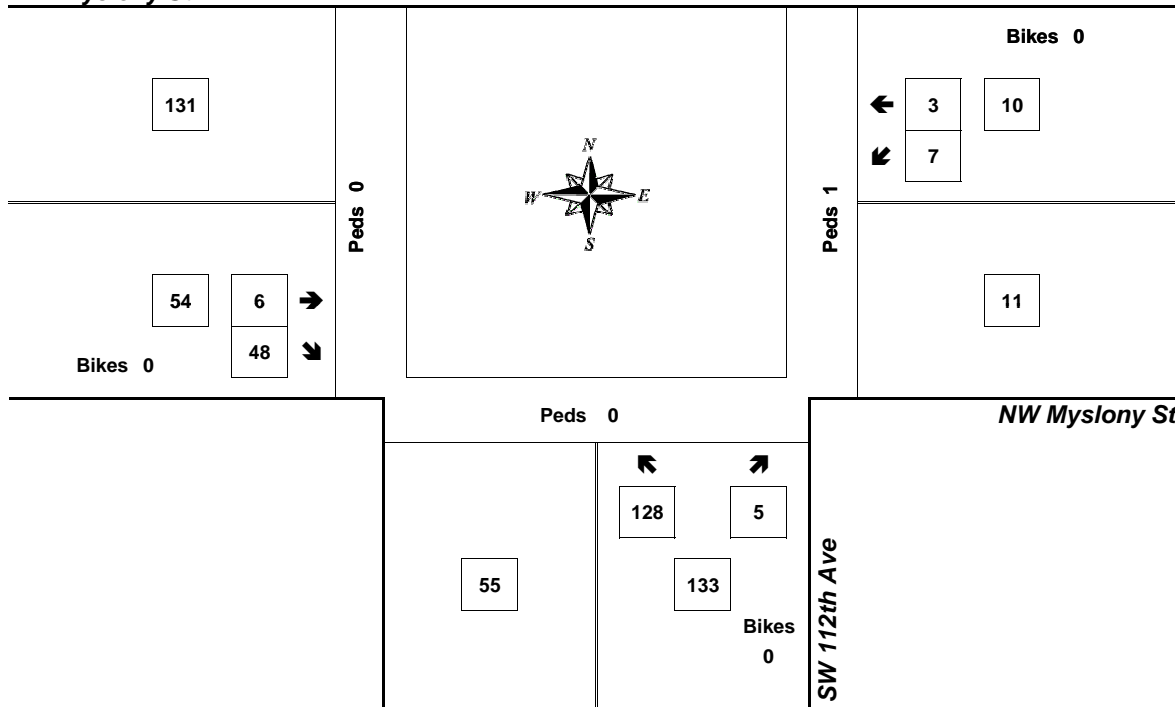
SW 112th Ave & NW Myslony St

4:20 PM to 5:20 PM
Tuesday, October 08, 2019

Bikes
0

NW Myslony St

Peds 0



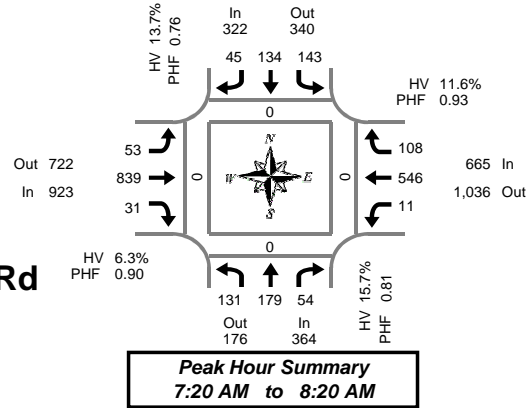
Approach	PHF	HV%	Volume
EB	0.84	5.6%	54
WB	0.50	10.0%	10
NB	0.74	1.5%	133
SB	0.00	0.0%	0
Intersection	0.77	3.0%	197

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 124th Ave & SW Tualatin Sherwood Rd

Thursday, February 07, 2019

7:00 AM to 9:00 AM

5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	5	8	2	0	5	7	4	0	5	87	5	0	0	40	7	0	0	0	0	0	
7:05 AM	13	12	3	0	19	8	3	0	2	69	5	0	0	31	4	0	0	0	0	0	
7:10 AM	5	10	5	0	3	5	3	0	9	75	1	0	0	39	4	0	0	0	0	0	
7:15 AM	6	9	6	0	8	4	4	0	9	77	0	0	0	42	5	0	0	0	0	0	
7:20 AM	15	11	6	0	8	9	0	0	6	71	3	0	1	38	6	0	0	0	0	0	
7:25 AM	16	7	3	0	20	11	4	0	3	63	1	0	0	48	7	0	0	0	0	0	
7:30 AM	6	15	2	0	4	3	3	0	4	85	2	1	0	51	10	0	0	0	0	0	
7:35 AM	8	16	4	0	18	16	2	0	5	64	4	0	2	48	8	0	0	0	0	0	
7:40 AM	14	15	7	0	11	20	2	0	4	65	4	0	1	47	6	0	0	0	0	0	
7:45 AM	8	18	8	0	12	23	1	0	4	65	1	0	1	39	10	0	0	0	0	0	
7:50 AM	9	19	8	0	13	20	4	0	4	67	1	0	0	48	9	0	0	0	0	0	
7:55 AM	11	23	1	0	16	11	4	0	3	64	2	0	1	53	8	0	0	0	0	0	
8:00 AM	18	15	8	0	14	9	10	0	6	62	3	0	2	42	16	0	0	0	0	0	
8:05 AM	11	14	1	0	9	3	2	0	3	82	2	0	1	44	6	0	0	0	0	0	
8:10 AM	8	14	4	0	10	5	5	0	6	75	5	0	0	43	11	0	0	0	0	0	
8:15 AM	7	12	2	0	8	4	8	0	5	76	3	0	2	45	11	0	0	0	0	0	
8:20 AM	3	5	2	0	14	6	5	0	9	91	2	0	0	29	4	0	0	0	0	0	
8:25 AM	11	9	2	0	4	5	6	0	5	70	8	0	2	49	6	0	0	0	0	0	
8:30 AM	15	14	2	0	5	5	4	0	3	59	7	0	1	45	7	0	0	0	0	0	
8:35 AM	3	11	2	0	8	6	6	0	4	69	6	0	1	47	8	0	0	0	0	0	
8:40 AM	7	8	3	0	7	7	4	0	12	84	8	0	0	59	4	0	0	0	0	0	
8:45 AM	2	15	0	0	6	2	2	0	9	74	2	0	3	46	5	0	0	0	0	0	
8:50 AM	6	10	1	0	7	13	3	0	5	73	3	0	0	51	7	0	0	0	0	0	
8:55 AM	3	9	1	0	9	8	6	0	9	68	2	0	1	56	5	0	0	0	0	0	
Total Survey	210	299	83	0	238	210	95	0	134	1,735	80	1	19	1,080	174	0	0	0	0	0	

15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	23	30	10	0	27	20	10	0	16	231	11	0	0	110	15	0	0	0	0	503	
7:15 AM	37	27	15	0	36	24	8	0	18	211	4	0	1	128	18	0	0	0	0	527	
7:30 AM	28	46	13	0	33	39	7	0	13	214	10	1	3	146	24	0	0	0	0	576	
7:45 AM	28	60	17	0	41	54	9	0	11	196	4	0	2	140	27	0	0	0	0	589	
8:00 AM	37	43	13	0	33	17	17	0	15	219	10	0	3	129	33	0	0	0	0	569	
8:15 AM	21	26	6	0	26	15	19	0	19	237	13	0	4	123	21	0	0	0	0	530	
8:30 AM	25	33	7	0	20	18	14	0	19	212	21	0	2	151	19	0	0	0	0	541	
8:45 AM	11	34	2	0	22	23	11	0	23	215	7	0	4	153	17	0	0	0	0	522	
Total Survey	210	299	83	0	238	210	95	0	134	1,735	80	1	19	1,080	174	0	0	0	0	4,357	

Peak Hour Summary

7:20 AM to 8:20 AM

By Approach	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	364	176	540	0	322	340	662	0	923	722	1,645	1	665	1,036	1,701	0	0	0	0	2,274	
%HV	15.7%				13.7%				6.3%				11.6%				10.4%				
PHF	0.81				0.76				0.90				0.93				0.94				

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	131	179	54	364	143	134	45	322	53	839	31	923	11	546	108	665	2,274
%HV	16.8%	10.6%	29.6%	15.7%	13.3%	14.9%	11.1%	13.7%	7.5%	5.4%	29.0%	6.3%	36.4%	10.4%	14.8%	11.6%	10.4%
PHF	0.82	0.75	0.59	0.81	0.83	0.53	0.63	0.76	0.88	0.90	0.78	0.90	0.69	0.93	0.82	0.93	0.94

Rolling Hour Summary

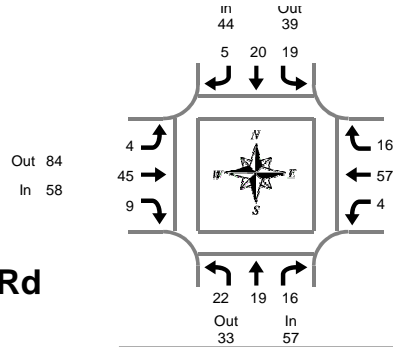
7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	116	163	55	0	137	137	34	0	58	852	29	1	6	524	84	0	0	0	0	2,195	
7:15 AM	130	176	58	0	143	134	41	0	57	840	28	1	9	543	102	0	0	0	0	2,261	
7:30 AM	114	175	49	0	133	125	52	0	58	866	37	1	12	538	105	0	0	0	0	2,264	
7:45 AM	111	162	43	0	120	104	59	0	64	864	48	0	11	543	100	0	0	0	0	2,229	
8:00 AM	94	136	28	0	101	73	61	0	76	883	51	0	13	556	90	0	0	0	0	2,162	

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SW 124th Ave & SW Tualatin Sherwood Rd

Thursday, February 07, 2019

7:00 AM to 9:00 AM

Peak Hour Summary
7:20 AM to 8:20 AM

Heavy Vehicle 5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	1	1	2	1	1	0	2	1	5	0	6	0	4	0	4	14
7:05 AM	1	1	2	4	1	0	0	1	0	2	0	2	0	2	0	2	9
7:10 AM	1	0	0	1	0	0	1	1	1	8	0	9	0	6	0	6	17
7:15 AM	0	1	2	3	0	1	0	1	0	5	0	5	0	1	3	4	13
7:20 AM	5	0	1	6	0	2	0	2	1	1	1	3	1	4	1	6	17
7:25 AM	0	1	1	2	1	0	1	2	0	7	0	7	0	4	1	5	16
7:30 AM	0	3	2	5	0	2	1	3	1	5	2	8	0	7	2	9	25
7:35 AM	0	4	1	5	3	3	0	6	0	5	2	7	0	4	1	5	23
7:40 AM	3	2	1	6	0	3	1	4	0	2	1	3	0	10	3	13	26
7:45 AM	3	2	1	6	1	2	0	3	1	6	0	7	0	5	0	5	21
7:50 AM	3	0	2	5	1	3	0	4	0	3	0	3	0	0	0	0	12
7:55 AM	1	1	0	2	1	2	0	3	0	5	0	5	0	3	3	6	16
8:00 AM	5	1	4	10	4	2	0	6	0	2	0	2	1	4	2	7	25
8:05 AM	0	0	0	0	2	0	0	2	1	2	0	3	1	7	1	9	14
8:10 AM	2	4	3	9	3	0	1	4	0	3	3	6	0	8	0	8	27
8:15 AM	0	1	0	1	3	1	1	5	0	4	0	4	1	1	2	4	14
8:20 AM	0	1	2	3	2	2	0	4	0	9	0	9	0	3	0	3	19
8:25 AM	0	0	2	2	1	1	1	3	0	4	2	6	1	7	0	8	19
8:30 AM	4	1	0	5	1	1	1	3	0	0	2	2	1	8	0	9	19
8:35 AM	2	0	0	2	3	1	0	4	1	11	1	13	0	3	2	5	24
8:40 AM	0	0	1	1	0	1	2	3	1	3	0	4	0	9	1	10	18
8:45 AM	2	3	0	5	1	1	1	3	0	6	1	7	1	6	0	7	22
8:50 AM	1	0	1	2	3	4	1	8	0	8	0	8	0	8	0	8	26
8:55 AM	0	3	1	4	2	3	0	5	1	8	0	9	0	7	1	8	26
Total Survey	33	30	28	91	34	36	12	82	9	114	15	138	7	121	23	151	462

Heavy Vehicle 15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	2	2	3	7	2	1	1	4	2	15	0	17	0	12	0	12	40
7:15 AM	5	2	4	11	1	3	1	5	1	13	1	15	1	9	5	15	46
7:30 AM	3	9	4	16	3	8	2	13	1	12	5	18	0	21	6	27	74
7:45 AM	7	3	3	13	3	7	0	10	1	14	0	15	0	8	3	11	49
8:00 AM	7	5	7	19	9	2	1	12	1	7	3	11	2	19	3	24	66
8:15 AM	0	2	4	6	6	4	2	12	0	17	2	19	2	11	2	15	52
8:30 AM	6	1	1	8	4	3	3	10	2	14	3	19	1	20	3	24	61
8:45 AM	3	6	2	11	6	8	2	16	1	22	1	24	1	21	1	23	74
Total Survey	33	30	28	91	34	36	12	82	9	114	15	138	7	121	23	151	462

Heavy Vehicle Peak Hour Summary 7:20 AM to 8:20 AM

By Approach	Northbound SW 124th Ave			Southbound SW 124th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	57	33	90	44	39	83	58	84	142	77	80	157	236
PHF	0.75			0.85			0.66			0.71			0.80

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	22	19	16	57	19	20	5	44	4	45	9	58	4	57	16	77	236
PHF	0.61	0.53	0.57	0.75	0.53	0.63	0.63	0.85	0.50	0.66	0.45	0.66	0.50	0.68	0.67	0.71	0.80

Heavy Vehicle Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	17	16	14	47	9	19	4	32	5	54	6	65	1	50	14	65	209
7:15 AM	22	19	18	59	16	20	4	40	4	46	9	59	3	57	17	77	235
7:30 AM	17	19	18	54	21	21	5	47	3	50	10	63	4	59	14	77	241
7:45 AM	20	11	15	46	22	16	6	44	4	52	8	64	5	58	11	74	228
8:00 AM	16	14	14	44	25	17	8	50	4	60	9	73	6	71	9	86	253

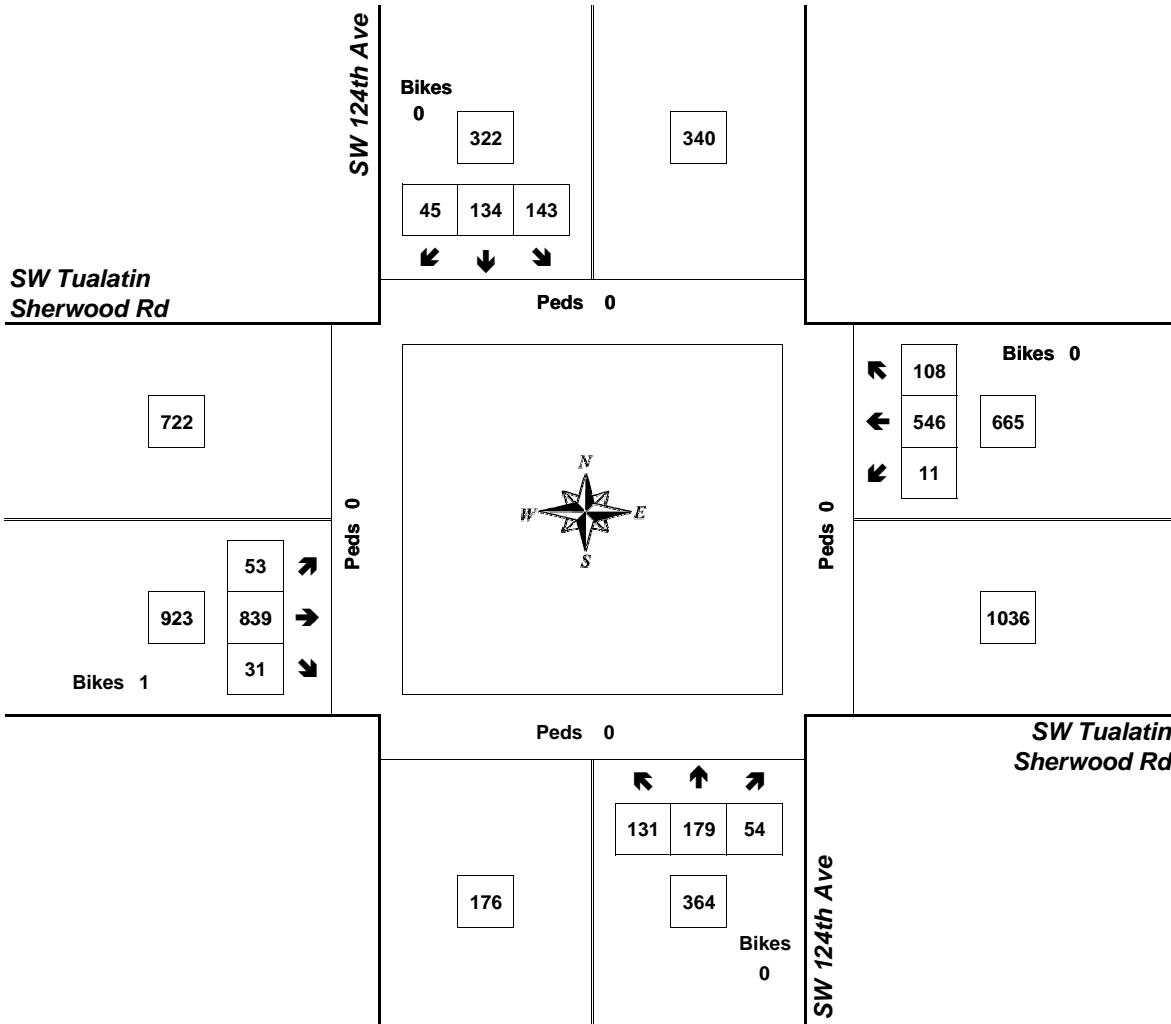
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 124th Ave & SW Tualatin Sherwood Rd

7:20 AM to 8:20 AM
Thursday, February 07, 2019



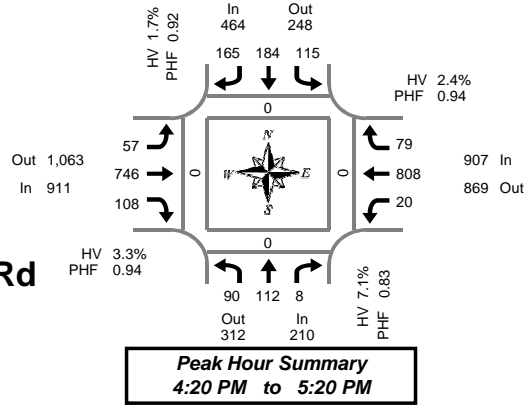
Approach	PHF	HV%	Volume
EB	0.90	6.3%	923
WB	0.93	11.6%	665
NB	0.81	15.7%	364
SB	0.76	13.7%	322
Intersection	0.94	10.4%	2,274

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 124th Ave & SW Tualatin Sherwood Rd

Wednesday, February 06, 2019

4:00 PM to 6:00 PM

5-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	5	4	0	0	13	21	11	0	5	61	6	0	2	72	12	0	212	0	0	0	0
4:05 PM	4	10	2	0	1	20	9	0	6	67	17	0	6	60	7	0	209	0	0	0	0
4:10 PM	11	13	3	0	4	14	14	0	6	58	9	0	5	66	12	0	215	0	0	0	0
4:15 PM	5	10	0	0	2	11	18	0	1	56	8	0	3	74	6	0	194	0	0	0	0
4:20 PM	14	9	0	0	16	19	11	0	5	66	11	0	1	61	7	0	220	0	0	0	0
4:25 PM	7	7	0	0	7	7	9	0	1	55	9	0	2	70	5	0	179	0	0	0	0
4:30 PM	6	11	0	0	7	13	15	0	7	58	10	0	1	76	4	0	208	0	0	0	0
4:35 PM	5	11	0	0	9	17	16	0	6	62	8	0	1	70	13	0	218	0	0	0	0
4:40 PM	6	7	1	0	10	20	13	0	9	51	4	0	2	64	8	0	195	0	0	0	0
4:45 PM	7	7	1	0	13	16	12	0	2	69	12	0	2	70	6	0	217	0	0	0	0
4:50 PM	12	10	3	0	10	11	10	0	5	52	11	0	1	67	5	0	197	0	0	0	0
4:55 PM	8	15	0	0	6	17	17	0	6	61	7	0	0	56	5	0	198	0	0	0	0
5:00 PM	6	5	0	0	9	16	14	0	5	66	10	0	1	71	6	0	209	0	0	0	0
5:05 PM	5	9	1	0	5	14	17	0	3	60	4	0	6	66	5	0	195	0	0	0	0
5:10 PM	9	12	1	0	12	19	14	0	2	78	10	0	1	73	9	0	240	0	0	0	0
5:15 PM	5	9	1	0	11	15	17	0	6	68	12	0	2	64	6	0	216	0	0	0	0
5:20 PM	10	8	0	0	14	16	24	0	2	62	9	1	0	53	3	0	201	0	0	0	0
5:25 PM	6	5	0	0	1	7	14	0	4	60	6	0	2	82	8	0	195	0	0	0	0
5:30 PM	1	10	0	0	4	7	14	0	6	75	7	0	2	81	4	0	211	0	0	0	0
5:35 PM	8	13	0	0	11	10	15	0	3	48	10	0	1	68	12	1	199	0	0	0	0
5:40 PM	11	7	1	0	9	12	14	0	4	63	14	0	1	65	8	0	209	0	0	0	0
5:45 PM	3	4	2	0	4	5	16	0	2	64	4	0	1	97	6	0	208	0	0	0	0
5:50 PM	4	12	1	0	8	7	10	0	1	57	7	0	0	63	3	0	173	0	0	0	0
5:55 PM	3	7	0	0	9	10	5	0	3	69	4	0	2	69	7	0	188	0	0	0	0
Total Survey	161	215	17	0	195	324	329	0	100	1,486	209	1	45	1,658	167	1	4,906	0	0	0	0

15-Minute Interval Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	20	27	5	0	18	55	34	0	17	186	32	0	13	198	31	0	636	0	0	0	0
4:15 PM	26	26	0	0	25	37	38	0	7	177	28	0	6	205	18	0	593	0	0	0	0
4:30 PM	17	29	1	0	26	50	44	0	22	171	22	0	4	210	25	0	621	0	0	0	0
4:45 PM	27	32	4	0	29	44	39	0	13	182	30	0	3	193	16	0	612	0	0	0	0
5:00 PM	20	26	2	0	26	49	45	0	10	204	24	0	8	210	20	0	644	0	0	0	0
5:15 PM	21	22	1	0	26	38	55	0	12	190	27	1	4	199	17	0	612	0	0	0	0
5:30 PM	20	30	1	0	24	29	43	0	13	186	31	0	4	214	24	1	619	0	0	0	0
5:45 PM	10	23	3	0	21	22	31	0	6	190	15	0	3	229	16	0	569	0	0	0	0
Total Survey	161	215	17	0	195	324	329	0	100	1,486	209	1	45	1,658	167	1	4,906	0	0	0	0

Peak Hour Summary 4:20 PM to 5:20 PM

By Approach	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	210	312	522	0	464	248	712	0	911	1,063	1,974	0	907	869	1,776	0	2,492	0	0	0	0
%HV	7.1%				1.7%				3.3%				2.4%				3.0%				
PHF	0.83				0.92				0.94				0.94				0.96				

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	90	112	8	210	115	184	165	464	57	746	108	911	20	808	79	907	2,492
%HV	5.6%	8.0%	12.5%	7.1%	3.5%	1.6%	0.6%	1.7%	3.5%	3.1%	4.6%	3.3%	0.0%	2.4%	3.8%	2.4%	3.0%
PHF	0.83	0.88	0.40	0.83	0.87	0.87	0.86	0.92	0.65	0.91	0.90	0.94	0.56	0.94	0.73	0.94	0.96

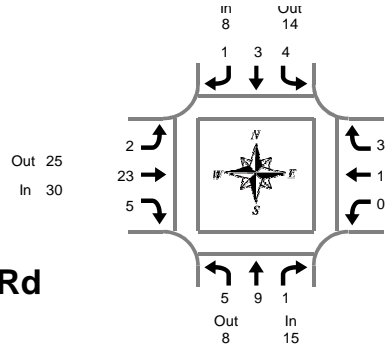
Rolling Hour Summary 4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	90	114	10	0	98	186	155	0	59	716	112	0	26	806	90	0	2,462	0	0	0	0
4:15 PM	90	113	7	0	106	180	166	0	52	734	104	0	21	818	79	0	2,470	0	0	0	0
4:30 PM	85	109	8	0	107	181	183	0	57	747	103	1	19	812	78	0	2,489	0	0	0	0
4:45 PM	88	110	8	0	105	160	182	0	48	762	112	1	19	816	77	1	2,487	0	0	0	0
5:00 PM	71	101	7	0	97	138	174	0	41	770	97	1	19	852	77	1	2,444	0	0	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SW 124th Ave & SW Tualatin Sherwood Rd

Wednesday, February 06, 2019

4:00 PM to 6:00 PM

Peak Hour Summary
4:20 PM to 5:20 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	1	3	0	4	0	2	1	3	0	0	2	2	9
4:05 PM	0	1	0	1	0	4	0	4	0	5	0	5	0	3	0	3	13
4:10 PM	2	1	1	4	0	0	0	0	0	3	1	4	0	3	1	4	12
4:15 PM	0	2	0	2	0	2	0	2	0	2	2	4	0	1	0	1	9
4:20 PM	0	1	0	1	1	0	0	1	0	3	0	3	0	3	0	3	8
4:25 PM	0	1	0	1	0	1	0	1	0	3	2	5	0	0	0	0	7
4:30 PM	1	1	0	2	1	0	0	1	0	1	1	2	0	2	1	3	8
4:35 PM	0	1	0	1	1	0	0	1	0	1	0	1	0	0	0	0	3
4:40 PM	2	2	0	4	1	1	0	2	1	0	0	1	0	4	0	4	11
4:45 PM	1	0	0	1	0	1	0	1	0	2	0	2	0	0	1	1	5
4:50 PM	0	0	1	1	0	0	0	0	0	1	1	2	0	2	0	2	5
4:55 PM	0	2	0	2	0	0	1	1	0	0	0	0	0	3	0	3	6
5:00 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	1	2	3
5:05 PM	1	0	0	1	0	0	0	0	0	3	0	3	0	2	0	2	6
5:10 PM	0	1	0	1	0	0	0	0	0	3	1	4	0	1	0	1	6
5:15 PM	0	0	0	0	0	0	0	0	0	1	5	6	0	1	0	1	7
5:20 PM	1	1	0	2	0	0	0	0	0	0	1	1	0	1	0	1	4
5:25 PM	0	0	0	0	0	0	0	0	1	3	1	5	0	0	0	0	5
5:30 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	1	0	1	3
5:35 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	2	0	2	3
5:40 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	1	0	1	3
5:45 PM	0	0	0	0	2	0	0	2	0	3	0	3	0	0	0	0	5
5:50 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	2	0	2	4
5:55 PM	0	0	0	0	1	0	0	1	0	1	0	1	0	2	0	2	4
Total Survey	8	14	2	24	9	12	1	22	3	48	11	62	0	35	6	41	149

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	2	1	5	1	7	0	8	0	10	2	12	0	6	3	9	34
4:15 PM	0	4	0	4	1	3	0	4	0	8	4	12	0	4	0	4	24
4:30 PM	3	4	0	7	3	1	0	4	1	2	1	4	0	6	1	7	22
4:45 PM	1	2	1	4	0	1	1	2	0	3	1	4	0	5	1	6	16
5:00 PM	1	1	0	2	0	0	0	0	0	7	1	8	0	4	1	5	15
5:15 PM	1	1	0	2	0	0	0	0	2	8	2	12	0	2	0	2	16
5:30 PM	0	0	0	0	1	0	0	1	0	4	0	4	0	4	0	4	9
5:45 PM	0	0	0	0	3	0	0	3	0	6	0	6	0	4	0	4	13
Total Survey	8	14	2	24	9	12	1	22	3	48	11	62	0	35	6	41	149

Heavy Vehicle Peak Hour Summary

4:20 PM to 5:20 PM

By Approach	Northbound SW 124th Ave			Southbound SW 124th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Sherwood Rd			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	15	8	23	8	14	22	30	25	55	22	28	50	75
PHF	0.54			0.50			0.58			0.79			0.82

By Movement	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	5	9	1	15	4	3	1	8	2	23	5	30	0	19	3	22	75
PHF	0.42	0.56	0.25	0.54	0.33	0.38	0.25	0.50	0.50	0.52	0.42	0.58	0.00	0.79	0.75	0.79	0.82

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 124th Ave				Southbound SW 124th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Sherwood Rd				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	6	12	2	20	5	12	1	18	1	23	8	32	0	21	5	26	96
4:15 PM	5	11	1	17	4	5	1	10	1	20	7	28	0	19	3	22	77
4:30 PM	6	8	1	15	3	2	1	6	3	20	5	28	0	17	3	20	69
4:45 PM	3	4	1	8	1	1	1	3	2	22	4	28	0	15	2	17	56
5:00 PM	2	2	0	4	4	0	0	4	2	25	3	30	0	14	1	15	53

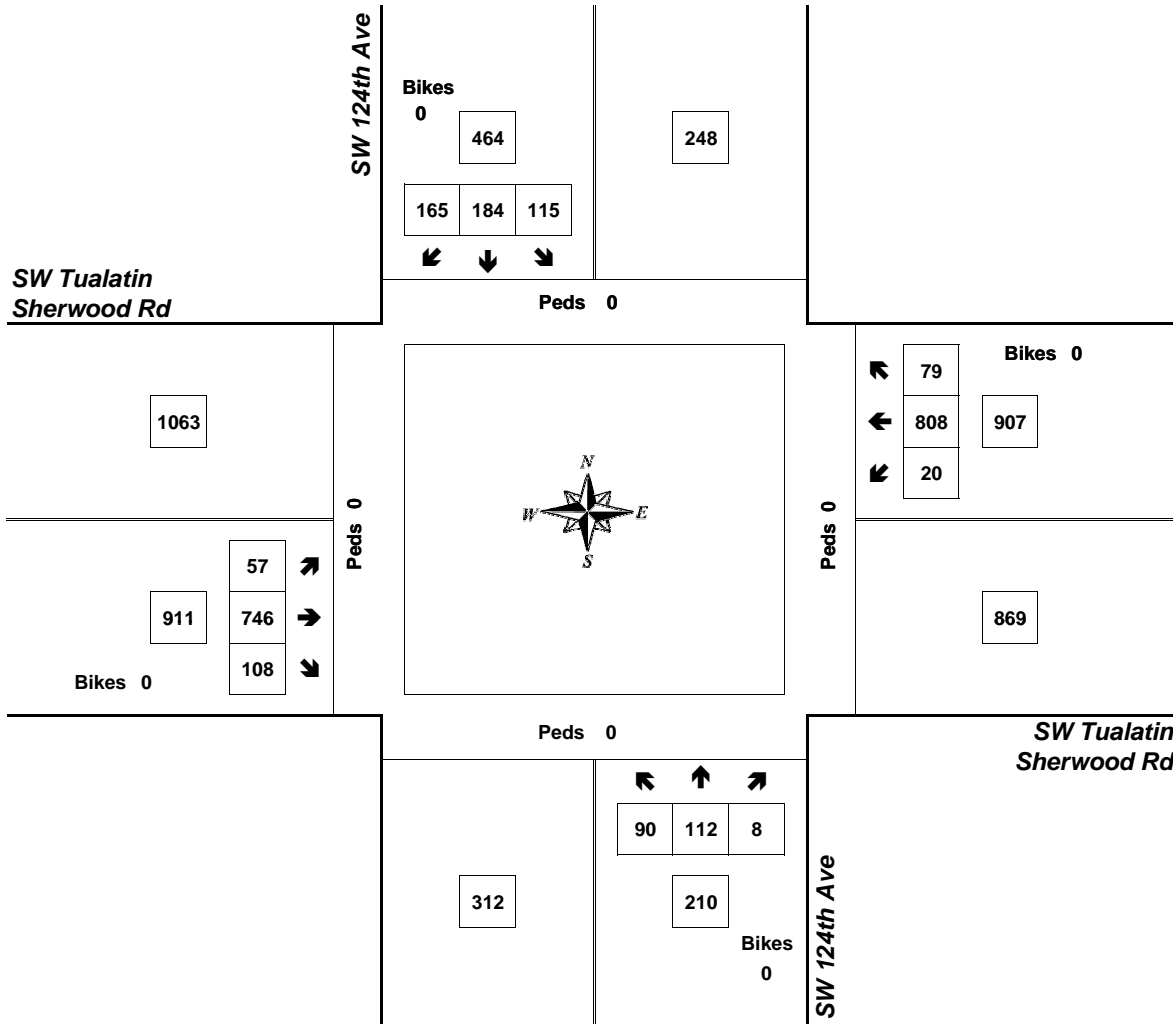
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 124th Ave & SW Tualatin Sherwood Rd

4:20 PM to 5:20 PM
Wednesday, February 06, 2019



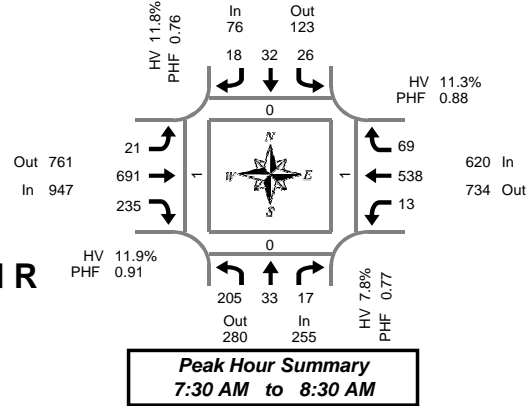
Approach	PHF	HV%	Volume
EB	0.94	3.3%	911
WB	0.94	2.4%	907
NB	0.83	7.1%	210
SB	0.92	1.7%	464
Intersection	0.96	3.0%	2,492

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 112th Ave & SW Tualatin Shderwood R

Tuesday, October 08, 2019
7:00 AM to 9:00 AM

5-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	17	3	0	0	1	0	1	0	3	56	15	1	0	49	7	0	152	0	0	0	0
7:05 AM	10	1	0	0	1	0	0	0	4	63	13	0	0	44	8	0	144	0	0	0	0
7:10 AM	11	3	0	0	2	2	0	0	2	53	29	0	0	26	3	0	131	0	0	0	0
7:15 AM	20	1	0	0	0	0	2	0	0	55	10	0	3	40	8	0	139	0	0	0	0
7:20 AM	11	3	0	0	3	2	1	0	2	55	16	0	3	44	6	0	146	0	0	0	0
7:25 AM	14	2	1	0	0	3	1	0	0	63	19	0	4	34	5	0	146	0	0	0	0
7:30 AM	27	3	0	0	4	2	1	0	0	50	18	1	0	44	2	0	151	0	0	0	0
7:35 AM	20	2	2	0	1	0	1	0	1	61	20	0	0	29	9	0	146	0	0	0	0
7:40 AM	25	2	2	0	2	3	2	0	2	57	24	0	1	44	1	0	165	0	0	0	0
7:45 AM	21	4	3	0	2	4	1	0	2	58	26	0	3	42	9	0	175	0	0	0	0
7:50 AM	9	7	0	0	0	6	1	0	6	58	27	0	2	46	7	0	169	0	0	0	0
7:55 AM	20	0	1	0	2	7	0	0	1	48	16	0	2	38	8	0	143	0	0	0	1
8:00 AM	23	1	0	0	1	3	4	0	2	60	22	0	1	39	6	0	162	0	0	0	0
8:05 AM	10	5	2	0	2	1	5	0	2	62	15	0	0	55	7	0	166	0	0	0	0
8:10 AM	10	1	4	0	4	2	0	0	2	56	12	0	2	57	7	0	157	0	0	0	0
8:15 AM	12	5	0	0	3	2	2	0	0	56	20	0	1	45	3	0	149	0	0	0	0
8:20 AM	20	2	0	0	2	2	1	0	2	51	19	0	1	43	4	0	147	0	0	1	0
8:25 AM	8	1	3	0	3	0	0	0	1	74	16	0	0	56	6	0	168	0	0	0	0
8:30 AM	13	0	0	0	3	1	1	0	1	64	18	0	1	37	5	0	144	0	0	0	0
8:35 AM	17	1	3	0	1	2	2	0	0	48	8	1	0	50	1	0	133	0	0	0	0
8:40 AM	13	3	0	0	3	2	1	0	1	56	19	1	0	52	6	0	156	0	0	0	0
8:45 AM	12	3	2	0	0	0	0	0	2	63	21	0	0	58	4	0	165	0	0	0	0
8:50 AM	15	6	2	0	2	1	4	0	1	67	14	0	2	68	2	0	184	0	0	0	0
8:55 AM	9	2	0	0	0	3	5	0	2	62	19	0	0	47	2	0	151	0	0	0	0
Total Survey	367	61	25	0	42	48	36	0	39	1,396	436	4	26	1,087	126	0	3,689	0	0	1	1

15-Minute Interval Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	38	7	0	0	4	2	1	0	9	172	57	1	0	119	18	0	427	0	0	0	0
7:15 AM	45	6	1	0	3	5	4	0	2	173	45	0	10	118	19	0	431	0	0	0	0
7:30 AM	72	7	4	0	7	5	4	0	3	168	62	1	1	117	12	0	462	0	0	0	0
7:45 AM	50	11	4	0	4	17	2	0	9	164	69	0	7	126	24	0	487	0	0	0	1
8:00 AM	43	7	6	0	7	6	9	0	6	178	49	0	3	151	20	0	485	0	0	0	0
8:15 AM	40	8	3	0	8	4	3	0	3	181	55	0	2	144	13	0	464	0	0	1	0
8:30 AM	43	4	3	0	7	5	4	0	2	168	45	2	1	139	12	0	433	0	0	0	0
8:45 AM	36	11	4	0	2	4	9	0	5	192	54	0	2	173	8	0	500	0	0	0	0
Total Survey	367	61	25	0	42	48	36	0	39	1,396	436	4	26	1,087	126	0	3,689	0	0	1	1

Peak Hour Summary 7:30 AM to 8:30 AM

By Approach	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	255	280	535	0	76	123	199	0	947	761	1,708	1	620	734	1,354	0	1,898	0	0	1	1
%HV	7.8%				11.8%				11.9%				11.3%				11.2%				
PHF	0.77				0.76				0.91				0.88				0.93				

By Movement	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	205	33	17	255	26	32	18	76	21	691	235	947	13	538	69	620	1,898
%HV	7.3%	3.0%	23.5%	7.8%	11.5%	0.0%	33.3%	11.8%	14.3%	14.3%	4.7%	11.9%	7.7%	12.3%	4.3%	11.3%	11.2%
PHF	0.71	0.63	0.61	0.77	0.72	0.47	0.50	0.76	0.53	0.95	0.76	0.91	0.46	0.86	0.72	0.88	0.93

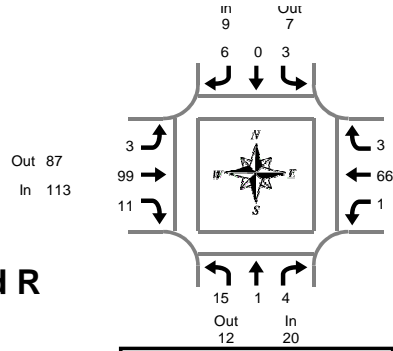
Rolling Hour Summary 7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
7:00 AM	205	31	9	0	18	29	11	0	23	677	233	2	18	480	73	0	1,807	0	0	0	1
7:15 AM	210	31	15	0	21	33	19	0	20	683	225	1	21	512	75	0	1,865	0	0	0	1
7:30 AM	205	33	17	0	26	32	18	0	21	691	235	1	13	538	69	0	1,898	0	0	1	1
7:45 AM	176	30	16	0	26	32	18	0	20	691	218	2	13	560	69	0	1,869	0	0	1	1
8:00 AM	162	30	16	0	24	19	25	0	16	719	203	2	8	607	53	0	1,882	0	0	1	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



Peak Hour Summary
7:30 AM to 8:30 AM

SW 112th Ave & SW Tualatin Shderwood R

Tuesday, October 08, 2019

7:00 AM to 9:00 AM

Heavy Vehicle 5-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	0	7	0	7	0	9	0	3	12
7:05 AM	0	0	0	0	0	0	0	0	0	1	7	1	9	0	3	0	12
7:10 AM	0	0	0	0	0	0	0	0	0	8	1	9	0	2	0	2	11
7:15 AM	0	0	0	0	0	0	0	0	0	9	0	9	1	7	1	9	18
7:20 AM	0	0	0	0	1	0	1	2	0	14	0	14	0	9	0	9	25
7:25 AM	2	0	1	3	0	0	1	1	0	5	0	5	0	12	0	12	21
7:30 AM	2	0	0	2	0	0	0	0	0	7	0	7	0	3	0	3	12
7:35 AM	3	0	2	5	0	0	0	0	0	11	0	11	0	6	1	7	23
7:40 AM	2	0	0	2	1	0	0	1	1	8	1	10	0	7	0	7	20
7:45 AM	0	0	0	0	1	0	0	1	0	7	0	7	0	4	0	4	12
7:50 AM	0	1	0	1	0	0	0	0	1	9	0	10	0	2	0	2	13
7:55 AM	3	0	0	3	0	0	0	0	0	9	2	11	0	6	1	7	21
8:00 AM	0	0	0	0	0	0	2	2	1	3	0	4	0	6	0	6	12
8:05 AM	0	0	1	1	0	0	3	3	0	9	2	11	0	6	0	6	21
8:10 AM	2	0	1	3	0	0	0	0	0	10	0	10	1	6	0	7	20
8:15 AM	0	0	0	0	1	0	0	1	0	7	1	8	0	5	1	6	15
8:20 AM	2	0	0	2	0	0	1	1	0	9	2	11	0	3	0	3	17
8:25 AM	1	0	0	1	0	0	0	0	0	10	3	13	0	12	0	12	26
8:30 AM	0	0	0	0	2	0	0	2	1	2	1	4	0	5	2	7	13
8:35 AM	1	0	0	1	0	0	0	0	0	7	1	8	0	11	0	11	20
8:40 AM	0	0	0	0	0	0	0	0	0	6	0	6	0	7	0	7	13
8:45 AM	0	0	0	0	0	0	0	0	1	2	2	5	0	10	2	12	17
8:50 AM	0	1	1	2	0	0	1	1	1	10	5	16	0	14	0	14	33
8:55 AM	0	0	0	0	0	0	2	2	0	11	1	12	0	13	0	13	27
Total Survey	18	2	6	26	6	0	11	17	7	187	23	217	2	168	8	178	438

Heavy Vehicle 15-Minute Interval Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	0	0	0	0	0	0	0	0	1	22	2	25	0	14	0	14	39
7:15 AM	2	0	1	3	1	0	2	3	0	28	0	28	1	28	1	30	64
7:30 AM	7	0	2	9	1	0	0	1	1	26	1	28	0	16	1	17	55
7:45 AM	3	1	0	4	1	0	0	1	1	25	2	28	0	12	1	13	46
8:00 AM	2	0	2	4	0	0	5	5	1	22	2	25	1	18	0	19	53
8:15 AM	3	0	0	3	1	0	1	2	0	26	6	32	0	20	1	21	58
8:30 AM	1	0	0	1	2	0	0	2	1	15	2	18	0	23	2	25	46
8:45 AM	0	1	1	2	0	0	3	3	2	23	8	33	0	37	2	39	77
Total Survey	18	2	6	26	6	0	11	17	7	187	23	217	2	168	8	178	438

Heavy Vehicle Peak Hour Summary

7:30 AM to 8:30 AM

By Approach	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Shderwood R			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	20	12	32	9	7	16	113	87	200	70	106	176	212
PHF	0.56			0.45			0.88			0.83			0.91

By Movement	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	15	1	4	20	3	0	6	9	3	99	11	113	1	66	3	70	212
PHF	0.54	0.25	0.50	0.56	0.38	0.00	0.30	0.45	0.38	0.95	0.46	0.88	0.25	0.83	0.75	0.83	0.91

Heavy Vehicle Rolling Hour Summary

7:00 AM to 9:00 AM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
7:00 AM	12	1	3	16	3	0	2	5	3	101	5	109	1	70	3	74	204
7:15 AM	14	1	5	20	3	0	7	10	3	101	5	109	2	74	3	79	218
7:30 AM	15	1	4	20	3	0	6	9	3	99	11	113	1	66	3	70	212
7:45 AM	9	1	2	12	4	0	6	10	3	88	12	103	1	73	4	78	203
8:00 AM	6	1	3	10	3	0	9	12	4	86	18	108	1	98	5	104	234

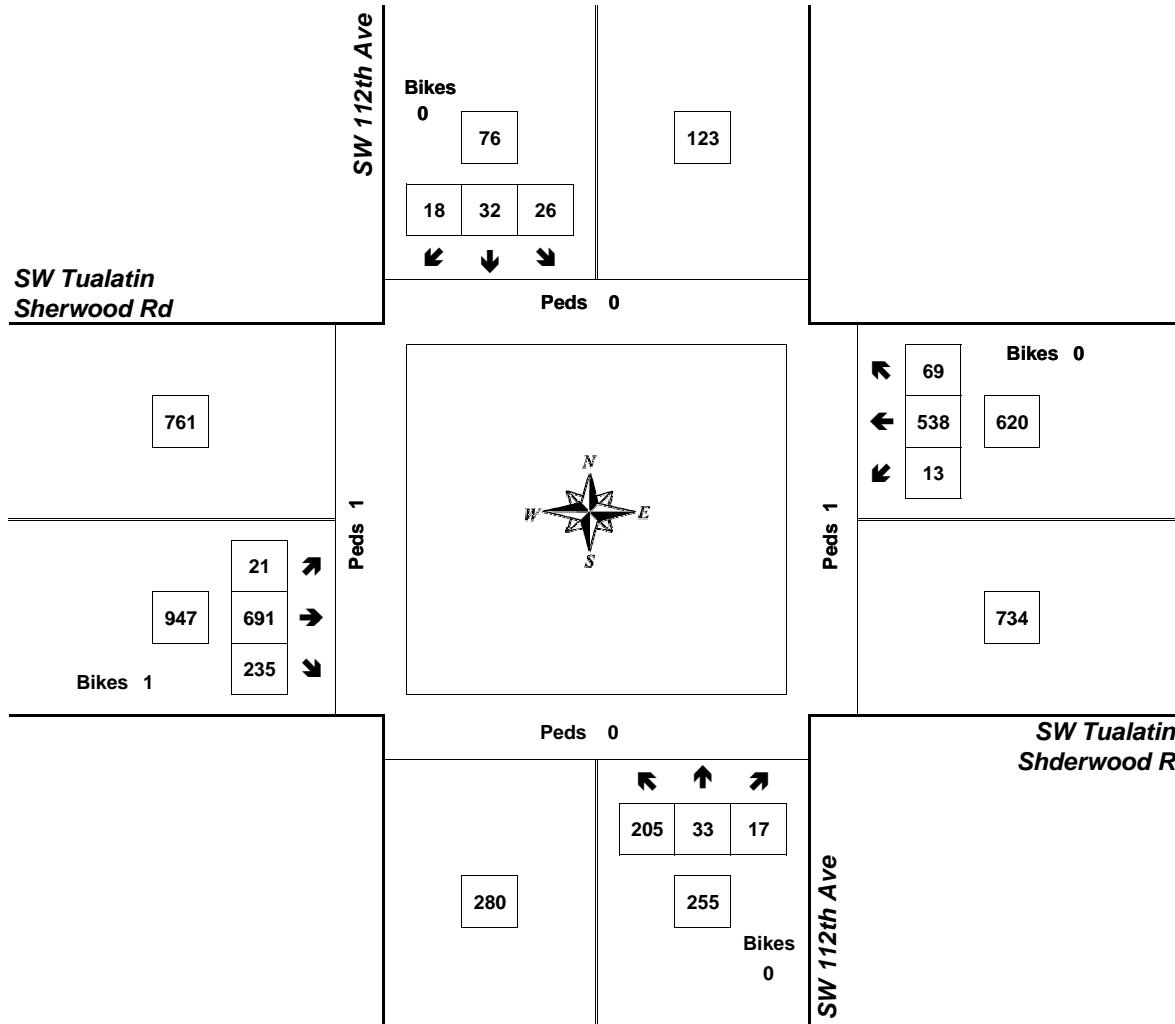
Peak Hour Summary



Clay Carney
(503) 833-2740

SW 112th Ave & SW Tualatin Shderwood R

7:30 AM to 8:30 AM
Tuesday, October 08, 2019



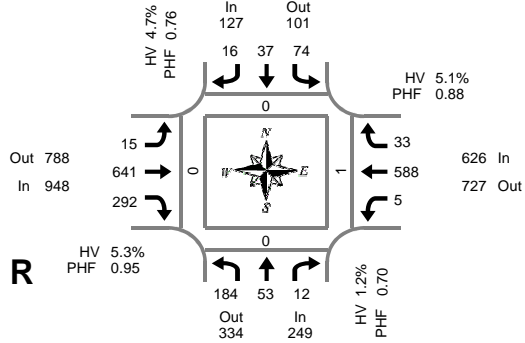
Approach	PHF	HV%	Volume
EB	0.91	11.9%	947
WB	0.88	11.3%	620
NB	0.77	7.8%	255
SB	0.76	11.8%	76
Intersection	0.93	11.2%	1,898

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary



Clay Carney
(503) 833-2740



SW 112th Ave & SW Tualatin Shderwood R

Tuesday, October 08, 2019

4:00 PM to 6:00 PM

**Peak Hour Summary
4:00 PM to 5:00 PM**

5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	13	2	0	0	17	4	1	0	1	57	20	0	0	43	4	0	162	0	0	0	0
4:05 PM	23	3	4	0	5	3	2	0	0	49	27	0	2	54	0	0	172	0	0	0	0
4:10 PM	15	2	2	0	6	2	2	0	3	71	20	0	0	62	2	0	187	0	0	0	0
4:15 PM	14	3	0	0	3	1	1	0	0	48	30	0	0	55	2	1	157	0	0	0	0
4:20 PM	14	6	0	0	4	2	1	0	0	57	21	1	0	39	5	0	149	0	0	0	0
4:25 PM	12	4	1	0	7	6	1	0	0	54	26	0	1	49	0	0	161	0	0	0	0
4:30 PM	15	7	2	1	4	5	1	0	1	48	19	0	0	35	1	0	138	0	0	1	0
4:35 PM	32	10	2	0	9	3	2	0	0	50	25	0	0	51	7	0	191	0	0	0	0
4:40 PM	15	6	0	0	2	4	1	0	2	50	29	0	0	42	1	0	152	0	0	0	0
4:45 PM	12	4	0	0	6	3	1	0	3	61	28	1	1	43	4	0	166	0	0	0	0
4:50 PM	10	2	0	0	5	2	1	0	3	45	18	0	1	59	5	0	151	0	0	0	0
4:55 PM	9	4	1	0	6	2	2	0	2	51	29	0	0	56	2	0	164	0	0	0	0
5:00 PM	8	7	2	0	0	6	2	0	1	50	21	0	0	53	4	0	150	0	0	0	0
5:05 PM	12	7	2	0	14	7	0	0	2	50	21	0	0	44	4	0	163	0	0	0	0
5:10 PM	18	5	3	0	1	3	1	0	1	35	29	0	0	45	2	0	143	0	0	0	0
5:15 PM	15	4	2	0	4	4	0	0	0	65	28	0	0	37	1	0	160	0	0	0	0
5:20 PM	10	1	0	0	2	1	1	0	3	63	22	0	0	55	3	0	161	0	0	0	0
5:25 PM	14	1	1	0	3	0	1	0	1	57	13	0	0	31	0	0	122	0	0	0	0
5:30 PM	10	3	2	1	2	3	0	0	1	61	21	0	0	44	1	0	148	0	0	0	0
5:35 PM	16	4	2	1	9	3	2	0	2	54	22	0	1	32	1	0	148	0	0	0	0
5:40 PM	14	3	1	0	1	1	2	0	2	58	16	0	0	49	0	0	147	0	0	0	0
5:45 PM	18	1	2	0	6	3	3	0	2	49	21	0	0	40	3	0	148	0	1	0	0
5:50 PM	7	2	1	0	4	0	0	0	0	55	25	0	0	43	2	0	139	1	0	0	0
5:55 PM	20	1	1	0	4	0	0	0	1	42	27	0	2	49	1	0	148	0	0	0	0
Total Survey	346	92	31	3	124	68	28	0	31	1,280	558	2	8	1,110	51	1	3,727	1	1	1	0

15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	51	7	6	0	28	9	5	0	4	177	67	0	2	159	6	0	521	0	0	0	0
4:15 PM	40	13	1	0	14	9	3	0	0	159	77	1	1	143	7	1	467	0	0	0	0
4:30 PM	62	23	4	1	15	12	4	0	3	148	73	0	0	128	9	0	481	0	0	1	0
4:45 PM	31	10	1	0	17	7	4	0	8	157	75	1	2	158	11	0	481	0	0	0	0
5:00 PM	38	19	7	0	15	16	3	0	4	135	71	0	0	142	6	0	456	0	0	0	0
5:15 PM	39	6	3	0	9	5	2	0	4	185	63	0	0	123	4	0	443	0	0	0	0
5:30 PM	40	10	5	2	12	7	4	0	5	173	59	0	1	125	2	0	443	0	0	0	0
5:45 PM	45	4	4	0	14	3	3	0	3	146	73	0	2	132	6	0	435	1	1	0	0
Total Survey	346	92	31	3	124	68	28	0	31	1,280	558	2	8	1,110	51	1	3,727	1	1	1	0

Peak Hour Summary

4:00 PM to 5:00 PM

By Approach	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Total	Pedestrians Crosswalk			
	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes	In	Out	Total	Bikes		North	South	East	West
Volume	249	334	583	1	127	101	228	0	948	788	1,736	2	626	727	1,353	1	1,950	0	0	1	0
%HV	1.2%				4.7%				5.3%				5.1%				4.7%				
PHF	0.70				0.76				0.95				0.88				0.94				

By Movement	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	184	53	12	249	74	37	16	127	15	641	292	2	5	588	33	1	1,950
%HV	1.1%	0.0%	8.3%	1.2%	5.4%	0.0%	12.5%	4.7%	6.7%	6.9%	1.7%	5.3%	20.0%	4.9%	6.1%	5.1%	4.7%
PHF	0.74	0.58	0.50	0.70	0.66	0.66	0.80	0.76	0.47	0.91	0.89	0.95	0.63	0.86	0.69	0.88	0.94

Rolling Hour Summary

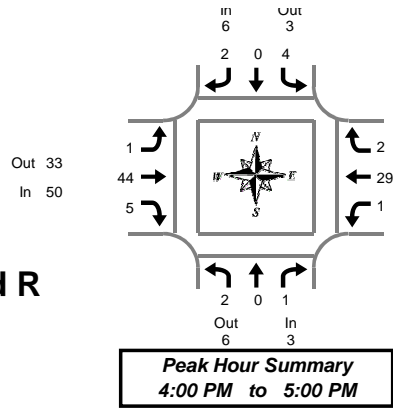
4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total	Pedestrians Crosswalk			
	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes	L	T	R	Bikes		North	South	East	West
4:00 PM	184	53	12	1	74	37	16	0	15	641	292	2	5	588	33	1	1,950	0	0	1	0
4:15 PM	171	65	13	1	61	44	14	0	15	599	296	2	3	571	33	1	1,885	0	0	1	0
4:30 PM	170	58	15	1	56	40	13	0	19	625	282	1	2	551	30	0	1,861	0	0	1	0
4:45 PM	148	45	16	2	53	35	13	0	21	650	268	1	3	548	23	0	1,823	0	0	0	0
5:00 PM	162	39	19	2	50	31	12	0	16	639	266	0	3	522	18	0	1,777	1	1	0	0

Heavy Vehicle Summary



Clay Carney
(503) 833-2740



SW 112th Ave & SW Tualatin Shderwood R

Tuesday, October 08, 2019

4:00 PM to 6:00 PM

Peak Hour Summary
4:00 PM to 5:00 PM

Heavy Vehicle 5-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	0	0	1	0	0	1	0	2	1	3	0	3	1	4	8
4:05 PM	0	0	0	0	1	0	1	2	0	3	0	3	1	4	0	5	10
4:10 PM	0	0	1	1	0	0	1	1	0	5	0	5	0	1	0	1	8
4:15 PM	0	0	0	0	0	0	0	0	0	1	1	2	0	1	0	1	3
4:20 PM	0	0	0	0	0	0	0	0	0	6	1	7	0	3	0	3	10
4:25 PM	0	0	0	0	1	0	0	1	0	6	1	7	0	2	0	2	10
4:30 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	0	0	0	2
4:35 PM	0	0	0	0	0	0	0	0	0	2	0	2	0	5	1	6	8
4:40 PM	1	0	0	1	0	0	0	0	0	7	0	7	0	2	0	2	10
4:45 PM	1	0	0	1	1	0	0	1	0	3	0	3	0	1	0	1	6
4:50 PM	0	0	0	0	0	0	0	0	1	4	0	5	0	4	0	4	9
4:55 PM	0	0	0	0	0	0	0	0	0	3	1	4	0	3	0	3	7
5:00 PM	1	0	1	2	0	0	0	0	0	3	0	3	0	1	0	1	6
5:05 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
5:10 PM	1	0	0	1	0	0	0	0	0	0	0	0	0	1	0	1	2
5:15 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4
5:20 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
5:25 PM	0	0	0	0	0	0	0	0	0	1	0	1	0	1	0	1	2
5:30 PM	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	0	1
5:35 PM	0	0	0	0	0	0	0	0	0	3	0	3	0	1	0	1	4
5:40 PM	2	0	0	2	0	0	0	0	0	3	1	4	0	3	0	3	9
5:45 PM	0	0	0	0	0	0	0	0	0	6	0	6	0	2	0	2	8
5:50 PM	0	0	0	0	0	0	0	0	0	1	1	2	0	2	0	2	4
5:55 PM	0	0	0	0	0	0	0	0	0	1	1	2	0	1	0	1	3
Total Survey	6	0	2	8	4	1	2	7	1	67	8	76	1	44	2	47	138

Heavy Vehicle 15-Minute Interval Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	0	0	1	1	2	0	2	4	0	10	1	11	1	8	1	10	26
4:15 PM	0	0	0	0	1	0	0	1	0	13	3	16	0	6	0	6	23
4:30 PM	1	0	0	1	0	0	0	0	0	11	0	11	0	7	1	8	20
4:45 PM	1	0	0	1	1	0	0	1	1	10	1	12	0	8	0	8	22
5:00 PM	2	0	1	3	0	0	0	0	0	4	0	4	0	3	0	3	10
5:15 PM	0	0	0	0	0	0	0	0	0	5	0	5	0	3	0	3	8
5:30 PM	2	0	0	2	0	1	0	1	0	6	1	7	0	4	0	4	14
5:45 PM	0	0	0	0	0	0	0	0	0	8	2	10	0	5	0	5	15
Total Survey	6	0	2	8	4	1	2	7	1	67	8	76	1	44	2	47	138

Heavy Vehicle Peak Hour Summary

4:00 PM to 5:00 PM

By Approach	Northbound SW 112th Ave			Southbound SW 112th Ave			Eastbound SW Tualatin Sherwood Rd			Westbound SW Tualatin Shderwood R			Total
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total	
Volume	3	6	9	6	3	9	50	33	83	32	49	81	91
PHF	0.38			0.38			0.78			0.80			0.88

By Movement	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	2	0	1	3	4	0	2	6	1	44	5	50	1	29	2	32	91
PHF	0.25	0.00	0.25	0.38	0.50	0.00	0.25	0.38	0.25	0.79	0.42	0.78	0.25	0.91	0.50	0.80	0.88

Heavy Vehicle Rolling Hour Summary

4:00 PM to 6:00 PM

Interval Start Time	Northbound SW 112th Ave				Southbound SW 112th Ave				Eastbound SW Tualatin Sherwood Rd				Westbound SW Tualatin Shderwood R				Interval Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
4:00 PM	2	0	1	3	4	0	2	6	1	44	5	50	1	29	2	32	91
4:15 PM	4	0	1	5	2	0	0	2	1	38	4	43	0	24	1	25	75
4:30 PM	4	0	1	5	1	0	0	1	1	30	1	32	0	21	1	22	60
4:45 PM	5	0	1	6	1	1	0	2	1	25	2	28	0	18	0	18	54
5:00 PM	4	0	1	5	0	1	0	1	0	23	3	26	0	15	0	15	47

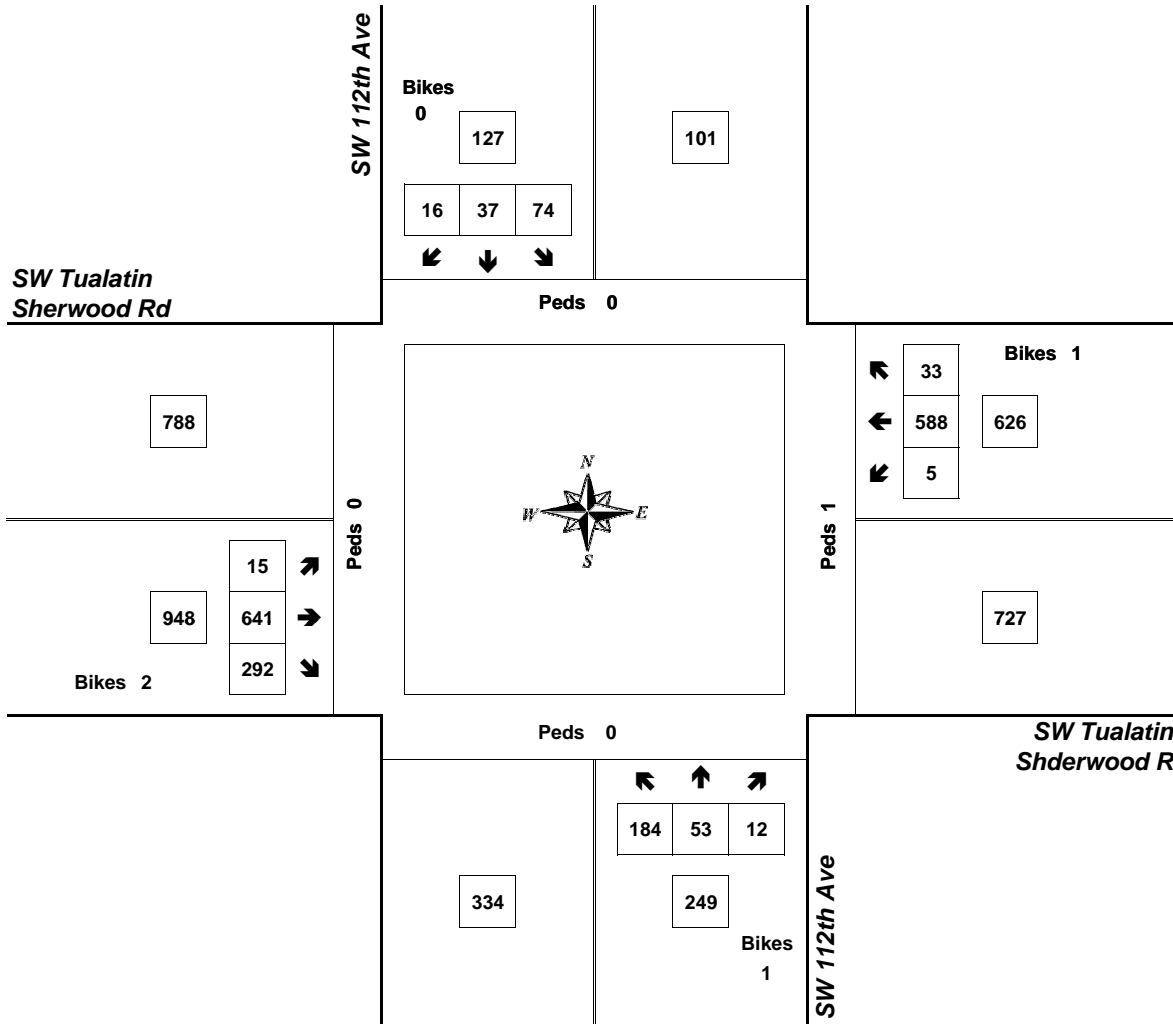
Peak Hour Summary



Clay Carney
(503) 833-2740

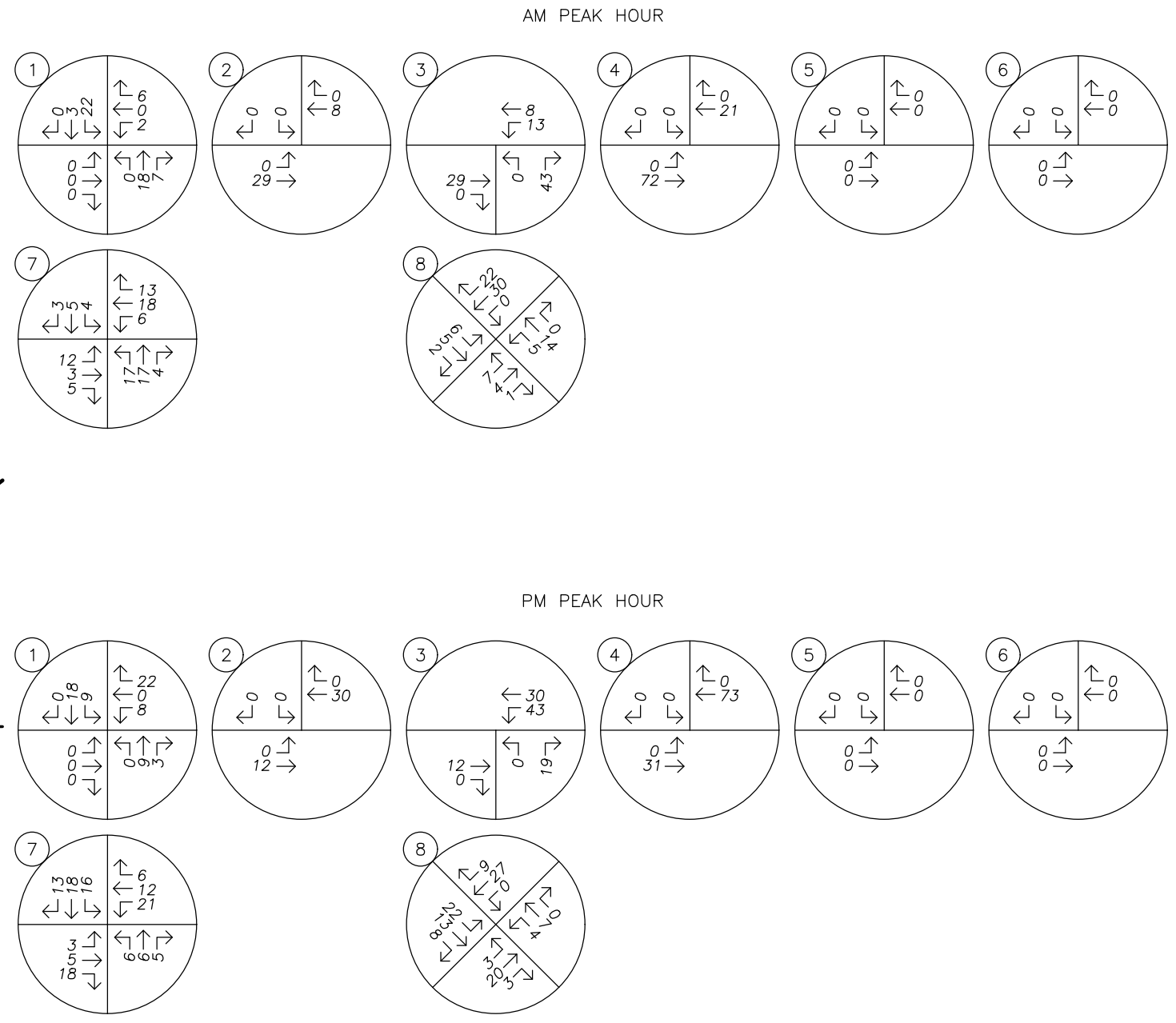
SW 112th Ave & SW Tualatin Shderwood R

4:00 PM to 5:00 PM
Tuesday, October 08, 2019



Approach	PHF	HV%	Volume
EB	0.95	5.3%	948
WB	0.88	5.1%	626
NB	0.70	1.2%	249
SB	0.76	4.7%	127
Intersection	0.94	4.7%	1,950

Count Period: 4:00 PM to 6:00 PM



TRAFFIC VOLUMES
 In-Process Development Trips
 AM & PM Peak Hours

Appendix D

Crash History Data



OREGON.. DEPARTMENT OF TRANSPORTATION - TRANSPORTATION DEVELOPMENT DIVISION
TRANSPORTATION DATA SECTION - CRASH ANALYSIS AND REPORTING UNIT
URBAN NON-SYSTEM CRASH LISTING

CITY OF TUALATIN, WASHINGTON COUNTY

124TH AVE and MYSLONY ST, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 9 of 9 Crash records shown. ONLY 3 CRASHES APPLICABLE TO INTERSECTION

SER#	S P	D R J S W	DATE	CLASS	CITY STREET	INT-TYPE	SPCL USE																	
INVEST	E A U I C O	DAY	DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD	WTHR	CRASH	TRLR QTY	MOVE				A S								
RD DPT	E L G N H R	TIME	FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT	SURF	COLL	OWNER	FROM	PRTC	INJ	G E	LICNS	PED							
UNLOC?	D C S V L K	LAT	LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY	LIGHT	SVRTY	V#	TYPE	TO	P#	TYPE	SVRTY	E X	RES	LOC	ERROR	ACT	EVENT	CAUSE	
00601	N N N		02/02/2015	16	SW MYSLONY ST	INTER	3-LEG	N	N	RAIN	ANGL-OTH	01	NONE	0	TURN-R									02
NONE		MO	0		SW 124TH AVE	CN		TRF SIGNAL	N	WET	TURN	PRVTE	E -N										015	00
N		5A				02	0		N	DLIT	INJ	PSNGR CAR		01	DRVR	NONE	47	M	OR-Y		028	000	02	
N		45 22 35.33	-122 48 17.98																				OR<25	
											02	NONE	0	STRGHT										
											PRVTE	S -N										000	00	
											TRUCK		01	DRVR	INJC	47	M	OR-Y		000	000	000	00	
																							OR<25	
03338	N N N	N N	06/16/2015	16	SW MYSLONY ST	INTER	3-LEG	N	N	CLR	ANGL-OTH	01	NONE	0	STRGHT									02
CITY		TU	0		SW 124TH AVE	CN		STOP SIGN	N	DRY	TURN	PRVTE	S -N										000	00
N		10A				02	0		N	DAY	PDO	PSNGR CAR		01	DRVR	NONE	34	F	OR-Y		000	000	00	
N		45 22 35.33	-122 48 17.98																				OR<25	
											01	NONE	0	STRGHT										
											PRVTE	S -N										000	00	
											PSNGR CAR		01	PSNG	NO<5	01	M			000	000	000	00	
											01	NONE	0	STRGHT										
											PRVTE	S -N										000	00	
											PSNGR CAR		02	PSNG	NO<5	04	M			000	000	000	00	
											02	NONE	0	TURN-L										
											PRVTE	E -S										015	00	
											TRUCK		01	DRVR	NONE	53	F	OR-Y		028	000	000	02	
																							OR<25	
01826	N N N	N N	03/18/2016	16	SW MYSLONY ST	INTER	3-LEG	N	N	CLR	O-1STOP	01	NONE	0	STRGHT									05
CITY		FR	0		SW 124TH AVE	CN		TRF SIGNAL	N	DRY	SS-M	PRVTE	N -S										000	00
N		4A				04	0		N	DLIT	INJ	PSNGR CAR		01	DRVR	INJC	47	M	NONE		044	000	05	
N		45 22 35.33	-122 48 17.98																				OR<25	
											02	NONE	0	STOP										

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CITY OF TUALATIN, WASHINGTON COUNTY

124TH AVE and MYSLONY ST, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

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PRVTE	S -N						012	00		
MTRCYCLE		01	DRVR	INJB	36	M	OR-Y	000	000	00

OR>25

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CITY OF TUALATIN, WASHINGTON COUNTY

124TH AVE and TUALATIN-SHERWOOD, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 90 of 90 Crash records shown. ONLY 66 CRASHES APPLICABLE TO INTERSECTION

SER#	S P	D M	R J S W DATE	CLASS	CITY STREET	INT-TYPE	SPCL USE													
INVEST	E A U I C O DAY	DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD WTHR	CRASH	TRLR QTY	MOVE	A S									
RD DPT	E L G N H R TIME	FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT SURF	COLL	OWNER	FROM	PRTC	INJ	G E LICNS	PED						
UNLOC?	D C S V L K LAT	LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY LIGHT	SVRTY	V# TYPE	TO	P# TYPE	SVRTY	E X RES	LOC	ERROR	ACT	EVENT	CAUSE		
02547	N N N		05/21/2018	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	1	STRGHT					27,29	
CITY		MO	0		SW 124TH AVE	N		TRF SIGNAL	N	DRY	REAR	PRVTE	N -S					000	00	
N		8A			06	0		N	DAY	INJ	SEMI TOW		01 DRVR	NONE	49	M	OTH-Y	016,026	038	27,29
N		45 22 9.72	-122 48 20.29																	N-RES
									02 NONE	0	STOP									
									PRVTE	N -S								012	00	
									PSNGR CAR		01 DRVR	INJC	65	F	OR-Y	000	000	000	000	00
																				OR<25
00625	N N N	N N	02/06/2019	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	1	TURN-L					27,29	
CITY		WE	0		SW 124TH AVE	N		TRF SIGNAL	N	DRY	REAR	PRVTE	N -E					000	00	
N		11A			06	0		N	DAY	INJ	SEMI TOW		01 DRVR	NONE	31	M	OTH-Y	016,026	038	27,29
N		45 22 9.72	-122 48 20.29																	N-RES
									02 NONE	0	STOP									
									PRVTE	N -S								011	00	
									PSNGR CAR		01 DRVR	INJC	17	M	OR-Y	000	000	000	000	00
																				OR<25
02778	N N N	N N	05/22/2015	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLD	S-1STOP	01 NONE	0	STRGHT					013	07
CITY		FR	0		SW 124TH AVE	E		TRF SIGNAL	N	DRY	REAR	PRVTE	E -W					000	00	
N		1P			06	0		N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	20	M	OTH-Y	043	000	07
N		45 22 9.72	-122 48 20.3																	OR<25
									02 NONE	0	STOP									
									PRVTE	E -W								011	013	00
									PSNGR CAR		01 DRVR	INJC	59	M	OR-Y	000	000	000	000	00
																				OR<25
									03 NONE	0	STOP									
									PRVTE	E -W								022	00	
									PSNGR CAR		01 DRVR	INJC	38	F	OR-Y	000	000	000	000	00
																				OR<25

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02310	N N N	04/29/2015	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT						29	
NONE		WE	0	SW 124TH AVE	E		TRF SIGNAL	N	DRY	REAR	PRVTE		E -W					000	00	
N		10A			06	0		N	DAY	PDO	PSNGR CAR			01 DRVR	NONE	00	Unk UNK	026	000	29
N		45 22 9.72	-122 48 20.29																OR<25	
											02 NONE	0	STOP							
											PRVTE		E -W					011	00	
											PSNGR CAR			01 DRVR	NONE	75	M OR-Y	000	000	00
																			OR<25	
04850	N N N	08/25/2015	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-STRGHT	01 NONE	0	STRGHT						29	
NONE		TU	0	SW 124TH AVE	E		TRF SIGNAL	N	DRY	REAR	PRVTE		E -W					000	00	
N		2P			06	0		N	DAY	PDO	PSNGR CAR			01 DRVR	NONE	00	F OR-Y	042	000	29
N		45 22 9.72	-122 48 20.29																OR<25	
											02 NONE	0	STRGHT							
											PRVTE		E -W					006	00	
											PSNGR CAR			01 DRVR	NONE	15	F OR-Y	000	000	00
																			OR<25	
02692	N N N	04/23/2016	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	9	STRGHT						29	
NONE		SA	0	SW 124TH AVE	E		TRF SIGNAL	N	DRY	REAR	N/A		E -W					000	00	
N		12P			06	0		N	DAY	PDO	PSNGR CAR			01 DRVR	NONE	00	Unk UNK	000	000	00
N		45 22 9.72	-122 48 20.29																UNK	
											02 NONE	9	STOP							
											N/A		E -W					011	00	
											PSNGR CAR			01 DRVR	NONE	00	Unk UNK	000	000	00
																			UNK	
03949	N N N	N N 06/16/2016	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	Y	CLD	FIX OBJ	01 NONE	9	TURN-L					040	08	
CITY		TH	0	SW 124TH AVE	E		TRF SIGNAL	N	DRY	FIX	N/A		N -E					000	00	
N		6P			05	0		N	DAY	PDO	PSNGR CAR			01 DRVR	NONE	00	Unk UNK	000	000	00
N		45 22 9.72	-122 48 20.29																UNK	
04777	N N N	N N 08/04/2017	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT						07	
CITY		FR	0	SW 124TH AVE	E		TRF SIGNAL	N	DRY	REAR	PRVTE		E -W					000	00	
N		3P			06	0		N	DAY	INJ	PSNGR CAR			01 DRVR	NONE	20	M OR-Y	043	000	07
N		45 22 9.72	-122 48 20.29																OR<25	
											02 NONE	0	STOP							

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CRASH ID	DATE	TIME	LOCATION	TYPE	SEVERITY	WEATHER	ROAD	CRASH TYPE	DRIVER	INJURY	PROPERTY	OTHER	TOTAL
07573	11/28/2017	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	RAIN	S-1STOP	01 NONE	0	STRGHT	27,07
CITY	TU	0	SW 124TH AVE	E		TRF SIGNAL	N	WET	REAR	PRVTE	E -W		000
N	5P			06	0		N	DLIT	INJ	PSNGR CAR		01 DRVR INJC 48 F OR-Y	016,043 038
N	45 22 9.72	-122 48 20.29											OR<25
										02 NONE	0	STOP	
										PRVTE	E -W		011
										PSNGR CAR		01 DRVR NONE 29 M OR-Y	000 000
													OR<25
03012	05/23/2017	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	9	STRGHT	07
CITY	TU	0	SW 124TH AVE	E		TRF SIGNAL	N	DRY	REAR	N/A	E -W		000
N	6P			06	0		N	DAY	PDO	PSNGR CAR		01 DRVR NONE 00 Unk UNK	000 000
N	45 22 9.72	-122 48 20.29											UNK
										02 NONE	9	STOP	
										N/A	E -W		011
										PSNGR CAR		01 DRVR NONE 00 Unk UNK	000 000
													UNK
00173	01/10/2019	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLD	S-1STOP	01 NONE	0	STRGHT	013 07
CITY	TH	0	SW 124TH AVE	E		TRF SIGNAL	N	DRY	REAR	PRVTE	E -W		000
N	6P			06	0		N	DLIT	INJ	PSNGR CAR		01 DRVR INJC 48 F OR-Y	043 000
N	45 22 9.72	-122 48 20.29											OR>25
										02 NONE	0	STOP	
										PRVTE	E -W		011 013
										PSNGR CAR		01 DRVR INJC 67 F OR-Y	000 000
													OR<25
										03 NONE	0	STOP	
										PRVTE	E -W		022
										PSNGR CAR		01 DRVR INJC 51 F OR-Y	000 000
													OR<25
										03 NONE	0	STOP	
										PRVTE	E -W		022
										PSNGR CAR		02 PSNG INJC 08 M	000 000

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1 - 90 of 90 Crash records shown. ONLY 66 CRASHES APPLICABLE TO INTERSECTION

														N/A	E -W					011	00								
														PSNGR CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00	00					
														UNK															
04362	N	N	N	N	N	06/19/2019	16	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLD	S-1STOP	01	NONE	9	STRGHT											07
CITY			WE	0	SW 124TH AVE	S			TRF SIGNAL	N	DRY	REAR	N/A	S -N											000	00			
N			6P			06	2			N	DAY	PDO	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	00						
N			45 22 42.84	-122 48											UNK														
														02	NONE	9	STOP												
														N/A	S -N					011	00								
														PSNGR CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00	00					
														UNK															
05163	N	N	N	N	N	09/08/2015	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE	0	STRGHT											32,07
CITY			TU	0	SW 124TH AVE	W			TRF SIGNAL	N	DRY	REAR	PRVTE	W -E											000	00			
N			2P			06	0			N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	35	M	NONE	052,043	000	32,07						
N			45 22 9.72	-122 48											OR<25														
														02	NONE	0	STRGHT												
														PRVTE	W -E					000	00								
														PSNGR CAR	01	DRVR	INJC	27	F	OTH-Y	000	000	00	00					
														N-RES															
														02	NONE	0	STRGHT												
														PRVTE	W -E					000	00								
														PSNGR CAR	02	PSNG	NO<5	01	M		000	000	00	00					
03535	N	N	N	N	N	05/31/2016	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE	0	STRGHT											07
CITY			TU	0	SW 124TH AVE	W			TRF SIGNAL	N	DRY	REAR	PRVTE	W -E											000	00			
N			2P			06	0			N	DAY	INJ	PSNGR CAR		01	DRVR	INJC	41	M	OR-Y	043	000	07						
N			45 22 9.72	-122 48											OR<25														
														02	NONE	0	STOP												
														PRVTE	W -E					011	00								
														PSNGR CAR	01	DRVR	NONE	32	F	OR-Y	000	000	00	00					
														OR<25															
04658	N	N	N	N	N	07/15/2016	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE	0	STRGHT											07
CITY			FR	0	SW 124TH AVE	W			TRF SIGNAL	N	DRY	REAR	PRVTE	W -E											000	00			
N			3P			06	0			N	DAY	INJ	PSNGR CAR		01	DRVR	INJB	50	F	OTH-Y	043	000	07						

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N	45 22 9.72	-122 48 20.29																OR<25
										02 NONE	0	STOP						
										PRVTE		W -E						011 00
										PSNGR CAR			01 DRVR	NONE	40 F	OR-Y		000 000 00
																		OR<25
01864	N N N N	03/20/2016	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLD	S-1STOP	01 NONE	9	STRGHT					27,29
CITY		SU	0	SW 124TH AVE	W		TRF SIGNAL	N	DRY	REAR	N/A		W -E					000 00
N		4P			06	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK		000 000 00
N	45 22 9.72	-122 48 20.29																UNK
											02 NONE	9	STOP					
											N/A		W -E					011 00
											PSNGR CAR		01 DRVR	NONE	00	Unk UNK		000 000 00
																		UNK
05361	N N N	08/11/2016	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	9	STRGHT					29
NONE		TH	0	SW 124TH AVE	W		TRF SIGNAL	N	DRY	REAR	N/A		W -E					000 00
N		6P			06	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK		000 000 00
N	45 22 9.72	-122 48 20.29																UNK
											02 NONE	9	STOP					
											N/A		W -E					011 00
											PSNGR CAR		01 DRVR	NONE	00	Unk UNK		000 000 00
																		UNK
07665	N N N	11/08/2016	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	9	STRGHT					27,29
NO RPT		TU	0	SW 124TH AVE	W		TRF SIGNAL	N	DRY	REAR	N/A		E -W					000 00
N		3P			05	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK		000 000 00
N	45 22 9.72	-122 48 20.29																UNK
											02 NONE	9	STOP					
											N/A		E -W					011 00
											SEMI TOW		01 DRVR	NONE	00	Unk UNK		000 000 00
																		UNK
00025	N N N	01/02/2017	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0	STRGHT					29
CITY		MO	0	SW 124TH AVE	W		TRF SIGNAL	N	DRY	REAR	PRVTE		W -E					000 00
N		5P			06	0		N	DLIT	INJ	PSNGR CAR		01 DRVR	NONE	79 M	OR-Y		026 000 29
N	45 22 9.72	-122 48 20.29																OR<25

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														02 NONE	0				STOP							
														PRVTE				W -E						011	00	
														PSNGR CAR				01 DRVR	INJC	30	F	OR-Y	000	000	00	
																					OR<25					
														02 NONE	0				STOP							
														PRVTE				W -E						011	00	
														PSNGR CAR				02 PSNG	INJC	05	F	000	000	00		
																					OR<25					
02204	N	N	N	N	N	04/18/2017	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	0				STRGHT						07
CITY				TU	0	SW 124TH AVE				W	TRF SIGNAL	N	DRY	REAR	PRVTE				W -E						000	00
N				6P				06	0	N	DAY	INJ	PSNGR CAR				01 DRVR	INJC	18	F	OTH-Y	043	000	07		
N				45 22 9.72	-122 48			20.29															OR<25			
														02 NONE	0				STOP							
														PRVTE				W -E						011	00	
														PSNGR CAR				01 DRVR	INJC	18	F	OR-Y	000	000	00	
																					OR<25					
05685	N	N	N			09/15/2017	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01 NONE	1				STRGHT						29
NONE				FR	0	SW 124TH AVE				W	TRF SIGNAL	N	DRY	REAR	PRVTE				W -E						000	00
N				5P				06	0	N	DAY	INJ	SEMI TOW				01 DRVR	NONE	38	M	OR-Y	026	000	29		
N				45 22 9.72	-122 48			20.29															OR<25			
														02 NONE	0				STOP							
														PRVTE				W -E						012	00	
														PSNGR CAR				01 DRVR	INJC	56	F	OR-Y	000	000	00	
																					OR<25					
06563	N	N	N	N	N	10/19/2017	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	RAIN	S-1STOP	01 NONE	0				STRGHT						07
CITY				TH	0	SW 124TH AVE				W	TRF SIGNAL	N	WET	REAR	PRVTE				W -E						000	00
N				6P				06	0	N	DLIT	INJ	PSNGR CAR				01 DRVR	NONE	17	M	OR-Y	043	000	07		
N				45 22 9.72	-122 48			20.29															OR<25			
														02 NONE	0				STOP							
														PRVTE				W -E						011	00	
														PSNGR CAR				01 DRVR	INJC	50	M	OR-Y	000	000	00	
																					OR<25					
														02 NONE	0				STOP							
														PRVTE				W -E						011	00	

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CITY OF TUALATIN, WASHINGTON COUNTY

124TH AVE and TUALATIN-SHERWOOD, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 90 of 90 Crash records shown. ONLY 66 CRASHES APPLICABLE TO INTERSECTION

													PSNGR	CAR				02	PSNG	INJC	50	F	000	000	00
07889	N	N	N	12/09/2017	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLR	S-1STOP	01	NONE	9	STRGHT						29			
NONE			SA	0	SW 124TH AVE		W	TRF SIGNAL		N	DRY	REAR	N/A		W -E						000	00			
N			1P			06	0			N	DAY	PDO	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	00		
N			45 22 9.72	-122 48			20.29																UNK		
													02	NONE	9	STOP									
													N/A		W -E						011	00			
													PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	00		
																							UNK		
03819	N	N	N	N	07/29/2019	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT				013	27,29			
CITY			MO	0	SW 124TH AVE		W	UNKNOWN		N	DRY	REAR	PRVTE		E -W						000	00			
N			9A			05	0			N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	81	M	OR-Y	016,026	038	27,29		
N			45 22 9.72	-122 48			20.29																OR<25		
													02	NONE	0	STOP									
													PRVTE		E -W						011	013	00		
													PSNGR CAR		01	DRVR	INJC	64	M	OR-Y	000	000	00		
																							OR<25		
													03	NONE	0	STOP									
													PRVTE		E -W						022	00			
													PSNGR CAR		01	DRVR	NONE	37	F	OR-Y	000	000	00		
																							OR<25		
04114	N	N	N	08/13/2019	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT						29			
NONE			TU	0	SW 124TH AVE		W	TRF SIGNAL		N	DRY	REAR	PRVTE		W -E						000	00			
N			2A			06	0			N	DLIT	INJ	PSNGR CAR		01	DRVR	NONE	35	M	OR-Y	026	000	29		
N			45 22 9.72	-122 48			20.29																OR<25		
													02	NONE	0	STOP									
													PRVTE		W -E						011	00			
													PSNGR CAR		01	DRVR	INJC	59	M	OR-Y	000	000	00		
																							OR<25		
82093	N	N	N	06/23/2019	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT						29			
NONE			SU	0	SW 124TH AVE		W	TRF SIGNAL		N	DRY	REAR	PRVTE		W -E						000	00			
N			11A			06	0			N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	62	F	OR-Y	026	000	29		

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124TH AVE and TUALATIN-SHERWOOD, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 90 of 90 Crash records shown. ONLY 66 CRASHES APPLICABLE TO INTERSECTION

N		45 22 9.71	-122 48 20.29																		OR<25					
										02 NONE	0		STOP													
										PRVTE			W -E								011	00				
										PSNGR CAR				01 DRVR	INJC	70	F	OR-Y		000	000	00				
																					OR<25					
00771	N N N	02/12/2019	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	RAIN	S-1STOP	01 NONE	9	STRGHT									29				
NONE		TU	0	SW 124TH AVE	W					TRF SIGNAL	N		WET	REAR		N/A						000	00			
N		8A			06	0					N		DAY	PDO		PSNGR CAR			01 DRVR	NONE	00	Unk UNK	000	000	00	
N		45 22 9.72	-122 48 20.29																				UNK			
										02 NONE	9		STOP													
										N/A			W -E										011	00		
										PSNGR CAR				01 DRVR	NONE	00	Unk UNK		000	000	000	000	00	00		
																							UNK			
06385	N N N N N	09/21/2016	14	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	CLD	O-1 L-TURN	01 NONE	0	STRGHT										04			
CITY		WE	0	SW 124TH AVE	CN					TRF SIGNAL	N		DRY	TURN		PRVTE							000	00		
N		8A			02	0					N		DAY	INJ		PSNGR CAR			01 DRVR	INJC	57	F	OR-Y	000	000	00
N		45 22 9.72	-122 48 20.29																					OR<25		
										02 NONE	0		TURN-L													
										PRVTE			W -N										000	00		
										PSNGR CAR				01 DRVR	NONE	23	F	OR-Y		020,004	000	000	04	04		
																							OR<25			
00335	N N N	01/18/2017	16	SW TUALATIN-SHERWOOD	INTER	3-LEG	N	N	RAIN	O-1 L-TURN	01 NONE	0	STRGHT										04			
NO RPT		WE	0	SW 124TH AVE	CN					TRF SIGNAL	N		WET	TURN		PRVTE							000	00		
N		1P			04	0					N		DAY	INJ		PSNGR CAR			01 DRVR	INJB	23	M	OR-Y	000	000	00
N		45 23 16.36	-122 48 15.23																					OR<25		
										02 NONE	0		TURN-L													
										PRVTE			N -E										000	00		
										PSNGR CAR				01 DRVR	NONE	20	M	OR-Y		020	000	000	04	04		
																							OR<25			
04434	N N N N N	07/21/2017	16	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLR	O-1 L-TURN	01 NONE	0	STRGHT										04			
CITY		FR	0	SW 124TH AVE	CN					TRF SIGNAL	N		DRY	TURN		PRVTE							000	00		
N		3P			01	2					N		DAY	INJ		PSNGR CAR			01 DRVR	INJB	35	M	OR-Y	020	000	04
N		45 22 42.84	-122 48 17.93																					OR<25		

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											02 NONE	0	TURN-L									
											PRVTE		S -W				000		00			
											PSNGR CAR			01 DRVR	NONE	55	M	OR-Y	000	000	00	
																				OR<25		
01124	N N N	N N	03/05/2019	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLR	O-1 L-TURN	01 NONE	0	STRGHT					080	02		
CITY			TU	0	SW 124TH AVE	CN		TRF SIGNAL	N	DRY	TURN	PRVTE		S -N					000	00		
N			7A			04	0		N	DAY	INJ	PSNGR CAR			01 DRVR	INJC	49	M	OR-Y	000	000	00
N			45 22 9.72	-122 48			20.29														OR<25	
											02 NONE	0	TURN-L									
											PRVTE		N -E						000	00		
											PSNGR CAR			01 DRVR	NONE	30	M	OR-Y	028,004	000	02	
																					OR<25	
											03 NONE	0	STOP									
											PRVTE		E -W						022	00		
											PSNGR CAR			01 DRVR	NONE	40	M	OR-Y	000	000	00	
																					OR<25	
02524	N N N	N N	05/18/2019	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLD	O-1 L-TURN	01 NONE	0	TURN-L							04	
CITY			SA	0	SW 124TH AVE	CN		TRF SIGNAL	N	DRY	TURN	PRVTE		W -N					000	00		
N			3P			02	0		N	DAY	INJ	PSNGR CAR			01 DRVR	INJC	77	F	OR-Y	020	000	04
N			45 22 9.72	-122 48			20.29														OR<25	
											02 NONE	0	STRGHT									
											PRVTE		E -W						000	00		
											PSNGR CAR			01 DRVR	INJC	23	M	OR-Y	000	000	00	
																					OR<25	
06869	N N N	N N	12/23/2019	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLD	O-1 L-TURN	01 NONE	0	STRGHT							04	
CITY			MO	0	SW 124TH AVE	CN		TRF SIGNAL	N	DRY	TURN	PRVTE		E -W					000	00		
N			1P			02	0		N	DAY	INJ	PSNGR CAR			01 DRVR	INJC	22	F	OR-Y	000	000	00
N			45 22 9.72	-122 48			20.29														OR<25	
											02 NONE	0	TURN-L									
											PRVTE		W -N						000	00		
											PSNGR CAR			01 DRVR	NONE	61	M	OR-Y	020	000	04	
																					OR<25	
05093	N N N	N N	08/01/2016	16	SW 124TH AVE	STRGHT		Y	N	CLR	S-1STOP	01 NONE	9	STRGHT							07	
CITY			MO	50	SW TUALATIN-SHERWOOD	N	(NONE)	UNKNOWN	N	DRY	REAR	N/A		N -S					000	00		

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N	9A	06	N	DAY	PDO	PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00						
N	45 22 10.65	-122 48 20.29	(03)																			
						02	NONE	9	STOP													
							N/A		N -S						012	00						
							SEMI TOW		01	DRVR	NONE	00	Unk	UNK	000	000						
																UNK						
02275	N N N	N N 05/07/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01	NONE	0	STRGHT			29						
CITY	TU	80		SW 124TH AVE	E	(NONE)	UNKNOWN	N	DRY	REAR	UNKN		E -W			000						
N	1P				08			N	DAY	INJ	PSNGR	CAR		01	DRVR	NONE	00	M	UNK	026	000	29
N	45 22 9.93	-122 48 18.3	(02)																			
						02	NONE	0	STOP													
							PRVTE		E -W							011	00					
							PSNGR	CAR	01	DRVR	INJC	35	F	OR-Y	000	000	00					
																	OR<25					
02767	N N N	06/01/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01	NONE	9	STRGHT			29						
NONE	SA	100		SW 124TH AVE	E	(NONE)	UNKNOWN	N	DRY	REAR	N/A		E -W			000						
N	2P				08			N	DAY	PDO	PSNGR	CAR		01	DRVR	NONE	00	Unk	UNK	000	000	00
N	45 22 9.95	-122 48 18.02	(02)																			
						02	NONE	9	STOP													
							N/A		E -W							011	00					
							PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00					
																	UNK					
06003	N N N	N N 11/15/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01	NONE	9	STRGHT			07						
CITY	FR	100		SW 124TH AVE	E	(NONE)	TRF SIGNAL	N	DRY	REAR	N/A		E -W			000						
N	6P				08			N	DUSK	PDO	PSNGR	CAR		01	DRVR	NONE	00	Unk	UNK	000	000	00
N	45 22 9.94	-122 48 18	(02)																			
						02	NONE	9	STOP													
							N/A		E -W							011	00					
							PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00					
																	UNK					
06147	N N N	11/13/2018	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	RAIN	S-1STOP	01	NONE	0	STRGHT			013	27,29					
NO RPT	TU	156		SW 124TH AVE	E	(NONE)	UNKNOWN	N	WET	REAR	PRVTE		E -W			000	00					
N	5P				08			N	DUSK	INJ	PSNGR	CAR		01	DRVR	NONE	46	M	OR-Y	016,026	038	27,29

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CRASH ID	DATE	TIME	LOCATION	CRASH TYPE	SEVERITY	STATUS	DRIVER	VEHICLE	INJURY	PROPERTY	OTHER	TOTAL		
N	45 22 10.04	-122 48 17.22	(02)	02 NONE	0	STOP						OR<25		
				PRVTE		E -W						011 013 00		
				PSNGR CAR			01 DRVR	INJC	37 M	OR-Y	000	022 00		
												OR<25		
				03 NONE	0	STOP						011 00		
				PRVTE		E -W						000 00		
				PSNGR CAR			01 DRVR	INJC	45 M	OR-Y	000	000 00		
												OR<25		
				03 NONE	0	STOP						011 00		
				PRVTE		E -W						000 00		
				PSNGR CAR			02 PSNG	INJC	45 F		000	000 00		
												OR<25		
				03 NONE	0	STOP						011 00		
				PRVTE		E -W						000 00		
				PSNGR CAR			03 PSNG	INJC	18 F		000	000 00		
<hr/>														
00223	N N N	N N 01/13/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	07	
CITY		SU	200	SW 124TH AVE	E	(NONE)	NONE	N	DRY	REAR		PRVTE	E -W	000 00
N		5P			08			N	DUSK	INJ		PSNGR CAR	01 DRVR	NONE 62 M OR-Y 043 000 07
N	45 22 10.1	-122 48 16.62	(02)										OR<25	
				02 NONE	0	STOP							011 00	
				PRVTE		E -W							000 00	
				PSNGR CAR			01 DRVR	INJC	66 M	OR-Y	000	000 00	OR<25	
<hr/>														
84730	N N N	11/10/2017	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	UNK	S-1STOP	01 NONE	9	STRGHT	29	
NO RPT		FR	500	SW 124TH AVE	E	(NONE)	UNKNOWN	N	WET	REAR		N/A	E -W	000 00
N		6P			08			N	DUSK	PDO		PSNGR CAR	01 DRVR	NONE 00 Unk UNK 000 000 00
N	45 22 10.52	-122 48 12.48	(02)										UNK	
				02 NONE	9	STOP							011 00	
				N/A		E -W							000 00	
				PSNGR CAR			01 DRVR	NONE	00 Unk UNK		000	000 00	UNK	
<hr/>														
02064	N N N	N N 04/25/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01 NONE	0	STRGHT	27,07	

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CITY	TH	500	SW 124TH AVE	E	(NONE)	NONE	N	DRY	REAR	PRVTE	E -W					000	00		
N	5P			08			N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	17 F	OR-Y	016,043	038	27,07	
N	45 22 10.52	-122 48 12.51			(02)													OR<25	
										02 NONE	0	STOP							
										PRVTE		E -W						011	00
										PSNGR CAR		01 DRVR	INJC	54 F	OR-Y	000	000	00	
																		OR<25	

00134	N N N	N N	01/08/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	RAIN	S-1STOP	01 NONE	9	STRGHT					07	
CITY	TU	500	SW 124TH AVE	E	(NONE)	NONE	N	WET	REAR	N/A	E -W							000	00
N	11A			08			N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000	00	
N	45 22 10.52	-122 48 12.49			(02)													UNK	
										02 NONE	9	STOP							
										N/A		E -W						011	00
										PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000	00	
																		UNK	

06592	Y N N	N N	12/01/2018	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLD	S-STRGHT	01 NONE	9	STRGHT					01	
CITY	SA	600	SW 124TH AVE	E	(NONE)	NONE	N	WET	REAR	N/A	E -W							000	00
N	11A			08			N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000	00	
N	45 22 10.66	-122 48 11.14			(02)													UNK	
										02 NONE	9	STRGHT							
										N/A		E -W						000	00
										PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000	00	
																		UNK	

02027	N N N		04/23/2019	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	CLR	S-1STOP	01 NONE	9	STRGHT					29	
NONE	TU	30	SW 124TH AVE	W	(NONE)	UNKNOWN	N	DRY	REAR	N/A	W -E							000	00
N	1P			06			N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000	00	
N	45 22 9.61	-122 48 21.36			(02)													UNK	
										02 NONE	9	STOP							
										N/A		W -E						011	00
										PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000	00	
																		UNK	

06771	N N N	N N	10/07/2016	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	CLR	S-1STOP	01 NONE	0	STRGHT					07	
CITY	FR	50	SW 124TH AVE	W	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	W -E							000	00

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N		3P		06			N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	44 F	OR-Y	043	000	07	
N		45 22 9.59	-122 48		(02)										OR<25				
			21.64							02 NONE	0	STOP							
										PRVTE		W -E					011	00	
										PSNGR CAR		01 DRVR	INJC	51 F	OTH-Y	000	000	00	
															N-RES				
										02 NONE	0	STOP							
										PRVTE		W -E					011	00	
										PSNGR CAR		02 PSNG	INJC	25 F		000	000	00	
<hr/>																			
05356	N N N	08/11/2016	14	SW TUALATIN-SHERWOOD	STRGHT		N	CLR	S-1STOP	01 NONE	9	STRGHT						06,29	
NONE		TH	50	SW 124TH AVE	W	(NONE)	UNKNOWN	N	DRY	REAR	N/A	W -E					000	00	
N		6A			06			N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00 Unk	UNK	000	000	
N		45 22 9.59	-122 48		(03)											UNK			
			21.64							02 NONE	9	STOP							
										N/A		W -E					011	00	
										PSNGR CAR		01 DRVR	NONE	00 Unk	UNK	000	000	00	
															UNK				
<hr/>																			
03771	N N N	06/09/2016	14	SW TUALATIN-SHERWOOD	STRGHT		Y	CLR	S-1STOP	01 NONE	9	STRGHT						27,07	
CITY		TH	75	SW 124TH AVE	W	(NONE)	TRF SIGNAL	N	DRY	REAR	N/A	W -E					000	00	
N		5P			08			N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00 Unk	UNK	000	000	
N		45 22 9.55	-122 48 22		(02)											UNK			
										02 NONE	9	STOP							
										N/A		W -E					011	00	
										UNKNOWN		01 DRVR	NONE	00 Unk	UNK	000	000	00	
															UNK				
<hr/>																			
06673	N N N	11/07/2015	14	SW TUALATIN-SHERWOOD	STRGHT		N	CLD	S-1STOP	01 NONE	0	STRGHT						29	
CITY		SA	100	SW 124TH AVE	W	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	W -E					000	00	
N		3P			08			N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	21 M	SUSP	026	000	
N		45 22 9.52	-122 48		(03)											OR<25			
			22.26							01 NONE	0	STRGHT							
										PRVTE		W -E					000	00	
										PSNGR CAR		02 PSNG	NO<5	01 M		000	000	00	

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										02 NONE	0	STOP								
										PRVTE		W -E					011		00	
										PSNGR CAR			01 DRVR	INJC	31 F	OR-Y	000	000	00	
																			OR<25	
										02 NONE	0	STOP								
										PRVTE		W -E						011	00	
										PSNGR CAR			02 PSNG	INJC	31 M		000	000	00	
										02 NONE	0	STOP								
										PRVTE		W -E						011	00	
										PSNGR CAR			03 PSNG	INJC	06 M		000	000	00	
										02 NONE	0	STOP								
										PRVTE		W -E						011	00	
										PSNGR CAR			04 PSNG	INJC	11 F		000	000	00	
03700	N N N	07/17/2018	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLR	S-STRGHT	01 NONE	0	STRGHT						29	
CITY		TU	100	SW 124TH AVE	W	(NONE)	NONE	N	DRY	REAR	PRVTE		W -E					000	00	
N		7A			08			N	DAY	INJ	PSNGR CAR			01 DRVR	NONE	19 F	OR-Y	042	000	29
N		45 22 9.52	-122 48 22.31			(02)													OR<25	
										02 NONE	0	STRGHT								
										PRVTE		W -E						006	00	
										PSNGR CAR			01 DRVR	INJC	41 F	OR-Y	000	000	00	
																			OR<25	
04024	N N N	08/08/2019	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	RAIN	S-1STOP	01 NONE	0	STRGHT						07	
NO RPT		TH	100	SW 124TH AVE	W	(NONE)	UNKNOWN	N	WET	REAR	PRVTE		W -E					000	00	
N		12P			08			N	DAY	INJ	PSNGR CAR			01 DRVR	NONE	18 M	OR-Y	043	000	07
N		45 22 9.48	-122 48 22.29			(02)													OR<25	
										02 NONE	0	STOP								
										PRVTE		W -E						011	00	
										PSNGR CAR			01 DRVR	INJC	56 M	OR-Y	000	000	00	
																			OR<25	
02746	N N N	N N 05/31/2019	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLR	S-1STOP	01 NONE	0	STRGHT						27,07	
CITY		FR	100	SW 124TH AVE	W	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE		W -E					000	00	

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124TH AVE and TUALATIN-SHERWOOD, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 90 of 90 Crash records shown. ONLY 66 CRASHES APPLICABLE TO INTERSECTION

N		3P		08				N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	28	F	SUSP		016,043	038	27,07
N		45 22 9.51	-122 48		(02)														OR<25			
			22.33										02	NONE	0			STOP				
																		PRVTE	W -E		011	00
														01	DRVR	INJC	30	M	NONE	000	000	00
																			OR<25			
03686	N N N	07/21/2019	14	SW TUALATIN-SHERWOOD	STRGHT			N	CLR	S-1STOP	01	NONE	0					STRGHT				29
NONE		SU	100	SW 124TH AVE	W	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE						W -E			000	00
N		2P			08			N	DAY	INJ		PSNGR CAR		01	DRVR	NONE	32	F	OR-Y	026	000	29
N		45 22 9.52	-122 48		(02)														OR<25			
			22.34															STOP				
																		PRVTE	W -E		011	00
														01	DRVR	INJC	62	F	OR-Y	000	000	00
																			OR<25			
07776	N N N	N N 11/12/2016	14	SW TUALATIN-SHERWOOD	STRGHT			N	CLR	S-STRGHT	01	NONE	9					STRGHT				07
CITY		SA	150	SW 124TH AVE	W	(NONE)	UNKNOWN	N	DRY	REAR		N/A						W -E			000	00
N		1P			08			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk UNK		000	000	00
N		45 22 9.45	-122 48		(02)														UNK			
			23.01															STOP				
																		N/A	W -E		006	00
														01	DRVR	NONE	00	Unk UNK		000	000	00
																			UNK			
00766	N N N	02/13/2019	14	SW TUALATIN-SHERWOOD	STRGHT			N	RAIN	S-1STOP	01	NONE	9					STRGHT				27,29
NONE		WE	150	SW 124TH AVE	W	(NONE)	UNKNOWN	N	WET	REAR		N/A						W -E			000	00
N		8A			08			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk UNK		000	000	00
N		45 22 9.44	-122 48		(02)														UNK			
			23.05															STOP				
																		N/A	W -E		011	00
														01	DRVR	NONE	00	Unk UNK		000	000	00
																			UNK			
03213	N N N	06/22/2019	14	SW TUALATIN-SHERWOOD	STRGHT			N	CLR	S-1STOP	01	NONE	9					STRGHT				29
NO RPT		SA	150	SW 124TH AVE	W	(NONE)	UNKNOWN	N	DRY	REAR		N/A						W -E			000	00
N		10A			08			N	DAY	PDO		PSNGR CAR		01	DRVR	NONE	00	Unk UNK		000	000	00

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1 - 90 of 90 Crash records shown. ONLY 66 CRASHES APPLICABLE TO INTERSECTION

N		45 22 9.45	-122 48 23.03	(02)														UNK		
										02 NONE	9	STOP								
										N/A		W -E					011	00		
										PSNGR CAR			01 DRVR	NONE	00	Unk UNK	000	000		
																		UNK		
07214	N N N	N N	10/22/2016	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	CLR	S-1STOP	01 NONE	0	STRGHT					013	29	
CITY		SA		200	SW 124TH AVE	W	(NONE)	NONE	N	DRY	REAR	PRVTE	W -E					000	00	
N		11A				08		N	DAY	INJ	PSNGR CAR			01 DRVR	NONE	19 F	OR-Y	026	000	29
N		45 22 9.38	-122 48 23.69	(02)															OR<25	
										02 NONE	0	STOP								
										PRVTE		W -E						011	013	00
										PSNGR CAR			01 DRVR	INJC	21 F	OTH-Y	000	000		00
																			N-RES	
										03 NONE	0	STOP								
										UNKN		W -E						022	00	
										PSNGR CAR			01 DRVR	NONE	48 F	OR-Y	000	000		00
																			OR<25	
00566	N N N	N N	02/03/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	RAIN	S-1STOP	01 NONE	0	STRGHT					013	27,07	
CITY		SU		200	SW 124TH AVE	W	(NONE)	UNKNOWN	N	WET	REAR	PRVTE	W -E					000	00	
N		7P				08		N	DLIT	INJ	PSNGR CAR			01 DRVR	INJC	31 F	OR-Y	016,043	038	27,07
N		45 22 9.38	-122 48 23.73	(02)															OR<25	
										02 NONE	0	STOP								
										PRVTE		W -E						011	013	00
										PSNGR CAR			01 DRVR	INJC	32 F	OTH-Y	000	000		00
																			OR<25	
										03 NONE	0	STOP								
										PRVTE		W -E						022	00	
										PSNGR CAR			01 DRVR	INJC	34 F	OR-Y	000	000		00
																			OR<25	
02178	N N N		04/24/2015	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	RAIN	S-STRGHT	01 NONE	0	STRGHT							29
NONE		FR		250	SW 124TH AVE	W	(NONE)	UNKNOWN	N	WET	SS-O	PRVTE	W -E					000	00	
N		1P				08		N	DAY	PDO	PSNGR CAR			01 DRVR	NONE	00 M	OR-Y	042	000	29
N		45 22 9.31	-122 48 24.41	(02)															OR<25	
										02 NONE	0	STRGHT								

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1 - 90 of 90 Crash records shown. ONLY 66 CRASHES APPLICABLE TO INTERSECTION

CRASH ID	DATE	TIME	LOCATION	CRASH TYPE	SEVERITY	STATUS	WEATHER	ROAD COND	CRASH TYPE	DRIVER	VEHICLE	INJURY	PROPERTY	OTHER
06054	10/13/2015	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	CLR	S-1STOP	01 NONE	0	STRGHT			29
NONE	TU	250	SW 124TH AVE	W	(NONE)	UNKNOWN	DRY	REAR	PRVTE	W -E				000
N	8A			08			DAY	PDO	PSNGR CAR	01 DRVR	NONE	00	F UNK	026
N	45 22 9.31	-122 48 24.46			(02)									OR<25
									02 NONE	0	STOP			
									PRVTE	W -E				011
									PSNGR CAR	01 DRVR	NONE	59	F OR-Y	000
														OR<25
04450	07/21/2017	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-STRGHT	01 NONE	9	STRGHT			29
NONE	FR	300	SW 124TH AVE	W	(NONE)	UNKNOWN	DRY	REAR	N/A	W -E				000
N	9P			08			DLIT	PDO	PSNGR CAR	01 DRVR	NONE	00	Unk UNK	000
N	45 22 9.25	-122 48 25.11			(02)									UNK
									02 NONE	9	STRGHT			
									N/A	W -E				006
									PSNGR CAR	01 DRVR	NONE	00	Unk UNK	000
														UNK
03669	07/19/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01 NONE	9	STRGHT			07
CITY	FR	505	SW 124TH AVE	W	(NONE)	UNKNOWN	DRY	REAR	N/A	W -E				000
N	6P			08			DAY	PDO	PSNGR CAR	01 DRVR	NONE	00	Unk UNK	000
N	45 22 8.97	-122 48 27.95			(02)									UNK
									02 NONE	9	STOP			
									N/A	W -E				011
									PSNGR CAR	01 DRVR	NONE	00	Unk UNK	000
														UNK
06669	12/05/2018	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-STRGHT	01 NONE	9	STRGHT			27,29
CITY	WE	580	SW 124TH AVE	W	(NONE)	NONE	DRY	REAR	N/A	W -E				000
N	6A			08			DAWN	PDO	PSNGR CAR	01 DRVR	NONE	00	Unk UNK	000
N	45 22 8.87	-122 48 29.02			(02)									UNK
									02 NONE	9	STOP			
									N/A	W -E				011

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PSNGR CAR 01 DRVR NONE 00 Unk UNK 000 000 00

UNK

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TUALATIN-SHERWOOD and 112TH AVE, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 34 of 34 Crash records shown. ONLY 25 CRASHES APPLICABLE TO INTERSECTION

SER#	S P	D M	R J S W	DATE	CLASS	CITY STREET	INT-TYPE	SPCL USE													
INVEST	E A U I C O	DAY	DIST	FIRST STREET	RD CHAR	(MEDIAN)	INT-REL	OFFRD WTHR	CRASH	TRLR QTY	MOVE	A S									
RD DPT	E L G N H R	TIME	FROM	SECOND STREET	DIRECT	LEGS	TRAF-	RNDBT SURF	COLL	OWNER	FROM	PRTC	INJ	G E LICNS	PED						
UNLOC?	D C S V L K	LAT	LONG	LRS	LOCTN	(#LANES)	CONTL	DRVWY LIGHT	SVRTY	V# TYPE	TO	P# TYPE	SVRTY	E X RES	LOC	ERROR	ACT	EVENT	CAUSE		
00692	N N N	N N	01/30/2016	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLD	S-1STOP	01 NONE	9	STRGHT						07	
CITY		SA	0	SW 112TH AVE	NE		TRF SIGNAL	N	WET	REAR	N/A	NE-SW							000	00	
N		4P			06	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK			000	000	
N		45 22 21.91	-122 47 31.86																	UNK	
										02 NONE	9	STOP									
										N/A	NE-SW								011	00	
										PSNGR CAR		01 DRVR	NONE	00	Unk UNK				000	000	
																				UNK	
02477	N N N	N N	04/29/2017	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLD	S-1STOP	01 NONE	9	STRGHT						27,29	
CITY		SA	0	SW 112TH AVE	NE		TRF SIGNAL	N	DRY	REAR	N/A	NE-SW							000	00	
N		5P			06	0		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00	Unk UNK			000	000	
N		45 22 21.91	-122 47 31.86																	UNK	
										02 NONE	9	STOP									
										N/A	NE-SW								011	00	
										PSNGR CAR		01 DRVR	NONE	00	Unk UNK				000	000	
																				UNK	
04052	N N N	N N	08/06/2018	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLR	S-1STOP	01 NONE	0	STRGHT						29	
CITY		MO	0	SW 112TH AVE	NE		TRF SIGNAL	N	DRY	REAR	PRVTE	NE-SW							000	00	
N		9A			06	0		N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	00	Unk UNK			026	000	
N		45 22 21.91	-122 47 31.86																	UNK	
										02 NONE	1	STOP									
										PRVTE	NE-SW								011	013	
										SEMI TOW		01 DRVR	INJC	66	M	OR-Y			000	000	
																				OR<25	
										03 NONE	0	STOP									
										PRVTE	NE-SW								022	00	
										PSNGR CAR		01 DRVR	NONE	33	M	OR-Y			000	000	
																				OR<25	

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05829	N N N	11/07/2019	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLR	S-1STOP	01 NONE	0	STRGHT					013	29		
NONE		TH	0	SW 112TH AVE	NE		TRF SIGNAL	N	DRY	REAR	PRVTE		NE-SW					000	00		
N		5P			06	0		N	DUSK	INJ	PSNGR CAR			01 DRVR	NONE	00	M	UNK	026	000	29
N		45 22 21.91	-122 47																	UNK	
			31.86																		
											02 NONE	0	STOP								
											PRVTE		NE-SW						011	013	00
											PSNGR CAR			01 DRVR	INJC	71	M	OR-Y	000	000	00
																					OR<25
											03 NONE	0	STOP								
											PRVTE		NE-SW						022		00
											PSNGR CAR			01 DRVR	NONE	46	M	OR-Y	000	000	00
																					OR<25
06395	N N N	N N 10/13/2017	14	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLD	S-1STOP	01 NONE	0	STRGHT					013	07		
CITY		FR	0	SW 112TH AVE	SW		TRF SIGNAL	N	DRY	REAR	PRVTE		NE-SW						000	00	
N		11A			05	0		N	DAY	INJ	PSNGR CAR			01 DRVR	NONE	51	M	OTH-Y	043	000	07
N		45 22 21.91	-122 47																		N-RES
			31.86																		
											02 NONE	0	STOP								
											PRVTE		NE-SW						011	013	00
											PSNGR CAR			01 DRVR	NONE	21	F	OR-Y	000	000	00
																					OR<25
											02 NONE	0	STOP								
											PRVTE		NE-SW						011	013	00
											PSNGR CAR			02 PSNG	INJB	21	M		000	000	00
											03 NONE	0	STOP								
											PRVTE		NE-SW						022	013	00
											PSNGR CAR			01 DRVR	INJC	31	M	OR-Y	000	000	00
																					OR<25
											04 NONE	0	STOP								
											PRVTE		NE-SW						022	013	00
											PSNGR CAR			01 DRVR	NONE	54	M	OR-Y	000	000	00
																					OR<25
											05 NONE	0	STOP								
											PRVTE		NE-SW						022		00
											PSNGR CAR			01 DRVR	NONE	59	F	OTH-Y	000	000	00
																					N-RES

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01101	N N N	02/28/2015	17	SW TUALATIN-SHERWOOD	INTER	CROSS	N	N	CLR	S-STRGHT	01 NONE	0	STRGHT						07	
CITY		SA	0	SW 112TH AVE	CN		TRF SIGNAL	N	DRY	REAR	PRVTE		NE-SW					000	00	
N		1P			03	0		N	DAY	INJ	PSNGR CAR			01 DRVR	INJB	62 M	OR-Y	043	000	07
N		45 22 21.91	-122 47 31.86																OR<25	
											02 NONE	0	STRGHT							
											PRVTE		NE-SW					006	00	
											PSNGR CAR			01 DRVR	INJC	46 F	OR-Y	000	000	00
																			OR<25	
06991	N N N	10/13/2016	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	RAIN	S-STRGHT	01 NONE	9	STRGHT						29	
NONE		TH	50	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	WET	REAR	N/A		NE-SW					000	00	
N		3P			06			N	DAY	PDO	PSNGR CAR			01 DRVR	NONE	00 Unk	UNK	000	000	00
N		45 22 22.34	-122 47 31.06			(02)													UNK	
											02 NONE	9	STRGHT							
											N/A		NE-SW					000	00	
											PSNGR CAR			01 DRVR	NONE	00 Unk	UNK	000	000	00
																			UNK	
06186	N N N	11/25/2019	14	SW TUALATIN-SHERWOOD	STRGHT		Y	N	CLD	S-1STOP	01 NONE	0	STRGHT						07	
CITY		MO	55	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	WET	REAR	PRVTE		NE-SW					000	00	
N		4P			08			N	DAY	INJ	PSNGR CAR			01 DRVR	NONE	18 M	SUSP	043	000	07
N		45 22 22.37	-122 47 31.01			(02)													OR<25	
											02 NONE	0	STOP							
											PRVTE		NE-SW					011	00	
											PSNGR CAR			01 DRVR	INJC	36 M	OR-Y	000	000	00
																			OR<25	
01607	N N N	03/30/2019	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLR	S-1STOP	01 NONE	0	STRGHT						29	
NONE		SA	70	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE		NE-SW					000	00	
N		8A			08			N	DAY	INJ	TRUCK			01 DRVR	NONE	00 Unk	UNK	026	000	29
N		45 22 22.46	-122 47 30.85			(02)													UNK	
											02 NONE	0	STOP							
											PRVTE		NE-SW					011	00	
											PSNGR CAR			01 DRVR	INJC	70 M	OR-Y	000	000	00
																			OR<25	
00018	N N N	01/02/2016	14	SW TUALATIN-SHERWOOD	STRGHT		Y	N	CLR	S-STRGHT	01 NONE	0	STRGHT					013	07, 32	

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CITY	SA	77	SW 112TH AVE	NE	(NONE)	TRF SIGNAL	N	DRY	REAR	PRVTE	NE-SW			000	00			
N	2P			08			N	DAY	INJ	PSNGR CAR		01 DRVR INJC	19 M	OR-Y	043,052	000	07,32	
N	45 22 22.54	-122 47 30.71			(02)												OR<25	
										02 NONE 0	STRGHT							
										PRVTE	NE-SW					006	013	00
										PSNGR CAR		01 DRVR INJB	45 F	OR-Y	000	000	00	
																	OR<25	
										03 NONE 0	STRGHT							
										PRVTE	NE-SW					022	013	00
										PSNGR CAR		01 DRVR NONE	25 M	OR-Y	000	000	00	
																	OR<25	
										04 NONE 0	STRGHT							
										PRVTE	NE-SW					022	00	
										PSNGR CAR		01 DRVR INJC	41 M	OR-Y	000	000	00	
																	OR<25	
07949	N N N	12/22/2015	14	SW TUALATIN-SHERWOOD	STRGHT		Y	N	CLR	S-1STOP	01 NONE 0	STRGHT					07	
NO RPT	TU	100		SW 112TH AVE	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	NE-SW				000	00	
N	11A				08			N	DAY	PDO	PSNGR CAR		01 DRVR NONE	58 F	OR-Y	043,026	000	07
N	45 22 22.67	-122 47 30.46				(02)												OR<25
										02 NONE 0	STOP							
										PRVTE	NE-SW					011	00	
										PSNGR CAR		01 DRVR NONE	44 F	OR-Y	000	000	00	
																	OR<25	
04634	N N N	N N 07/14/2016	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLR	S-STRGHT	01 NONE 9	STRGHT					27,07	
CITY	TH	100		SW 112TH AVE	NE	(NONE)	UNKNOWN	N	DRY	REAR	N/A	NE-SW				000	00	
N	3P				08			N	DAY	PDO	PSNGR CAR		01 DRVR NONE	00 Unk	UNK	000	000	00
N	45 22 22.65	-122 47 30.5				(02)												UNK
										02 NONE 9	STRGHT							
										N/A	NE-SW					006	00	
										PSNGR CAR		01 DRVR NONE	00 Unk	UNK	000	000	00	
																	UNK	
03668	N N N	N N 06/20/2017	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLR	S-1STOP	01 NONE 0	STRGHT				013	29	
CITY	TU	100		SW 112TH AVE	NE	(NONE)	NONE	N	DRY	REAR	PRVTE	NE-SW				000	00	
N	3P				08			N	DAY	INJ	PSNGR CAR		01 DRVR INJA	31 F	OR-Y	026	000	29

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CITY OF TUALATIN, WASHINGTON COUNTY

TUALATIN-SHERWOOD and 112TH AVE, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 34 of 34 Crash records shown. ONLY 25 CRASHES APPLICABLE TO INTERSECTION

CRASH ID	DATE	TIME	LOCATION	CRASH TYPE	WEATHER	ROAD COND	DRIVER	VEHICLE	SEVERITY	INJURY	PROPERTY	OTHER	TOTAL
N	45 22 22.69	-122 47 30.42	(02)	01 NONE 0 STRGHT								OR<25	
				PRVTE NE-SW									000 00
				PSNGR CAR	02 PSNG INJB 60 M								000 00
				01 NONE 0 STRGHT									
				PRVTE NE-SW									000 00
				PSNGR CAR	03 PSNG INJC 14 M								000 00
				02 NONE 0 STOP									
				PRVTE NE-SW									011 013 00
				PSNGR CAR	01 DRVR NONE 56 M OR-Y								000 00
													OR<25
				03 NONE 0 STOP									
				PRVTE NE-SW									022 00
				PSNGR CAR	01 DRVR INJC 25 F OR-Y								000 00
													OR<25
				03 NONE 0 STOP									
				PRVTE NE-SW									022 00
				PSNGR CAR	02 PSNG NO<5 01 F								000 00
<hr/>													
06625	N N N	N N 10/21/2017	14	SW TUALATIN-SHERWOOD STRGHT	N	N	RAIN	S-1STOP	01 NONE 0 STRGHT				07
CITY	SA	100	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	WET	REAR	PRVTE NE-SW			000 00
N	6P		08				N	DLIT	INJ	PSNGR CAR	01 DRVR NONE 32 M OR-Y	043	000 07
N	45 22 22.64	-122 47 30.52	(02)										OR<25
				02 NONE 0 STOP									
				PRVTE NE-SW									011 00
				PSNGR CAR	01 DRVR INJC 48 M OR-Y								000 00
													OR<25
<hr/>													
03858	N N N	07/31/2019	14	SW TUALATIN-SHERWOOD STRGHT	N	N	CLR	S-1STOP	01 NONE 0 STRGHT				29
NONE	WE	100	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE NE-SW			000 00
N	9A		08				N	DAY	INJ	PSNGR CAR	01 DRVR NONE 21 M OR-Y	026	000 29
N	45 22 22.65	-122 47 30.5	(02)										OR<25
				02 NONE 0 STOP									
				PRVTE NE-SW									011 00

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TUALATIN-SHERWOOD and 112TH AVE, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 34 of 34 Crash records shown. ONLY 25 CRASHES APPLICABLE TO INTERSECTION

														PSNGR CAR	01 DRVR	INJC	55 M	OR-Y	000	000	00	
																		OR<25				
00572	N N N	N N	02/03/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	RAIN	S-1STOP	01 NONE	0	STRGHT					07				
CITY			SU	150	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	WET	REAR	PRVTE	NE-SW					000	00			
N			7P			08		N	DLIT	INJ	PSNGR CAR		01 DRVR	NONE	25 F	OR-Y	043	000	07			
N			45 22 22.96	-122 47			(02)									OR<25						
														02 NONE	0	STOP						
														PRVTE		NE-SW					011	00
														PSNGR CAR		01 DRVR	INJC	50 F	OR-Y	000	000	00
																		OR<25				
04548	N N N	N N	07/11/2016	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-STRGHT	01 NONE	0	STRGHT					27,07				
CITY			MO	200	SW 112TH AVE	NE	(NONE)	NONE	N	DRY	REAR	PRVTE	NE-SW					000	00			
N			5P			08		N	DAY	INJ	PSNGR CAR		01 DRVR	INJC	32 F	OR-Y	016,043	038	27,07			
N			45 22 23.29	-122 47			(02)									OR<25						
														01 NONE	0	STRGHT						
														PRVTE		NE-SW					000	00
														PSNGR CAR		02 PSNG	INJB	07 F		000	000	00
														01 NONE	0	STRGHT						
														PRVTE		NE-SW					000	00
														PSNGR CAR		03 PSNG	INJB	04 M		000	000	00
														02 NONE	0	STRGHT						
														PRVTE		NE-SW					000	00
														PSNGR CAR		01 DRVR	NONE	46 M	OR-Y	000	000	00
																		OR<25				
01513	N N N	N N	03/18/2017	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	RAIN	S-STRGHT	01 NONE	9	STRGHT					07				
CITY			SA	250	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	WET	REAR	N/A	NE-SW					000	00			
N			10A			08		N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	00 Unk	UNK	000	000	00			
N			45 22 23.56	-122 47			(02)									UNK						
														02 NONE	9	STRGHT						
														N/A		NE-SW					000	00
														PSNGR CAR		01 DRVR	NONE	00 Unk	UNK	000	000	00
																		UNK				

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TUALATIN-SHERWOOD and 112TH AVE, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 34 of 34 Crash records shown. ONLY 25 CRASHES APPLICABLE TO INTERSECTION

08138	Y N N	N N	11/28/2016	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLD	S-STRGHT	01 NONE	9	STRGHT										29,01			
CITY		MO		300	SW 112TH AVE	NE	(NONE)	TRF SIGNAL	N	WET	REAR	N/A	NE-SW										000	00		
N		3P				08			N	DAY	PDO	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK				000	000	00	
N			45 22	23.86			(02)																	UNK		
				-122																				28.3		
				47							02	NONE	9	STRGHT												
											N/A		NE-SW											006	00	
											PSNGR CAR			01	DRVR	NONE	00	Unk	UNK				000	000	00	
																								UNK		
00725	N N N	N N	02/12/2018	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01 NONE	0	STRGHT										013	27,29		
CITY		MO		400	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	NE-SW											000	00	
N		3P				08			N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	50	M	OR-Y				016,026	038	27,29	
N			45 22	24.46			(02)																	OR<25		
				-122																				27.2		
				47							02	NONE	0	STOP												
											PRVTE		NE-SW											011	013	00
											PSNGR CAR			01	DRVR	INJC	57	M	OR-Y				000	000	00	
																								OR<25		
											03	NONE	0	STOP												
											PRVTE		SW-NE											022	013	00
											PSNGR CAR			01	DRVR	INJC	30	M	OR-Y				000	000	00	
																								OR<25		
											04	NONE	0	STOP												
											PRVTE		SW-NE											022	00	
											PSNGR CAR			01	DRVR	NONE	39	F	OR-Y				000	000	00	
																								OR<25		
01876	N N N	N N	04/10/2015	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-STRGHT	01 NONE	0	STRGHT											07		
CITY		FR		500	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	NE-SW											000	00	
N		12P				08			N	DAY	PDO	PSNGR CAR		01	DRVR	NONE	69	F	OR-Y				043	000	07	
N			45 22	25.1			(02)																	OR<25		
				-122																				26.04		
				47							02	NONE	0	STOP												
											PRVTE		NE-SW											011	00	
											PSNGR CAR			01	DRVR	NONE	30	F	OR-Y				000	000	00	
																								OR<25		
00838	N N N	N N	02/14/2015	16	SW TUALATIN-SHERWOOD	STRGHT	N	N	FOG	S-STRGHT	01 NONE	0	STRGHT											07		
CITY		SA		634	SW 112TH AVE	NE	(NONE)	CHANNEL	N	DRY	REAR	PRVTE	NE-SW											000	00	

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TUALATIN-SHERWOOD and 112TH AVE, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 34 of 34 Crash records shown. ONLY 25 CRASHES APPLICABLE TO INTERSECTION

CRASH ID	DATE	TIME	LOCATION	CRASH TYPE	SEVERITY	STATUS	DRIVER	VEHICLE	INJURY	PROPERTY	CRASH TYPE	SEVERITY	STATUS	DRIVER	VEHICLE	INJURY	PROPERTY	TOTAL				
N	9A		08				N	DAY	INJ	PSNGR CAR	01	DRVR	NONE	30	F	OR-Y	043	000	07			
N	45 22 25.77	-122 47			(02)															OR<25		
		24.82									01	NONE	0		STRGHT							
												PRVTE			NE-SW					000	00	
												PSNGR CAR	02	PSNG	NO<5	03	M			000	000	00
											02	NONE	0		STRGHT							
												PRVTE			NE-SW					006	00	
												PSNGR CAR	01	DRVR	INJC	49	F	OR-Y		000	000	00
																					OR<25	
											02	NONE	0		STRGHT							
												PRVTE			NE-SW					006	00	
												PSNGR CAR	02	PSNG	INJC	07	M			000	000	00
03592	N N N	N N 07/15/2019	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLD	S-STRGHT	01	NONE	0		STRGHT						16,29	
CITY		MO	650	SW 112TH AVE	NE	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE			NE-SW					000	00	
N		3P			08			N	DAY	INJ		PSNGR CAR	01	DRVR	NONE	30	F	OR-Y		042	025	16,29
N		45 22 25.98	-122 47			(02)															OR<25	
		24.43																				
											02	NONE	0		STRGHT							
												PRVTE			NE-SW						000	00
												PSNGR CAR	01	DRVR	NONE	61	M	OR-Y		000	000	00
																					OR<25	
											02	NONE	0		STRGHT							
												PRVTE			NE-SW						000	00
												PSNGR CAR	02	PSNG	INJC	60	F			000	000	00
02995	N N N	06/02/2015	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	UNK	S-1STOP	01	NONE	0		STRGHT						29	
NONE		TU	300	SW 112TH AVE	E	(NONE)	UNKNOWN	N	UNK	REAR		PRVTE			NE-SW						000	00
N		3P			08			N	DAY	PDO		PSNGR CAR	01	DRVR	NONE	45	M	OR-Y		026	000	29
N		45 22 23.85	-122 47			(02)															OR<25	
		28.32																				
											02	NONE	0		STOP							
												PRVTE			NE-SW						011	00
												PSNGR CAR	01	DRVR	NONE	60	M	OR-Y		000	000	00
																					OR<25	

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CITY OF TUALATIN, WASHINGTON COUNTY

TUALATIN-SHERWOOD and 112TH AVE, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 34 of 34 Crash records shown. ONLY 25 CRASHES APPLICABLE TO INTERSECTION

Case No	City	Date	Count	Location	Street	Control	Weather	Time	Crash Type	Severity	Other	Count	Count					
06334	N N N	09/18/2016	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	CLR	S-1STOP	01 NONE	0	STRGHT	013	29				
NO RPT	SU	200		SW 112TH AVE	SW	(NONE)	UNKNOWN	N	DRY	REAR	UNKN	SW-NE	000	00				
N	2P				08			N	DAY	INJ	PSNGR CAR	01 DRVR	NONE	00 Unk UNK	026	000	29	
N		45 22 20.57	-122 47			(02)												
			34.54															
										02 NONE	0	STOP						
										PRVTE		SW-NE	011	013	00			
										PSNGR CAR		01 DRVR	INJC	38 M	OR-Y	000	000	00
										03 NONE	0	STOP						
										PRVTE		SW-NE	022	00				
										PSNGR CAR		01 DRVR	NONE	57 F	OR-Y	000	000	00

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TUALATIN-SHERWOOD and AVERY ST, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 48 of 48 Crash records shown. ONLY 40 CRASHES APPLICABLE TO INTERSECTION

NONE	WE	0	SW TUALATIN-SHERWOOD	SE		TRF SIGNAL	N	ICE	TURN	N/A	NE-SE					000	00						
N	6P			06	0		N	DLIT	PDO	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	00			
N	45 22 21.91	-122 47 31.86																			UNK		
										02	NONE	9	STOP										
										N/A	SE-NW										012	00	
										PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	000	000	00	
																						UNK	
00236	N N N	01/12/2017	14	SW AVERY ST	INTER	CROSS	N	N	CLR	S-1STOP	01	NONE	0	STRGHT								29	
NONE	TH	0	SW TUALATIN-SHERWOOD	SE		TRF SIGNAL	N	ICE	REAR	PRVTE	SE-NW										000	00	
N	5P			06	0		N	DUSK	INJ	PSNGR CAR		01	DRVR	NONE	20	M	OR-Y	026	000	000	000	29	
N	45 22 21.91	-122 47 31.86																				OR<25	
										02	NONE	0	STOP										
										PRVTE	SE-NW											011	00
										PSNGR CAR		01	DRVR	INJC	43	M	OR-Y	000	000	000	000	00	
																						OR<25	
00249	Y N N	N N 01/12/2017	14	SW AVERY ST	INTER	CROSS	N	N	CLR	ANGL-STP	01	NONE	9	TURN-R									01
CITY	TH	0	SW TUALATIN-SHERWOOD	SE		TRF SIGNAL	N	ICE	TURN	N/A	SW-SE										000	00	
N	2P			06	0		N	DAY	PDO	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	000	000	00	
N	45 22 21.91	-122 47 31.86																				UNK	
										02	NONE	9	STOP										
										N/A	SE-NW											012	00
										PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	000	000	00	
																						UNK	
00261	N N N	01/13/2017	14	SW AVERY ST	INTER	CROSS	N	N	CLR	ANGL-STP	01	NONE	9	TURN-R									08
NONE	FR	0	SW TUALATIN-SHERWOOD	SE		TRF SIGNAL	N	ICE	TURN	N/A	SW-SE										000	00	
N	8A			06	0		N	DAY	PDO	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	000	000	00	
N	45 22 21.91	-122 47 31.86																				UNK	
										02	NONE	9	STOP										
										N/A	SE-NW											012	00
										PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	000	000	00	
																						UNK	
00277	N N N	N N 01/14/2017	14	SW AVERY ST	INTER	CROSS	N	N	CLR	ANGL-STP	01	NONE	9	TURN-R								124	08
CITY	SA	0	SW TUALATIN-SHERWOOD	SE		TRF SIGNAL	N	ICE	TURN	N/A	SW-SE										000	00	

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CITY OF TUALATIN, WASHINGTON COUNTY

TUALATIN-SHERWOOD and AVERY ST, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 48 of 48 Crash records shown. ONLY 40 CRASHES APPLICABLE TO INTERSECTION

N	2P	06	0	N	DAY	PDO	PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00																
N	45 22 21.91	-122 47	31.86														UNK																
							02	NONE	9	STOP																							
								N/A		SE-NW						012	00																
								PSNGR	CAR		01	DRVR	NONE	00	Unk	UNK	000																
																	UNK																
00300	N N N	N N	01/14/2017	14	SW AVERY ST	INTER	CROSS	N	N	CLR	ANGL-STP	01	NONE	9	TURN-R			08															
CITY	SA	0			SW TUALATIN-SHERWOOD	SE		TRF	SIGNAL	N	ICE	TURN	N/A		SW-SE			000	00														
N	4P					06	0	N	DAY	PDO	PSNGR	CAR		01	DRVR	NONE	00	Unk	UNK														
N	45 22 21.91	-122 47	31.86															UNK															
											02	NONE	9	STOP																			
												N/A		SE-NW				012	00														
												PSNGR	CAR		01	DRVR	NONE	00	Unk	UNK													
																		000	000	00													
																		UNK															
00986	N N N		02/27/2019	14	SW AVERY ST	INTER	CROSS	N	N	SNOW	ANGL-STP	01	NONE	0	TURN-R			124	08														
NONE	WE	0			SW TUALATIN-SHERWOOD	SE		TRF	SIGNAL	N	ICE	TURN	PRVTE		SW-SE			000	124	00													
N	4A					06	0	N	DLIT	INJ	PSNGR	CAR		01	DRVR	NONE	31	M	OR-Y	001	000	08											
N	45 22 21.91	-122 47	31.86																OR<25														
																			02	NONE	0	STOP											
																				PRVTE		SE-NW				012	00						
																					PSNGR	CAR		01	DRVR	INJC	46	M	OR-Y	000	000	00	
																														OR<25			
08199	N N N		12/31/2015	14	SW AVERY ST	INTER	CROSS	N	N	UNK	S-1STOP	01	NONE	0	STRGHT			013	29														
NONE	TH	0			SW TUALATIN-SHERWOOD	SW		TRF	SIGNAL	N	UNK	REAR	PRVTE		SW-NE			000		00													
N	11A					06	0	N	DAY	PDO	PSNGR	CAR		01	DRVR	NONE	00	F	UNK	026	000	29											
N	45 22 21.91	-122 47	31.86																	UNK													
																				02	NONE	0	STOP										
																					PRVTE		SW-NE						011	013	00		
																						PSNGR	CAR		01	DRVR	NONE	68	M	OR-Y	000	022	00
																														OR<25			
																					03	UNKN	0	STOP									
																						UNKN		SW-NE						011		00	
																						UNKNOWN			01	DRVR	NONE	00	Unk	UNK	000	000	00
																															UNK		

CITY OF TUALATIN, WASHINGTON COUNTY

TUALATIN-SHERWOOD and AVERY ST, City of Tualatin, Washington County, 01/01/2015 to 12/31/2019

1 - 48 of 48 Crash records shown. ONLY 40 CRASHES APPLICABLE TO INTERSECTION

Case No	City	Date	Time	Location	Intersection	Crash Type	Severity	Weather	Time of Day	Road Conditions	Vehicle Type	Driver Status	Occupant Status	Other Status	Count	Other Count
02297	N N N	04/08/2016	14	SW AVERY ST	INTER CROSS	N N	CLR	S-1STOP	01 NONE	9	STRGHT				087	07
	CITY	FR	0	SW TUALATIN-SHERWOOD	SW	TRF SIGNAL	N	DRY	REAR	N/A	SW-NE				000	00
	N	7P			06	0	N	DUSK	PDO	PSNGR CAR	01 DRVR	NONE	00	Unk UNK	000	000
	N	45 22 21.91	-122 47 31.86											UNK		
									02 NONE	9	STOP					
									N/A		SW-NE				011	00
									PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000
														UNK		
07608	N N N	11/05/2016	14	SW AVERY ST	INTER CROSS	N N	RAIN	S-1STOP	01 NONE	9	STRGHT					29
	NONE	SA	0	SW TUALATIN-SHERWOOD	SW	TRF SIGNAL	N	WET	REAR	N/A	SW-NE				000	00
	N	UNK			06	0	N	DAY	PDO	PSNGR CAR	01 DRVR	NONE	00	Unk UNK	000	000
	N	45 22 21.91	-122 47 31.86											UNK		
									02 NONE	9	STOP					
									N/A		SW-NE				011	00
									PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000
														UNK		
00687	N N N	02/08/2018	14	SW AVERY ST	INTER CROSS	N N	CLD	S-1STOP	01 NONE	9	STRGHT					29
	NONE	TH	0	SW TUALATIN-SHERWOOD	SW	TRF SIGNAL	N	DRY	REAR	N/A	SW-NE				000	00
	N	3P			06	0	N	DAY	PDO	PSNGR CAR	01 DRVR	NONE	00	Unk UNK	000	000
	N	45 22 21.91	-122 47 31.86											UNK		
									02 NONE	9	STOP					
									N/A		SW-NE				011	00
									PSNGR CAR		01 DRVR	NONE	00	Unk UNK	000	000
														UNK		
04744	N N N	08/03/2017	14	SW AVERY ST	INTER CROSS	N N	CLR	ANGL-OTH	01 NONE	1	STRGHT					04
	CITY	TH	0	SW TUALATIN-SHERWOOD	CN	TRF SIGNAL	N	DRY	TURN	PRVTE	NE-SW				000	00
	N	9A			01	0	N	DAY	INJ	PSNGR CAR	01 DRVR	NONE	29	F OR-Y	020	000
	N	45 22 21.91	-122 47 31.86											OR<25		
									02 NONE	0	TURN-L					
									PRVTE		SE-SW				000	00
									PSNGR CAR		01 DRVR	INJB	53	F OR-Y	000	000
														OR<25		

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Case No	City	Date	Time	Location	Direction	Weather	Crash Type	Severity	Count	Other	Notes	Count	Count	Count							
							PSNGR CAR		01	DRVR	INJC	55	F	OR-Y	000	000	00				
														OR<25							
							03 NONE	0	STOP												
							PRVTE		NE-SW							022	00				
							PSNGR CAR		01	DRVR	INJC	34	M	OR-Y	000	000	00				
														OR<25							
07931	N N N	12/22/2015	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	RAIN	S-1STOP	01	NONE	0	STRGHT			013	29				
NONE		TU	100	SW AVERY ST	NE	(NONE)	UNKNOWN	N	WET	REAR	PRVTE	NE-SW				000	00				
N		5P			08			N	DLIT	INJ	PSNGR CAR		01	DRVR	NONE	35	F	OR-Y	026	000	29
N		45 22 22.64	-122 47			(04)												OR<25			
			30.53																		
							02 NONE	0	STOP												
							PRVTE		NE-SW							011	013	00			
							PSNGR CAR		01	DRVR	INJC	48	F	OR-Y	000	000	00				
																		OR<25			
							03 NONE	0	STOP												
							PRVTE		NE-SW							022	00				
							PSNGR CAR		01	DRVR	NONE	60	F	OR-Y	000	000	00				
																		OR<25			
00801	N N N	01/30/2016	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	RAIN	S-1STOP	01	NONE	9	STRGHT				29				
NONE		SA	200	SW AVERY ST	NE	(NONE)	UNKNOWN	N	WET	REAR	N/A	NE-SW				000	00				
N		6P			08			N	DLIT	PDO	PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	00
N		45 22 23.27	-122 47			(02)												UNK			
			29.38																		
							02 NONE	9	STOP												
							N/A		NE-SW							011	00				
							PSNGR CAR		01	DRVR	NONE	00	Unk	UNK	000	000	00				
																		UNK			
00590	N N N	N N 02/03/2018	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLD	S-1STOP	01	NONE	0	STRGHT			087,013	27,07				
CITY		SA	200	SW AVERY ST	NE	(NONE)	NONE	N	DRY	REAR	PRVTE	NE-SW				000	00				
N		12P			08			N	DAY	INJ	PSNGR CAR		01	DRVR	NONE	58	F	OR-Y	016,043	038	27,07
N		45 22 23.25	-122 47			(02)												OR<25			
			29.41																		
							02 NONE	0	STOP												
							PRVTE		NE-SW							011	013	00			
							PSNGR CAR		01	DRVR	NONE	73	F	OR-Y	000	000	00				
																		OR<25			

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07841	N N N	12/18/2015	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01 NONE	0	STRGHT							07	
CITY		FR	300	SW AVERY ST	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	NE-SW						000	00	
N		6P			08			N	DLIT	INJ	PSNGR CAR		01 DRVR	NONE	29	M	OR-Y	043	000	07
N		45 22 23.85	-122 47 28.31			(02)													OR<25	
											02 NONE	0	STOP							
											PRVTE	NE-SW							011	00
											PSNGR CAR		01 DRVR	INJC	58	M	OR-Y	000	000	00
																			OR<25	
00845	N N N	02/14/2015	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	FOG	S-1STOP	01 NONE	0	STRGHT							07	
CITY		SA	300	SW AVERY ST	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	NE-SW							000	00
N		9A			08			N	DAY	PDO	PSNGR CAR		01 DRVR	NONE	24	M	OR-Y	043	000	07
N		45 22 23.84	-122 47 28.34			(02)													OR<25	
											02 NONE	0	STOP							
											PRVTE	NE-SW							011	00
											PSNGR CAR		01 DRVR	NONE	20	F	OR-Y	000	000	00
																			OR<25	
01240	N N N	N N 03/06/2017	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLD	S-STRGHT	01 NONE	0	STRGHT							07	
CITY		MO	300	SW AVERY ST	NE	(NONE)	NONE	N	WET	REAR	PRVTE	NE-SW							000	00
N		3P			08			N	DAY	INJ	PSNGR CAR		01 DRVR	INJC	21	M	OR-Y	043	000	07
N		45 22 23.86	-122 47 28.3			(02)													OR<25	
											01 NONE	0	STRGHT							
											PRVTE	NE-SW							000	00
											PSNGR CAR		02 PSNG	INJC	36	F		000	000	00
											02 NONE	0	STRGHT							
											PRVTE	NE-SW							000	00
											PSNGR CAR		01 DRVR	NONE	43	M	SUSP	000	000	00
																			OR<25	
06521	N N N	N N 11/28/2018	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	RAIN	S-1STOP	01 NONE	0	STRGHT							27,29	
CITY		WE	346	SW AVERY ST	NE	(NONE)	UNKNOWN	N	WET	REAR	PRVTE	NE-SW							000	00
N		6A			08			N	DLIT	INJ	PSNGR CAR		01 DRVR	NONE	26	F	OR-Y	016,026	038	27,29
N		45 22 24.15	-122 47 27.77			(02)													OR<25	
											01 NONE	0	STRGHT							

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											PRVTE	NE-SW						000	00	
											PSNGR CAR			02 PSNG	INJB	39 M		000	000	00
											02 NONE	0	STOP							
											PRVTE	NE-SW							011	00
											PSNGR CAR			01 DRVR	NONE	53 M	OR-Y	000	000	00
																				OR<25
											02 NONE	0	STOP							
											PRVTE	NE-SW							011	00
											PSNGR CAR			02 PSNG	INJC	36 M		000	000	00
02887	N N N	N N	05/29/2015	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLR	S-1STOP	01 NONE	0	STRGHT					013	07
CITY		FR		400	SW AVERY ST	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	NE-SW						000	00
N		1P				08			N	DAY	INJ	PSNGR CAR		01 DRVR	NONE	51 F	OR-Y	043	000	07
N		45 22	24.45	-122 47			(02)													OR<25
				27.22																
											02 NONE	0	STOP							
											PRVTE	NE-SW							011	013
											PSNGR CAR			01 DRVR	INJC	55 F	OR-Y	000	000	00
																				OR<25
											03 NONE	0	STOP							
											PRVTE	NE-SW							022	00
											PSNGR CAR			01 DRVR	INJC	44 M	OR-Y	000	000	00
																				OR<25
02619	N N N	N N	05/05/2017	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLD	S-STRGHT	01 NONE	9	STRGHT						07
CITY		FR		500	SW AVERY ST	NE	(NONE)	UNKNOWN	N	WET	REAR	N/A	NE-SW						000	00
N		6A				08			N	DAWN	PDO	SEMI TOW		01 DRVR	NONE	00 Unk	UNK	000	000	00
N		45 22	25.07	-122 47			(02)													UNK
				26.09																
											02 NONE	9	STRGHT							
											N/A	NE-SW							000	00
											SEMI TOW			01 DRVR	NONE	00 Unk	UNK	000	000	00
																				UNK
02127	N N N	N N	04/14/2017	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLD	S-1STOP	01 NONE	1	STRGHT					013	07
CITY		FR		815	SW AVERY ST	NE	(NONE)	UNKNOWN	N	DRY	REAR	PRVTE	NE-SW						000	00
N		8A				08			N	DAY	INJ	SEMI TOW		01 DRVR	NONE	38 M	OR-Y	043	000	07
N		45 22	26.96	-122 47			(02)													OR>25
				22.65																

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														02	NONE	0	STOP										
														PRVTE	NE-SW			011	013	00							
														PSNGR	CAR	01	DRVR	INJC	63	M	OR-Y	000	000	00			
																					OR<25						
														03	NONE	0	STRGHT										
														PRVTE	NE-SW			022	00								
														PSNGR	CAR	01	DRVR	NONE	33	M	OR-Y	000	000	00			
																					OR<25						
06371	N	N	N	N	N	12/03/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLR	S-1STOP	01	NONE	0	STRGHT										
CITY					TU	1000	SW AVERY ST	NE	(NONE)	NONE	N	DRY	REAR	PRVTE	NE-SW			000	00								
N					12P			08			N	DAY	INJ	PSNGR	CAR	01	DRVR	NONE	38	F	OR-Y	016,043	038	27,07			
N					45 22 28	-122 47 20.75			(02)								OR<25										
														02	NONE	0	STOP										
														PRVTE	NE-SW			011	013	00							
														PSNGR	CAR	01	DRVR	INJC	83	M	OR-Y	000	000	00			
																					OR<25						
														02	NONE	0	STOP										
														PRVTE	NE-SW			011	013	00							
														PSNGR	CAR	02	PSNG	INJC	80	F		000	000	00			
																					OR<25						
														03	NONE	0	STOP										
														PRVTE	NE-SW			022	00								
														PSNGR	CAR	01	DRVR	NONE	68	M	OR-Y	000	000	00			
																					OR<25						
03248	N	N	N	N	N	06/24/2019	14	SW TUALATIN-SHERWOOD	STRGHT	N	N	CLD	S-1STOP	01	NONE	0	STRGHT										
CITY					MO	1300	SW AVERY ST	NE	(NONE)	NONE	N	DRY	REAR	PRVTE	NE-SW			000	00								
N					5P			08			N	DAY	INJ	PSNGR	CAR	01	DRVR	NONE	16	M	OR-Y	043	000	07			
N					45 22 29.92	-122 47 17.25			(02)								OR<25										
														02	NONE	0	STOP										
														PRVTE	NE-SW			011	00								
														PSNGR	CAR	01	DRVR	INJC	22	F	OR-Y	000	000	00			
																					OR<25						
05848	N	N	N			09/20/2017	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	RAIN	S-STRGHT	01	NONE	9	STRGHT										
NONE					WE	40	SW AVERY ST	SW	(NONE)	UNKNOWN	N	WET	SS-O	N/A	SW-NE			000	00								
N					4P			06			N	DAY	PDO	PSNGR	CAR	01	DRVR	NONE	00	Unk	UNK	000	000	00			

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N		45 22 21.49	-122 47		(03)														UNK
			32.7																
										02 NONE	9	STRGHT							
										N/A		SW-NE							000 00
										PSNGR CAR			01 DRVR	NONE	00	Unk UNK			000 00
																			UNK
05672	N N N	10/23/2018	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	CLR	S-1STOP	01 NONE	9	STRGHT							29
NONE		TU	50	SW AVERY ST	SW	(NONE)	UNKNOWN	N	DRY	REAR		N/A							000 00
N		5P			06			N	DAY	PDO		PSNGR CAR		01 DRVR	NONE	00	Unk UNK		000 00
N		45 22 21.42	-122 47			(02)													UNK
			32.83																
										02 NONE	9	STOP							
										N/A		SW-NE							011 00
										PSNGR CAR			01 DRVR	NONE	00	Unk UNK			000 00
																			UNK
05942	N N N	09/04/2016	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	CLD	S-1STOP	01 NONE	0	STRGHT							013 07
CITY		SU	75	SW AVERY ST	SW	(NONE)	UNKNOWN	N	DRY	REAR		PRVTE							000 00
N		10A			08			N	DAY	INJ		PSNGR CAR		01 DRVR	NONE	62	M	OR-Y	043 000 07
N		45 22 21.3	-122 47			(02)													OR<25
			33.08																
										02 NONE	0	STOP							
										PRVTE		SW-NE							011 013 00
										PSNGR CAR			01 DRVR	INJC	54	M	OR-Y		000 000 00
																			OR<25
										02 NONE	0	STOP							
										PRVTE		SW-NE							011 013 00
										PSNGR CAR			02 PSNG	INJC	54	F			000 000 00
										03 NONE	0	STOP							
										PRVTE		SW-NE							022 00
										PSNGR CAR			01 DRVR	INJC	57	F	OR-Y		000 000 00
																			OR>25
06743	N N N	12/05/2018	14	SW TUALATIN-SHERWOOD	STRGHT	Y	N	CLR	S-1STOP	01 NONE	0	STRGHT							013 29
CITY		WE	75	SW AVERY ST	SW	(NONE)	NONE	N	DRY	REAR		PRVTE							000 00
N		4P			08			N	DAY	INJ		PSNGR CAR		01 DRVR	INJC	85	F	OR-Y	026 000 29
N		45 22 21.29	-122 47			(02)													OR<25
			33.09																
										02 NONE	0	STOP							

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											PRVTE	SW-NE						011	013	00					
											PSNGR CAR			01	DRVR	NONE	47	M	OR-Y	000	000	00			
																						OR<25			
										03	NONE	0	STOP												
											PRVTE	SW-NE										022	00		
											PSNGR CAR			01	DRVR	NONE	34	M	OTH-Y	000	000	00			
																							N-RES		
08424	N N N	12/31/2017	14	SW TUALATIN-SHERWOOD	STRGHT		N	N	CLR	S-1STOP	01	NONE	9	STRGHT									29		
NONE		SU	100	SW AVERY ST	SW	(NONE)	UNKNOWN	N	DRY	REAR	N/A	SW-NE											000	00	
N		2P			08			N	DAY	PDO	PSNGR CAR			01	DRVR	NONE	00	Unk	UNK	000	000	00	00	00	
N		45 22 21.14	-122 47 33.39			(02)																	UNK		
											02	NONE	9	STOP											
											N/A	SW-NE											011	00	
											PSNGR CAR			01	DRVR	NONE	00	Unk	UNK	000	000	00	00	00	
																							UNK		
03569	N N N	07/12/2019	14	SW TUALATIN-SHERWOOD	STRGHT		Y	N	CLR	S-STRGHT	01	NONE	9	STRGHT										29	
NONE		FR	200	SW AVERY ST	SW	(NONE)	UNKNOWN	N	DRY	REAR	N/A	SW-NE												000	00
N		7A			08			N	DAY	PDO	PSNGR CAR			01	DRVR	NONE	00	Unk	UNK	000	000	00	00	00	
N		45 22 20.56	-122 47 34.55			(02)																		UNK	
											02	NONE	9	STRGHT											
											N/A	SW-NE												006	00
											PSNGR CAR			01	DRVR	NONE	00	Unk	UNK	000	000	00	00	00	
																							UNK		
01379	Y N N	N N 03/14/2015	16	SW TUALATIN-SHERWOOD	STRGHT		N	N	RAIN	S-STRGHT	01	NONE	0	STRGHT										07,30	
CITY		SA	450	SW AVERY ST	SW	(NONE)	UNKNOWN	N	WET	REAR	PRVTE	SW-NE												000	00
N		1P			08			N	DAY	INJ	PSNGR CAR			01	DRVR	NONE	17	F	OR-Y	043,050	038	00	07,30		
N		45 22 19.08	-122 47 37.12			(02)																		OR<25	
											02	NONE	0	STRGHT											
											PRVTE	SW-NE												006	00
											PSNGR CAR			01	DRVR	INJC	55	F	OR-Y	000	000	00	00	00	
																								OR<25	

Appendix E

Left-turn Lane Warrant Calculations

Traffic Signal Warrant Calculations



Left-Turn Lane Warrant Analysis



Project: Hedges Creek
 Intersection: 4. West General Access at SW Myslony Street
 Date: 1/3/2022
 Scenario: 2024 Buildout Conditions - AM Peak Hour (EB)

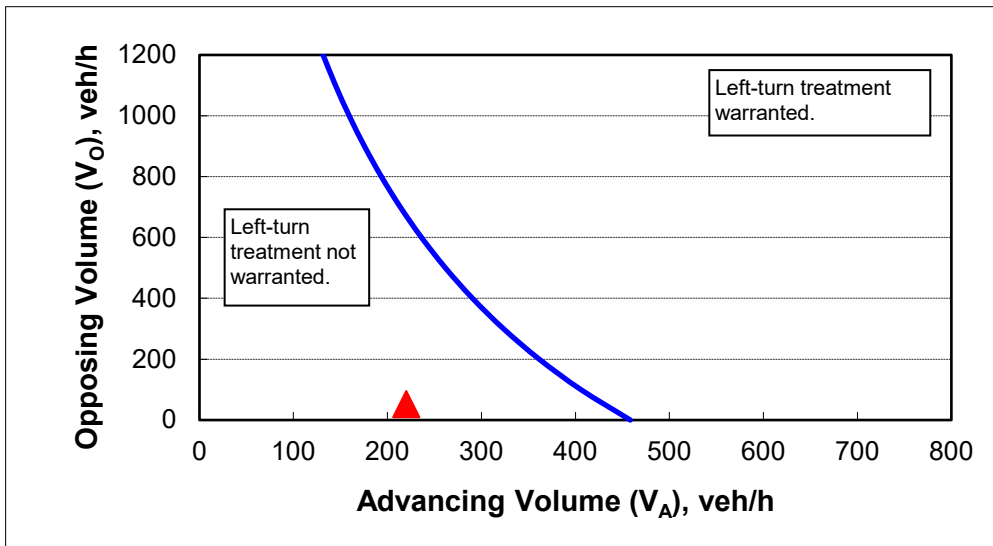
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	27%
Advancing volume (V_A), veh/h:	220
Opposing volume (V_O), veh/h:	52

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	430
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis



Project: Hedges Creek
 Intersection: 4. West General Access at SW Myslony Street
 Date: 1/3/2022
 Scenario: 2024 Buildout Conditions - PM Peak Hour (EB)

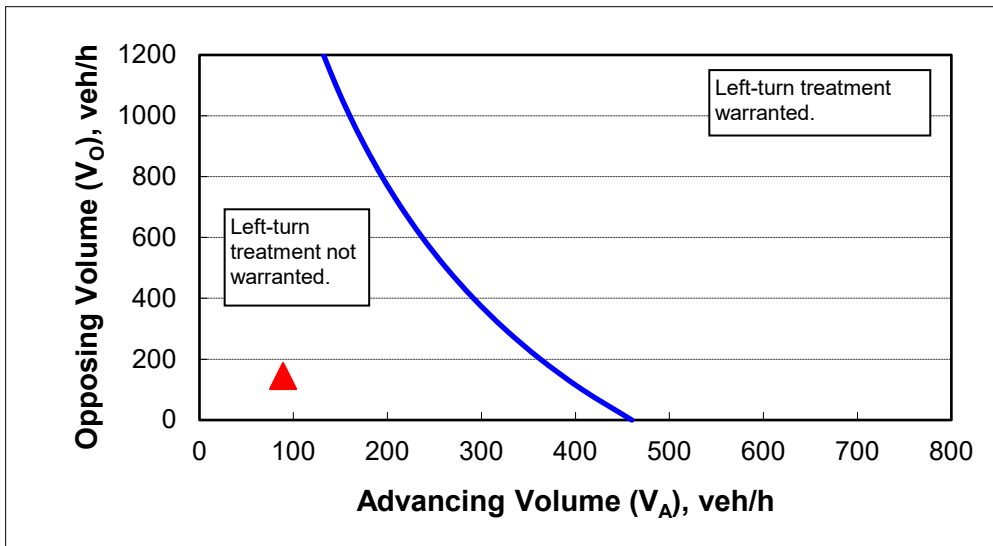
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	27%
Advancing volume (V_A), veh/h:	89
Opposing volume (V_O), veh/h:	145

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	386
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis



Project: Hedges Creek
 Intersection: 5. East Truck Access at SW Myslony Street
 Date: 1/3/2022
 Scenario: 2024 Buildout Conditions - AM Peak Hour (EB)

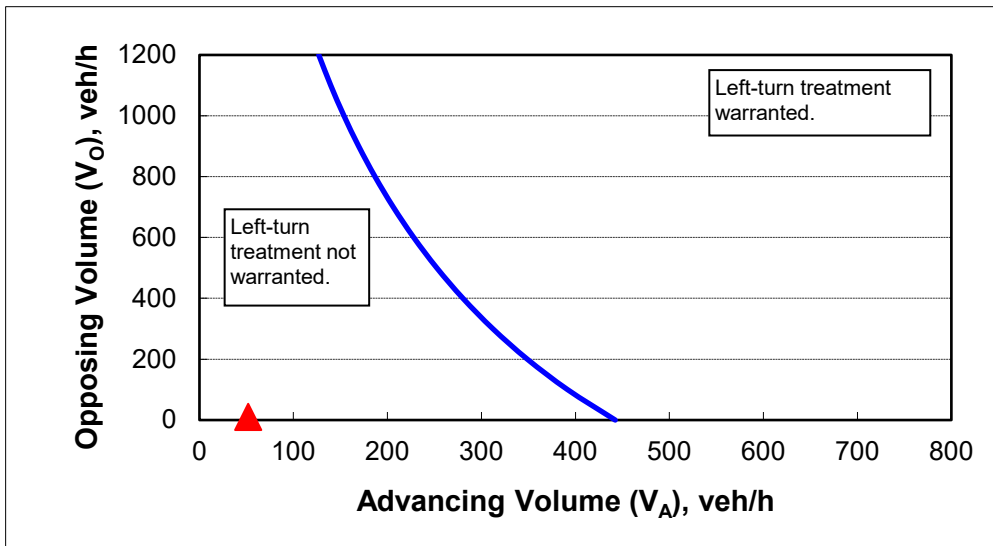
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	31%
Advancing volume (V_A), veh/h:	52
Opposing volume (V_O), veh/h:	10

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	437
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis



Project: Hedges Creek
 Intersection: 5. East Truck Access at SW Myslony Street
 Date: 1/3/2022
 Scenario: 2024 Buildout Conditions - PM Peak Hour (EB)

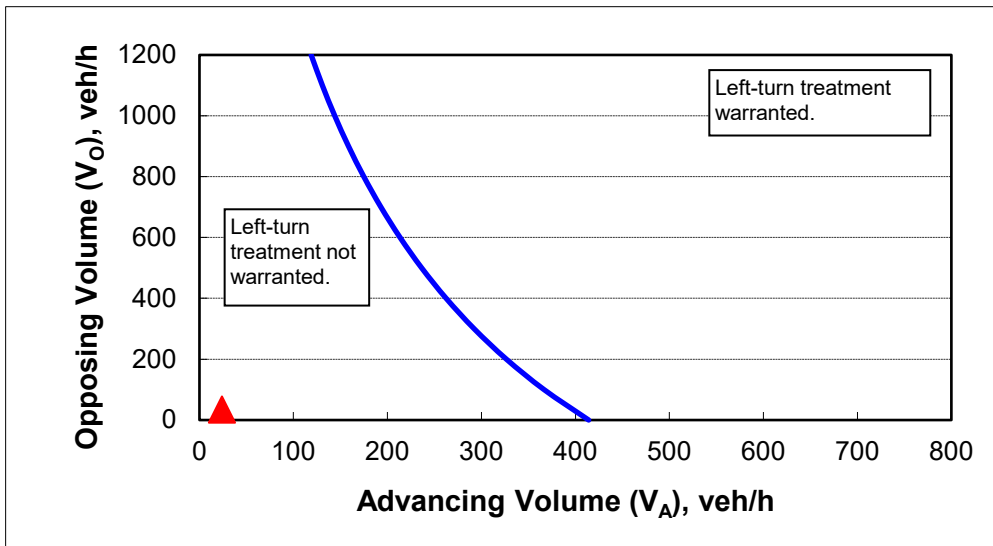
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	42%
Advancing volume (V_A), veh/h:	24
Opposing volume (V_O), veh/h:	35

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	397
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis



Project: Hedges Creek
 Intersection: 6. East General Access at SW Myslony Street
 Date: 1/3/2022
 Scenario: 2024 Buildout Conditions - AM Peak Hour (EB)

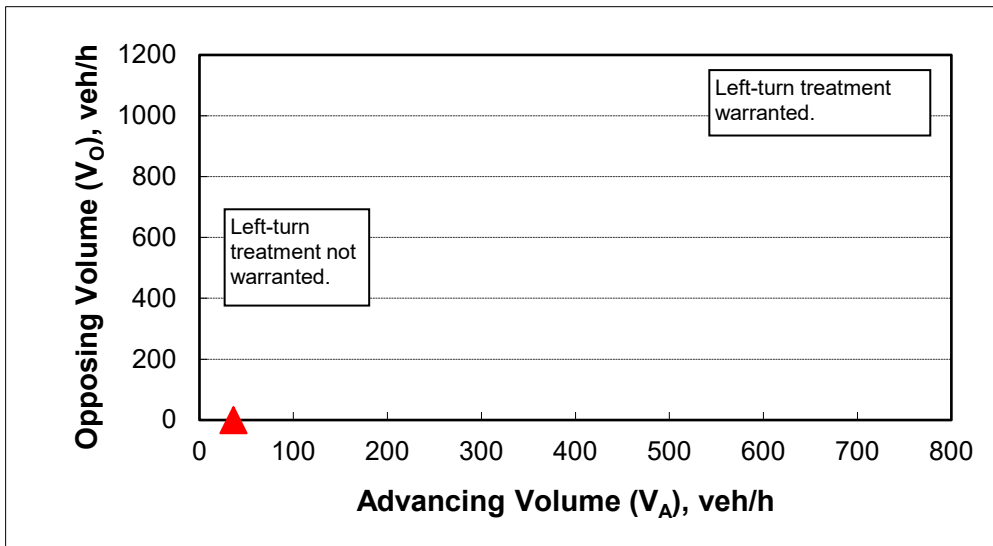
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	100%
Advancing volume (V_A), veh/h:	36
Opposing volume (V_O), veh/h:	0

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	3884
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Left-Turn Lane Warrant Analysis



Project: Hedges Creek
 Intersection: 6. East General Access at SW Myslony Street
 Date: 1/3/2022
 Scenario: 2024 Buildout Conditions - PM Peak Hour (EB)

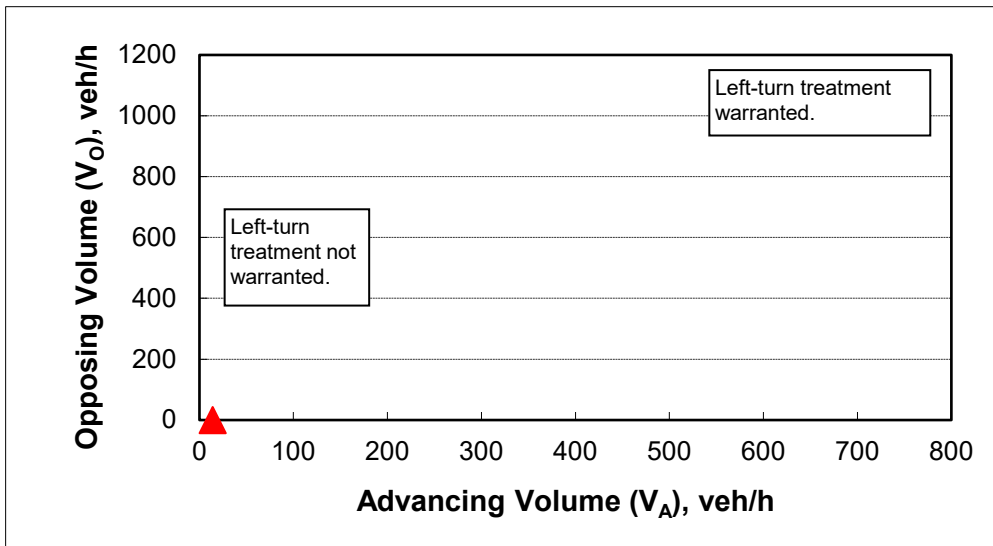
2-lane roadway (English)

INPUT

Variable	Value
85 th percentile speed, mph:	25
Percent of left-turns in advancing volume (V_A), %:	100%
Advancing volume (V_A), veh/h:	14
Opposing volume (V_O), veh/h:	0

OUTPUT

Variable	Value
Limiting advancing volume (V_A), veh/h:	3428
Guidance for determining the need for a major-road left-turn bay:	
Left-turn treatment NOT warranted.	



CALIBRATION CONSTANTS

Variable	Value
Average time for making left-turn, s:	3.0
Critical headway, s:	5.0
Average time for left-turn vehicle to clear the advancing lane, s:	1.9

Traffic Signal Warrant Analysis



Project: Hedges Creek
 Date: 1/3/2022
 Scenario: 2021 Existing Conditions

Major Street:	SW 124th Avenue	Minor Street:	SW Myslony Street
Number of Lanes:	2	Number of Lanes:	1
PM Peak Hour Volumes:	897	PM Peak Hour Volumes:	157

Warrant Used:

_____ 100 percent of standard warrants used
 X 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
Major St.	Minor St.	100% Warrants	70% Warrants	100% Warrants	70% Warrants
WARRANT 1, CONDITION A					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
<i>Warrant 1</i>			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	8,970	7,400	
Minor Street*	1,570	1,850	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	8,970	11,100	
Minor Street*	1,570	950	No
<i>Combination Warrant</i>			
Major Street	8,970	8,880	
Minor Street*	1,570	1,480	Yes

Note: Minor street right-turning traffic volumes reduced by 25%.

Traffic Signal Warrant Analysis



Project: Hedges Creek
 Date: 1/3/2022
 Scenario: 2024 Buildout Conditions

Major Street:	SW Myslony Street	Minor Street:	SW 112th Avenue
Number of Lanes:	1	Number of Lanes:	1
PM Peak Hour Volumes:	332	PM Peak Hour Volumes:	169

Warrant Used:
 100 percent of standard warrants used
 70 percent of standard warrants used due to 85th percentile speed in excess of 40 mph or isolated community with population less than 10,000.

Number of Lanes for Moving Traffic on Each Approach:		ADT on Major St. (total of both approaches)		ADT on Minor St. (higher-volume approach)	
Major St.	Minor St.	100% Warrants	70% Warrants	100% Warrants	70% Warrants
WARRANT 1, CONDITION A					
1	1	8,850	6,200	2,650	1,850
2 or more	1	10,600	7,400	2,650	1,850
2 or more	2 or more	10,600	7,400	3,550	2,500
1	2 or more	8,850	6,200	3,550	2,500
WARRANT 1, CONDITION B					
1	1	13,300	9,300	1,350	950
2 or more	1	15,900	11,100	1,350	950
2 or more	2 or more	15,900	11,100	1,750	1,250
1	2 or more	13,300	9,300	1,750	1,250

Note: ADT volumes assume 8th highest hour is 5.6% of the daily volume

	Approach Volumes	Minimum Volumes	Is Signal Warrant Met?
Warrant 1			
<i>Condition A: Minimum Vehicular Volume</i>			
Major Street	3,320	8,850	
Minor Street*	1,690	2,650	No
<i>Condition B: Interruption of Continuous Traffic</i>			
Major Street	3,320	13,300	
Minor Street*	1,690	1,350	No
<i>Combination Warrant</i>			
Major Street	3,320	10,640	
Minor Street*	1,690	2,120	No

Note: Minor street right-turning traffic volumes reduced by 25%.

Appendix F

Level of Service Descriptions

Capacity Reports





LEVEL OF SERVICE

Level of service is used to describe the quality of traffic flow. Levels of service A to C are considered good, and rural roads are usually designed for level of service C. Urban streets and signalized intersections are typically designed for level of service D. Level of service E is considered to be the limit of acceptable delay. For unsignalized intersections, level of service E is generally considered acceptable. Here is a more complete description of levels of service:

Level of service A: Very low delay at intersections, with all traffic signal cycles clearing and no vehicles waiting through more than one signal cycle. On highways, low volume and high speeds, with speeds not restricted by other vehicles.

Level of service B: Operating speeds beginning to be affected by other traffic; short traffic delays at intersections. Higher average intersection delay than for level of service A resulting from more vehicles stopping.

Level of service C: Operating speeds and maneuverability closely controlled by other traffic; higher delays at intersections than for level of service B due to a significant number of vehicles stopping. Not all signal cycles clear the waiting vehicles. This is the recommended design standard for rural highways.

Level of service D: Tolerable operating speeds; long traffic delays occur at intersections. The influence of congestion is noticeable. At traffic signals many vehicles stop, and the proportion of vehicles not stopping declines. The number of signal cycle failures, for which vehicles must wait through more than one signal cycle, are noticeable. This is typically the design level for urban signalized intersections.

Level of service E: Restricted speeds, very long traffic delays at traffic signals, and traffic volumes near capacity. Flow is unstable so that any interruption, no matter how minor, will cause queues to form and service to deteriorate to level of service F. Traffic signal cycle failures are frequent occurrences. For unsignalized intersections, level of service E or better is generally considered acceptable.

Level of service F: Extreme delays, resulting in long queues which may interfere with other traffic movements. There may be stoppages of long duration, and speeds may drop to zero. There may be frequent signal cycle failures. Level of service F will typically result when vehicle arrival rates are greater than capacity. It is considered unacceptable by most drivers.



*LEVEL OF SERVICE CRITERIA
FOR SIGNALIZED INTERSECTIONS*

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-20
C	20-35
D	35-55
E	55-80
F	>80

*LEVEL OF SERVICE CRITERIA
FOR UNSIGNALIZED INTERSECTIONS*

LEVEL OF SERVICE	CONTROL DELAY PER VEHICLE (Seconds)
A	<10
B	10-15
C	15-25
D	25-35
E	35-50
F	>50

HCM 6th TWSC
1: SW 124th Avenue & SW Myslony Street

01/04/2022

Intersection												
Int Delay, s/veh	1.8											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	0	3	24	1	31	6	312	53	117	518	4
Future Vol, veh/h	1	0	3	24	1	31	6	312	53	117	518	4
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	67	67	67	43	43	43	17	17	17	9	9	9
Mvmt Flow	1	0	3	26	1	33	6	335	57	126	557	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	991	1216	282	909	1190	197	561	0	0	393	0	0
Stage 1	811	811	-	377	377	-	-	-	-	-	-	-
Stage 2	180	405	-	532	813	-	-	-	-	-	-	-
Critical Hdwy	8.84	7.84	8.24	8.36	7.36	7.76	4.44	-	-	4.28	-	-
Critical Hdwy Stg 1	7.84	6.84	-	7.36	6.36	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.84	6.84	-	7.36	6.36	-	-	-	-	-	-	-
Follow-up Hdwy	4.17	4.67	3.97	3.93	4.43	3.73	2.37	-	-	2.29	-	-
Pot Cap-1 Maneuver	127	108	553	175	136	698	909	-	-	1114	-	-
Stage 1	228	267	-	517	522	-	-	-	-	-	-	-
Stage 2	646	459	-	407	306	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	109	95	552	158	120	697	909	-	-	1113	-	-
Mov Cap-2 Maneuver	207	200	-	304	239	-	-	-	-	-	-	-
Stage 1	226	237	-	513	518	-	-	-	-	-	-	-
Stage 2	610	455	-	358	271	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	14.3	14.5	0.1	1.6
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	909	-	-	390	439	1113	-	-
HCM Lane V/C Ratio	0.007	-	-	0.011	0.137	0.113	-	-
HCM Control Delay (s)	9	-	-	14.3	14.5	8.6	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.5	0.4	-	-

Intersection	
Intersection Delay, s/veh	8.2
Intersection LOS	A

























Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Traffic Vol, veh/h	10	95	4	9	61	24
Future Vol, veh/h	10	95	4	9	61	24
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	14	14	54	54	24	24
Mvmt Flow	13	123	5	12	79	31
Number of Lanes	1	0	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	7.6	8.5	8.8
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	0%	0%	31%
Vol Thru, %	0%	0%	10%	69%
Vol Right, %	0%	100%	90%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	61	24	105	13
LT Vol	61	0	0	4
Through Vol	0	0	10	9
RT Vol	0	24	95	0
Lane Flow Rate	79	31	136	17
Geometry Grp	7	7	2	2
Degree of Util (X)	0.125	0.039	0.149	0.025
Departure Headway (Hd)	5.676	4.473	3.926	5.323
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	627	792	919	676
Service Time	3.449	2.246	1.927	3.328
HCM Lane V/C Ratio	0.126	0.039	0.148	0.025
HCM Control Delay	9.3	7.4	7.6	8.5
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.4	0.1	0.5	0.1

HCM 6th Signalized Intersection Summary
 7: SW 124th Avenue & SW Tualatin-Sherwood Road

01/04/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	50	725	97	40	582	80	163	156	49	145	226	51
Future Volume (veh/h)	50	725	97	40	582	80	163	156	49	145	226	51
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1707	1707	1707	1648	1648	1648	1707	1707	1707
Adj Flow Rate, veh/h	52	747	64	41	600	43	168	161	26	149	233	16
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	14	14	14	13	13	13	17	17	17	13	13	13
Cap, veh/h	400	1012	941	283	957	870	172	445	71	259	264	323
Arrive On Green	0.07	0.60	0.60	0.03	0.56	0.56	0.06	0.16	0.16	0.05	0.15	0.15
Sat Flow, veh/h	1612	1693	1433	1626	1707	1428	1570	2707	429	1626	1707	1447
Grp Volume(v), veh/h	52	747	64	41	600	43	168	92	95	149	233	16
Grp Sat Flow(s),veh/h/ln	1612	1693	1433	1626	1707	1428	1570	1566	1571	1626	1707	1447
Q Serve(g_s), s	1.4	38.1	1.9	1.3	28.6	1.5	7.0	6.3	6.5	5.8	16.0	1.0
Cycle Q Clear(g_c), s	1.4	38.1	1.9	1.3	28.6	1.5	7.0	6.3	6.5	5.8	16.0	1.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	400	1012	941	283	957	870	172	257	258	259	264	323
V/C Ratio(X)	0.13	0.74	0.07	0.15	0.63	0.05	0.98	0.36	0.37	0.57	0.88	0.05
Avail Cap(c_a), veh/h	430	1012	941	307	957	870	172	368	369	259	384	425
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	12.0	17.4	7.4	15.3	17.9	9.5	47.8	44.5	44.6	44.4	49.7	36.6
Incr Delay (d2), s/veh	0.1	4.8	0.1	0.1	1.2	0.0	60.8	0.3	0.3	3.1	11.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.4	14.5	0.6	0.4	10.6	0.4	4.9	2.4	2.5	1.7	7.5	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	12.0	22.2	7.6	15.4	19.1	9.5	108.7	44.8	44.9	47.5	61.4	36.7
LnGrp LOS	B	C	A	B	B	A	F	D	D	D	E	D
Approach Vol, veh/h		863			684			355			398	
Approach Delay, s/veh		20.5			18.2			75.1			55.2	
Approach LOS		C			B			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.7	77.2	11.0	24.0	12.2	72.7	9.8	25.2				
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5				
Max Green Setting (Gmax), s	5.5	61.5	7.0	27.0	10.5	56.5	5.8	28.2				
Max Q Clear Time (g_c+I1), s	3.3	40.1	9.0	18.0	3.4	30.6	7.8	8.5				
Green Ext Time (p_c), s	0.0	8.5	0.0	0.5	0.0	6.9	0.0	0.5				
Intersection Summary												
HCM 6th Ctrl Delay			34.2									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary
 8: SW Tualatin-Sherwood Road & SW 112th Avenue

01/04/2022



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	27	50	17	157	50	11	20	738	161	7	635	102
Future Volume (veh/h)	27	50	17	157	50	11	20	738	161	7	635	102
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1589	1589	1589	1870	1870	1870	1663	1663	1663	1722	1722	1722
Adj Flow Rate, veh/h	30	56	9	174	56	6	22	820	143	8	706	70
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	21	21	21	2	2	2	16	16	16	12	12	12
Cap, veh/h	37	75	12	191	231	25	374	1161	1135	285	1184	1039
Arrive On Green	0.02	0.06	0.06	0.11	0.14	0.14	0.02	0.70	0.70	0.01	0.69	0.69
Sat Flow, veh/h	1513	1336	215	1781	1660	178	1584	1663	1409	1640	1722	1459
Grp Volume(v), veh/h	30	0	65	174	0	62	22	820	143	8	706	70
Grp Sat Flow(s),veh/h/ln	1513	0	1550	1781	0	1838	1584	1663	1409	1640	1722	1459
Q Serve(g_s), s	2.8	0.0	5.8	13.5	0.0	4.2	0.6	41.1	3.1	0.2	30.4	2.0
Cycle Q Clear(g_c), s	2.8	0.0	5.8	13.5	0.0	4.2	0.6	41.1	3.1	0.2	30.4	2.0
Prop In Lane	1.00		0.14	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	37	0	87	191	0	255	374	1161	1135	285	1184	1039
V/C Ratio(X)	0.81	0.00	0.74	0.91	0.00	0.24	0.06	0.71	0.13	0.03	0.60	0.07
Avail Cap(c_a), veh/h	86	0	299	191	0	446	404	1161	1135	333	1184	1039
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.59	0.59	0.59	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.9	0.0	65.1	61.8	0.0	53.7	9.5	12.6	2.9	12.1	11.6	6.1
Incr Delay (d2), s/veh	13.9	0.0	4.6	40.4	0.0	0.2	0.0	2.2	0.1	0.0	2.2	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.2	0.0	2.4	8.2	0.0	2.0	0.2	13.9	0.7	0.1	11.0	0.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.8	0.0	69.6	102.3	0.0	53.9	9.5	14.7	3.1	12.1	13.8	6.2
LnGrp LOS	F	A	E	F	A	D	A	B	A	B	B	A
Approach Vol, veh/h		95		236		985		784				
Approach Delay, s/veh		73.5		89.6		12.9		13.1				
Approach LOS		E		F		B		B				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	103.3	19.0	12.4	6.9	101.7	7.4	24.0					
Change Period (Y+Rc), s	4.0	5.5	4.0	4.5	4.0	5.5	4.0	4.5				
Max Green Setting (Gmax), s	5.5	74.5	15.0	27.0	5.5	74.5	8.0	34.0				
Max Q Clear Time (g_c+1), s	12.2	43.1	15.5	7.8	2.6	32.4	4.8	6.2				
Green Ext Time (p_c), s	0.0	10.4	0.0	0.1	0.0	8.4	0.0	0.1				
Intersection Summary												
HCM 6th Ctrl Delay			24.3									
HCM 6th LOS			C									

HCM 6th TWSC
1: SW 124th Avenue & SW Myslony Street

01/04/2022

Intersection												
Int Delay, s/veh	2.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	11	1	6	45	0	149	0	387	10	25	474	1
Future Vol, veh/h	11	1	6	45	0	149	0	387	10	25	474	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	2	2	4	4	4	3	3	3
Mvmt Flow	12	1	7	49	0	162	0	421	11	27	515	1

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	781	1003	258	740	998	217	516	0	0	433	0	0
Stage 1	570	570	-	428	428	-	-	-	-	-	-	-
Stage 2	211	433	-	312	570	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.54	6.54	6.94	4.18	-	-	4.16	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.52	4.02	3.32	2.24	-	-	2.23	-	-
Pot Cap-1 Maneuver	288	244	747	305	242	787	1032	-	-	1116	-	-
Stage 1	479	509	-	575	583	-	-	-	-	-	-	-
Stage 2	777	585	-	673	504	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	224	238	747	296	236	786	1032	-	-	1115	-	-
Mov Cap-2 Maneuver	401	406	-	477	409	-	-	-	-	-	-	-
Stage 1	479	497	-	574	582	-	-	-	-	-	-	-
Stage 2	617	584	-	650	492	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	12.9	12.6	0	0.4
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	1032	-	-	475	683	1115	-	-
HCM Lane V/C Ratio	-	-	-	0.041	0.309	0.024	-	-
HCM Control Delay (s)	0	-	-	12.9	12.6	8.3	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.1	1.3	0.1	-	-

HCM 6th AWSC
3: SW 112th Avenue & SW Myslony Street

01/04/2022

Intersection	
Intersection Delay, s/veh	8.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Traffic Vol, veh/h	7	73	5	14	126	3
Future Vol, veh/h	7	73	5	14	126	3
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	13	13	32	32	9	9
Mvmt Flow	9	94	6	18	162	4
Number of Lanes	1	0	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	7.6	8.3	9.8
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	0%	0%	26%
Vol Thru, %	0%	0%	9%	74%
Vol Right, %	0%	100%	91%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	126	3	80	19
LT Vol	126	0	0	5
Through Vol	0	0	7	14
RT Vol	0	3	73	0
Lane Flow Rate	162	4	103	24
Geometry Grp	7	7	2	2
Degree of Util (X)	0.241	0.004	0.116	0.034
Departure Headway (Hd)	5.375	4.172	4.079	5.079
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	664	849	884	708
Service Time	3.146	1.943	2.079	3.084
HCM Lane V/C Ratio	0.244	0.005	0.117	0.034
HCM Control Delay	9.9	7	7.6	8.3
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.9	0	0.4	0.1

HCM 6th Signalized Intersection Summary
 7: SW 124th Avenue & SW Tualatin-Sherwood Road

01/04/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	67	691	155	30	736	84	112	183	41	86	256	152
Future Volume (veh/h)	67	691	155	30	736	84	112	183	41	86	256	152
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1826	1826	1826	1856	1856	1856
Adj Flow Rate, veh/h	72	743	104	32	791	50	120	197	28	92	275	74
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	3	3	3	5	5	5	3	3	3
Cap, veh/h	332	1103	1006	320	1022	938	165	515	72	269	313	383
Arrive On Green	0.08	0.60	0.60	0.03	0.55	0.55	0.05	0.17	0.17	0.05	0.17	0.17
Sat Flow, veh/h	1753	1841	1557	1767	1856	1571	1739	3054	428	1767	1856	1568
Grp Volume(v), veh/h	72	743	104	32	791	50	120	111	114	92	275	74
Grp Sat Flow(s),veh/h/ln	1753	1841	1557	1767	1856	1571	1739	1735	1747	1767	1856	1568
Q Serve(g_s), s	1.8	32.6	3.0	0.9	40.1	1.6	5.6	6.8	7.0	5.2	17.4	4.5
Cycle Q Clear(g_c), s	1.8	32.6	3.0	0.9	40.1	1.6	5.6	6.8	7.0	5.2	17.4	4.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.24	1.00		1.00
Lane Grp Cap(c), veh/h	332	1103	1006	320	1022	938	165	292	295	269	313	383
V/C Ratio(X)	0.22	0.67	0.10	0.10	0.77	0.05	0.73	0.38	0.39	0.34	0.88	0.19
Avail Cap(c_a), veh/h	353	1103	1006	352	1022	938	165	392	395	269	419	473
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.72	0.72	0.72	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.3	16.2	8.1	14.0	21.1	10.0	44.1	44.3	44.4	39.2	48.7	36.0
Incr Delay (d2), s/veh	0.1	3.3	0.2	0.0	3.0	0.0	13.0	0.3	0.3	0.8	12.5	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.7	13.2	1.0	0.3	16.6	0.5	1.5	2.9	3.0	2.2	8.9	1.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	19.5	8.3	14.1	24.1	10.1	57.1	44.6	44.7	40.0	61.2	36.0
LnGrp LOS	B	B	A	B	C	B	E	D	D	D	E	D
Approach Vol, veh/h		919			873			345			441	
Approach Delay, s/veh		18.0			23.0			49.0			52.6	
Approach LOS		B			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	7.3	77.4	9.6	25.7	13.1	71.6	9.6	25.7				
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5				
Max Green Setting (Gmax), s	5.5	62.8	5.6	27.1	10.5	57.8	5.6	27.1				
Max Q Clear Time (g_c+I1), s	2.9	34.6	7.6	19.4	3.8	42.1	7.2	9.0				
Green Ext Time (p_c), s	0.0	9.8	0.0	0.6	0.0	7.5	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			29.7									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary
 8: SW Tualatin-Sherwood Road & SW 112th Avenue

01/04/2022



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	70	70	34	176	78	6	27	643	280	4	649	21
Future Volume (veh/h)	70	70	34	176	78	6	27	643	280	4	649	21
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1841	1841	1841	1826	1826	1826	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	73	73	20	183	81	4	28	670	215	4	676	0
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	5	5	5	2	2	2	4	4	4
Cap, veh/h	93	104	29	209	245	12	421	1215	1220	350	1159	1065
Arrive On Green	0.05	0.07	0.07	0.12	0.14	0.14	0.03	0.65	0.65	0.01	0.63	0.00
Sat Flow, veh/h	1753	1389	380	1739	1723	85	1781	1870	1584	1753	1841	1560
Grp Volume(v), veh/h	73	0	93	183	0	85	28	670	215	4	676	0
Grp Sat Flow(s),veh/h/ln	1753	0	1769	1739	0	1808	1781	1870	1584	1753	1841	1560
Q Serve(g_s), s	4.9	0.0	6.2	12.4	0.0	5.1	0.7	23.5	4.3	0.1	25.8	0.0
Cycle Q Clear(g_c), s	4.9	0.0	6.2	12.4	0.0	5.1	0.7	23.5	4.3	0.1	25.8	0.0
Prop In Lane	1.00		0.22	1.00		0.05	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	93	0	133	209	0	257	421	1215	1220	350	1159	1065
V/C Ratio(X)	0.79	0.00	0.70	0.88	0.00	0.33	0.07	0.55	0.18	0.01	0.58	0.00
Avail Cap(c_a), veh/h	156	0	398	246	0	502	458	1215	1220	421	1159	1065
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.72	0.72	0.72	1.00	1.00	0.00
Uniform Delay (d), s/veh	56.2	0.0	54.2	51.9	0.0	46.3	10.1	11.5	3.7	9.9	13.0	0.0
Incr Delay (d2), s/veh	5.5	0.0	2.5	22.7	0.0	0.3	0.0	1.3	0.2	0.0	2.1	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.3	0.0	2.9	6.7	0.0	2.3	0.2	8.9	1.2	0.0	10.1	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.6	0.0	56.7	74.6	0.0	46.6	10.1	12.8	3.9	9.9	15.2	0.0
LnGrp LOS	E	A	E	E	A	D	B	B	A	A	B	A
Approach Vol, veh/h		166		268			913			680		
Approach Delay, s/veh		58.9		65.7			10.6			15.1		
Approach LOS		E		E			B			B		
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.6	83.5	18.4	13.5	7.0	81.1	10.3	21.6				
Change Period (Y+Rc), s	4.0	5.5	4.0	4.5	4.0	5.5	4.0	4.5				
Max Green Setting (Gmax), s	5.5	52.5	17.0	27.0	5.5	52.5	10.7	33.3				
Max Q Clear Time (g_c+1), s	12.1	25.5	14.4	8.2	2.7	27.8	6.9	7.1				
Green Ext Time (p_c), s	0.0	7.9	0.0	0.2	0.0	6.4	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay				23.4								
HCM 6th LOS				C								

HCM 6th TWSC
1: SW 124th Avenue & SW Myslony Street

01/04/2022

Intersection												
Int Delay, s/veh	2.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	0	3	27	1	39	6	349	63	146	553	4
Future Vol, veh/h	1	0	3	27	1	39	6	349	63	146	553	4
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	67	67	67	43	43	43	17	17	17	9	9	9
Mvmt Flow	1	0	3	29	1	42	6	375	68	157	595	4

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1111	1367	301	1035	1335	223	599	0	0	444	0	0
Stage 1	911	911	-	422	422	-	-	-	-	-	-	-
Stage 2	200	456	-	613	913	-	-	-	-	-	-	-
Critical Hdwy	8.84	7.84	8.24	8.36	7.36	7.76	4.44	-	-	4.28	-	-
Critical Hdwy Stg 1	7.84	6.84	-	7.36	6.36	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.84	6.84	-	7.36	6.36	-	-	-	-	-	-	-
Follow-up Hdwy	4.17	4.67	3.97	3.93	4.43	3.73	2.37	-	-	2.29	-	-
Pot Cap-1 Maneuver	100	84	535	138	108	668	878	-	-	1064	-	-
Stage 1	192	233	-	482	494	-	-	-	-	-	-	-
Stage 2	626	429	-	359	270	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	82	71	534	121	91	667	878	-	-	1063	-	-
Mov Cap-2 Maneuver	174	164	-	259	203	-	-	-	-	-	-	-
Stage 1	191	199	-	478	490	-	-	-	-	-	-	-
Stage 2	581	426	-	304	230	-	-	-	-	-	-	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	15.4	16	0.1	1.9
HCM LOS	C	C		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	878	-	-	352	400	1063	-	-
HCM Lane V/C Ratio	0.007	-	-	0.012	0.18	0.148	-	-
HCM Control Delay (s)	9.1	-	-	15.4	16	9	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	0.6	0.5	-	-

HCM 6th Signalized Intersection Summary
 1: SW 124th Avenue & SW Myslony Street

01/04/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕↔		↕	↕↔	
Traffic Volume (veh/h)	1	0	3	27	1	39	6	349	63	146	553	4
Future Volume (veh/h)	1	0	3	27	1	39	6	349	63	146	553	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	0.99		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	907	907	907	1263	1263	1263	1648	1648	1648	1767	1767	1767
Adj Flow Rate, veh/h	1	0	0	29	1	14	6	375	44	157	595	4
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	67	67	67	43	43	43	17	17	17	9	9	9
Cap, veh/h	334	0	0	276	1	18	494	770	90	656	1357	9
Arrive On Green	0.06	0.00	0.00	0.06	0.06	0.06	0.01	0.27	0.27	0.13	0.40	0.40
Sat Flow, veh/h	814	0	0	657	23	317	1570	2824	329	1682	3418	23
Grp Volume(v), veh/h	1	0	0	44	0	0	6	207	212	157	292	307
Grp Sat Flow(s),veh/h/ln	814	0	0	996	0	0	1570	1566	1588	1682	1678	1762
Q Serve(g_s), s	0.0	0.0	0.0	1.1	0.0	0.0	0.1	2.8	2.8	1.5	3.2	3.2
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.1	0.0	0.0	0.1	2.8	2.8	1.5	3.2	3.2
Prop In Lane	1.00		0.00	0.66		0.32	1.00		0.21	1.00		0.01
Lane Grp Cap(c), veh/h	334	0	0	295	0	0	494	427	433	656	666	700
V/C Ratio(X)	0.00	0.00	0.00	0.15	0.00	0.00	0.01	0.48	0.49	0.24	0.44	0.44
Avail Cap(c_a), veh/h	791	0	0	967	0	0	824	1276	1294	934	1501	1576
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.2	0.0	0.0	11.7	0.0	0.0	6.5	7.7	7.7	4.8	5.5	5.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.9	0.9	0.2	0.5	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.5	0.5	0.1	0.3	0.3
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.2	0.0	0.0	11.9	0.0	0.0	6.5	8.5	8.5	5.0	6.0	6.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		1			44			425			756	
Approach Delay, s/veh		11.2			11.9			8.5			5.8	
Approach LOS		B			B			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	7.8	11.4		6.0	4.7	14.5		6.0				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	7.5	20.5		18.5	5.5	22.5		18.5				
Max Q Clear Time (g_c+I1), s	3.5	4.8		2.0	2.1	5.2		3.1				
Green Ext Time (p_c), s	0.1	2.0		0.0	0.0	3.0		0.1				
Intersection Summary												
HCM 6th Ctrl Delay				6.9								
HCM 6th LOS				A								

HCM 6th AWSC
 3: SW 112th Avenue & SW Myslony Street

01/04/2022

Intersection	
Intersection Delay, s/veh	8.6
Intersection LOS	A

























Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	40	101	17	18	65	68
Future Vol, veh/h	40	101	17	18	65	68
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	14	14	54	54	24	24
Mvmt Flow	52	131	22	23	84	88
Number of Lanes	1	0	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	8.4	9	8.8
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	0%	0%	49%
Vol Thru, %	0%	0%	28%	51%
Vol Right, %	0%	100%	72%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	65	68	141	35
LT Vol	65	0	0	17
Through Vol	0	0	40	18
RT Vol	0	68	101	0
Lane Flow Rate	84	88	183	45
Geometry Grp	7	7	2	2
Degree of Util (X)	0.139	0.116	0.215	0.07
Departure Headway (Hd)	5.938	4.733	4.226	5.568
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	605	759	851	645
Service Time	3.661	2.456	2.238	3.589
HCM Lane V/C Ratio	0.139	0.116	0.215	0.07
HCM Control Delay	9.6	8.1	8.4	9
HCM Lane LOS	A	A	A	A
HCM 95th-tile Q	0.5	0.4	0.8	0.2

HCM 6th Signalized Intersection Summary
 7: SW 124th Avenue & SW Tualatin-Sherwood Road

01/04/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	65	772	108	48	636	98	190	183	56	158	245	57
Future Volume (veh/h)	65	772	108	48	636	98	190	183	56	158	245	57
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1707	1707	1707	1648	1648	1648	1707	1707	1707
Adj Flow Rate, veh/h	67	796	71	49	656	59	196	189	34	163	253	22
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	14	14	14	13	13	13	17	17	17	13	13	13
Cap, veh/h	349	984	920	237	923	839	176	479	85	259	283	348
Arrive On Green	0.07	0.58	0.58	0.03	0.54	0.54	0.06	0.18	0.18	0.05	0.17	0.17
Sat Flow, veh/h	1612	1693	1433	1626	1707	1428	1570	2659	470	1626	1707	1447
Grp Volume(v), veh/h	67	796	71	49	656	59	196	110	113	163	253	22
Grp Sat Flow(s),veh/h/ln	1612	1693	1433	1626	1707	1428	1570	1566	1563	1626	1707	1447
Q Serve(g_s), s	1.9	44.6	2.2	1.6	34.4	2.1	7.3	7.4	7.7	5.6	17.4	1.4
Cycle Q Clear(g_c), s	1.9	44.6	2.2	1.6	34.4	2.1	7.3	7.4	7.7	5.6	17.4	1.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.30	1.00		1.00
Lane Grp Cap(c), veh/h	349	984	920	237	923	839	176	282	282	259	283	348
V/C Ratio(X)	0.19	0.81	0.08	0.21	0.71	0.07	1.12	0.39	0.40	0.63	0.89	0.06
Avail Cap(c_a), veh/h	370	984	920	257	923	839	176	374	374	259	384	433
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.59	0.59	0.59	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	14.6	19.9	8.1	18.4	20.6	10.7	47.1	43.4	43.5	44.7	49.0	35.2
Incr Delay (d2), s/veh	0.1	7.2	0.2	0.1	1.8	0.0	102.1	0.3	0.3	4.8	15.0	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.6	17.6	0.7	0.5	13.0	0.6	7.0	2.8	2.9	2.3	8.4	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	14.7	27.0	8.2	18.5	22.4	10.7	149.1	43.7	43.8	49.5	64.0	35.2
LnGrp LOS	B	C	A	B	C	B	F	D	D	D	E	D
Approach Vol, veh/h		934			764			419			438	
Approach Delay, s/veh		24.7			21.2			93.1			57.2	
Approach LOS		C			C			F			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	75.3	11.3	25.4	12.9	70.4	9.6	27.1				
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5				
Max Green Setting (Gmax), s	5.5	61.2	7.3	27.0	10.5	56.2	5.6	28.7				
Max Q Clear Time (g_c+I1), s	3.6	46.6	9.3	19.4	3.9	36.4	7.6	9.7				
Green Ext Time (p_c), s	0.0	7.4	0.0	0.5	0.0	6.9	0.0	0.6				
Intersection Summary												
HCM 6th Ctrl Delay			40.4									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary
 8: SW Tualatin-Sherwood Road & SW 112th Avenue

01/04/2022



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↗		↖	↗		↖	↗	↖	↗	↖	↗
Traffic Volume (veh/h)	35	58	20	172	67	12	28	787	172	7	704	130
Future Volume (veh/h)	35	58	20	172	67	12	28	787	172	7	704	130
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1589	1589	1589	1870	1870	1870	1663	1663	1663	1722	1722	1722
Adj Flow Rate, veh/h	39	64	12	191	74	9	31	874	155	8	782	93
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	21	21	21	2	2	2	16	16	16	12	12	12
Cap, veh/h	47	83	16	196	233	28	316	1144	1125	240	1158	1027
Arrive On Green	0.03	0.06	0.06	0.11	0.14	0.14	0.03	0.69	0.69	0.01	0.67	0.67
Sat Flow, veh/h	1513	1301	244	1781	1636	199	1584	1663	1409	1640	1722	1459
Grp Volume(v), veh/h	39	0	76	191	0	83	31	874	155	8	782	93
Grp Sat Flow(s),veh/h/ln	1513	0	1545	1781	0	1835	1584	1663	1409	1640	1722	1459
Q Serve(g_s), s	3.6	0.0	6.8	15.0	0.0	5.7	0.8	48.4	3.5	0.2	38.1	2.8
Cycle Q Clear(g_c), s	3.6	0.0	6.8	15.0	0.0	5.7	0.8	48.4	3.5	0.2	38.1	2.8
Prop In Lane	1.00		0.16	1.00		0.11	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	47	0	99	196	0	262	316	1144	1125	240	1158	1027
V/C Ratio(X)	0.83	0.00	0.77	0.97	0.00	0.32	0.10	0.76	0.14	0.03	0.68	0.09
Avail Cap(c_a), veh/h	110	0	298	196	0	422	339	1144	1125	289	1158	1027
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.49	0.49	0.49	1.00	1.00	1.00
Uniform Delay (d), s/veh	67.4	0.0	64.5	62.1	0.0	53.9	12.0	14.4	3.2	14.9	13.7	6.6
Incr Delay (d2), s/veh	12.5	0.0	4.7	56.6	0.0	0.3	0.0	2.4	0.1	0.0	3.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.6	0.0	2.8	9.8	0.0	2.6	0.3	16.6	0.9	0.1	14.2	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	79.9	0.0	69.2	118.7	0.0	54.1	12.0	16.8	3.3	14.9	16.9	6.7
LnGrp LOS	E	A	E	F	A	D	B	B	A	B	B	A
Approach Vol, veh/h		115			274			1060			883	
Approach Delay, s/veh		72.9			99.1			14.7			15.8	
Approach LOS		E			F			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.3	101.8	19.4	13.4	7.5	99.7	8.4	24.5				
Change Period (Y+Rc), s	4.0	5.5	4.0	4.5	4.0	5.5	4.0	4.5				
Max Green Setting (Gmax), s	5.5	74.1	15.4	27.0	5.5	74.1	10.2	32.2				
Max Q Clear Time (g_c+1), s	12.2	50.4	17.0	8.8	2.8	40.1	5.6	7.7				
Green Ext Time (p_c), s	0.0	10.2	0.0	0.2	0.0	9.6	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	27.9
HCM 6th LOS	C

HCM 6th TWSC
1: SW 124th Avenue & SW Myslony Street

01/04/2022

Intersection												
Int Delay, s/veh	3.1											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	12	1	6	56	0	180	0	420	14	36	521	1
Future Vol, veh/h	12	1	6	56	0	180	0	420	14	36	521	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	2	2	4	4	4	3	3	3
Mvmt Flow	13	1	7	61	0	196	0	457	15	39	566	1

Major/Minor	Minor2		Minor1		Major1			Major2				
Conflicting Flow All	874	1118	284	828	1111	237	567	0	0	473	0	0
Stage 1	645	645	-	466	466	-	-	-	-	-	-	-
Stage 2	229	473	-	362	645	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.54	6.54	6.94	4.18	-	-	4.16	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.52	4.02	3.32	2.24	-	-	2.23	-	-
Pot Cap-1 Maneuver	247	209	719	263	208	764	987	-	-	1078	-	-
Stage 1	432	471	-	546	561	-	-	-	-	-	-	-
Stage 2	759	562	-	629	466	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	179	201	719	252	200	763	987	-	-	1077	-	-
Mov Cap-2 Maneuver	353	369	-	440	374	-	-	-	-	-	-	-
Stage 1	432	454	-	545	560	-	-	-	-	-	-	-
Stage 2	564	561	-	599	449	-	-	-	-	-	-	-



















Approach	EB	WB	NB	SB
HCM Control Delay, s	14	14.1	0	0.5
HCM LOS	B	B		

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	987	-	-	422	650	1077	-	-
HCM Lane V/C Ratio	-	-	-	0.049	0.395	0.036	-	-
HCM Control Delay (s)	0	-	-	14	14.1	8.5	-	-
HCM Lane LOS	A	-	-	B	B	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	1.9	0.1	-	-

HCM 6th Signalized Intersection Summary

1: SW 124th Avenue & SW Myslony Street

01/04/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	12	1	6	56	0	180	0	420	14	36	521	1
Future Volume (veh/h)	12	1	6	56	0	180	0	420	14	36	521	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1841	1841	1841	1856	1856	1856
Adj Flow Rate, veh/h	13	1	3	61	0	68	0	457	12	39	566	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	2	2	2	4	4	4	3	3	3
Cap, veh/h	388	44	38	305	0	102	531	982	26	532	1843	3
Arrive On Green	0.13	0.13	0.13	0.13	0.00	0.13	0.00	0.28	0.28	0.05	0.51	0.51
Sat Flow, veh/h	1038	344	296	718	0	801	1753	3481	91	1767	3611	6
Grp Volume(v), veh/h	17	0	0	129	0	0	0	229	240	39	276	291
Grp Sat Flow(s),veh/h/ln	1679	0	0	1519	0	0	1753	1749	1824	1767	1763	1854
Q Serve(g_s), s	0.0	0.0	0.0	1.8	0.0	0.0	0.0	2.7	2.7	0.3	2.3	2.3
Cycle Q Clear(g_c), s	0.2	0.0	0.0	2.0	0.0	0.0	0.0	2.7	2.7	0.3	2.3	2.3
Prop In Lane	0.76		0.18	0.47		0.53	1.00		0.05	1.00		0.00
Lane Grp Cap(c), veh/h	470	0	0	407	0	0	531	493	514	532	900	946
V/C Ratio(X)	0.04	0.00	0.00	0.32	0.00	0.00	0.00	0.46	0.47	0.07	0.31	0.31
Avail Cap(c_a), veh/h	1401	0	0	1391	0	0	876	1512	1577	839	1559	1640
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.5	0.0	0.0	10.3	0.0	0.0	0.0	7.4	7.4	4.9	3.5	3.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.4	0.0	0.0	0.0	0.7	0.7	0.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	0.5	0.0	0.0	0.0	0.5	0.5	0.0	0.0	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.6	0.0	0.0	10.8	0.0	0.0	0.0	8.1	8.0	5.0	3.7	3.7
LnGrp LOS	A	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		17			129			469			606	
Approach Delay, s/veh		9.6			10.8			8.1			3.8	
Approach LOS		A			B			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	5.7	11.5		7.7	0.0	17.2		7.7				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	21.5		19.5	5.0	22.0		19.5				
Max Q Clear Time (g_c+I1), s	2.3	4.7		2.2	0.0	4.3		4.0				
Green Ext Time (p_c), s	0.0	2.2		0.0	0.0	2.8		0.6				
Intersection Summary												
HCM 6th Ctrl Delay				6.2								
HCM 6th LOS				A								

HCM 6th AWSC
3: SW 112th Avenue & SW Myslony Street

01/04/2022

Intersection	
Intersection Delay, s/veh	9.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	19	77	48	45	134	22
Future Vol, veh/h	19	77	48	45	134	22
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	13	13	32	32	9	9
Mvmt Flow	24	99	62	58	172	28
Number of Lanes	1	0	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	8.2	9.4	10.1
HCM LOS	A	A	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	0%	0%	52%
Vol Thru, %	0%	0%	20%	48%
Vol Right, %	0%	100%	80%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	134	22	96	93
LT Vol	134	0	0	48
Through Vol	0	0	19	45
RT Vol	0	22	77	0
Lane Flow Rate	172	28	123	119
Geometry Grp	7	7	2	2
Degree of Util (X)	0.274	0.035	0.149	0.174
Departure Headway (Hd)	5.737	4.531	4.364	5.252
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	627	789	822	683
Service Time	3.472	2.266	2.39	3.279
HCM Lane V/C Ratio	0.274	0.035	0.15	0.174
HCM Control Delay	10.6	7.4	8.2	9.4
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	1.1	0.1	0.5	0.6

HCM 6th Signalized Intersection Summary
 7: SW 124th Avenue & SW Tualatin-Sherwood Road

01/04/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	74	738	182	53	793	95	125	200	49	107	290	174
Future Volume (veh/h)	74	738	182	53	793	95	125	200	49	107	290	174
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1826	1826	1826	1856	1856	1856
Adj Flow Rate, veh/h	80	794	122	57	853	59	134	215	35	115	312	115
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	3	3	3	5	5	5	3	3	3
Cap, veh/h	274	1053	964	272	983	906	163	561	90	281	348	416
Arrive On Green	0.08	0.57	0.57	0.04	0.53	0.53	0.05	0.19	0.19	0.05	0.19	0.19
Sat Flow, veh/h	1753	1841	1557	1767	1856	1571	1739	2993	480	1767	1856	1568
Grp Volume(v), veh/h	80	794	122	57	853	59	134	123	127	115	312	115
Grp Sat Flow(s),veh/h/ln	1753	1841	1557	1767	1856	1571	1739	1735	1738	1767	1856	1568
Q Serve(g_s), s	2.2	39.0	3.9	1.7	48.0	2.0	5.6	7.5	7.7	5.6	19.7	7.0
Cycle Q Clear(g_c), s	2.2	39.0	3.9	1.7	48.0	2.0	5.6	7.5	7.7	5.6	19.7	7.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.28	1.00		1.00
Lane Grp Cap(c), veh/h	274	1053	964	272	983	906	163	325	326	281	348	416
V/C Ratio(X)	0.29	0.75	0.13	0.21	0.87	0.07	0.82	0.38	0.39	0.41	0.90	0.28
Avail Cap(c_a), veh/h	292	1053	964	291	983	906	163	392	393	281	419	476
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.63	0.63	0.63	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	20.9	19.3	9.5	17.0	24.5	11.2	44.5	42.6	42.7	38.8	47.6	35.0
Incr Delay (d2), s/veh	0.2	5.0	0.3	0.1	5.7	0.0	26.0	0.3	0.3	1.0	17.4	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.0	16.4	1.3	0.6	20.7	0.7	2.5	3.1	3.2	2.8	10.5	2.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	21.1	24.3	9.7	17.1	30.3	11.2	70.5	42.9	43.0	39.7	65.0	35.1
LnGrp LOS	C	C	A	B	C	B	E	D	D	D	E	D
Approach Vol, veh/h		996			969			384			542	
Approach Delay, s/veh		22.3			28.3			52.6			53.3	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.3	74.2	9.6	28.0	13.3	69.1	9.6	28.0				
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5				
Max Green Setting (Gmax), s	5.5	62.8	5.6	27.1	10.5	57.8	5.6	27.1				
Max Q Clear Time (g_c+I1), s	3.7	41.0	7.6	21.7	4.2	50.0	7.6	9.7				
Green Ext Time (p_c), s	0.0	9.6	0.0	0.6	0.0	4.9	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			34.1									
HCM 6th LOS			C									

HCM 6th Signalized Intersection Summary
 8: SW Tualatin-Sherwood Road & SW 112th Avenue

01/04/2022



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations	↖	↗		↖	↗		↖	↗	↖	↗	↖	↗
Traffic Volume (veh/h)	96	87	44	191	90	6	32	702	300	4	716	31
Future Volume (veh/h)	96	87	44	191	90	6	32	702	300	4	716	31
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		0.99	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1841	1841	1841	1826	1826	1826	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	100	91	30	199	94	4	33	731	237	4	746	13
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	5	5	5	2	2	2	4	4	4
Cap, veh/h	124	120	40	225	259	11	343	1169	1194	289	1109	1049
Arrive On Green	0.07	0.09	0.09	0.13	0.15	0.15	0.03	0.62	0.62	0.01	0.60	0.60
Sat Flow, veh/h	1753	1323	436	1739	1736	74	1781	1870	1584	1753	1841	1559
Grp Volume(v), veh/h	100	0	121	199	0	98	33	731	237	4	746	13
Grp Sat Flow(s),veh/h/ln	1753	0	1759	1739	0	1810	1781	1870	1584	1753	1841	1559
Q Serve(g_s), s	6.7	0.0	8.1	13.5	0.0	5.8	0.8	28.9	5.2	0.1	32.5	0.3
Cycle Q Clear(g_c), s	6.7	0.0	8.1	13.5	0.0	5.8	0.8	28.9	5.2	0.1	32.5	0.3
Prop In Lane	1.00		0.25	1.00		0.04	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	124	0	160	225	0	270	343	1169	1194	289	1109	1049
V/C Ratio(X)	0.81	0.00	0.76	0.89	0.00	0.36	0.10	0.63	0.20	0.01	0.67	0.01
Avail Cap(c_a), veh/h	199	0	396	232	0	444	376	1169	1194	360	1109	1049
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.62	0.62	0.62	1.00	1.00	1.00
Uniform Delay (d), s/veh	55.0	0.0	53.3	51.4	0.0	45.9	12.9	13.9	4.3	12.1	16.0	6.5
Incr Delay (d2), s/veh	5.0	0.0	2.7	29.3	0.0	0.3	0.0	1.6	0.2	0.0	3.3	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	3.2	0.0	3.7	7.7	0.0	2.6	0.3	11.3	1.5	0.0	13.2	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	60.0	0.0	56.0	80.7	0.0	46.2	13.0	15.4	4.5	12.1	19.2	6.5
LnGrp LOS	E	A	E	F	A	D	B	B	A	B	B	A
Approach Vol, veh/h		221		297		1001		763				
Approach Delay, s/veh		57.8		69.3		12.8		19.0				
Approach LOS		E		E		B		B				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.6	80.5	19.5	15.4	7.3	77.8	12.5	22.4				
Change Period (Y+Rc), s	4.0	5.5	4.0	4.5	4.0	5.5	4.0	4.5				
Max Green Setting (Gmax), s	5.5	53.5	16.0	27.0	5.5	53.5	13.6	29.4				
Max Q Clear Time (g_c+1), s	12.1	30.9	15.5	10.1	2.8	34.5	8.7	7.8				
Green Ext Time (p_c), s	0.0	8.3	0.0	0.3	0.0	6.6	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay				26.6								
HCM 6th LOS				C								

HCM 6th TWSC
1: SW 124th Avenue & SW Myslony Street

01/04/2022

Intersection												
Int Delay, s/veh	2.7											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	1	0	3	42	1	47	6	349	106	171	553	4
Future Vol, veh/h	1	0	3	42	1	47	6	349	106	171	553	4
Conflicting Peds, #/hr	0	0	1	1	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	93	93	93	93	93	93	93	93	93	93	93	93
Heavy Vehicles, %	67	67	67	43	43	43	17	17	17	9	9	9
Mvmt Flow	1	0	3	45	1	51	6	375	114	184	595	4

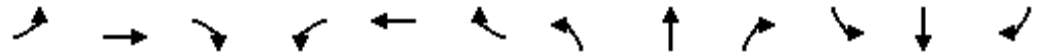
Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	1165	1467	301	1112	1412	246	599	0	0	490	0	0
Stage 1	965	965	-	445	445	-	-	-	-	-	-	-
Stage 2	200	502	-	667	967	-	-	-	-	-	-	-
Critical Hdwy	8.84	7.84	8.24	8.36	7.36	7.76	4.44	-	-	4.28	-	-
Critical Hdwy Stg 1	7.84	6.84	-	7.36	6.36	-	-	-	-	-	-	-
Critical Hdwy Stg 2	7.84	6.84	-	7.36	6.36	-	-	-	-	-	-	-
Follow-up Hdwy	4.17	4.67	3.97	3.93	4.43	3.73	2.37	-	-	2.29	-	-
Pot Cap-1 Maneuver	90	71	535	120	96	643	878	-	-	1022	-	-
Stage 1	175	216	-	466	481	-	-	-	-	-	-	-
Stage 2	626	404	-	330	252	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	71	58	534	102	78	642	878	-	-	1021	-	-
Mov Cap-2 Maneuver	158	141	-	231	183	-	-	-	-	-	-	-
Stage 1	174	177	-	462	477	-	-	-	-	-	-	-
Stage 2	571	401	-	269	207	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	15.9		19.4		0.1		2.2	
HCM LOS	C		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	878	-	-	335	346	1021	-	-
HCM Lane V/C Ratio	0.007	-	-	0.013	0.28	0.18	-	-
HCM Control Delay (s)	9.1	-	-	15.9	19.4	9.3	-	-
HCM Lane LOS	A	-	-	C	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0	1.1	0.7	-	-

HCM 6th Signalized Intersection Summary
 1: SW 124th Avenue & SW Myslony Street

01/04/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Volume (veh/h)	1	0	3	42	1	47	6	349	106	171	553	4
Future Volume (veh/h)	1	0	3	42	1	47	6	349	106	171	553	4
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	907	907	907	1263	1263	1263	1648	1648	1648	1767	1767	1767
Adj Flow Rate, veh/h	1	0	0	45	1	17	6	375	68	184	595	3
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	67	67	67	43	43	43	17	17	17	9	9	9
Cap, veh/h	335	0	0	286	1	20	483	728	131	645	1393	7
Arrive On Green	0.08	0.00	0.00	0.08	0.08	0.08	0.01	0.27	0.27	0.14	0.41	0.41
Sat Flow, veh/h	831	0	0	706	16	267	1570	2651	476	1682	3425	17
Grp Volume(v), veh/h	1	0	0	63	0	0	6	220	223	184	292	306
Grp Sat Flow(s),veh/h/ln	831	0	0	989	0	0	1570	1566	1561	1682	1678	1763
Q Serve(g_s), s	0.0	0.0	0.0	1.6	0.0	0.0	0.1	3.1	3.2	1.8	3.3	3.3
Cycle Q Clear(g_c), s	0.0	0.0	0.0	1.7	0.0	0.0	0.1	3.1	3.2	1.8	3.3	3.3
Prop In Lane	1.00		0.00	0.71		0.27	1.00		0.31	1.00		0.01
Lane Grp Cap(c), veh/h	335	0	0	308	0	0	483	430	429	645	682	717
V/C Ratio(X)	0.00	0.00	0.00	0.20	0.00	0.00	0.01	0.51	0.52	0.29	0.43	0.43
Avail Cap(c_a), veh/h	742	0	0	903	0	0	767	1123	1120	1013	1489	1565
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(l)	1.00	0.00	0.00	1.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	11.3	0.0	0.0	12.1	0.0	0.0	6.8	8.1	8.1	4.9	5.6	5.6
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.9	1.0	0.2	0.4	0.4
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.0	0.0	0.0	0.3	0.0	0.0	0.0	0.6	0.6	0.1	0.4	0.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	11.3	0.0	0.0	12.4	0.0	0.0	6.8	9.0	9.1	5.1	6.1	6.0
LnGrp LOS	B	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		1			63			449			782	
Approach Delay, s/veh		11.3			12.4			9.0			5.8	
Approach LOS		B			B			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	8.2	11.8		6.5	4.7	15.3		6.5				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	9.5	19.0		18.0	5.0	23.5		18.0				
Max Q Clear Time (g_c+I1), s	3.8	5.2		2.0	2.1	5.3		3.7				
Green Ext Time (p_c), s	0.2	2.0		0.0	0.0	3.1		0.2				

Intersection Summary

HCM 6th Ctrl Delay	7.3
HCM 6th LOS	A

HCM 6th TWSC
 2: SW Myslony Street & West Truck Access

01/04/2022

Intersection						
Int Delay, s/veh	0.3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	8	201	103	6	2	3
Future Vol, veh/h	8	201	103	6	2	3
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	14	14	54	54	20	20
Mvmt Flow	10	261	134	8	3	4

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	142	0	-	0	419 138
Stage 1	-	-	-	-	138 -
Stage 2	-	-	-	-	281 -
Critical Hdwy	4.24	-	-	-	6.6 6.4
Critical Hdwy Stg 1	-	-	-	-	5.6 -
Critical Hdwy Stg 2	-	-	-	-	5.6 -
Follow-up Hdwy	2.326	-	-	-	3.68 3.48
Pot Cap-1 Maneuver	1370	-	-	-	558 865
Stage 1	-	-	-	-	846 -
Stage 2	-	-	-	-	727 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1370	-	-	-	554 865
Mov Cap-2 Maneuver	-	-	-	-	660 -
Stage 1	-	-	-	-	840 -
Stage 2	-	-	-	-	727 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	9.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1370	-	-	-	769
HCM Lane V/C Ratio	0.008	-	-	-	0.008
HCM Control Delay (s)	7.6	-	-	-	9.7
HCM Lane LOS	A	-	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th AWSC
3: SW 112th Avenue & SW Myslony Street

01/04/2022

Intersection	
Intersection Delay, s/veh	9.8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↻			↻	↻	↻
Traffic Vol, veh/h	100	103	31	38	71	120
Future Vol, veh/h	100	103	31	38	71	120
Peak Hour Factor	0.77	0.77	0.77	0.77	0.77	0.77
Heavy Vehicles, %	14	14	54	54	24	24
Mvmt Flow	130	134	40	49	92	156
Number of Lanes	1	0	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	10	9.9	9.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	0%	0%	45%
Vol Thru, %	0%	0%	49%	55%
Vol Right, %	0%	100%	51%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	71	120	203	69
LT Vol	71	0	0	31
Through Vol	0	0	100	38
RT Vol	0	120	103	0
Lane Flow Rate	92	156	264	90
Geometry Grp	7	7	2	2
Degree of Util (X)	0.161	0.219	0.338	0.146
Departure Headway (Hd)	6.276	5.067	4.611	5.87
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	570	704	778	609
Service Time	4.031	2.822	2.649	3.923
HCM Lane V/C Ratio	0.161	0.222	0.339	0.148
HCM Control Delay	10.2	9.3	10	9.9
HCM Lane LOS	B	A	A	A
HCM 95th-tile Q	0.6	0.8	1.5	0.5

HCM 6th TWSC
 4: SW Myslony Street & West General Access

01/04/2022

Intersection						
Int Delay, s/veh	2.1					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↕	↕		↕	
Traffic Vol, veh/h	60	160	52	0	0	17
Future Vol, veh/h	60	160	52	0	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	14	14	54	54	0	0
Mvmt Flow	78	208	68	0	0	22

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	68	0	-	0	432 68
Stage 1	-	-	-	-	68 -
Stage 2	-	-	-	-	364 -
Critical Hdwy	4.24	-	-	-	6.4 6.2
Critical Hdwy Stg 1	-	-	-	-	5.4 -
Critical Hdwy Stg 2	-	-	-	-	5.4 -
Follow-up Hdwy	2.326	-	-	-	3.5 3.3
Pot Cap-1 Maneuver	1460	-	-	-	584 1001
Stage 1	-	-	-	-	960 -
Stage 2	-	-	-	-	707 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1460	-	-	-	549 1001
Mov Cap-2 Maneuver	-	-	-	-	549 -
Stage 1	-	-	-	-	902 -
Stage 2	-	-	-	-	707 -

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	8.7
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1460	-	-	-	1001
HCM Lane V/C Ratio	0.053	-	-	-	0.022
HCM Control Delay (s)	7.6	0	-	-	8.7
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.2	-	-	-	0.1

HCM 6th TWSC
 5: SW Myslony Street & East Truck Access

01/04/2022

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	16	36	10	0	0	7
Future Vol, veh/h	16	36	10	0	0	7
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	8	8	0	0	43	43
Mvmt Flow	21	47	13	0	0	9

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	13	0	-	0	102 13
Stage 1	-	-	-	-	13 -
Stage 2	-	-	-	-	89 -
Critical Hdwy	4.18	-	-	-	6.83 6.63
Critical Hdwy Stg 1	-	-	-	-	5.83 -
Critical Hdwy Stg 2	-	-	-	-	5.83 -
Follow-up Hdwy	2.272	-	-	-	3.887 3.687
Pot Cap-1 Maneuver	1567	-	-	-	806 960
Stage 1	-	-	-	-	913 -
Stage 2	-	-	-	-	841 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1567	-	-	-	795 960
Mov Cap-2 Maneuver	-	-	-	-	795 -
Stage 1	-	-	-	-	900 -
Stage 2	-	-	-	-	841 -

Approach	EB	WB	SB
HCM Control Delay, s	2.3	0	8.8
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1567	-	-	-	960
HCM Lane V/C Ratio	0.013	-	-	-	0.009
HCM Control Delay (s)	7.3	0	-	-	8.8
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0

HCM 6th TWSC
6: SW Myslony Street & East General Access

01/04/2022

Intersection						
Int Delay, s/veh	7.4					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	36	0	0	0	0	10
Future Vol, veh/h	36	0	0	0	0	10
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	77	77	77	77	77	77
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	47	0	0	0	0	13

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1	0	-	0	95
Stage 1	-	-	-	-	1
Stage 2	-	-	-	-	94
Critical Hdwy	4.1	-	-	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	2.2	-	-	-	3.5
Pot Cap-1 Maneuver	1635	-	-	-	909
Stage 1	-	-	-	-	1028
Stage 2	-	-	-	-	935
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1635	-	-	-	883
Mov Cap-2 Maneuver	-	-	-	-	883
Stage 1	-	-	-	-	998
Stage 2	-	-	-	-	935

Approach	EB	WB	SB
HCM Control Delay, s	7.3	0	8.3
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1635	-	-	-	1090
HCM Lane V/C Ratio	0.029	-	-	-	0.012
HCM Control Delay (s)	7.3	0	-	-	8.3
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0

HCM 6th Signalized Intersection Summary
 7: SW 124th Avenue & SW Tualatin-Sherwood Road

01/04/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	77	785	108	48	639	98	190	214	56	158	255	62
Future Volume (veh/h)	77	785	108	48	639	98	190	214	56	158	255	62
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.99	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1693	1693	1693	1707	1707	1707	1648	1648	1648	1707	1707	1707
Adj Flow Rate, veh/h	79	809	71	49	659	59	196	221	38	163	263	24
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Percent Heavy Veh, %	14	14	14	13	13	13	17	17	17	13	13	13
Cap, veh/h	331	956	912	210	889	831	193	491	83	269	293	360
Arrive On Green	0.08	0.56	0.56	0.03	0.52	0.52	0.07	0.18	0.18	0.06	0.17	0.17
Sat Flow, veh/h	1612	1693	1433	1626	1707	1427	1570	2679	453	1626	1707	1447
Grp Volume(v), veh/h	79	809	71	49	659	59	196	128	131	163	263	24
Grp Sat Flow(s),veh/h/ln	1612	1693	1433	1626	1707	1427	1570	1566	1566	1626	1707	1447
Q Serve(g_s), s	2.4	47.8	2.3	1.7	36.1	2.2	8.6	8.7	9.0	7.2	18.1	1.5
Cycle Q Clear(g_c), s	2.4	47.8	2.3	1.7	36.1	2.2	8.6	8.7	9.0	7.2	18.1	1.5
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.29	1.00		1.00
Lane Grp Cap(c), veh/h	331	956	912	210	889	831	193	287	287	269	293	360
V/C Ratio(X)	0.24	0.85	0.08	0.23	0.74	0.07	1.02	0.44	0.46	0.61	0.90	0.07
Avail Cap(c_a), veh/h	347	956	912	230	889	831	193	371	371	269	384	437
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.57	0.57	0.57	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	16.2	21.8	8.3	20.5	22.4	11.0	45.3	43.6	43.7	42.0	48.7	34.4
Incr Delay (d2), s/veh	0.1	9.2	0.2	0.1	2.2	0.0	69.6	0.4	0.4	3.9	16.6	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.8	19.4	0.7	0.6	13.8	0.6	5.7	3.3	3.4	1.5	8.8	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	16.4	30.9	8.5	20.6	24.6	11.0	114.9	44.0	44.1	45.8	65.2	34.4
LnGrp LOS	B	C	A	C	C	B	F	D	D	D	E	C
Approach Vol, veh/h		959			767			455			450	
Approach Delay, s/veh		28.1			23.3			74.6			56.6	
Approach LOS		C			C			E			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.0	73.3	12.6	26.1	13.3	68.0	11.2	27.5				
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5				
Max Green Setting (Gmax), s	5.5	59.9	8.6	27.0	10.5	54.9	7.2	28.4				
Max Q Clear Time (g_c+I1), s	3.7	49.8	10.6	20.1	4.4	38.1	9.2	11.0				
Green Ext Time (p_c), s	0.0	5.7	0.0	0.5	0.0	6.4	0.0	0.7				

Intersection Summary												
HCM 6th Ctrl Delay			39.6									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary
 8: SW Tualatin-Sherwood Road & SW 112th Avenue

01/04/2022



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	46	60	23	172	74	12	41	787	172	7	704	168
Future Volume (veh/h)	46	60	23	172	74	12	41	787	172	7	704	168
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No		No		No		No		No		No
Adj Sat Flow, veh/h/ln	1589	1589	1589	1870	1870	1870	1663	1663	1663	1722	1722	1722
Adj Flow Rate, veh/h	51	67	16	191	82	9	46	874	155	8	782	120
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Percent Heavy Veh, %	21	21	21	2	2	2	16	16	16	12	12	12
Cap, veh/h	62	85	20	196	228	25	309	1136	1118	235	1142	1028
Arrive On Green	0.04	0.07	0.07	0.11	0.14	0.14	0.03	0.68	0.68	0.01	0.66	0.66
Sat Flow, veh/h	1513	1240	296	1781	1656	182	1584	1663	1409	1640	1722	1459
Grp Volume(v), veh/h	51	0	83	191	0	91	46	874	155	8	782	120
Grp Sat Flow(s),veh/h/ln	1513	0	1536	1781	0	1838	1584	1663	1409	1640	1722	1459
Q Serve(g_s), s	4.7	0.0	7.4	15.0	0.0	6.3	1.3	49.2	3.6	0.2	39.3	3.7
Cycle Q Clear(g_c), s	4.7	0.0	7.4	15.0	0.0	6.3	1.3	49.2	3.6	0.2	39.3	3.7
Prop In Lane	1.00		0.19	1.00		0.10	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	62	0	106	196	0	253	309	1136	1118	235	1142	1028
V/C Ratio(X)	0.82	0.00	0.79	0.97	0.00	0.36	0.15	0.77	0.14	0.03	0.68	0.12
Avail Cap(c_a), veh/h	122	0	296	196	0	408	324	1136	1118	283	1142	1028
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.45	0.45	0.45	1.00	1.00	1.00
Uniform Delay (d), s/veh	66.6	0.0	64.2	62.1	0.0	54.8	12.8	14.8	3.4	15.3	14.6	6.7
Incr Delay (d2), s/veh	9.3	0.0	4.8	56.6	0.0	0.3	0.0	2.3	0.1	0.0	3.3	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	2.0	0.0	3.1	9.8	0.0	2.9	0.4	16.9	0.9	0.1	14.7	1.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.9	0.0	68.9	118.7	0.0	55.1	12.8	17.1	3.5	15.4	17.9	6.9
LnGrp LOS	E	A	E	F	A	E	B	B	A	B	B	A
Approach Vol, veh/h		134		282		1075		910				
Approach Delay, s/veh		71.6		98.2		15.0		16.4				
Approach LOS		E		F		B		B				
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	5.3	101.1	19.4	14.1	8.2	98.3	9.8	23.8				
Change Period (Y+Rc), s	4.0	5.5	4.0	4.5	4.0	5.5	4.0	4.5				
Max Green Setting (Gmax), s	5.5	74.1	15.4	27.0	5.5	74.1	11.3	31.1				
Max Q Clear Time (g_c+1), s	12.2	51.2	17.0	9.4	3.3	41.3	6.7	8.3				
Green Ext Time (p_c), s	0.0	10.0	0.0	0.2	0.0	9.7	0.0	0.2				

Intersection Summary

HCM 6th Ctrl Delay	28.5
HCM 6th LOS	C

HCM 6th TWSC
1: SW 124th Avenue & SW Myslony Street

01/04/2022

Intersection												
Int Delay, s/veh	4.6											
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↕	↕		↕	↕	
Traffic Vol, veh/h	12	1	6	100	0	205	0	420	33	47	521	1
Future Vol, veh/h	12	1	6	100	0	205	0	420	33	47	521	1
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	1	1	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	-	-	-	-	-	-	100	-	-	100	-	-
Veh in Median Storage, #	-	2	-	-	2	-	-	0	-	-	0	-
Grade, %	-	0	-	-	0	-	-	0	-	-	0	-
Peak Hour Factor	92	92	92	92	92	92	92	92	92	92	92	92
Heavy Vehicles, %	0	0	0	2	2	2	4	4	4	3	3	3
Mvmt Flow	13	1	7	109	0	223	0	457	36	51	566	1

Major/Minor	Minor2		Minor1		Major1		Major2					
Conflicting Flow All	898	1163	284	862	1145	248	567	0	0	494	0	0
Stage 1	669	669	-	476	476	-	-	-	-	-	-	-
Stage 2	229	494	-	386	669	-	-	-	-	-	-	-
Critical Hdwy	7.5	6.5	6.9	7.54	6.54	6.94	4.18	-	-	4.16	-	-
Critical Hdwy Stg 1	6.5	5.5	-	6.54	5.54	-	-	-	-	-	-	-
Critical Hdwy Stg 2	6.5	5.5	-	6.54	5.54	-	-	-	-	-	-	-
Follow-up Hdwy	3.5	4	3.3	3.52	4.02	3.32	2.24	-	-	2.23	-	-
Pot Cap-1 Maneuver	237	196	719	249	198	752	987	-	-	1059	-	-
Stage 1	418	459	-	539	555	-	-	-	-	-	-	-
Stage 2	759	550	-	609	454	-	-	-	-	-	-	-
Platoon blocked, %								-	-	-	-	-
Mov Cap-1 Maneuver	160	186	719	237	188	751	987	-	-	1058	-	-
Mov Cap-2 Maneuver	333	352	-	426	361	-	-	-	-	-	-	-
Stage 1	418	437	-	538	554	-	-	-	-	-	-	-
Stage 2	534	549	-	573	432	-	-	-	-	-	-	-

Approach	EB		WB		NB		SB	
HCM Control Delay, s	14.4		18.1		0		0.7	
HCM LOS	B		C					

Minor Lane/Major Mvmt	NBL	NBT	NBR	EBLn1	WBLn1	SBL	SBT	SBR
Capacity (veh/h)	987	-	-	402	601	1058	-	-
HCM Lane V/C Ratio	-	-	-	0.051	0.552	0.048	-	-
HCM Control Delay (s)	0	-	-	14.4	18.1	8.6	-	-
HCM Lane LOS	A	-	-	B	C	A	-	-
HCM 95th %tile Q(veh)	0	-	-	0.2	3.4	0.2	-	-

HCM 6th Signalized Intersection Summary

1: SW 124th Avenue & SW Myslony Street

01/04/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↕↔		↗	↕↔	
Traffic Volume (veh/h)	12	1	6	100	0	205	0	420	33	47	521	1
Future Volume (veh/h)	12	1	6	100	0	205	0	420	33	47	521	1
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1900	1900	1900	1870	1870	1870	1841	1841	1841	1856	1856	1856
Adj Flow Rate, veh/h	13	1	3	109	0	105	0	457	26	51	566	1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0	2	2	2	4	4	4	3	3	3
Cap, veh/h	449	50	59	327	19	149	481	899	51	493	1746	3
Arrive On Green	0.20	0.20	0.20	0.20	0.00	0.20	0.00	0.27	0.27	0.06	0.48	0.48
Sat Flow, veh/h	1130	248	295	680	93	744	1753	3364	191	1767	3611	6
Grp Volume(v), veh/h	17	0	0	214	0	0	0	237	246	51	276	291
Grp Sat Flow(s),veh/h/ln	1674	0	0	1516	0	0	1753	1749	1806	1767	1763	1854
Q Serve(g_s), s	0.0	0.0	0.0	3.1	0.0	0.0	0.0	3.3	3.3	0.5	2.7	2.7
Cycle Q Clear(g_c), s	0.2	0.0	0.0	3.7	0.0	0.0	0.0	3.3	3.3	0.5	2.7	2.7
Prop In Lane	0.76		0.18	0.51		0.49	1.00		0.11	1.00		0.00
Lane Grp Cap(c), veh/h	558	0	0	494	0	0	481	467	483	493	853	897
V/C Ratio(X)	0.03	0.00	0.00	0.43	0.00	0.00	0.00	0.51	0.51	0.10	0.32	0.32
Avail Cap(c_a), veh/h	1276	0	0	1270	0	0	783	1260	1301	732	1301	1368
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	0.00	1.00	0.00	0.00	0.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	9.2	0.0	0.0	10.6	0.0	0.0	0.0	8.8	8.8	5.9	4.5	4.5
Incr Delay (d2), s/veh	0.0	0.0	0.0	0.6	0.0	0.0	0.0	0.9	0.8	0.1	0.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	0.1	0.0	0.0	1.0	0.0	0.0	0.0	0.7	0.7	0.1	0.2	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	9.2	0.0	0.0	11.1	0.0	0.0	0.0	9.7	9.7	6.0	4.7	4.7
LnGrp LOS	A	A	A	B	A	A	A	A	A	A	A	A
Approach Vol, veh/h		17			214			483			618	
Approach Delay, s/veh		9.2			11.1			9.7			4.8	
Approach LOS		A			B			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	6.2	12.1		10.2	0.0	18.3		10.2				
Change Period (Y+Rc), s	4.5	4.5		4.5	4.5	4.5		4.5				
Max Green Setting (Gmax), s	5.5	20.5		20.5	5.0	21.0		20.5				
Max Q Clear Time (g_c+I1), s	2.5	5.3		2.2	0.0	4.7		5.7				
Green Ext Time (p_c), s	0.0	2.2		0.0	0.0	2.7		1.1				
Intersection Summary												
HCM 6th Ctrl Delay				7.7								
HCM 6th LOS				A								

HCM 6th TWSC
 2: SW Myslony Street & West Truck Access

01/04/2022

Intersection						
Int Delay, s/veh	0.5					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	↘	↑	↗		↘	
Traffic Vol, veh/h	4	122	240	2	6	8
Future Vol, veh/h	4	122	240	2	6	8
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	100	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	2	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	13	13	32	32	14	14
Mvmt Flow	5	156	308	3	8	10

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	311	0	-	0	476 310
Stage 1	-	-	-	-	310 -
Stage 2	-	-	-	-	166 -
Critical Hdwy	4.23	-	-	-	6.54 6.34
Critical Hdwy Stg 1	-	-	-	-	5.54 -
Critical Hdwy Stg 2	-	-	-	-	5.54 -
Follow-up Hdwy	2.317	-	-	-	3.626 3.426
Pot Cap-1 Maneuver	1190	-	-	-	526 703
Stage 1	-	-	-	-	717 -
Stage 2	-	-	-	-	835 -
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1190	-	-	-	524 703
Mov Cap-2 Maneuver	-	-	-	-	644 -
Stage 1	-	-	-	-	714 -
Stage 2	-	-	-	-	835 -

Approach	EB	WB	SB
HCM Control Delay, s	0.3	0	10.5
HCM LOS			B

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1190	-	-	-	676
HCM Lane V/C Ratio	0.004	-	-	-	0.027
HCM Control Delay (s)	8	-	-	-	10.5
HCM Lane LOS	A	-	-	-	B
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th AWSC
3: SW 112th Avenue & SW Myslony Street

01/04/2022

Intersection	
Intersection Delay, s/veh	10.8
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Vol, veh/h	45	83	98	106	136	44
Future Vol, veh/h	45	83	98	106	136	44
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Heavy Vehicles, %	13	13	32	32	9	9
Mvmt Flow	58	106	126	136	174	56
Number of Lanes	1	0	0	1	1	1

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	1	1	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	1
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	1
HCM Control Delay	9.1	11.9	10.8
HCM LOS	A	B	B

Lane	NBLn1	NBLn2	EBLn1	WBLn1
Vol Left, %	100%	0%	0%	48%
Vol Thru, %	0%	0%	35%	52%
Vol Right, %	0%	100%	65%	0%
Sign Control	Stop	Stop	Stop	Stop
Traffic Vol by Lane	136	44	128	204
LT Vol	136	0	0	98
Through Vol	0	0	45	106
RT Vol	0	44	83	0
Lane Flow Rate	174	56	164	262
Geometry Grp	7	7	2	2
Degree of Util (X)	0.301	0.078	0.217	0.392
Departure Headway (Hd)	6.218	5.007	4.75	5.396
Convergence, Y/N	Yes	Yes	Yes	Yes
Cap	574	709	750	664
Service Time	3.996	2.785	2.812	3.453
HCM Lane V/C Ratio	0.303	0.079	0.219	0.395
HCM Control Delay	11.7	8.2	9.1	11.9
HCM Lane LOS	B	A	A	B
HCM 95th-tile Q	1.3	0.3	0.8	1.9

HCM 6th TWSC
 4: SW Myslony Street & West General Access

01/04/2022

Intersection						
Int Delay, s/veh	2.6					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	24	65	145	0	0	59
Future Vol, veh/h	24	65	145	0	0	59
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	13	13	32	32	0	0
Mvmt Flow	31	83	186	0	0	76

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	186	0	-	0	331
Stage 1	-	-	-	-	186
Stage 2	-	-	-	-	145
Critical Hdwy	4.23	-	-	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	2.317	-	-	-	3.5
Pot Cap-1 Maneuver	1325	-	-	-	668
Stage 1	-	-	-	-	851
Stage 2	-	-	-	-	887
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1325	-	-	-	651
Mov Cap-2 Maneuver	-	-	-	-	651
Stage 1	-	-	-	-	830
Stage 2	-	-	-	-	887

Approach	EB	WB	SB
HCM Control Delay, s	2.1	0	9.6
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1325	-	-	-	861
HCM Lane V/C Ratio	0.023	-	-	-	0.088
HCM Control Delay (s)	7.8	0	-	-	9.6
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0.1	-	-	-	0.3

HCM 6th TWSC
 5: SW Myslony Street & East Truck Access

01/04/2022

Intersection						
Int Delay, s/veh	3					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	10	14	35	0	0	17
Future Vol, veh/h	10	14	35	0	0	17
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	21	21	0	0	29	29
Mvmt Flow	13	18	45	0	0	22

Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	45	0	-	0	89
Stage 1	-	-	-	-	45
Stage 2	-	-	-	-	44
Critical Hdwy	4.31	-	-	-	6.69
Critical Hdwy Stg 1	-	-	-	-	5.69
Critical Hdwy Stg 2	-	-	-	-	5.69
Follow-up Hdwy	2.389	-	-	-	3.761
Pot Cap-1 Maneuver	1449	-	-	-	850
Stage 1	-	-	-	-	913
Stage 2	-	-	-	-	914
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1449	-	-	-	842
Mov Cap-2 Maneuver	-	-	-	-	842
Stage 1	-	-	-	-	905
Stage 2	-	-	-	-	914

Approach	EB	WB	SB
HCM Control Delay, s	3.1	0	8.9
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1449	-	-	-	953
HCM Lane V/C Ratio	0.009	-	-	-	0.023
HCM Control Delay (s)	7.5	0	-	-	8.9
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th TWSC
6: SW Myslony Street & East General Access

01/04/2022

Intersection						
Int Delay, s/veh	7.9					
Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↶	↷		↶	
Traffic Vol, veh/h	14	0	0	0	0	35
Future Vol, veh/h	14	0	0	0	0	35
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	0	0	-	0	-
Peak Hour Factor	78	78	78	78	78	78
Heavy Vehicles, %	0	0	0	0	0	0
Mvmt Flow	18	0	0	0	0	45

























Major/Minor	Major1	Major2	Minor2		
Conflicting Flow All	1	0	-	0	37
Stage 1	-	-	-	-	1
Stage 2	-	-	-	-	36
Critical Hdwy	4.1	-	-	-	6.4
Critical Hdwy Stg 1	-	-	-	-	5.4
Critical Hdwy Stg 2	-	-	-	-	5.4
Follow-up Hdwy	2.2	-	-	-	3.5
Pot Cap-1 Maneuver	1635	-	-	-	981
Stage 1	-	-	-	-	1028
Stage 2	-	-	-	-	992
Platoon blocked, %		-	-	-	
Mov Cap-1 Maneuver	1635	-	-	-	970
Mov Cap-2 Maneuver	-	-	-	-	970
Stage 1	-	-	-	-	1017
Stage 2	-	-	-	-	992

Approach	EB	WB	SB
HCM Control Delay, s	7.2	0	8.4
HCM LOS			A

Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1635	-	-	-	1090
HCM Lane V/C Ratio	0.011	-	-	-	0.041
HCM Control Delay (s)	7.2	0	-	-	8.4
HCM Lane LOS	A	A	-	-	A
HCM 95th %tile Q(veh)	0	-	-	-	0.1

HCM 6th Signalized Intersection Summary
 7: SW 124th Avenue & SW Tualatin-Sherwood Road

01/04/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	79	744	182	53	805	95	125	214	49	107	321	187
Future Volume (veh/h)	79	744	182	53	805	95	125	214	49	107	321	187
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1856	1856	1856	1826	1826	1826	1856	1856	1856
Adj Flow Rate, veh/h	85	800	122	57	866	59	134	230	37	115	345	133
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Percent Heavy Veh, %	4	4	4	3	3	3	5	5	5	3	3	3
Cap, veh/h	247	1020	939	250	949	877	163	615	98	295	378	443
Arrive On Green	0.08	0.55	0.55	0.04	0.51	0.51	0.05	0.21	0.21	0.05	0.20	0.20
Sat Flow, veh/h	1753	1841	1557	1767	1856	1571	1739	2998	475	1767	1856	1569
Grp Volume(v), veh/h	85	800	122	57	866	59	134	132	135	115	345	133
Grp Sat Flow(s),veh/h/ln	1753	1841	1557	1767	1856	1571	1739	1735	1739	1767	1856	1569
Q Serve(g_s), s	2.4	41.1	4.1	1.8	51.3	2.1	5.8	7.8	8.1	5.6	21.8	8.0
Cycle Q Clear(g_c), s	2.4	41.1	4.1	1.8	51.3	2.1	5.8	7.8	8.1	5.6	21.8	8.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		0.27	1.00		1.00
Lane Grp Cap(c), veh/h	247	1020	939	250	949	877	163	356	357	295	378	443
V/C Ratio(X)	0.34	0.78	0.13	0.23	0.91	0.07	0.82	0.37	0.38	0.39	0.91	0.30
Avail Cap(c_a), veh/h	263	1020	939	268	949	877	163	395	396	295	419	478
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	0.59	0.59	0.59	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	23.6	21.1	10.3	18.7	26.9	12.2	42.7	41.0	41.1	37.1	46.8	33.8
Incr Delay (d2), s/veh	0.3	6.0	0.3	0.1	8.5	0.0	25.6	0.2	0.2	0.8	21.8	0.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.1	17.7	1.4	0.7	22.9	0.7	2.4	3.3	3.4	2.7	12.0	3.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	23.9	27.1	10.6	18.8	35.4	12.2	68.2	41.3	41.4	37.9	68.5	33.9
LnGrp LOS	C	C	B	B	D	B	E	D	D	D	E	C
Approach Vol, veh/h		1007			982			401			593	
Approach Delay, s/veh		24.8			33.1			50.3			54.8	
Approach LOS		C			C			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	8.3	72.0	9.8	29.9	13.4	66.9	9.6	30.1				
Change Period (Y+Rc), s	4.0	5.5	4.0	5.5	4.0	5.5	4.0	5.5				
Max Green Setting (Gmax), s	5.5	62.6	5.8	27.1	10.5	57.6	5.6	27.3				
Max Q Clear Time (g_c+I1), s	3.8	43.1	7.8	23.8	4.4	53.3	7.6	10.1				
Green Ext Time (p_c), s	0.0	9.1	0.0	0.5	0.0	2.9	0.0	0.7				
Intersection Summary												
HCM 6th Ctrl Delay			36.9									
HCM 6th LOS			D									

HCM 6th Signalized Intersection Summary
 8: SW Tualatin-Sherwood Road & SW 112th Avenue

01/04/2022



Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	134	93	56	191	92	6	38	702	300	4	716	47
Future Volume (veh/h)	134	93	56	191	92	6	38	702	300	4	716	47
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		0.97	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1841	1841	1841	1826	1826	1826	1870	1870	1870	1841	1841	1841
Adj Flow Rate, veh/h	140	97	40	199	96	5	40	731	237	4	746	30
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Percent Heavy Veh, %	4	4	4	5	5	5	2	2	2	4	4	4
Cap, veh/h	166	124	51	225	232	12	330	1151	1179	280	1086	1067
Arrive On Green	0.09	0.10	0.10	0.13	0.13	0.13	0.03	0.62	0.62	0.01	0.59	0.59
Sat Flow, veh/h	1753	1236	510	1739	1717	89	1781	1870	1584	1753	1841	1559
Grp Volume(v), veh/h	140	0	137	199	0	101	40	731	237	4	746	30
Grp Sat Flow(s),veh/h/ln	1753	0	1746	1739	0	1807	1781	1870	1584	1753	1841	1559
Q Serve(g_s), s	9.4	0.0	9.2	13.5	0.0	6.1	1.0	29.6	5.4	0.1	33.5	0.7
Cycle Q Clear(g_c), s	9.4	0.0	9.2	13.5	0.0	6.1	1.0	29.6	5.4	0.1	33.5	0.7
Prop In Lane	1.00		0.29	1.00		0.05	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	166	0	175	225	0	244	330	1151	1179	280	1086	1067
V/C Ratio(X)	0.84	0.00	0.78	0.89	0.00	0.41	0.12	0.64	0.20	0.01	0.69	0.03
Avail Cap(c_a), veh/h	196	0	393	232	0	446	357	1151	1179	351	1086	1067
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	0.59	0.59	0.59	1.00	1.00	1.00
Uniform Delay (d), s/veh	53.5	0.0	52.7	51.4	0.0	47.6	13.7	14.6	4.6	12.8	17.0	6.1
Incr Delay (d2), s/veh	21.5	0.0	2.9	29.3	0.0	0.4	0.0	1.6	0.2	0.0	3.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.2	0.0	4.2	7.7	0.0	2.8	0.4	11.6	1.6	0.0	13.8	0.2
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	75.0	0.0	55.6	80.7	0.0	48.0	13.8	16.2	4.8	12.8	20.5	6.1
LnGrp LOS	E	A	E	F	A	D	B	B	A	B	C	A
Approach Vol, veh/h		277			300			1008			780	
Approach Delay, s/veh		65.4			69.7			13.4			19.9	
Approach LOS		E			E			B			B	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	4.6	79.3	19.5	16.5	7.7	76.3	15.3	20.7				
Change Period (Y+Rc), s	4.0	5.5	4.0	4.5	4.0	5.5	4.0	4.5				
Max Green Setting (Gmax), s	5.5	53.5	16.0	27.0	5.5	53.5	13.4	29.6				
Max Q Clear Time (g_c+I), s	12.1	31.6	15.5	11.2	3.0	35.5	11.4	8.1				
Green Ext Time (p_c), s	0.0	8.2	0.0	0.3	0.0	6.6	0.0	0.2				
Intersection Summary												
HCM 6th Ctrl Delay				28.8								
HCM 6th LOS				C								

Memorandum

To: City of Tualatin Public Works
From: Daniel Stumpf, PE
Date: March 30, 2022
Subject: Hedges Creek Industrial Transportation Impact Study
DKS Review Comments – Comments Response



Introduction

This memorandum serves as a response to comments received from DKS & Associates, dated February 3, 2022, pertaining to the *Hedges Creek Industrial Transportation Impact Study* (TIS), dated January 6, 2022. An updated version of the TIS, dated March 30, 2022, was prepared which addresses these comments.

The following narrative describes the comments which are directly related with the analyses in the TIS and changes made to address these issues. Items related to the site plan (e.g. site access locations and spacing standards) will be addressed separate from the TIS; however, an updated version of the site plan was included in the appendix of the updated March 2022 TIS. Comments received are *italicized* and **bolded** with responses following.

TIS Comments

Comment #1

Other things that don't impact the outcome but should be included/fixd:

No HCM 6th v/c calculations were included in the Appendix as stated in the text

The original version of the TIS includes intersection capacity calculations generated by TrafficWare Synchro software for each of the study intersections; however, calculations utilizing ODOT's APM methodology for determining signalized intersection v/c ratios were missing. The updated version of the TIS includes both the Synchro calculations as well as the manual calculations based on ODOT's APM in Appendix F.

Comment #2

Peak hour factor of 0.77 was assumed in future site driveway HCM analysis. This assumption needs some explanation or backup in the text since it is so much lower than a normal PHF. If the peaking characteristics of the development are high, then consideration should be made to adjusting the PHF at existing intersection, at least at the approach level.

For the proposed site access intersections along SW Myslony Street, the peak hour factors applied to these intersections were assumed to match the morning and evening peak hour factors at the nearby intersection of SW Myslony Street at SW 112th Avenue. Note that the peak hour factors of the SW Myslony Street at SW 112th

Avenue intersection are expected to increase once the proposed development is constructed. Therefore, using these lower peak hour factors at the site access intersections as well as the as at the SW Myslony Street at SW 112th Avenue intersection as part of the buildout year analysis scenarios will provide a more conservative evaluation of intersection operation and capacity.

The aforementioned narrative was included in the *Operational Analysis* section of the updated TIS.

Comment #3

They mention Myslony/124th meets signal warrants but in the appendix it only meets a "combo warrant" under warrant 1 instead of the typical Case A or Case B. This is not common. It might be worthwhile to take a deeper dive in to the volume assumptions, but it looks like the signal is already approved.

***Side note: Is there is a signal going in at 124th/Myslony, then you could sign it to allow u-turns for the Island Greens development. You could always have them pay to push the curb back to allow more U-turn space.*

The signal warrants under the "combo warrant" were based on the following guidance and standards detailed in Section 4C.02 Warrant 1, Eight-Hour Vehicular Volume of the *Manual on Uniform Traffic Control Devices* (MUTCD).

Guidance:

06 The combination of Conditions A and B is intended for application at locations where Condition A is not satisfied and Condition B is not satisfied and should be applied only after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems.

Standard:

07 The need for a traffic control signal shall be considered if an engineering study finds that both of the following conditions exist for each of any 8 hours of an average day:

- A. The vehicles per hour given in both of the 80 percent columns of Condition A in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection; and*
- B. The vehicles per hour given in both of the 80 percent columns of Condition B in Table 4C-1 exist on the major-street and the higher-volume minor-street approaches, respectively, to the intersection.*

These major-street and minor-street volumes shall be for the same 8 hours for each condition; however, the 8 hours satisfied in Condition A shall not be required to be the same 8 hours satisfied in Condition B. On the minor street, the higher volume shall not be required to be on the same approach during each of the 8 hours.

As described in the TIS, the "combo warrant" is projected to be met under existing year 2021 traffic conditions. For the intersection of SW Myslony Street at SW 124th Avenue, these volumes were estimated by comparing year 2019 traffic volumes at the intersection (grown to reflect year 2021 conditions by applying a two percent per year compounded growth factor over a two-year period to the intersection volumes) and comparing these to recently collected year 2021 traffic counts. Based on the difference in peak hour volumes, COVID-19



adjustment factors were calculated and applied to the intersection's recently collected 2021 peak hour volumes. These adjusted 2021 volumes were used for analysis in the preparation of the TIS. The 8th highest hour volumes described in the MUTCD were developed under the common assumption that the evening peak hour volumes are approximately 10% of the daily volumes and the 8th highest hour represents approximately 5.65% of the daily volumes. Based on these adjusted existing volumes this "combo warrant" is met.

Based on correspondence with City of Tualatin staff as well as referencing the *Four-S Corp Distribution Center TIS*, dated August 28, 2018, as part of a 2018 Tualatin Bond Issue for the SW Myslony Street extension project, the intersection of SW Myslony Street at SW 124th Avenue was approved and currently planned for installation of a traffic signal. Therefore, no mitigation as part of the proposed development is necessary

If you have any questions regarding this comment's response memorandum/TIA addendum, feel free to contact me.



Memorandum

To: City of Tualatin Public Works
From: Daniel Stumpf, PE
Date: May 18, 2022
Subject: Hedges Creek Industrial Transportation Impact Study
DKS Review Comments – Comments Response #2



Introduction

This memorandum serves as a response to a second iteration of comments received from DKS & Associates, dated April 14, 2022, pertaining to the *Hedges Creek Industrial Transportation Impact Study* (TIS), dated March 30, 2022, and the associated site plan. The following narrative describes the comments received in *bolded italics* with responses following.

TIS Comments

Comment #1

Overall, all required topics are covered in the TIS and look technically sufficient. Comments 1 and 2 have been sufficiently addressed.

No further action is necessary.

Comment #2

Regarding comment 3 on the Myslony Street/124th Avenue signal: Following a discussion with City of Tualatin staff, it was noted that the project to construct a signal at this location is not on the funded capital projects list. However, the City agrees that a signal (or a turn prohibition) would be appropriate at this location (as identified in the TIS) due to higher speeds along the 124th corridor, high truck turning movements from Myslony Street, and additional traffic (including trucks) to/from the proposed development. This signal would be creditable through the Transportation Development Tax (TDT) program. The developer will need to construct the signal and would receive TDT credits prior to occupancy.

The applicant is willing to construct a traffic signal at the intersection of SW Myslony Street at SW 124th Avenue prior to the issuance of a certificate of occupancy with the understanding that installation of the traffic signal will be TDT creditable.

Comment #3

Remaining comments are regarding the updated site plan dated April 4, 2022.

- *Driveway 1 located at the western end of the property is in an acceptable location as shown, given it can't be located any further away from nearby driveways.*

No further action is necessary

- *Driveway 2 located just east of 112th Avenue does not meet access standards (measured 130 feet edge to edge from 112th Avenue, standard is 150 feet). In addition, it is approximately 70 feet from the driveway to the east on the south side. For safety reasons it is best to avoid offset intersections in such close proximity. Left turns from offset driveways create conflicts where the drivers don't yield to opposing vehicles in the adjacent driveway. The developer should move driveway 2 to align with the southern driveway to the east, thus eliminating the offset and meeting the 150-foot required distance from 112th Avenue.*

Driveway 2 will be located to align with the southern driveway, eliminating the offset and meeting the 150-foot required distance from SW 112th Avenue. This is shown on the most recent site plan (attached for reference purposes).

- *A center turn lane appears to be provided east of 112th Avenue along the tangent section, but the width tapers from approximately 42 feet to 30 feet through the s-curve. The necessary cross-section for this street is a three-lane section. The development needs to build the center turn lane through the s-curve to the east end of the property. This will provide additional space for truck turning movements for both the property to the south and the developer's eastern driveways, as well as additional space to facilitate safe turning movements of vehicle to and from the offset intersections along the s-curve.*

The site plan has been updated such that SW Myslony Street remains approximately 42 feet in width through the S-curve to the eastern property line. The applicant will widen SW Myslony Street accordingly and stripe a center turn/two-way left-turn lane along this segment of SW Myslony Street to a standard three-lane section width.

- *Along the proposed development an easement or frontage improvement should be made for the planned Ice Age Tonquin Trail as follows: The trail should be a multi-use path from the northwest corner of 112th Avenue to the east. It would then become a normal 12-foot-wide trail with 2-foot shy distances within a public easement adjacent to the east property line, for a total of 16 feet in width. The developer shall construct the trail along their east property line to complete this segment of the Ice Age Tonquin Trail and to provide maintenance access to the public sanitary sewer line.*

The updated site plan includes the multi-use path along SW Myslony Street as well as a 12-foot-wide trail within a 15-foot easement along the east property line. The applicant will construct the improvements.

If you have any questions regarding this comment's response memorandum/TIA addendum, feel free to contact me.



NET LOT AREA:	± 914,700 sf 21.00 acres
TOTAL BUILDING AREA:	442,575 sf
BUILDING A:	148,600 sf
BUILDING B:	142,550 sf
BUILDING C:	151,425 sf

SITE COVERAGE (on NET): 48.13 %

DOCK DOOR RATIO:	
BUILDING A:	1 / 8,255 sf
BUILDING B:	1 / 5,483 sf
BUILDING C:	1 / 5,608 sf

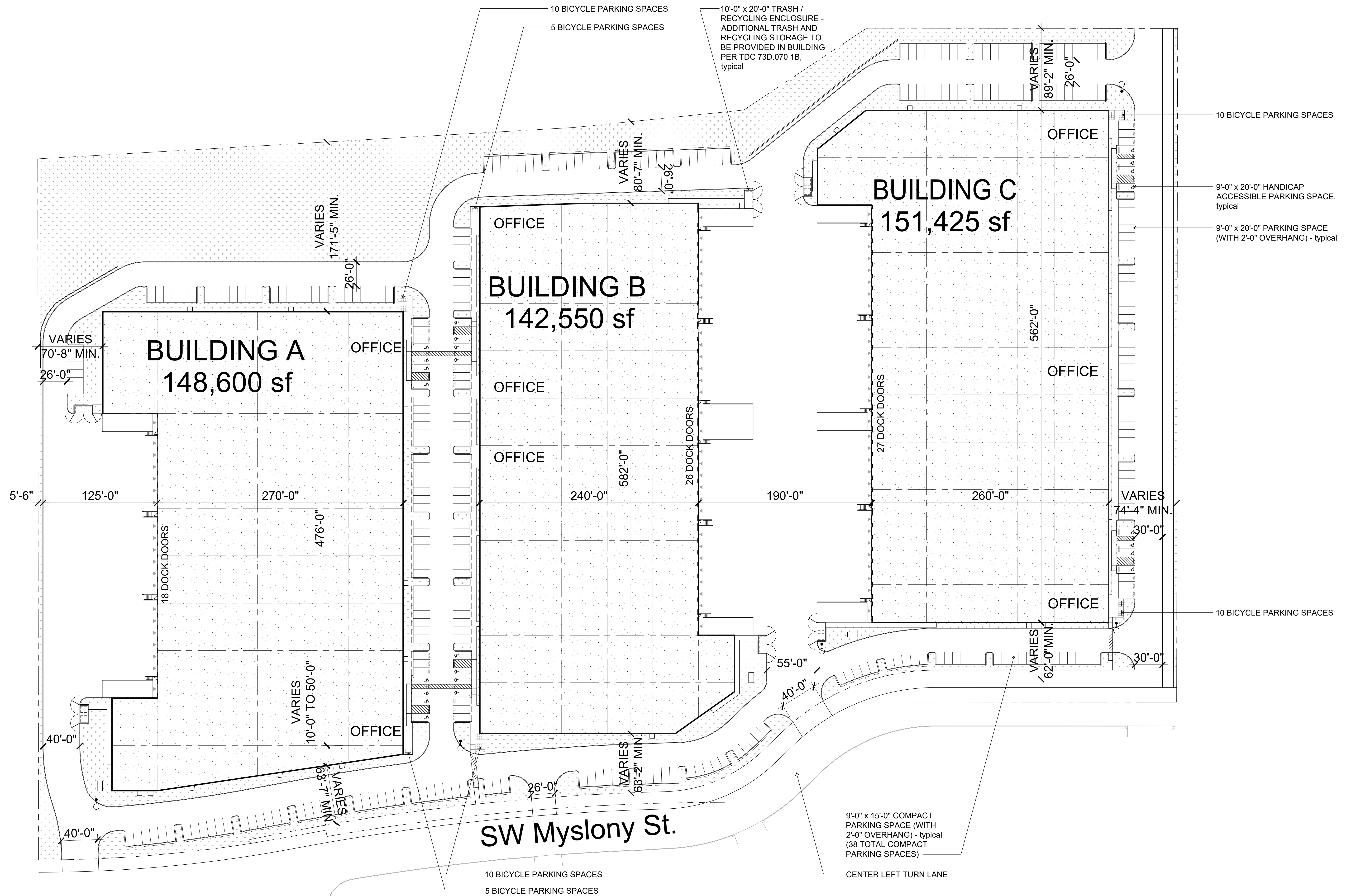
PARKING REQUIRED	308 spaces
BUILDING A:	104 spaces
WAREHOUSE (70%) at .3 per 1,000:	32 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	72 spaces
BUILDING B:	99 spaces
WAREHOUSE (70%) at .3 per 1,000:	30 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	69 spaces
BUILDING C:	105 spaces
WAREHOUSE (70%) at .3 per 1,000:	32 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	73 spaces

PARKING PROVIDED: 335 spaces

LANDSCAPE REQUIRED: 137,205 sf (15%)

LANDSCAPE PROVIDED: 143,321 sf (15.67%)

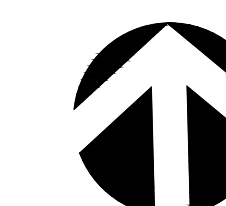
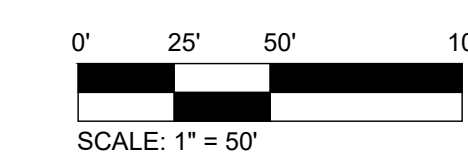
21 April 2022 p:\2019\19500 phelan development\19500.36-walgraeve property, or new road schemes\19500.36 site plan - ar package - 04212022.dwg



PRELIMINARY SITE PLAN

21 April 2022

Hedges Creek
11345 SW Herman Road
Tualatin, Oregon



MEMORANDUM

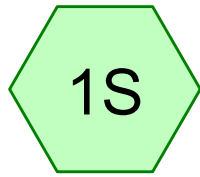
DATE: December 23, 2021
BY: Craig Harris, PE
SUBJECT: Stormwater Memo
PROJECT: Hedges Creek – 11345 SW Herman Road, Tualatin, OR
PROJECT NO.: A20120.10

This memorandum is to outline the utility requirements and existing conditions for the proposed Hedges Creek project in Tualatin, OR. The total site area is 904,068SF, and the existing site is an undeveloped field. This project proposes to develop the site with three buildings and the associated parking, sidewalks, and utilities. As a result of these improvements, the proposed site will have 777,000SF of new impervious area.

The project will meet Clean Water Services standards for stormwater management. Storm runoff from the proposed impervious area will be directed via sheet flow to catch basins, piped conveyance, underground detention, and underground treatment vaults. Proprietary treatment vaults will filter the CWS water quality event per CWS standards. Detained runoff will be released at a controlled rate to reduce the peak flow from the 2-year storm to half the existing peak, and to match the existing peak flow during the 5-, 10-, and 25-year storms (see attached HydroCAD Report).

The water leaving the site will flow to a 183' perforated pipe to disperse the flow into the wetlands north of the development, which is the existing destination of runoff from the site.

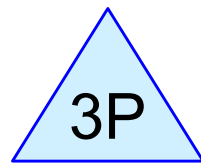




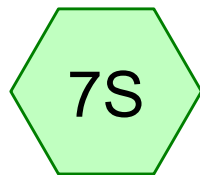
Predeveloped Basin A



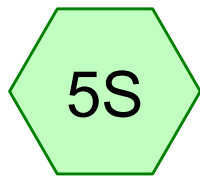
Developed Basin A



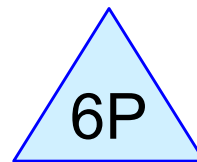
Detention A



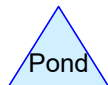
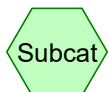
Predeveloped Basin B



Developed Basin B



Detention B



Summary for Subcatchment 1S: Predeveloped Basin A

Runoff = 1.56 cfs @ 8.31 hrs, Volume= 0.922 af, Depth= 0.74"

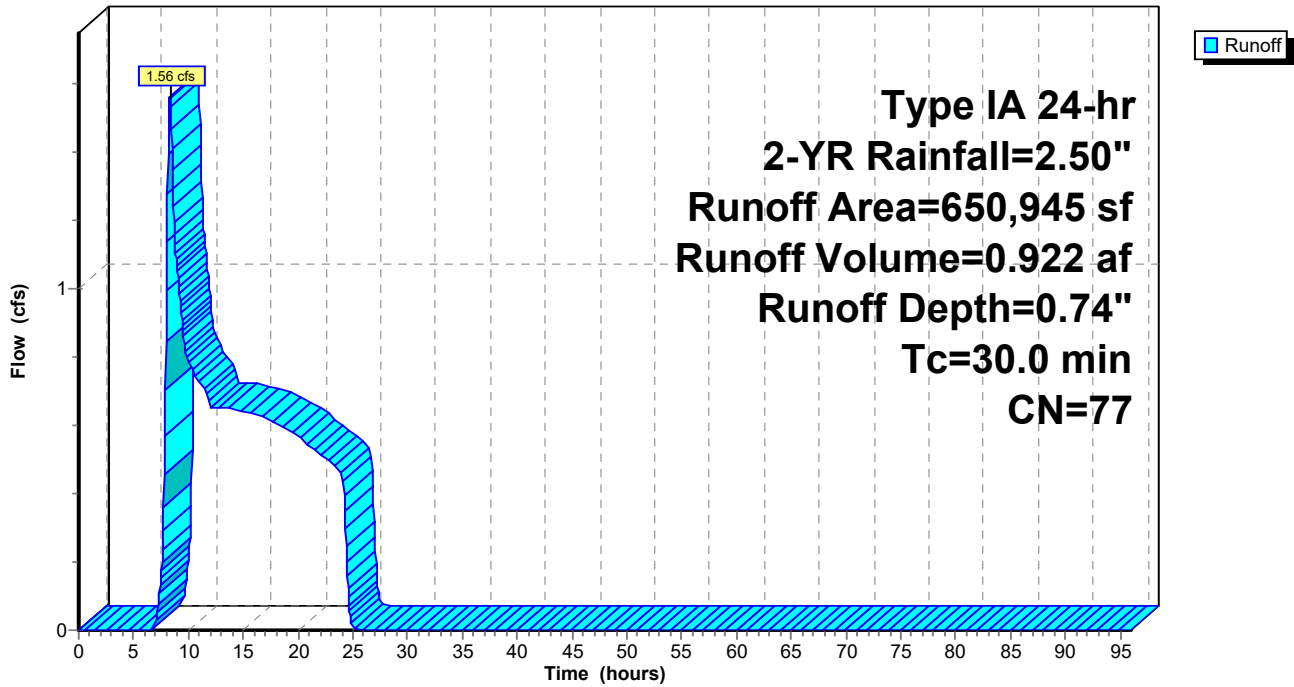
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
* 650,945	77	>75% Grass cover, Good, HSG D
650,945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 1S: Predeveloped Basin A

Hydrograph



Walgraves

Prepared by AAI Engineering

HydroCAD® 10.00-26 s/n 01638 © 2020 HydroCAD Software Solutions LLC

Type IA 24-hr 2-YR Rainfall=2.50"

Printed 12/21/2021

Page 3

Summary for Subcatchment 2S: Developed Basin A

Runoff = 8.75 cfs @ 7.86 hrs, Volume= 2.828 af, Depth= 2.27"

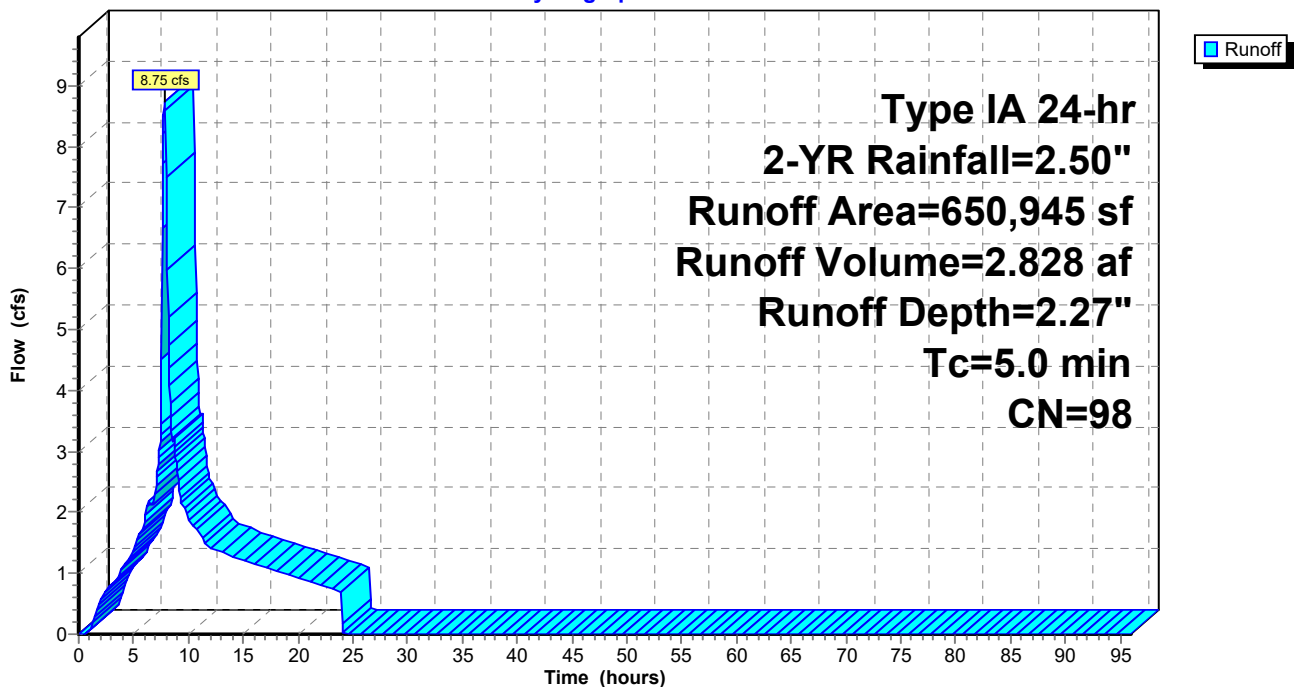
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
* 650,945	98	
650,945		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Developed Basin A

Hydrograph



Summary for Subcatchment 5S: Developed Basin B

Runoff = 1.69 cfs @ 7.86 hrs, Volume= 0.548 af, Depth= 2.27"

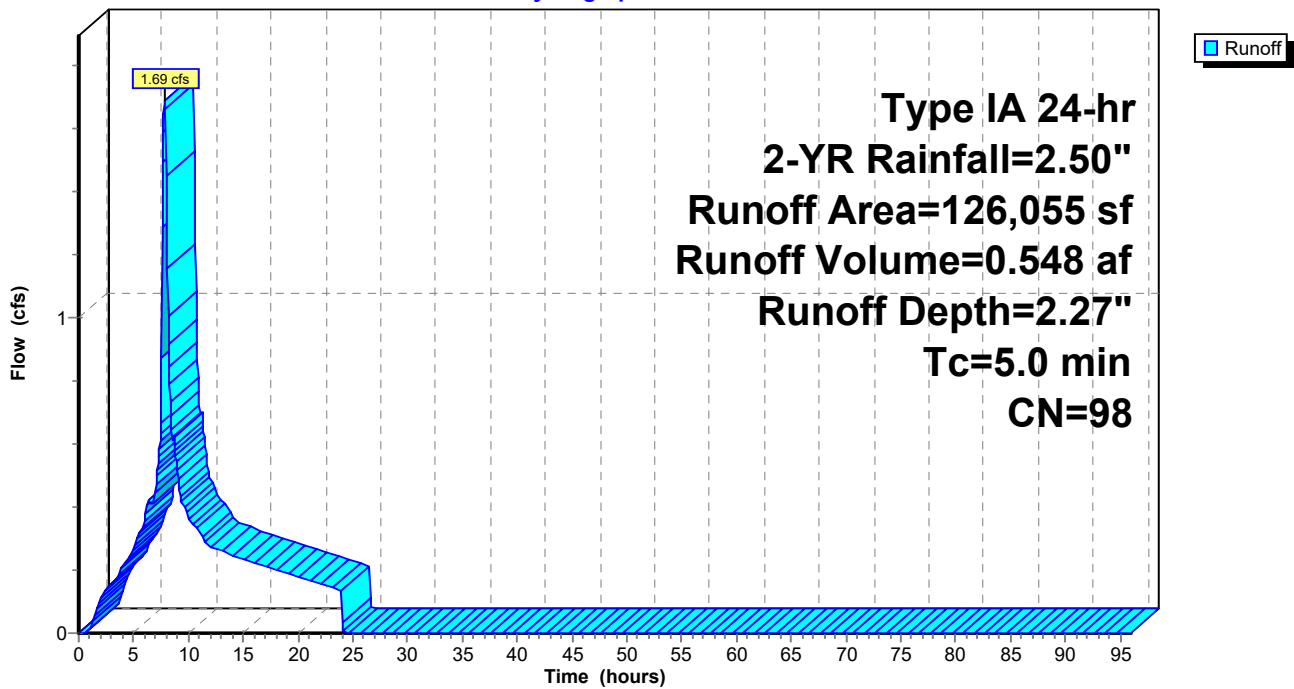
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 2-YR Rainfall=2.50"

	Area (sf)	CN	Description
*	69,225	98	Concrete
*	56,830	98	Roof
	126,055	98	Weighted Average
	126,055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: Developed Basin B

Hydrograph



Summary for Subcatchment 7S: Predeveloped Basin B

Runoff = 0.40 cfs @ 7.93 hrs, Volume= 0.179 af, Depth= 0.74"

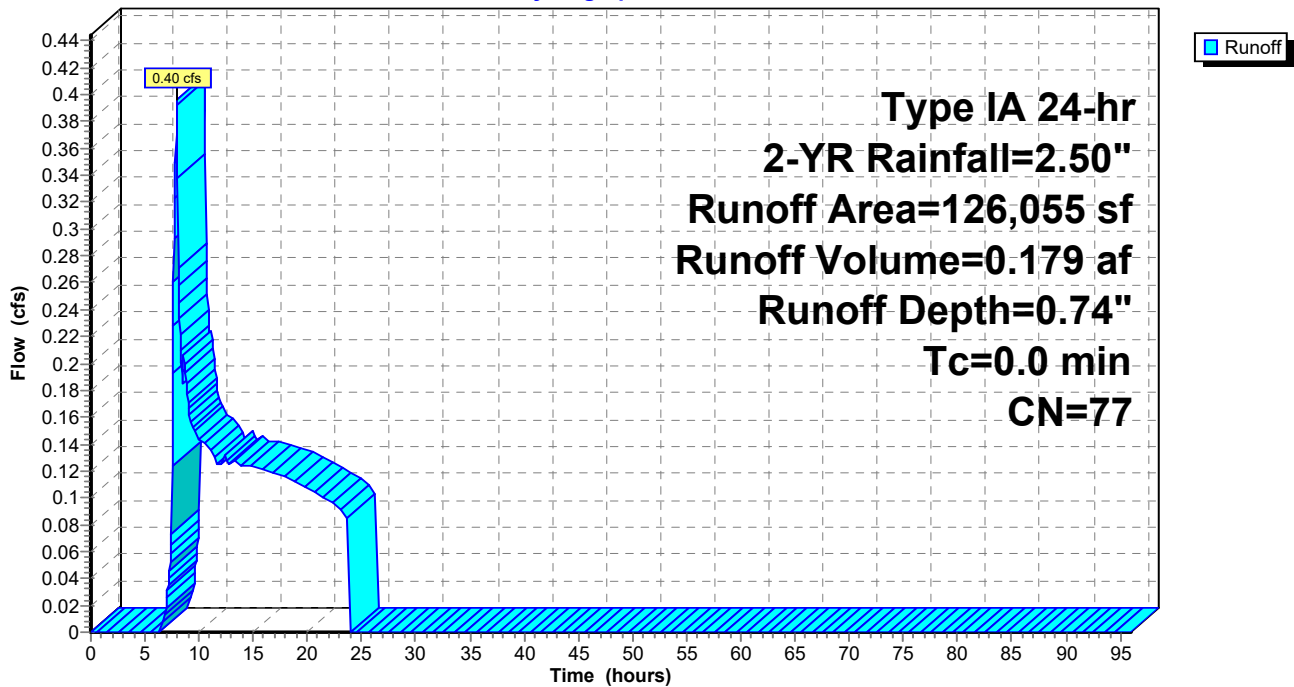
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
* 126,055	77	
126,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, 20

Subcatchment 7S: Predeveloped Basin B

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 14.944 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2-YR event
 Inflow = 8.75 cfs @ 7.86 hrs, Volume= 2.828 af
 Outflow = 0.78 cfs @ 22.70 hrs, Volume= 2.828 af, Atten= 91%, Lag= 890.2 min
 Primary = 0.78 cfs @ 22.70 hrs, Volume= 2.828 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 3.47' @ 22.70 hrs Surf.Area= 0.457 ac Storage= 1.670 af

Plug-Flow detention time= 1,113.9 min calculated for 2.828 af (100% of inflow)
 Center-of-Mass det. time= 1,113.5 min (1,785.4 - 671.9)

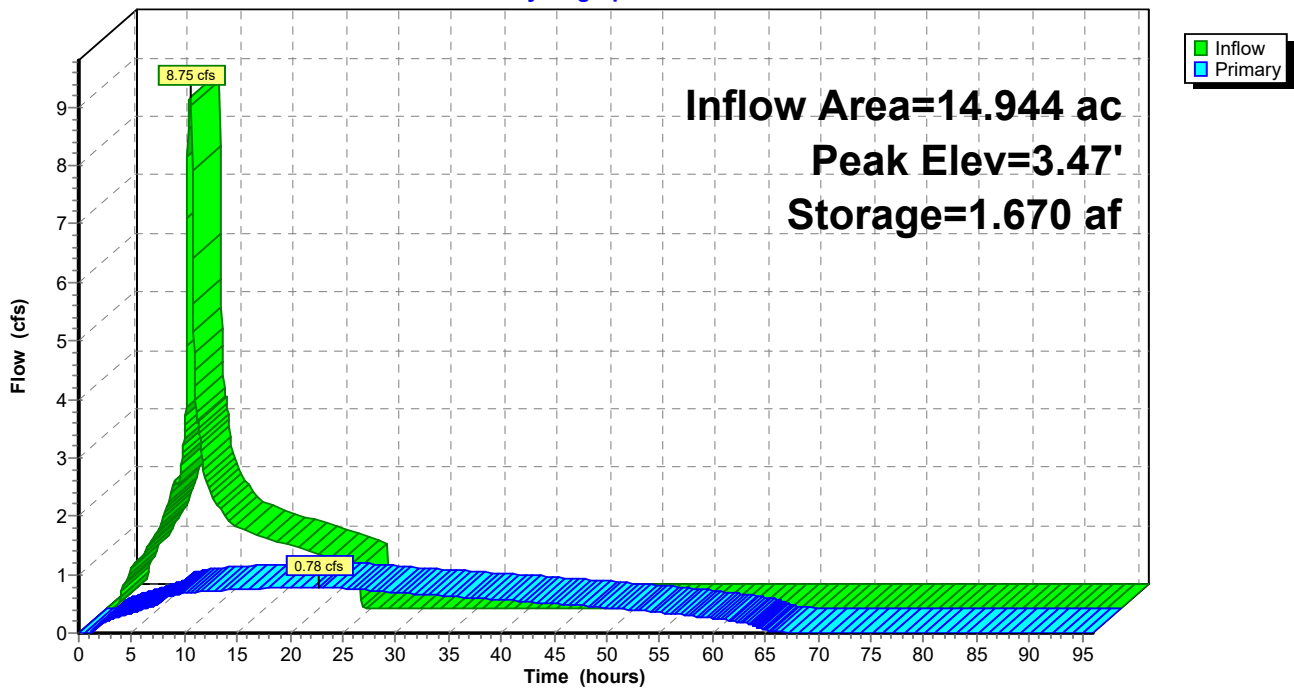
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1.947 af	52.0" Round Pipe Storage L= 5,750.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	3.85'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

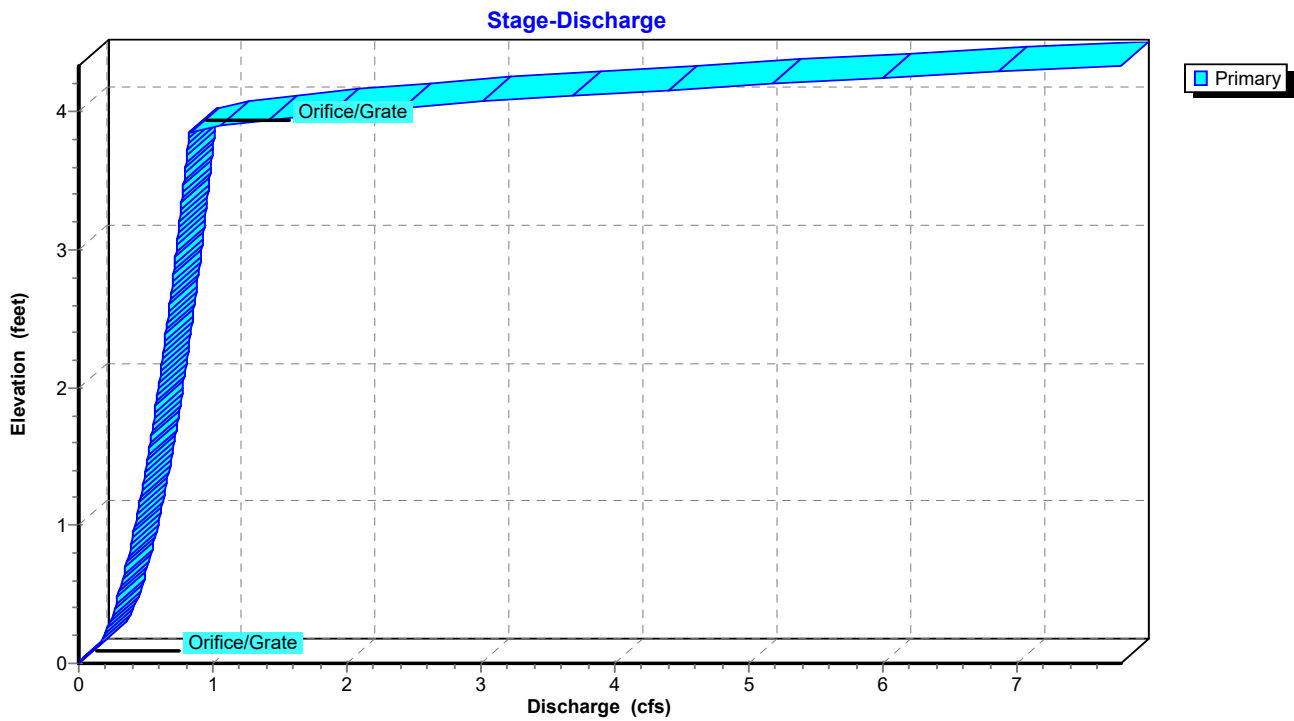
Primary OutFlow Max=0.78 cfs @ 22.70 hrs HW=3.47' (Free Discharge)
 1=Orifice/Grate (Orifice Controls 0.78 cfs @ 8.97 fps)
 2=Orifice/Grate (Controls 0.00 cfs)

Pond 3P: Detention A

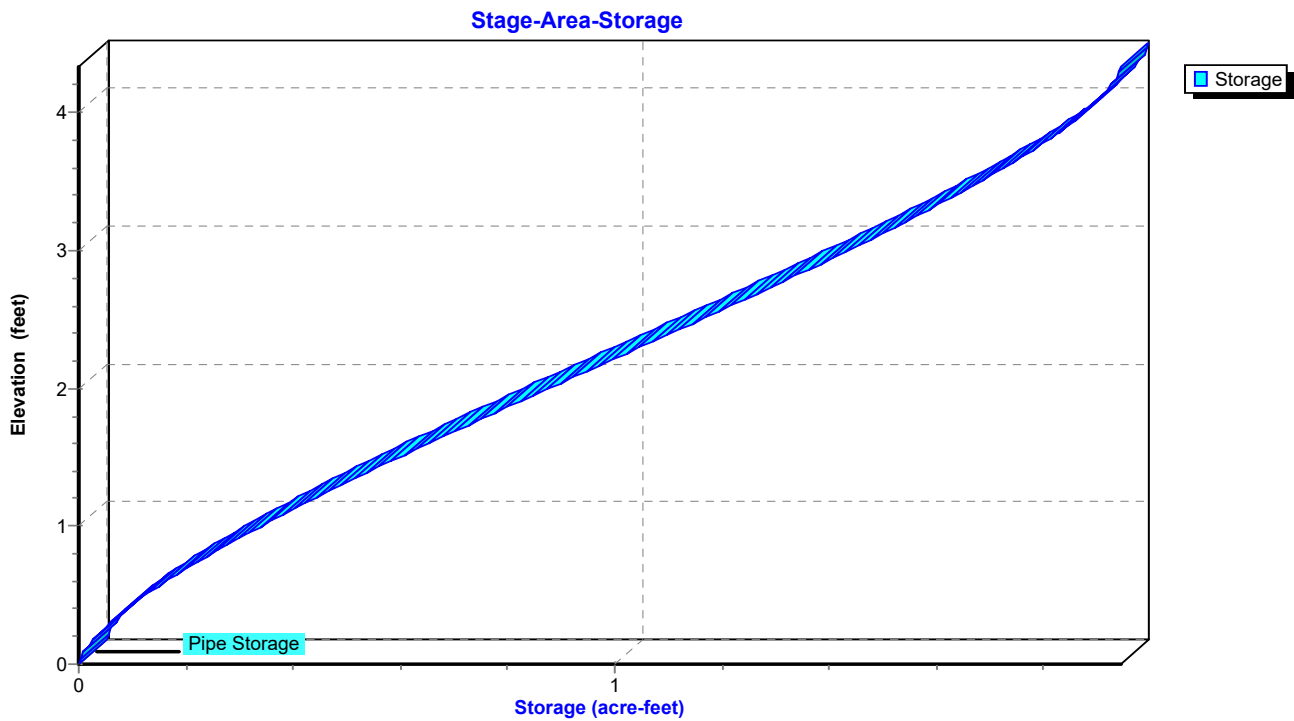
Hydrograph



Pond 3P: Detention A



Pond 3P: Detention A



Walgraves

Prepared by AAI Engineering

HydroCAD® 10.00-26 s/n 01638 © 2020 HydroCAD Software Solutions LLC

Type IA 24-hr 2-YR Rainfall=2.50"

Printed 12/21/2021

Page 8

Summary for Pond 6P: Detention B

Inflow Area = 2.894 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2-YR event
Inflow = 1.69 cfs @ 7.86 hrs, Volume= 0.548 af
Outflow = 0.20 cfs @ 18.15 hrs, Volume= 0.548 af, Atten= 88%, Lag= 617.3 min
Primary = 0.20 cfs @ 18.15 hrs, Volume= 0.548 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 2.10' @ 18.15 hrs Surf.Area= 0.177 ac Storage= 0.260 af

Plug-Flow detention time= 721.9 min calculated for 0.547 af (100% of inflow)
Center-of-Mass det. time= 722.4 min (1,394.3 - 671.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.000 af	20.41'W x 200.00'L x 2.75'H Field A 0.258 af Overall - 0.163 af Embedded = 0.094 af x 0.0% Voids
#2A	0.00'	0.163 af	CMP Arch 49x33 x 40 Inside #1 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 40 Chambers in 4 Rows
#3B	0.00'	0.000 af	25.85'W x 140.00'L x 2.75'H Field B 0.228 af Overall - 0.143 af Embedded = 0.085 af x 0.0% Voids
#4B	0.00'	0.143 af	CMP Arch 49x33 x 35 Inside #3 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 35 Chambers in 5 Rows
		0.306 af	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	2.3" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	2.10'	6.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	2.52'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.20 cfs @ 18.15 hrs HW=2.10' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.20 cfs @ 6.98 fps)

2=Orifice/Grate (Controls 0.00 cfs)

3=Orifice/Grate (Controls 0.00 cfs)

Pond 6P: Detention B - Chamber Wizard Field A

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

10 Chambers/Row x 20.00' Long = 200.00' Row Length

4 Rows x 49.0" Wide + 16.3" Spacing x 3 = 20.41' Base Width

33.0" Chamber Height = 2.75' Field Height

40 Chambers x 178.0 cf = 7,118.3 cf Chamber Storage

11,224.6 cf Field - 7,118.3 cf Chambers = 4,106.3 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 7,118.3 cf = 0.163 af

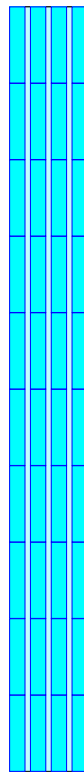
Overall Storage Efficiency = 63.4%

Overall System Size = 200.00' x 20.41' x 2.75'

40 Chambers

415.7 cy Field

152.1 cy Stone



Pond 6P: Detention B - Chamber Wizard Field B

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

7 Chambers/Row x 20.00' Long = 140.00' Row Length

5 Rows x 49.0" Wide + 16.3" Spacing x 4 = 25.85' Base Width

33.0" Chamber Height = 2.75' Field Height

35 Chambers x 178.0 cf = 6,228.5 cf Chamber Storage

9,952.3 cf Field - 6,228.5 cf Chambers = 3,723.8 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 6,228.5 cf = 0.143 af

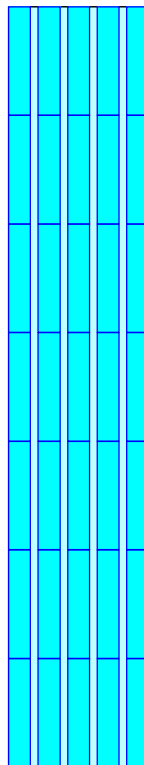
Overall Storage Efficiency = 62.6%

Overall System Size = 140.00' x 25.85' x 2.75'

35 Chambers

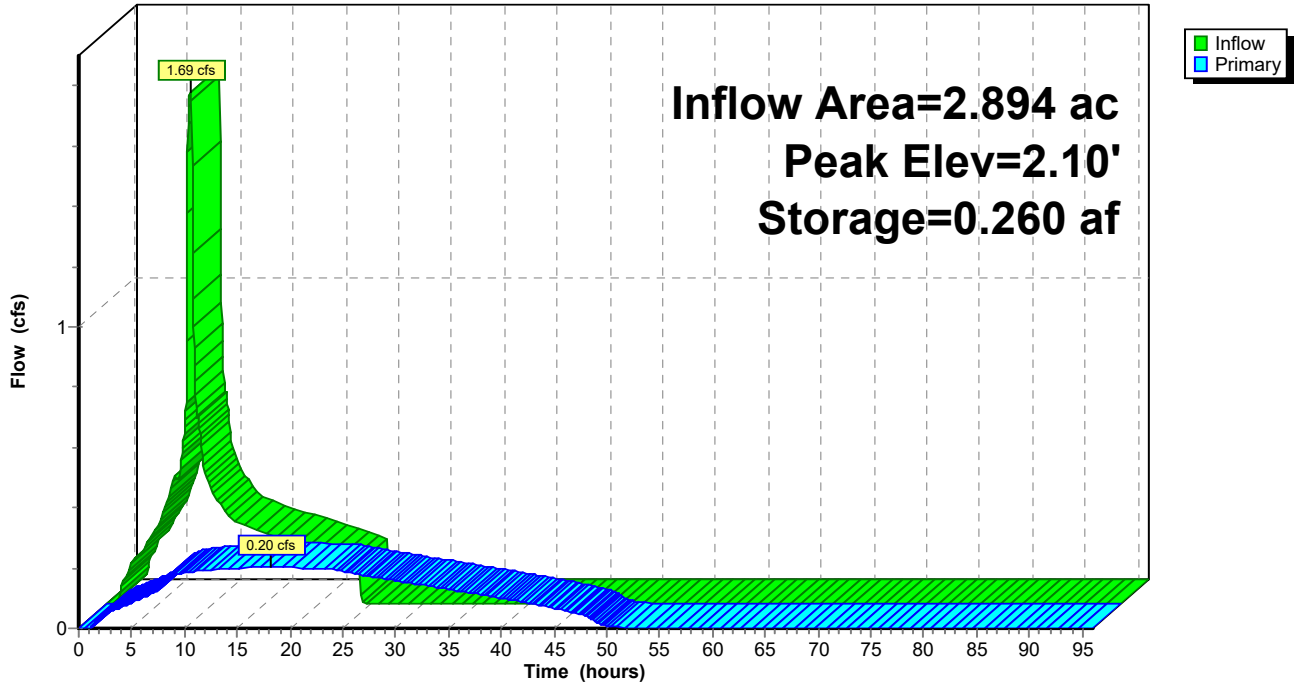
368.6 cy Field

137.9 cy Stone



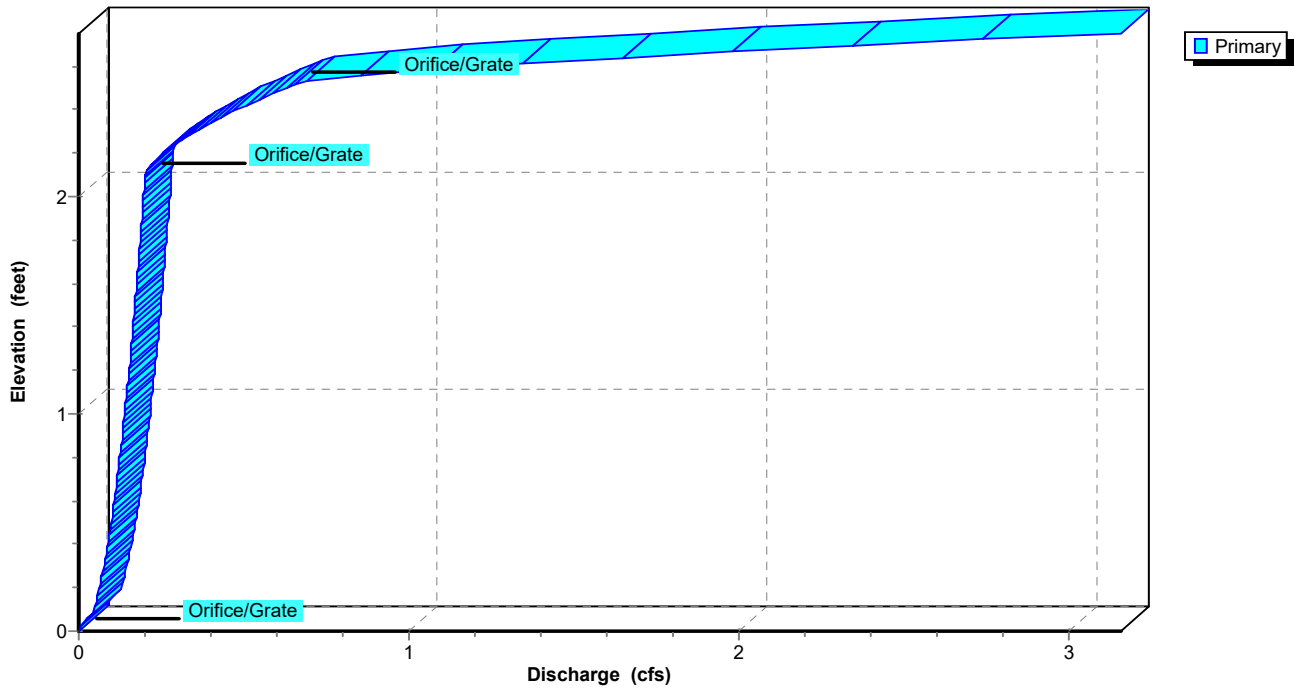
Pond 6P: Detention B

Hydrograph

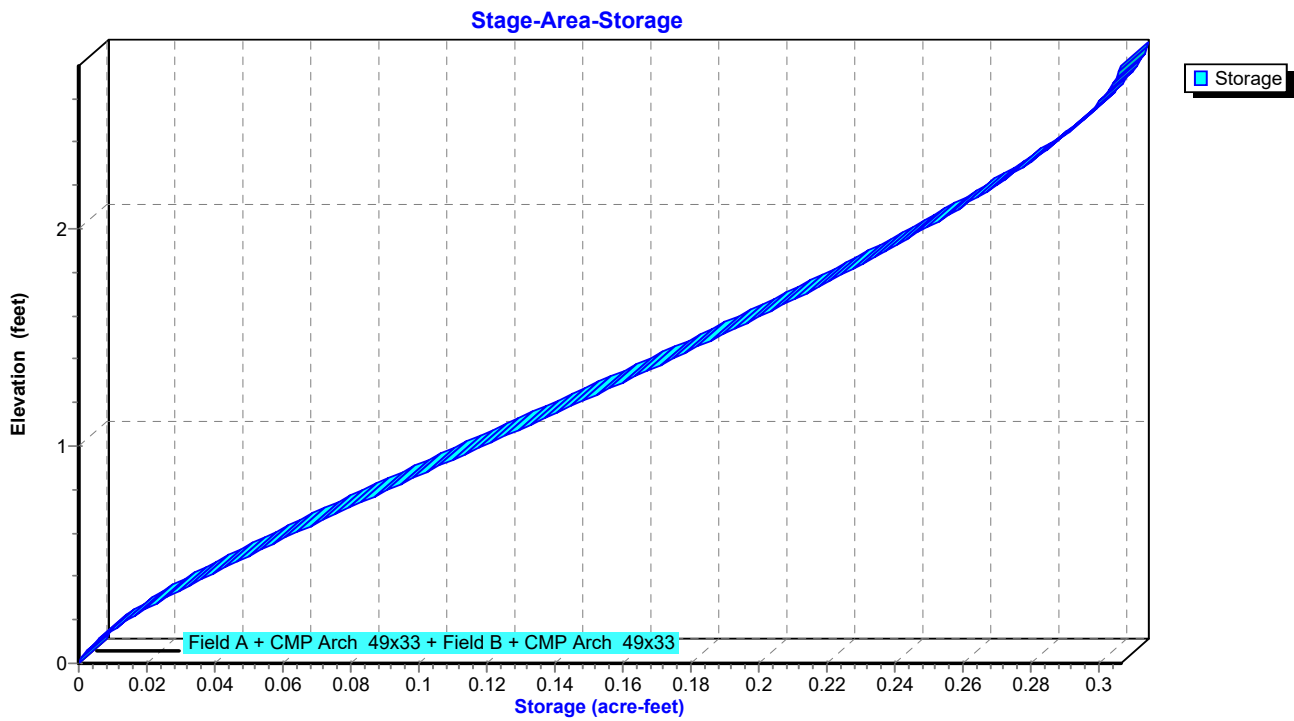


Pond 6P: Detention B

Stage-Discharge



Pond 6P: Detention B



Summary for Subcatchment 1S: Predeveloped Basin A

Runoff = 2.86 cfs @ 8.27 hrs, Volume= 1.421 af, Depth= 1.14"

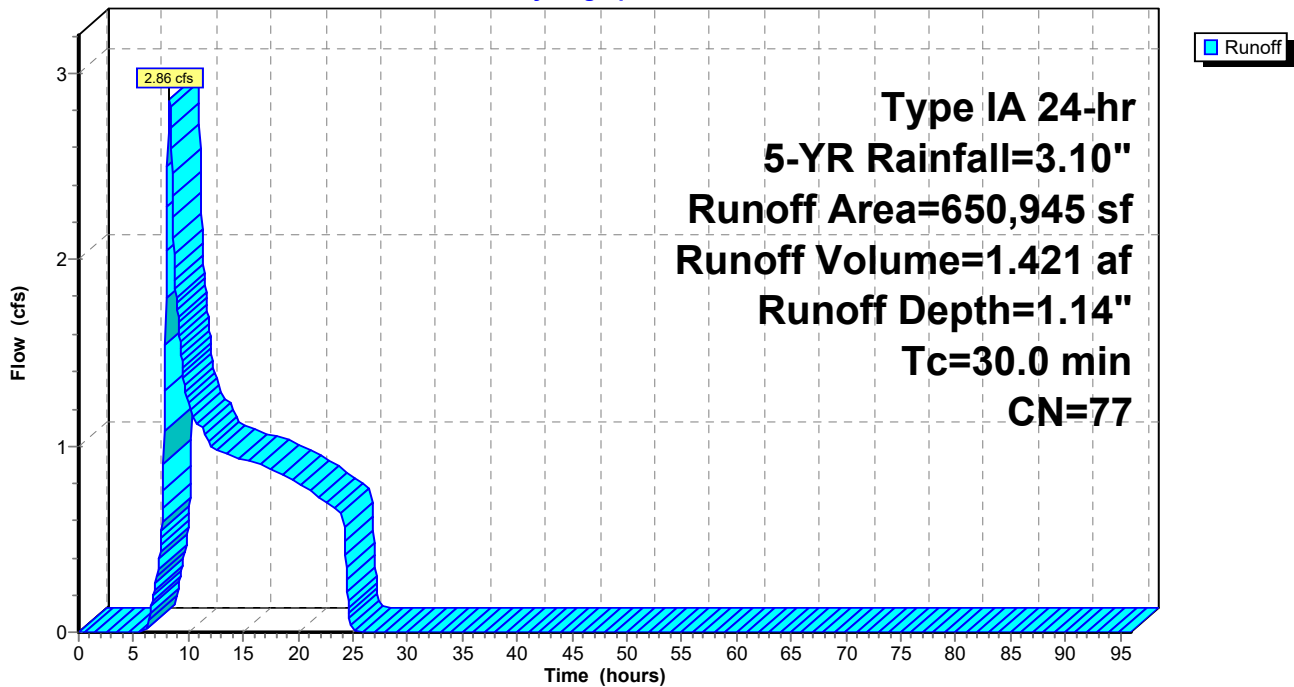
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
* 650,945	77	>75% Grass cover, Good, HSG D
650,945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 1S: Predeveloped Basin A

Hydrograph



Walgraves

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Type IA 24-hr 5-YR Rainfall=3.10"

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Summary for Subcatchment 2S: Developed Basin A

Runoff = 10.97 cfs @ 7.86 hrs, Volume= 3.571 af, Depth= 2.87"

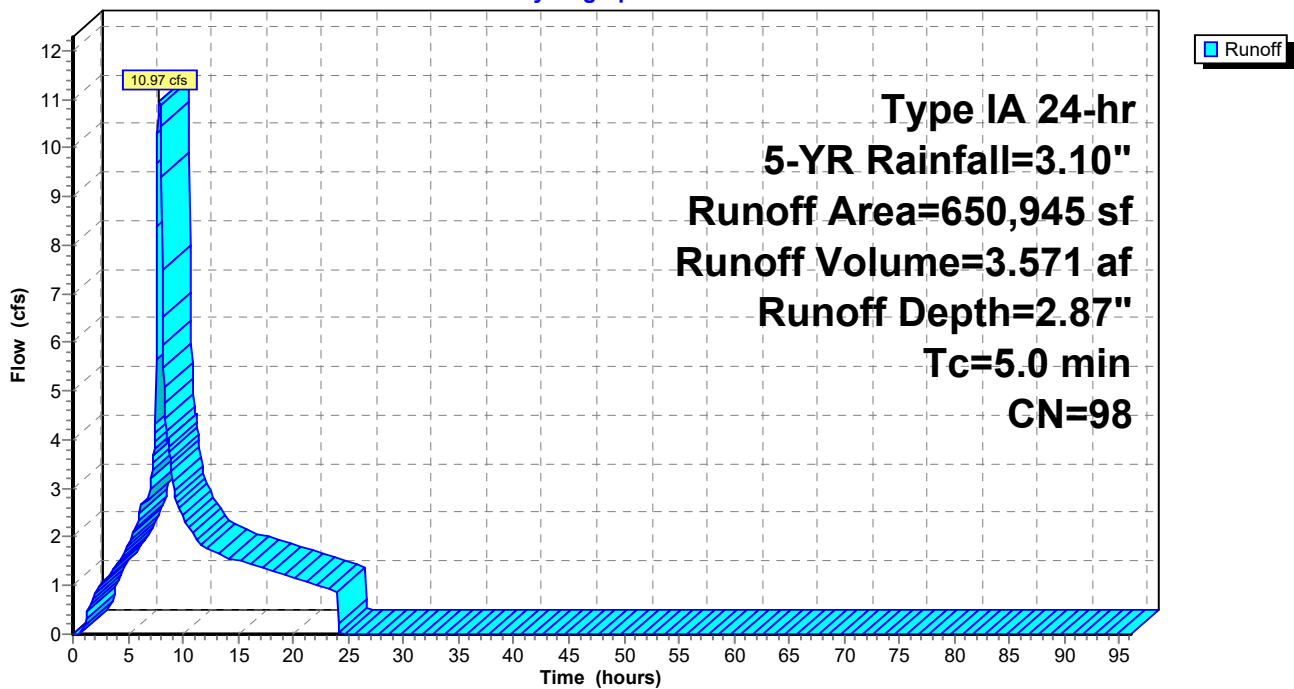
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
* 650,945	98	
650,945		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Developed Basin A

Hydrograph



Summary for Subcatchment 5S: Developed Basin B

Runoff = 2.12 cfs @ 7.86 hrs, Volume= 0.692 af, Depth= 2.87"

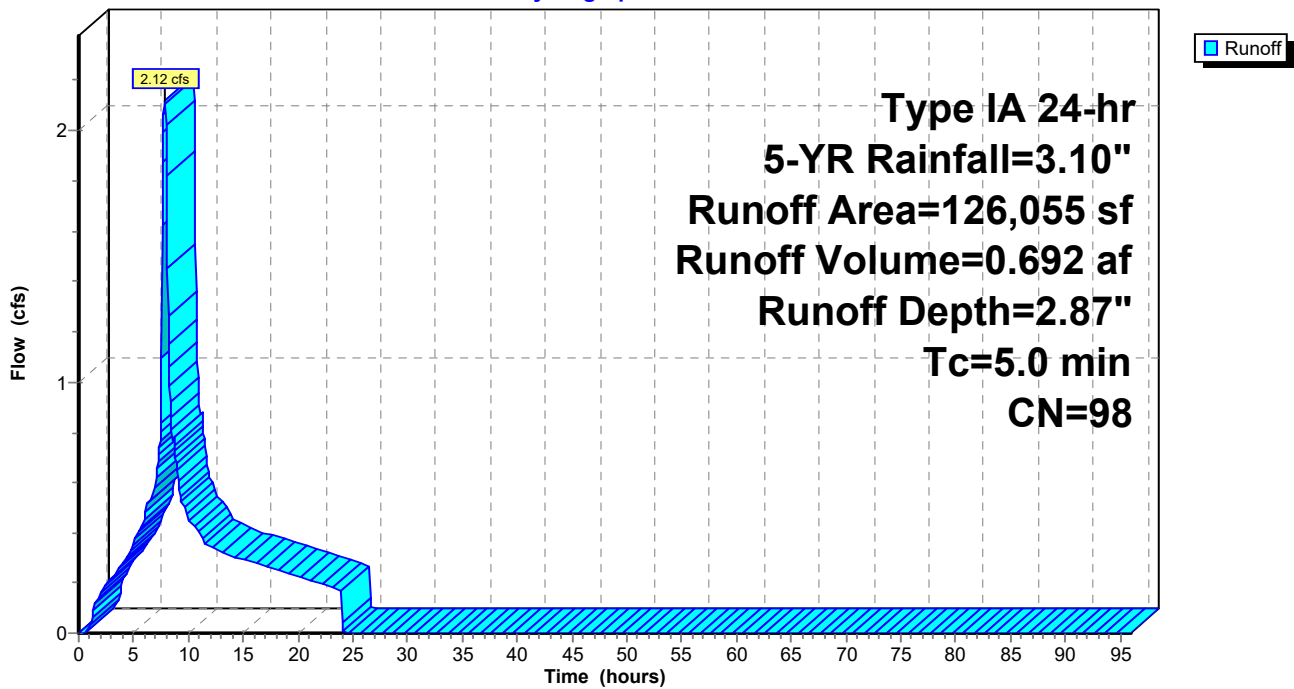
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 5-YR Rainfall=3.10"

	Area (sf)	CN	Description
*	69,225	98	Concrete
*	56,830	98	Roof
	126,055	98	Weighted Average
	126,055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: Developed Basin B

Hydrograph



Summary for Subcatchment 7S: Predeveloped Basin B

Runoff = 0.70 cfs @ 7.93 hrs, Volume= 0.275 af, Depth= 1.14"

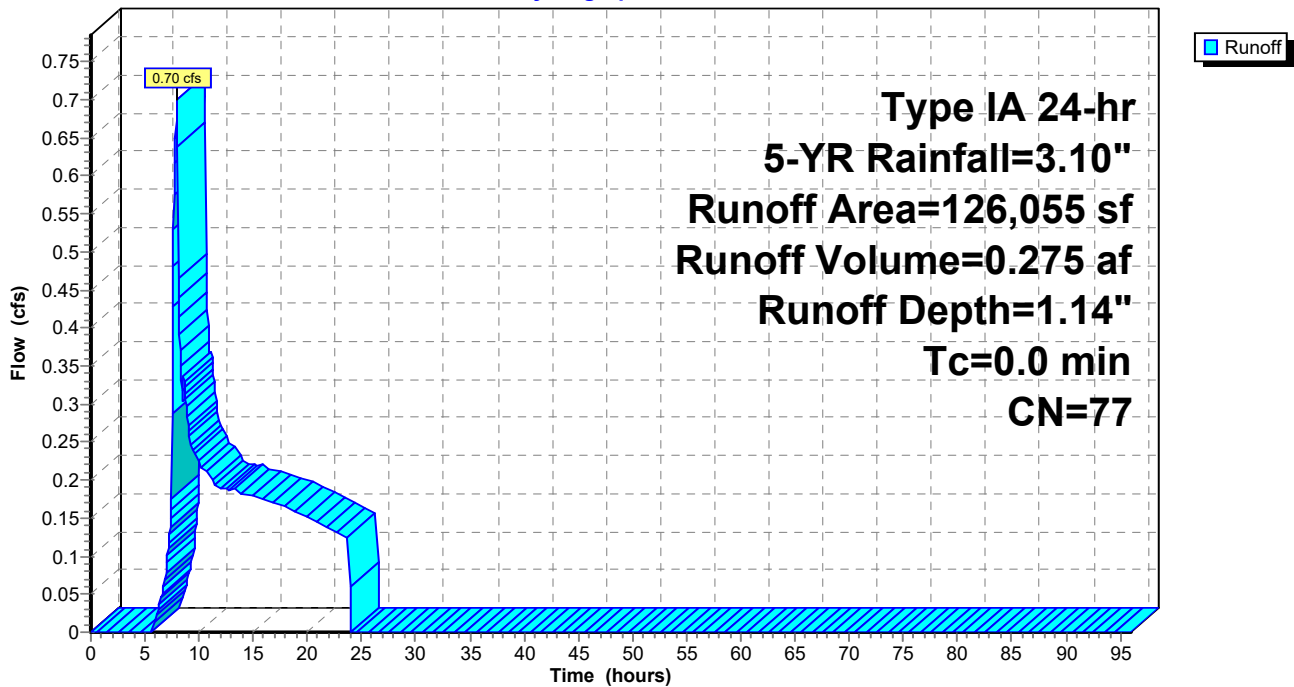
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
* 126,055	77	
126,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, 20

Subcatchment 7S: Predeveloped Basin B

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 14.944 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5-YR event
 Inflow = 10.97 cfs @ 7.86 hrs, Volume= 3.571 af
 Outflow = 1.62 cfs @ 13.50 hrs, Volume= 3.571 af, Atten= 85%, Lag= 338.7 min
 Primary = 1.62 cfs @ 13.50 hrs, Volume= 3.571 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 3.96' @ 13.50 hrs Surf.Area= 0.320 ac Storage= 1.866 af

Plug-Flow detention time= 1,047.1 min calculated for 3.571 af (100% of inflow)
 Center-of-Mass det. time= 1,046.8 min (1,712.2 - 665.4)

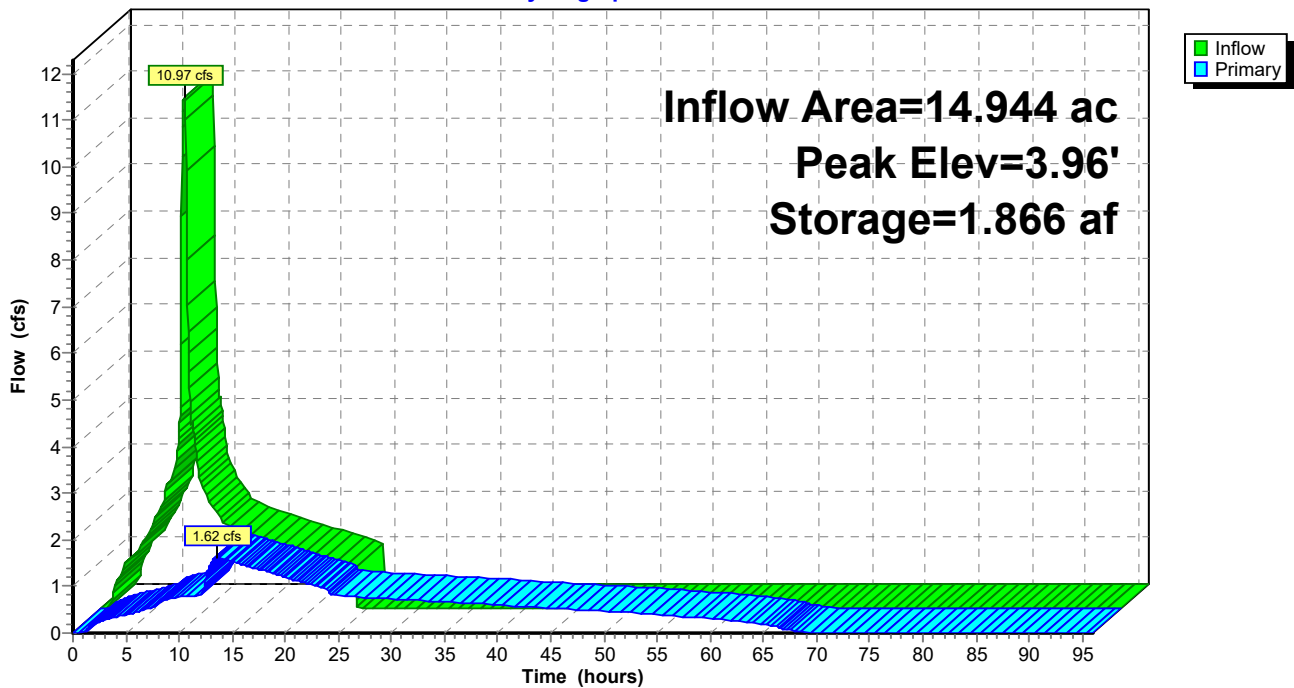
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1.947 af	52.0" Round Pipe Storage L= 5,750.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	3.85'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

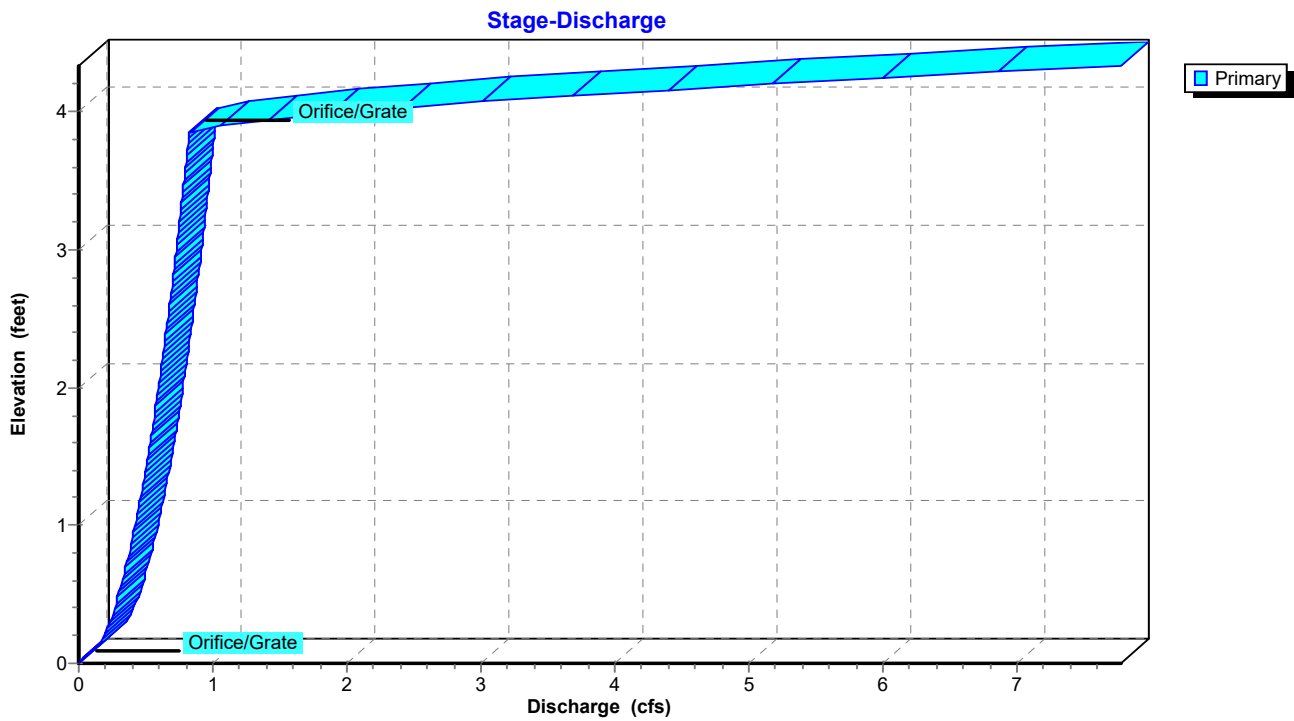
Primary OutFlow Max=1.61 cfs @ 13.50 hrs HW=3.96' (Free Discharge)
 1=Orifice/Grate (Orifice Controls 0.84 cfs @ 9.58 fps)
 2=Orifice/Grate (Weir Controls 0.78 cfs @ 1.10 fps)

Pond 3P: Detention A

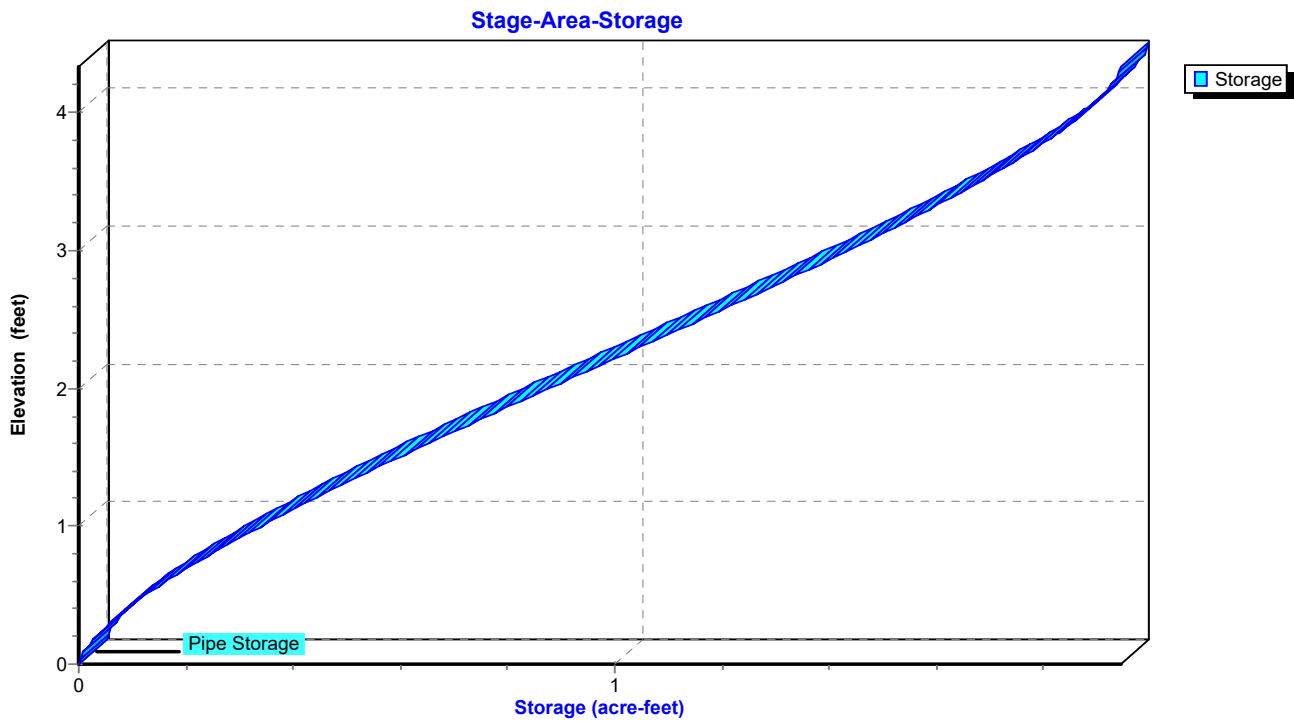
Hydrograph



Pond 3P: Detention A



Pond 3P: Detention A



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 5-YR Rainfall=3.10"

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Summary for Pond 6P: Detention B

Inflow Area = 2.894 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5-YR event
Inflow = 2.12 cfs @ 7.86 hrs, Volume= 0.692 af
Outflow = 0.41 cfs @ 10.86 hrs, Volume= 0.692 af, Atten= 81%, Lag= 180.0 min
Primary = 0.41 cfs @ 10.86 hrs, Volume= 0.692 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 2.35' @ 10.86 hrs Surf.Area= 0.177 ac Storage= 0.283 af

Plug-Flow detention time= 639.0 min calculated for 0.692 af (100% of inflow)
Center-of-Mass det. time= 638.6 min (1,304.1 - 665.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.000 af	20.41'W x 200.00'L x 2.75'H Field A 0.258 af Overall - 0.163 af Embedded = 0.094 af x 0.0% Voids
#2A	0.00'	0.163 af	CMP Arch 49x33 x 40 Inside #1 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 40 Chambers in 4 Rows
#3B	0.00'	0.000 af	25.85'W x 140.00'L x 2.75'H Field B 0.228 af Overall - 0.143 af Embedded = 0.085 af x 0.0% Voids
#4B	0.00'	0.143 af	CMP Arch 49x33 x 35 Inside #3 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 35 Chambers in 5 Rows
		0.306 af	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	2.3" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	2.10'	6.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	2.52'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.41 cfs @ 10.86 hrs HW=2.35' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.21 cfs @ 7.38 fps)

2=Orifice/Grate (Orifice Controls 0.20 cfs @ 1.59 fps)

3=Orifice/Grate (Controls 0.00 cfs)

Pond 6P: Detention B - Chamber Wizard Field A

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

10 Chambers/Row x 20.00' Long = 200.00' Row Length

4 Rows x 49.0" Wide + 16.3" Spacing x 3 = 20.41' Base Width

33.0" Chamber Height = 2.75' Field Height

40 Chambers x 178.0 cf = 7,118.3 cf Chamber Storage

11,224.6 cf Field - 7,118.3 cf Chambers = 4,106.3 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 7,118.3 cf = 0.163 af

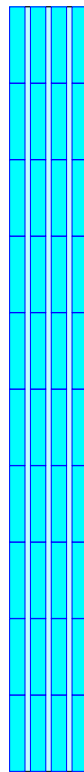
Overall Storage Efficiency = 63.4%

Overall System Size = 200.00' x 20.41' x 2.75'

40 Chambers

415.7 cy Field

152.1 cy Stone



Pond 6P: Detention B - Chamber Wizard Field B

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

7 Chambers/Row x 20.00' Long = 140.00' Row Length

5 Rows x 49.0" Wide + 16.3" Spacing x 4 = 25.85' Base Width

33.0" Chamber Height = 2.75' Field Height

35 Chambers x 178.0 cf = 6,228.5 cf Chamber Storage

9,952.3 cf Field - 6,228.5 cf Chambers = 3,723.8 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 6,228.5 cf = 0.143 af

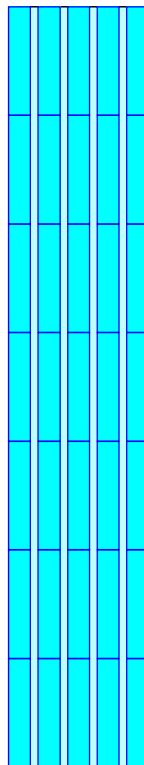
Overall Storage Efficiency = 62.6%

Overall System Size = 140.00' x 25.85' x 2.75'

35 Chambers

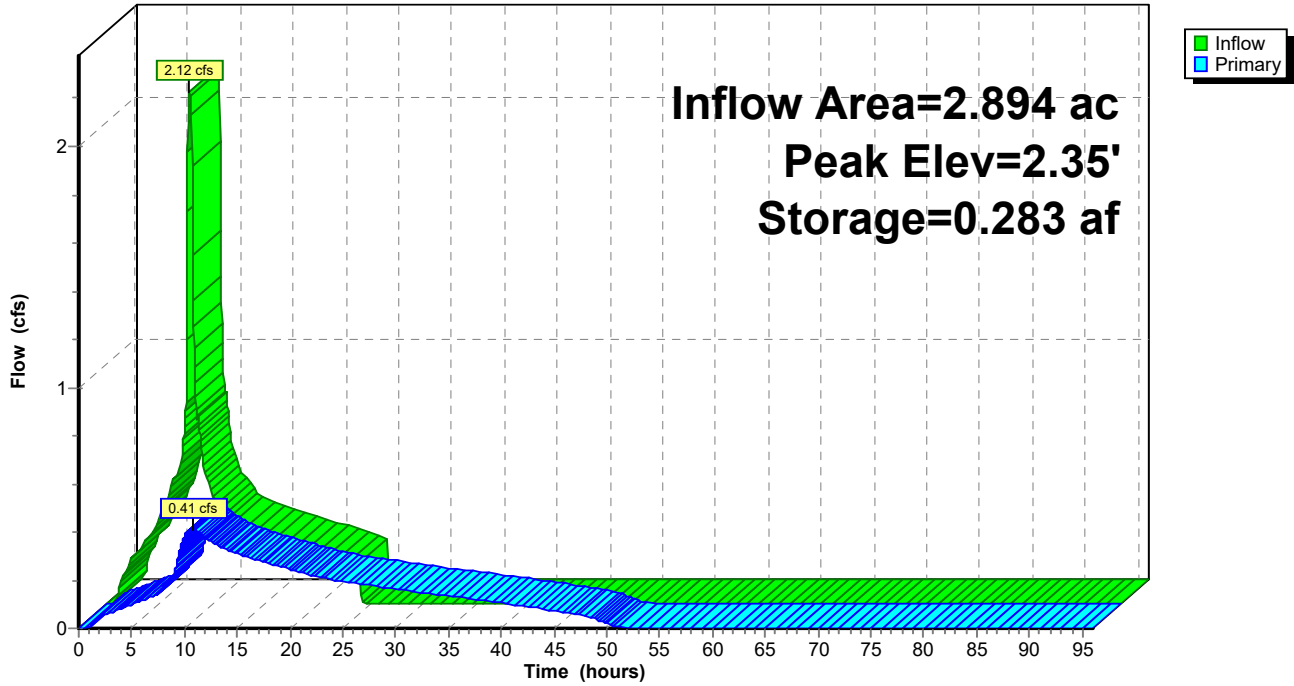
368.6 cy Field

137.9 cy Stone



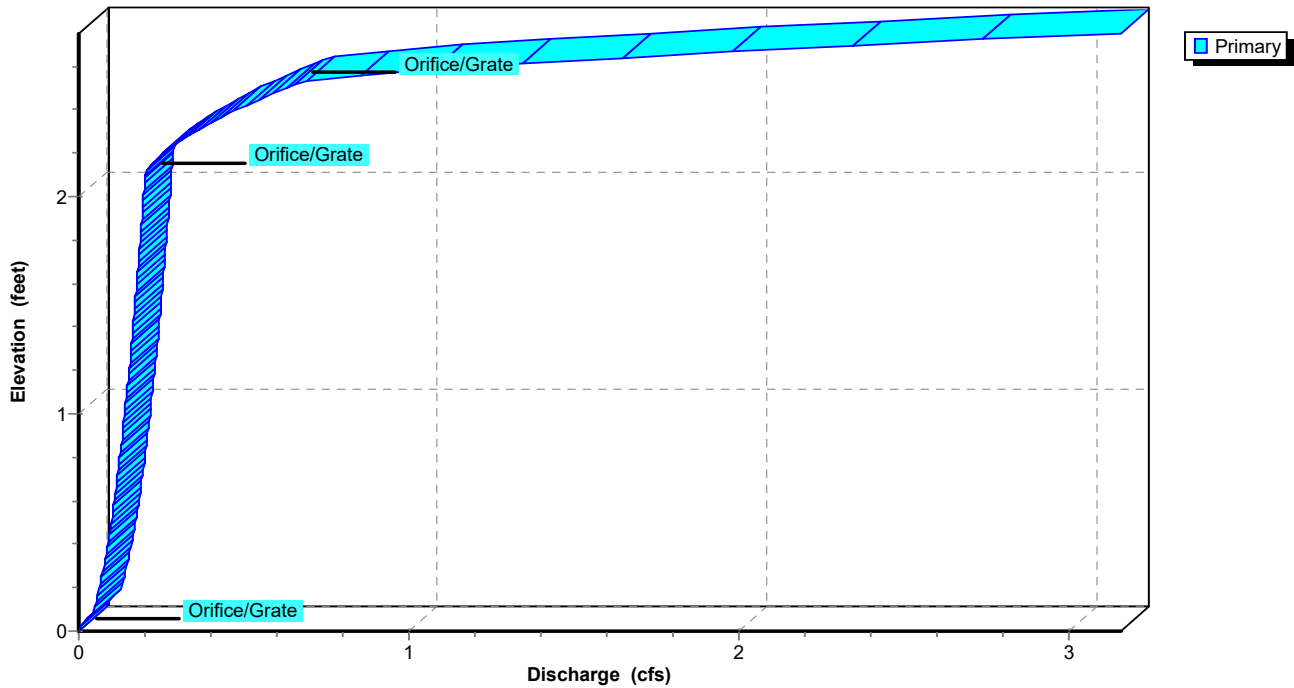
Pond 6P: Detention B

Hydrograph



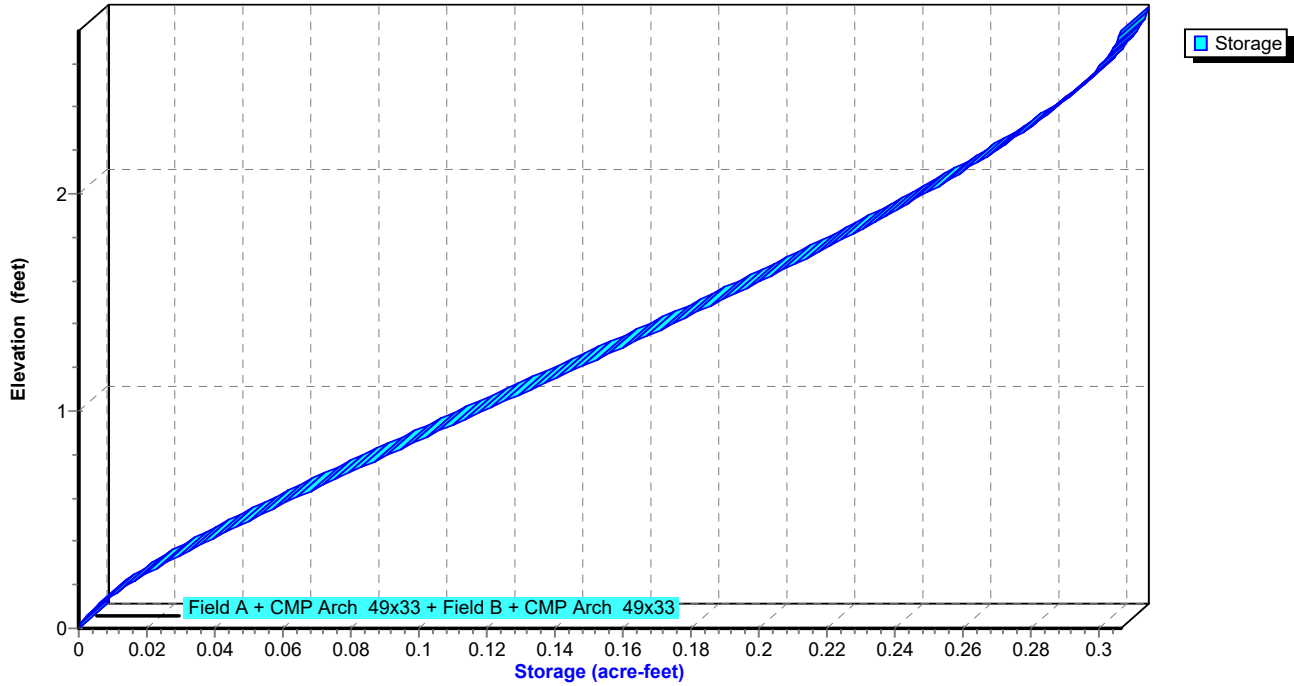
Pond 6P: Detention B

Stage-Discharge



Pond 6P: Detention B

Stage-Area-Storage



Summary for Subcatchment 1S: Predeveloped Basin A

Runoff = 3.71 cfs @ 8.26 hrs, Volume= 1.735 af, Depth= 1.39"

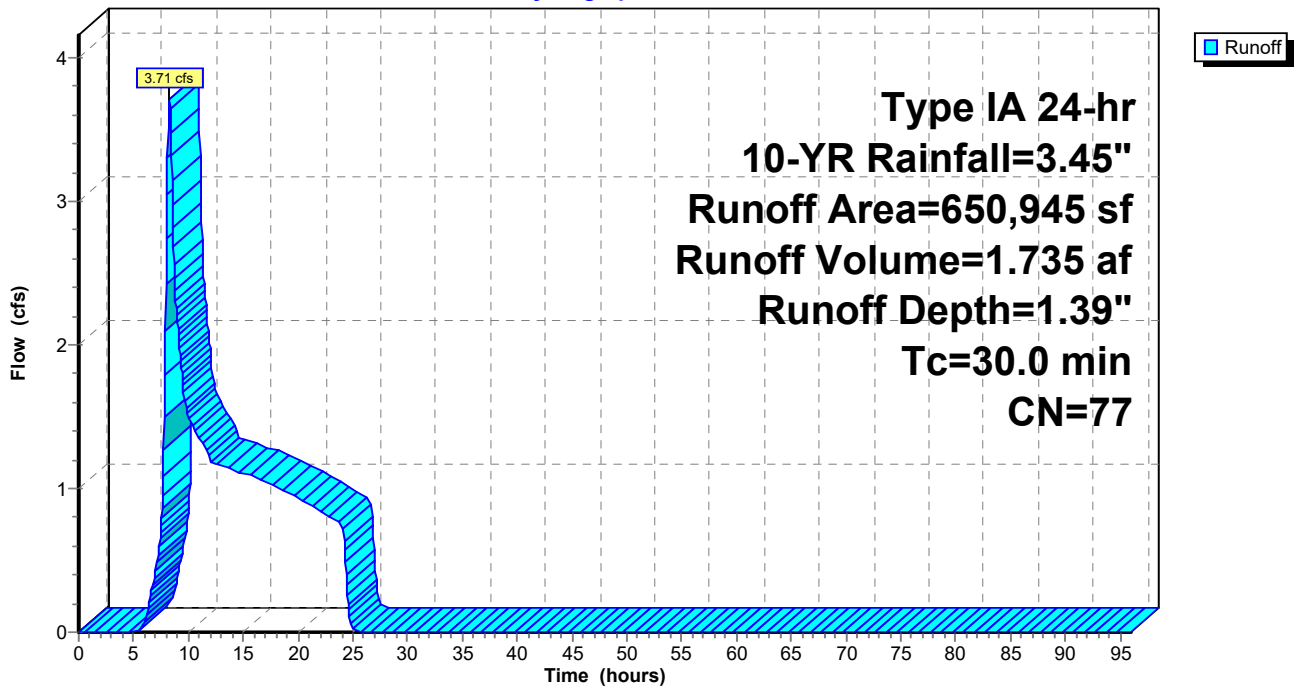
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
* 650,945	77	>75% Grass cover, Good, HSG D
650,945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 1S: Predeveloped Basin A

Hydrograph



Summary for Subcatchment 2S: Developed Basin A

Runoff = 12.26 cfs @ 7.86 hrs, Volume= 4.006 af, Depth= 3.22"

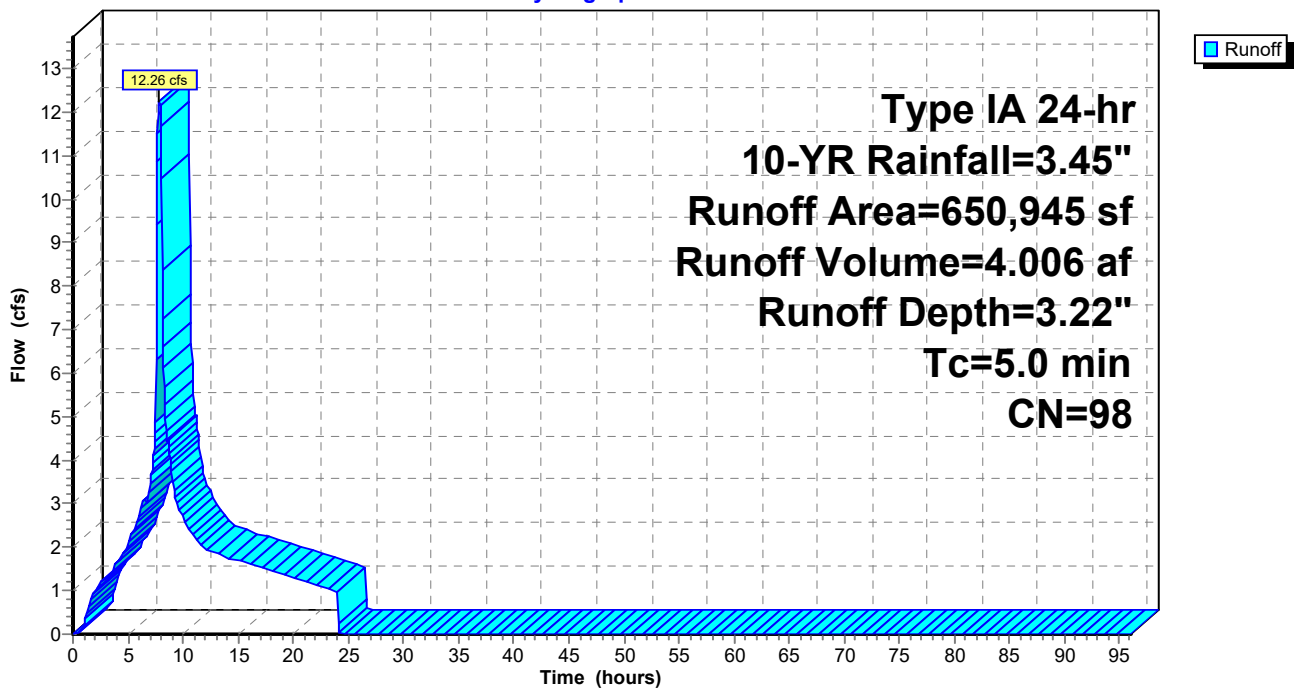
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
* 650,945	98	
650,945		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Developed Basin A

Hydrograph



Summary for Subcatchment 5S: Developed Basin B

Runoff = 2.37 cfs @ 7.86 hrs, Volume= 0.776 af, Depth= 3.22"

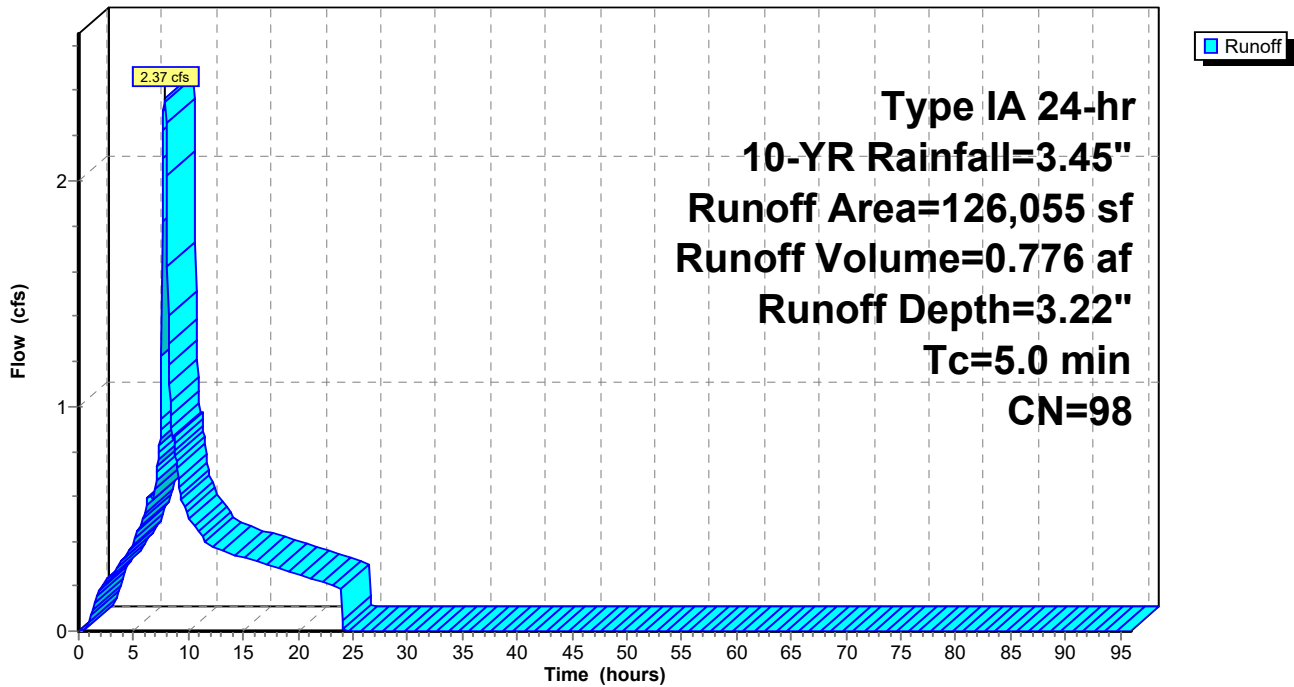
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-YR Rainfall=3.45"

	Area (sf)	CN	Description
*	69,225	98	Concrete
*	56,830	98	Roof
	126,055	98	Weighted Average
	126,055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: Developed Basin B

Hydrograph



Summary for Subcatchment 7S: Predeveloped Basin B

Runoff = 0.88 cfs @ 7.92 hrs, Volume= 0.336 af, Depth= 1.39"

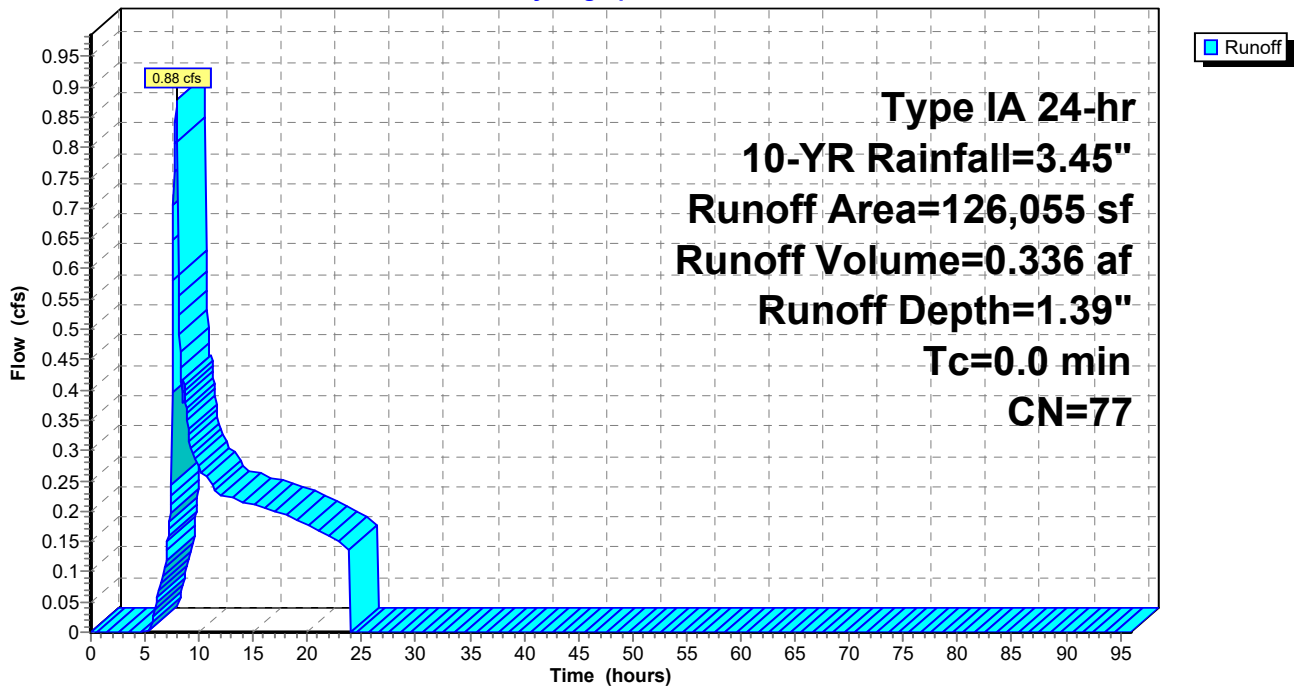
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
* 126,055	77	
126,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, 20

Subcatchment 7S: Predeveloped Basin B

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 14.944 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10-YR event
 Inflow = 12.26 cfs @ 7.86 hrs, Volume= 4.006 af
 Outflow = 2.30 cfs @ 11.01 hrs, Volume= 4.006 af, Atten= 81%, Lag= 189.2 min
 Primary = 2.30 cfs @ 11.01 hrs, Volume= 4.006 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 4.02' @ 11.01 hrs Surf.Area= 0.296 ac Storage= 1.884 af

Plug-Flow detention time= 952.1 min calculated for 4.004 af (100% of inflow)
 Center-of-Mass det. time= 953.0 min (1,615.6 - 662.5)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1.947 af	52.0" Round Pipe Storage L= 5,750.0'

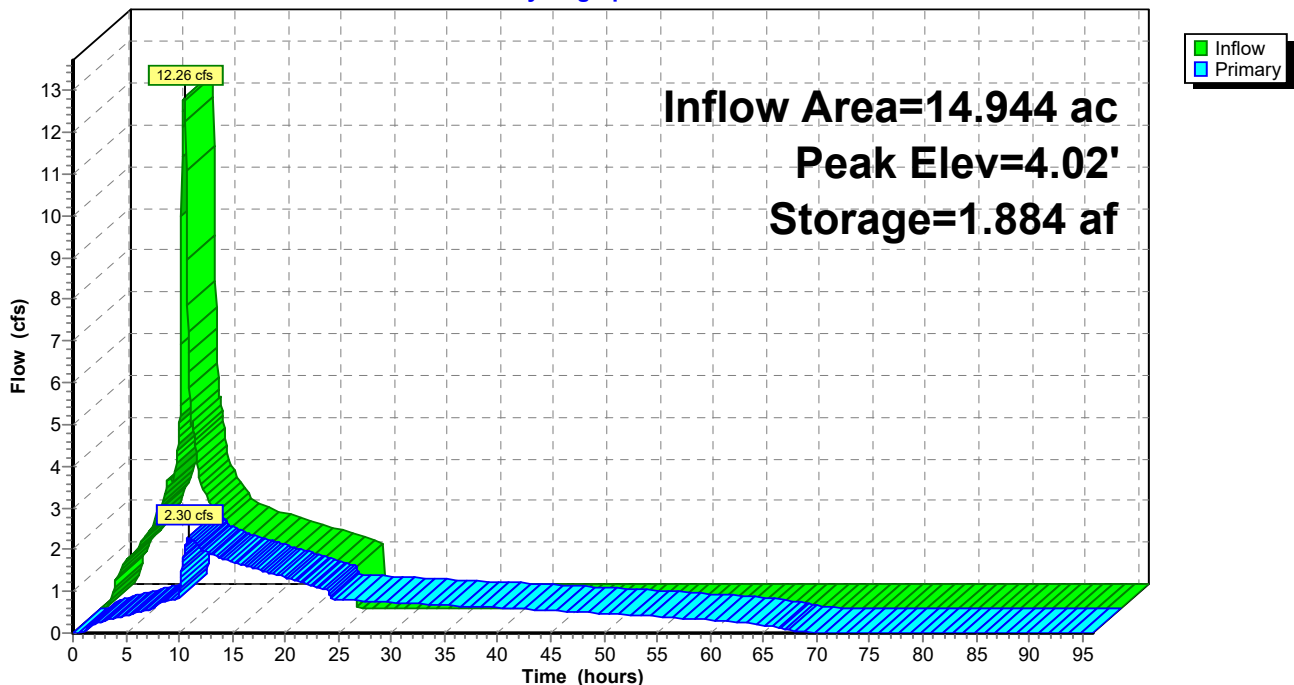
Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	3.85'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.29 cfs @ 11.01 hrs HW=4.02' (Free Discharge)

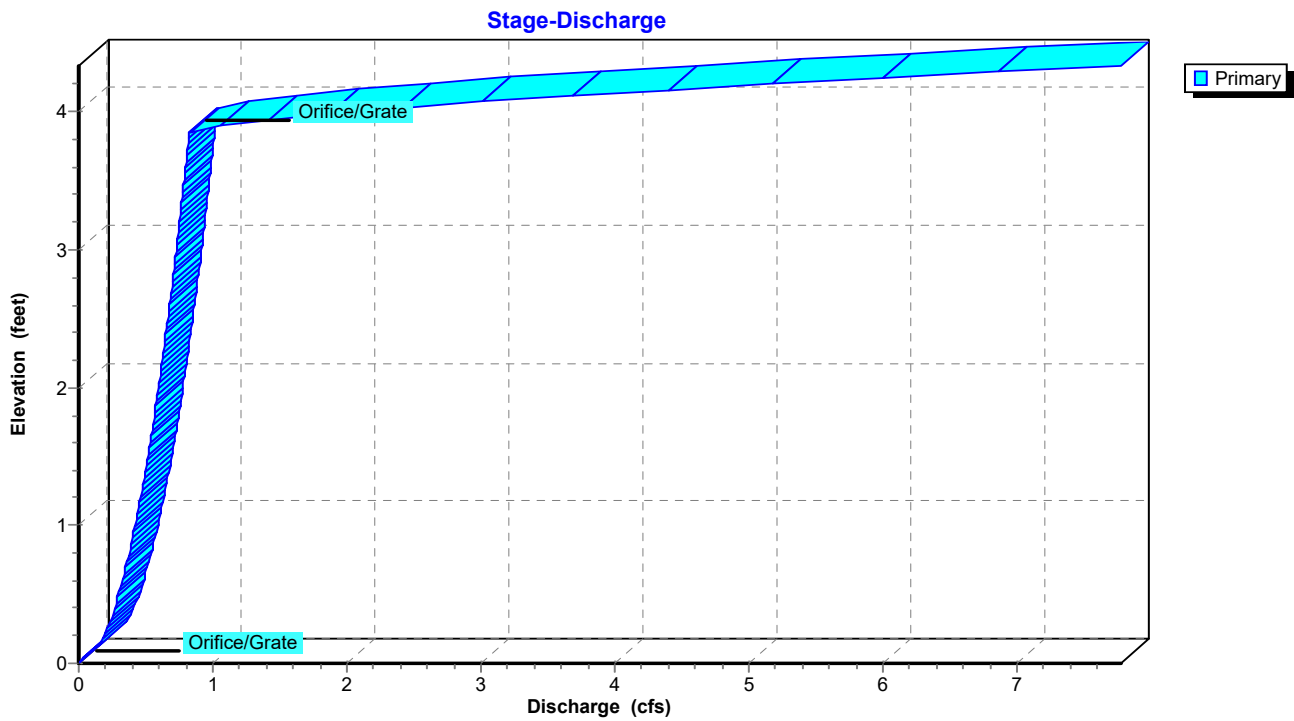
1=Orifice/Grate (Orifice Controls 0.84 cfs @ 9.65 fps)
 2=Orifice/Grate (Weir Controls 1.45 cfs @ 1.35 fps)

Pond 3P: Detention A

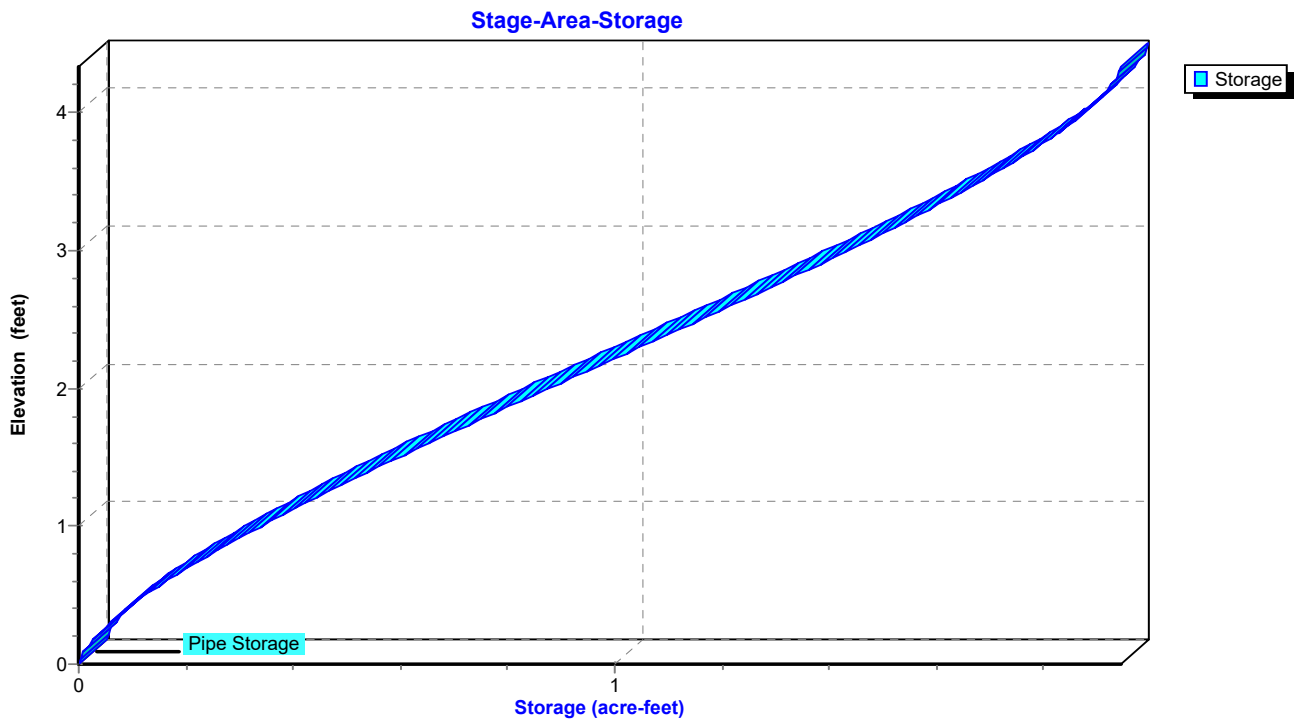
Hydrograph



Pond 3P: Detention A



Pond 3P: Detention A



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 10-YR Rainfall=3.45"

Printed 12/21/2021

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Summary for Pond 6P: Detention B

Inflow Area = 2.894 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10-YR event
 Inflow = 2.37 cfs @ 7.86 hrs, Volume= 0.776 af
 Outflow = 0.58 cfs @ 9.36 hrs, Volume= 0.776 af, Atten= 75%, Lag= 90.5 min
 Primary = 0.58 cfs @ 9.36 hrs, Volume= 0.776 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 2.47' @ 9.36 hrs Surf.Area= 0.177 ac Storage= 0.293 af

Plug-Flow detention time= 586.0 min calculated for 0.775 af (100% of inflow)
 Center-of-Mass det. time= 586.6 min (1,249.1 - 662.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.000 af	20.41'W x 200.00'L x 2.75'H Field A 0.258 af Overall - 0.163 af Embedded = 0.094 af x 0.0% Voids
#2A	0.00'	0.163 af	CMP Arch 49x33 x 40 Inside #1 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 40 Chambers in 4 Rows
#3B	0.00'	0.000 af	25.85'W x 140.00'L x 2.75'H Field B 0.228 af Overall - 0.143 af Embedded = 0.085 af x 0.0% Voids
#4B	0.00'	0.143 af	CMP Arch 49x33 x 35 Inside #3 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 35 Chambers in 5 Rows
		0.306 af	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	2.3" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	2.10'	6.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	2.52'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.58 cfs @ 9.36 hrs HW=2.47' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.22 cfs @ 7.57 fps)

2=Orifice/Grate (Orifice Controls 0.37 cfs @ 1.96 fps)

3=Orifice/Grate (Controls 0.00 cfs)

Pond 6P: Detention B - Chamber Wizard Field A

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

10 Chambers/Row x 20.00' Long = 200.00' Row Length

4 Rows x 49.0" Wide + 16.3" Spacing x 3 = 20.41' Base Width

33.0" Chamber Height = 2.75' Field Height

40 Chambers x 178.0 cf = 7,118.3 cf Chamber Storage

11,224.6 cf Field - 7,118.3 cf Chambers = 4,106.3 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 7,118.3 cf = 0.163 af

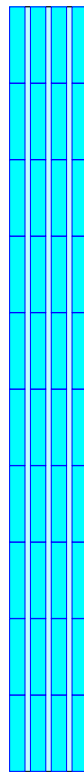
Overall Storage Efficiency = 63.4%

Overall System Size = 200.00' x 20.41' x 2.75'

40 Chambers

415.7 cy Field

152.1 cy Stone



Pond 6P: Detention B - Chamber Wizard Field B

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

7 Chambers/Row x 20.00' Long = 140.00' Row Length

5 Rows x 49.0" Wide + 16.3" Spacing x 4 = 25.85' Base Width

33.0" Chamber Height = 2.75' Field Height

35 Chambers x 178.0 cf = 6,228.5 cf Chamber Storage

9,952.3 cf Field - 6,228.5 cf Chambers = 3,723.8 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 6,228.5 cf = 0.143 af

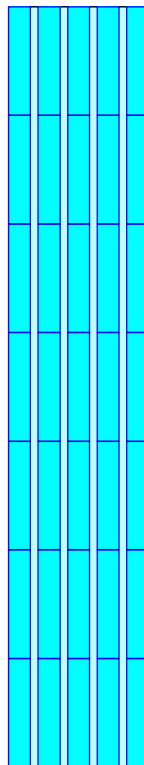
Overall Storage Efficiency = 62.6%

Overall System Size = 140.00' x 25.85' x 2.75'

35 Chambers

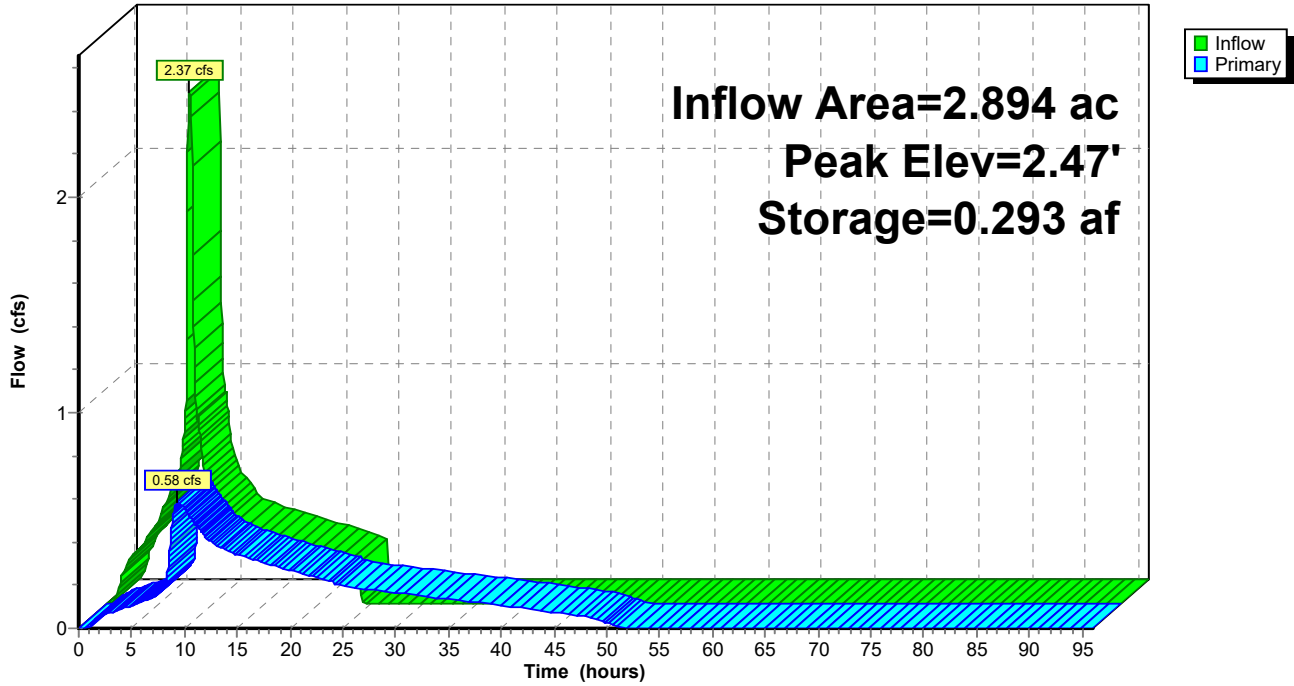
368.6 cy Field

137.9 cy Stone



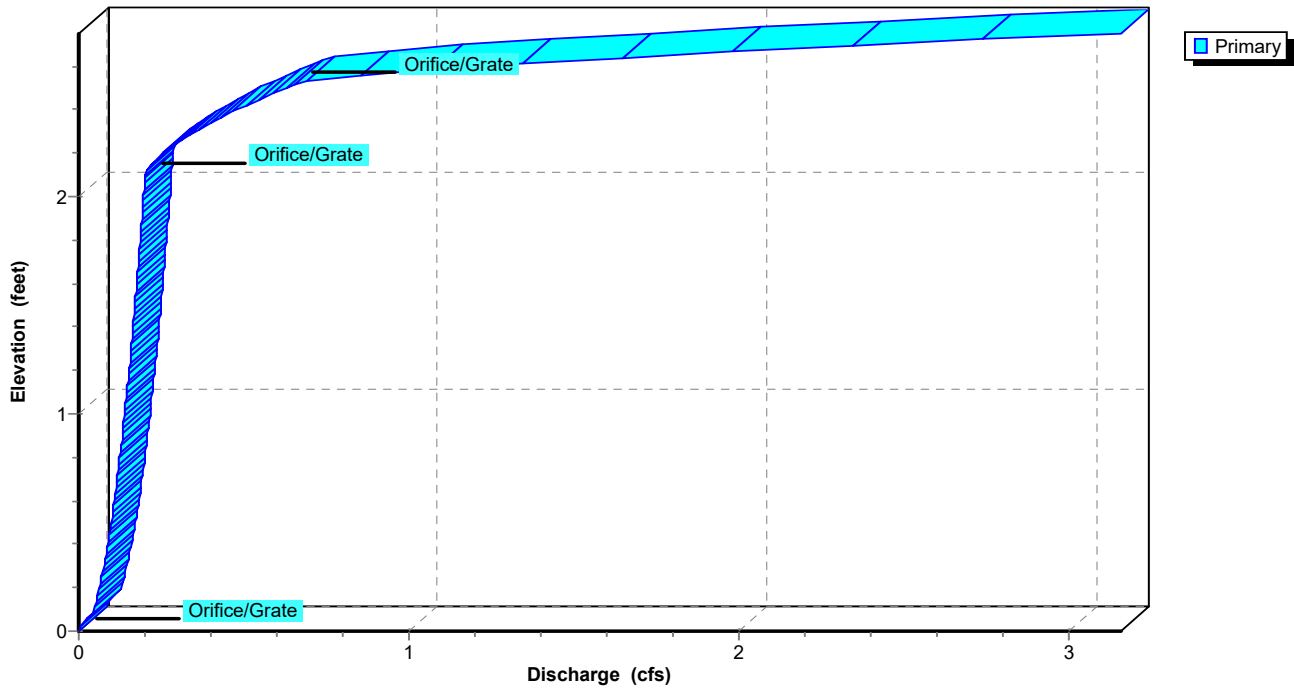
Pond 6P: Detention B

Hydrograph



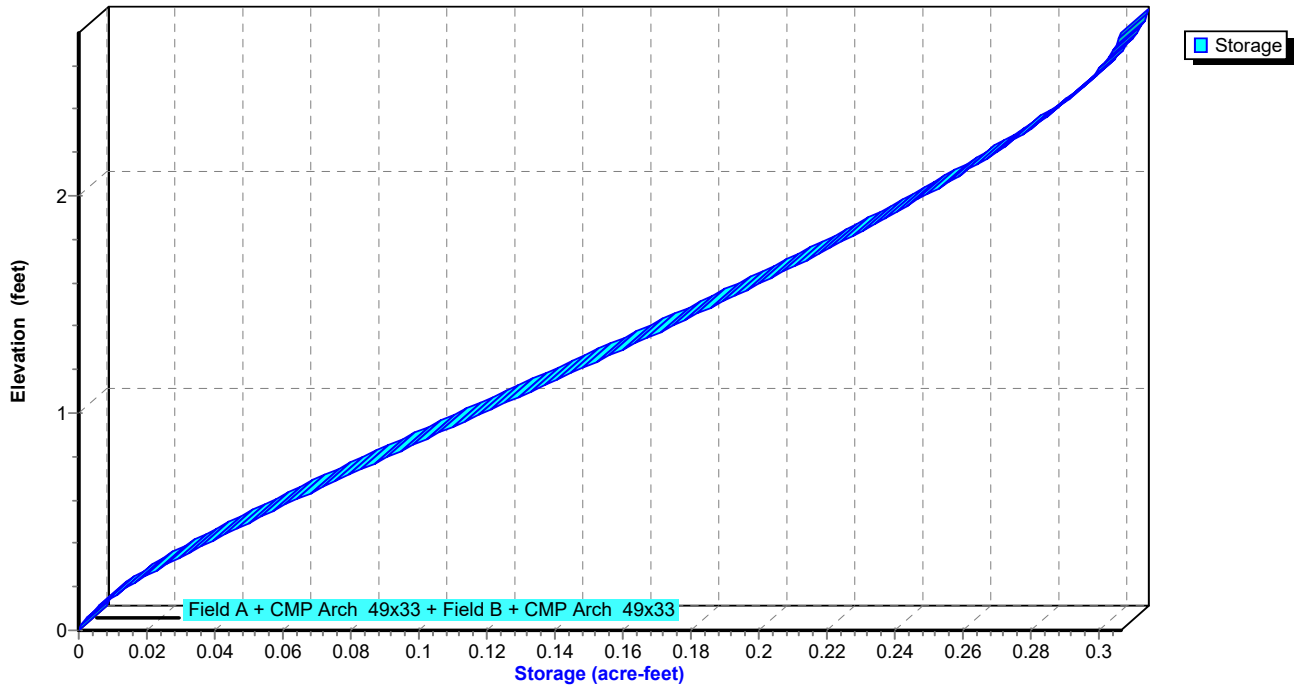
Pond 6P: Detention B

Stage-Discharge



Pond 6P: Detention B

Stage-Area-Storage



Summary for Subcatchment 1S: Predeveloped Basin A

Runoff = 4.87 cfs @ 8.25 hrs, Volume= 2.160 af, Depth= 1.73"

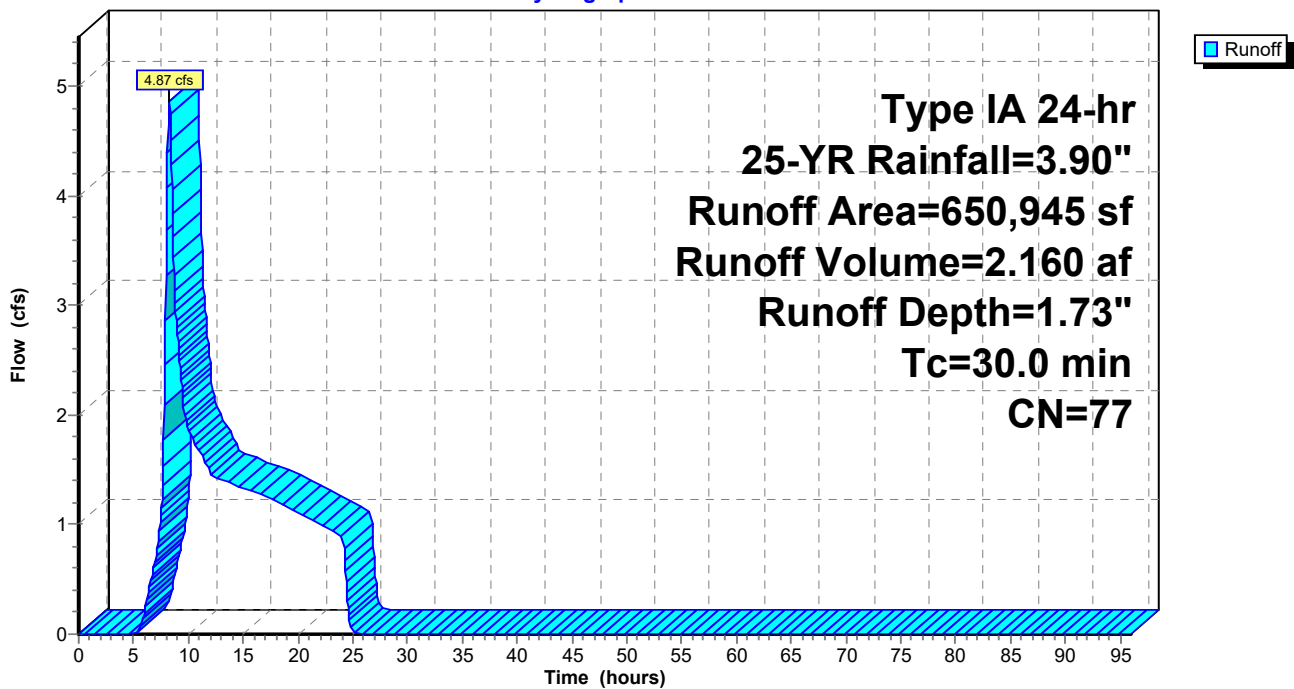
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
* 650,945	77	>75% Grass cover, Good, HSG D
650,945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 1S: Predeveloped Basin A

Hydrograph



Summary for Subcatchment 2S: Developed Basin A

Runoff = 13.91 cfs @ 7.86 hrs, Volume= 4.564 af, Depth= 3.67"

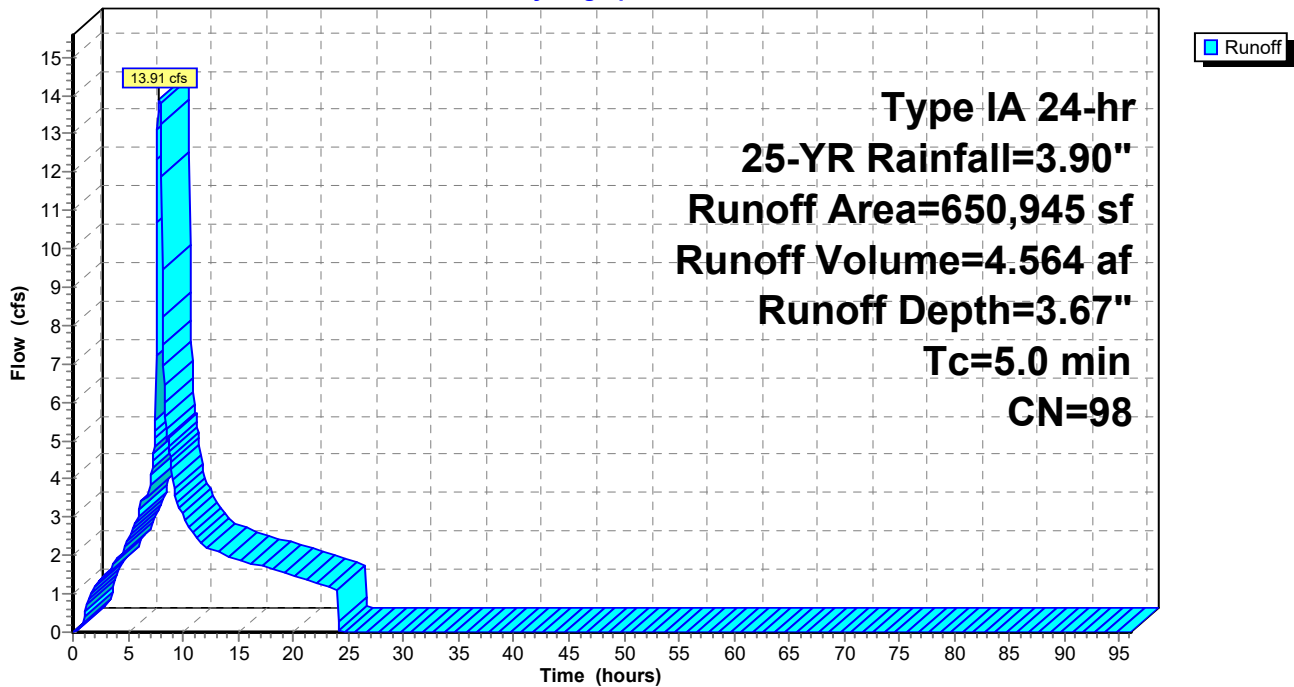
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
* 650,945	98	
650,945		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Developed Basin A

Hydrograph



Summary for Subcatchment 5S: Developed Basin B

Runoff = 2.69 cfs @ 7.86 hrs, Volume= 0.884 af, Depth= 3.67"

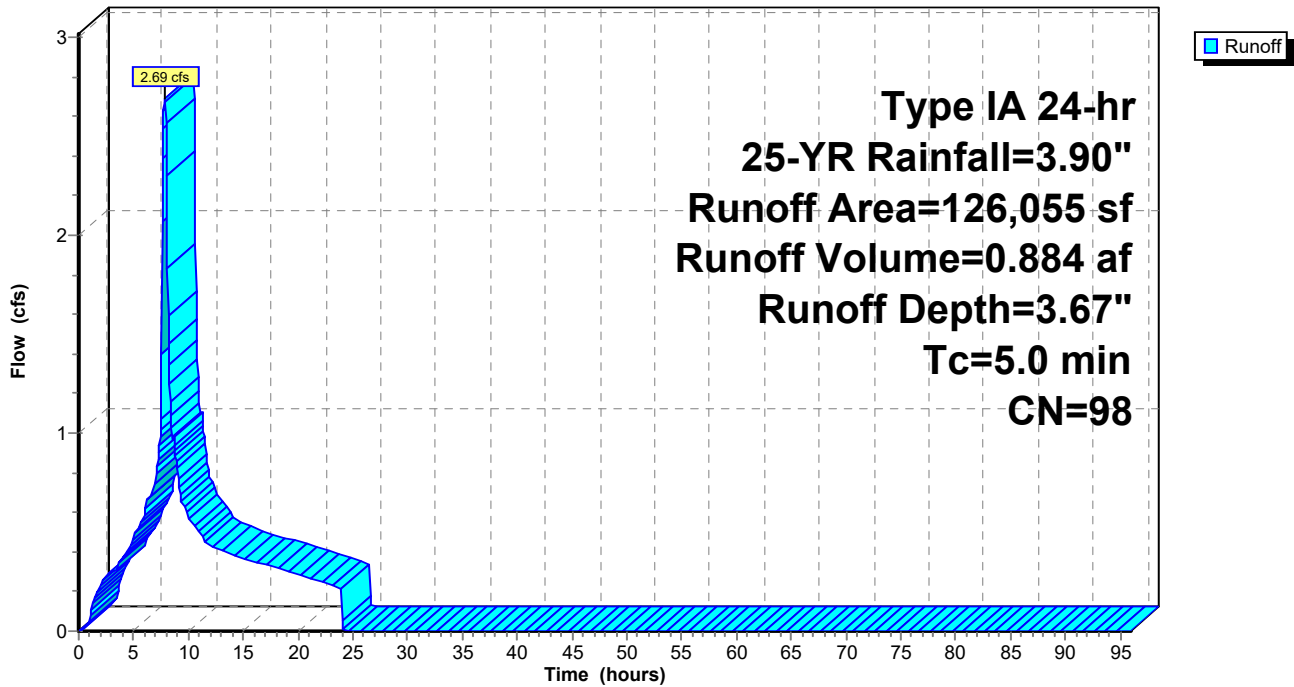
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-YR Rainfall=3.90"

	Area (sf)	CN	Description
*	69,225	98	Concrete
*	56,830	98	Roof
	126,055	98	Weighted Average
	126,055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: Developed Basin B

Hydrograph



Summary for Subcatchment 7S: Predeveloped Basin B

Runoff = 1.14 cfs @ 7.90 hrs, Volume= 0.418 af, Depth= 1.73"

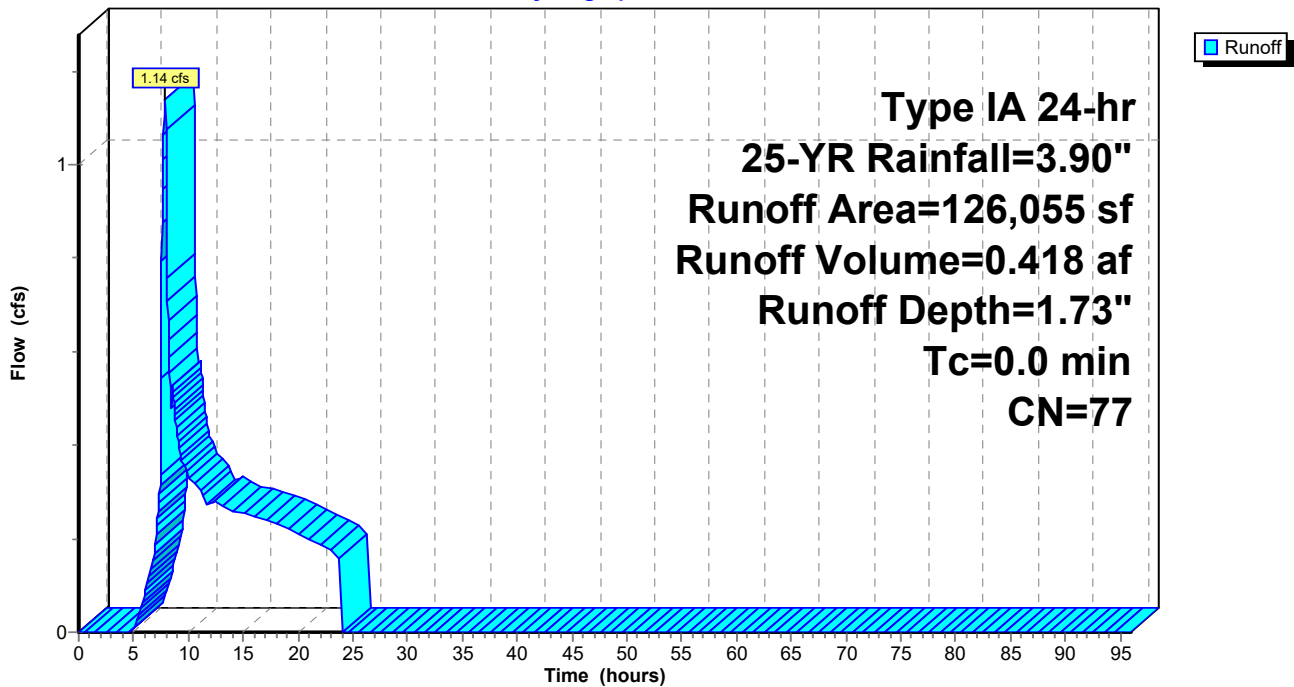
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
* 126,055	77	
126,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, 20

Subcatchment 7S: Predeveloped Basin B

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 14.944 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25-YR event
 Inflow = 13.91 cfs @ 7.86 hrs, Volume= 4.564 af
 Outflow = 3.49 cfs @ 9.32 hrs, Volume= 4.564 af, Atten= 75%, Lag= 87.7 min
 Primary = 3.49 cfs @ 9.32 hrs, Volume= 4.564 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 4.10' @ 9.32 hrs Surf.Area= 0.256 ac Storage= 1.907 af

Plug-Flow detention time= 849.9 min calculated for 4.562 af (100% of inflow)
 Center-of-Mass det. time= 850.9 min (1,510.4 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1.947 af	52.0" Round Pipe Storage L= 5,750.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	3.85'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

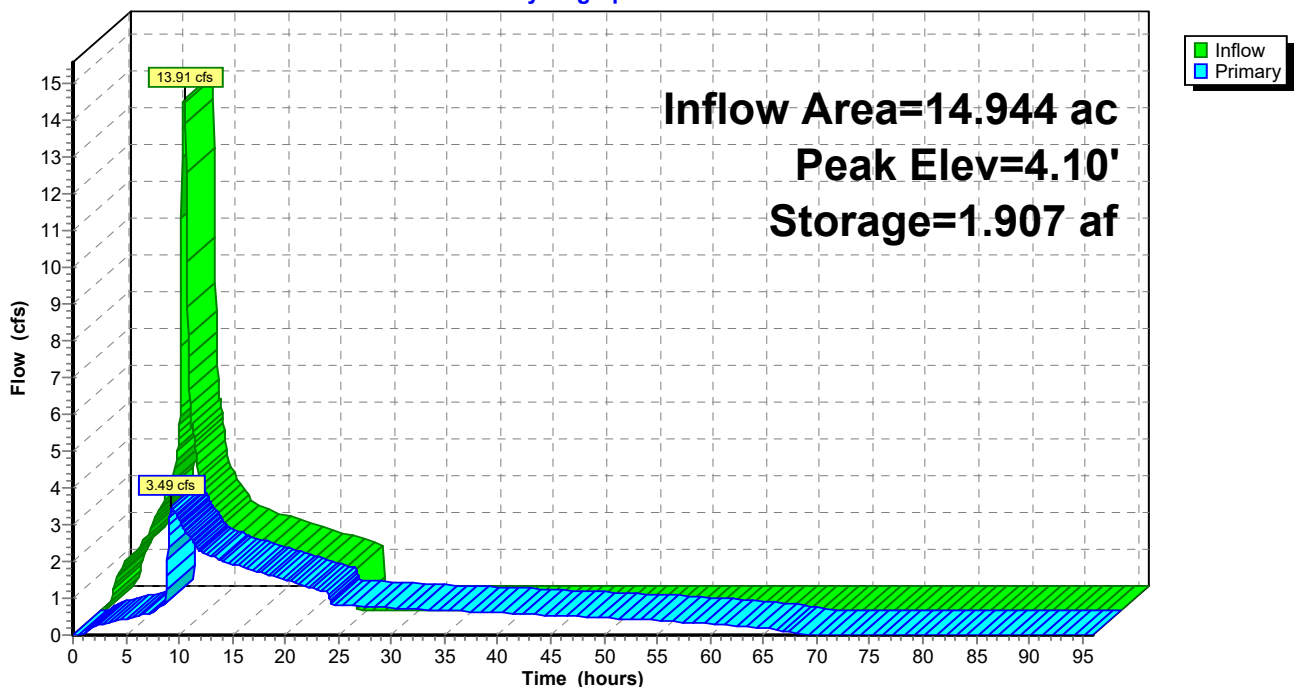
Primary OutFlow Max=3.48 cfs @ 9.32 hrs HW=4.10' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.85 cfs @ 9.75 fps)

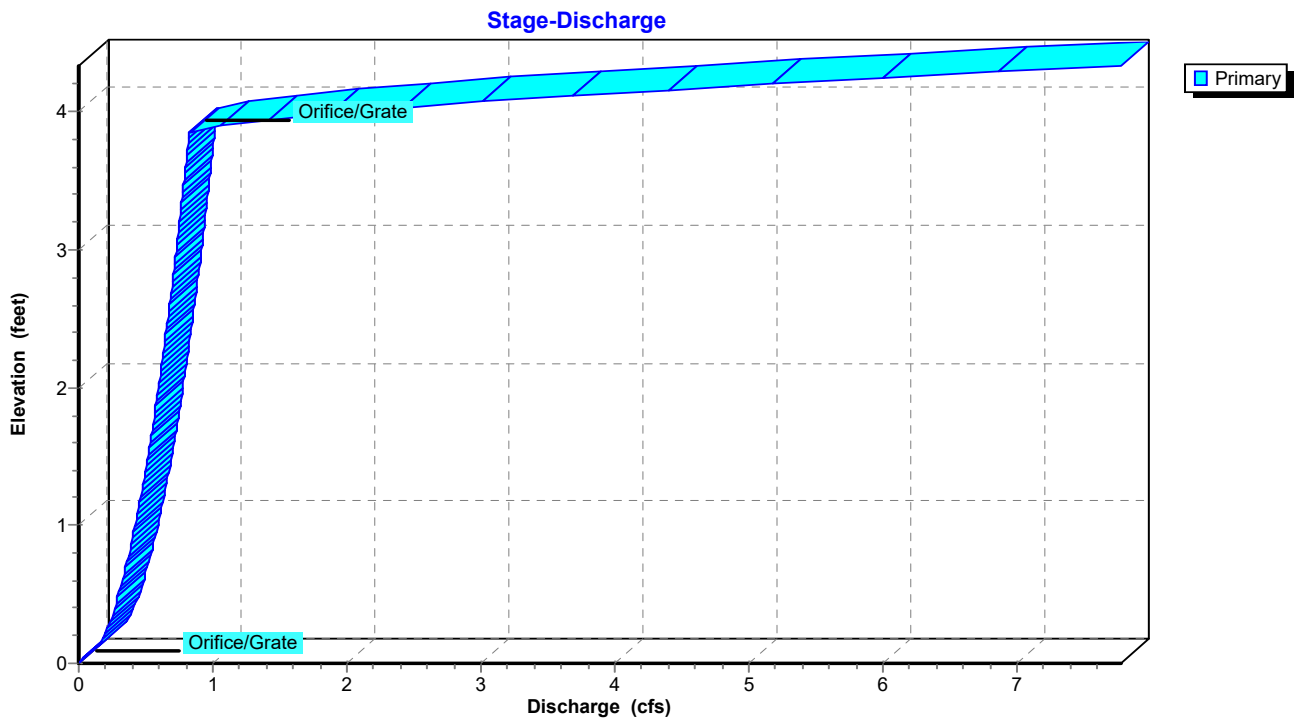
2=Orifice/Grate (Weir Controls 2.63 cfs @ 1.65 fps)

Pond 3P: Detention A

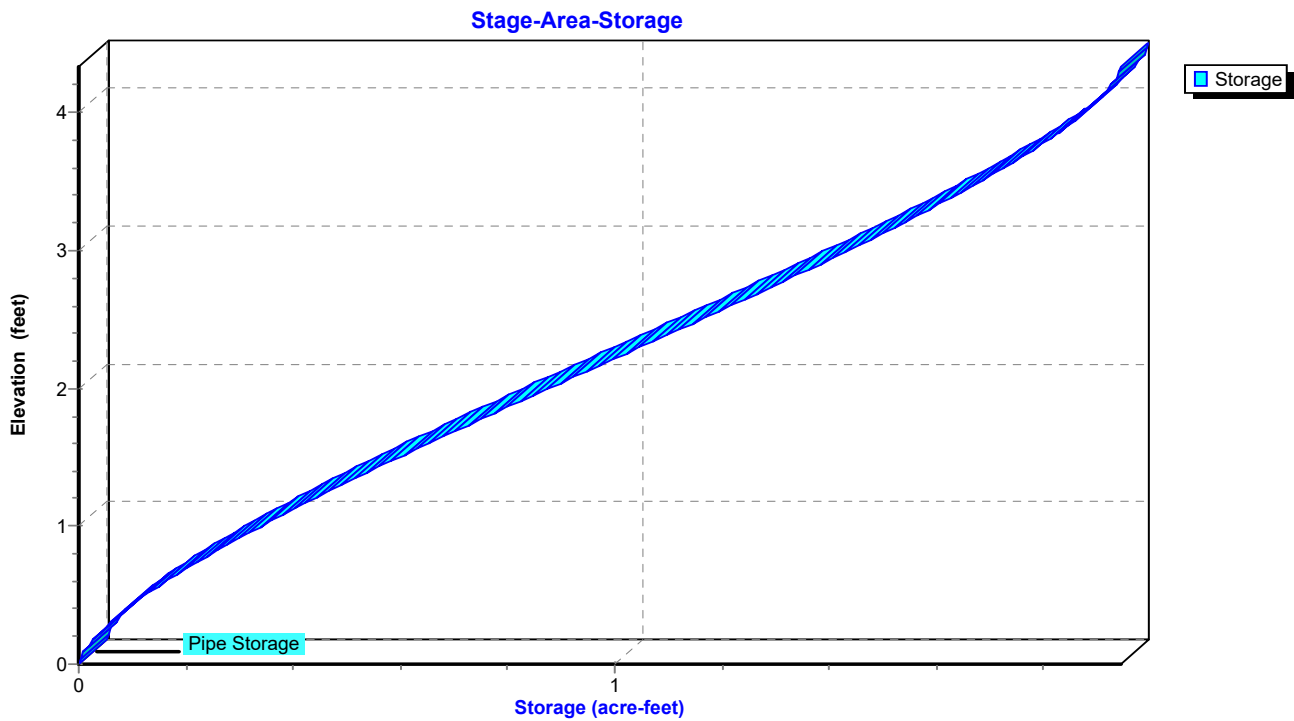
Hydrograph



Pond 3P: Detention A



Pond 3P: Detention A



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 25-YR Rainfall=3.90"

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Summary for Pond 6P: Detention B

Inflow Area = 2.894 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25-YR event
 Inflow = 2.69 cfs @ 7.86 hrs, Volume= 0.884 af
 Outflow = 1.08 cfs @ 8.41 hrs, Volume= 0.884 af, Atten= 60%, Lag= 33.5 min
 Primary = 1.08 cfs @ 8.41 hrs, Volume= 0.884 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 2.59' @ 8.41 hrs Surf.Area= 0.177 ac Storage= 0.300 af

Plug-Flow detention time= 528.9 min calculated for 0.883 af (100% of inflow)
 Center-of-Mass det. time= 529.5 min (1,189.0 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.000 af	20.41'W x 200.00'L x 2.75'H Field A 0.258 af Overall - 0.163 af Embedded = 0.094 af x 0.0% Voids
#2A	0.00'	0.163 af	CMP Arch 49x33 x 40 Inside #1 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 40 Chambers in 4 Rows
#3B	0.00'	0.000 af	25.85'W x 140.00'L x 2.75'H Field B 0.228 af Overall - 0.143 af Embedded = 0.085 af x 0.0% Voids
#4B	0.00'	0.143 af	CMP Arch 49x33 x 35 Inside #3 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 35 Chambers in 5 Rows
		0.306 af	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	2.3" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	2.10'	6.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	2.52'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.07 cfs @ 8.41 hrs HW=2.58' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.22 cfs @ 7.74 fps)

2=Orifice/Grate (Orifice Controls 0.51 cfs @ 2.46 fps)

3=Orifice/Grate (Weir Controls 0.34 cfs @ 0.83 fps)

Pond 6P: Detention B - Chamber Wizard Field A

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

10 Chambers/Row x 20.00' Long = 200.00' Row Length

4 Rows x 49.0" Wide + 16.3" Spacing x 3 = 20.41' Base Width

33.0" Chamber Height = 2.75' Field Height

40 Chambers x 178.0 cf = 7,118.3 cf Chamber Storage

11,224.6 cf Field - 7,118.3 cf Chambers = 4,106.3 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 7,118.3 cf = 0.163 af

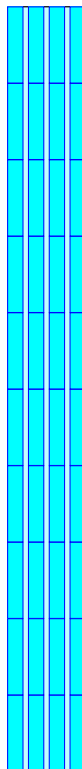
Overall Storage Efficiency = 63.4%

Overall System Size = 200.00' x 20.41' x 2.75'

40 Chambers

415.7 cy Field

152.1 cy Stone



Pond 6P: Detention B - Chamber Wizard Field B

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

7 Chambers/Row x 20.00' Long = 140.00' Row Length

5 Rows x 49.0" Wide + 16.3" Spacing x 4 = 25.85' Base Width

33.0" Chamber Height = 2.75' Field Height

35 Chambers x 178.0 cf = 6,228.5 cf Chamber Storage

9,952.3 cf Field - 6,228.5 cf Chambers = 3,723.8 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 6,228.5 cf = 0.143 af

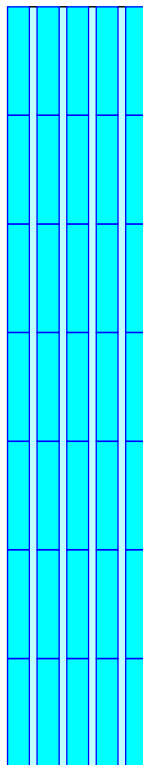
Overall Storage Efficiency = 62.6%

Overall System Size = 140.00' x 25.85' x 2.75'

35 Chambers

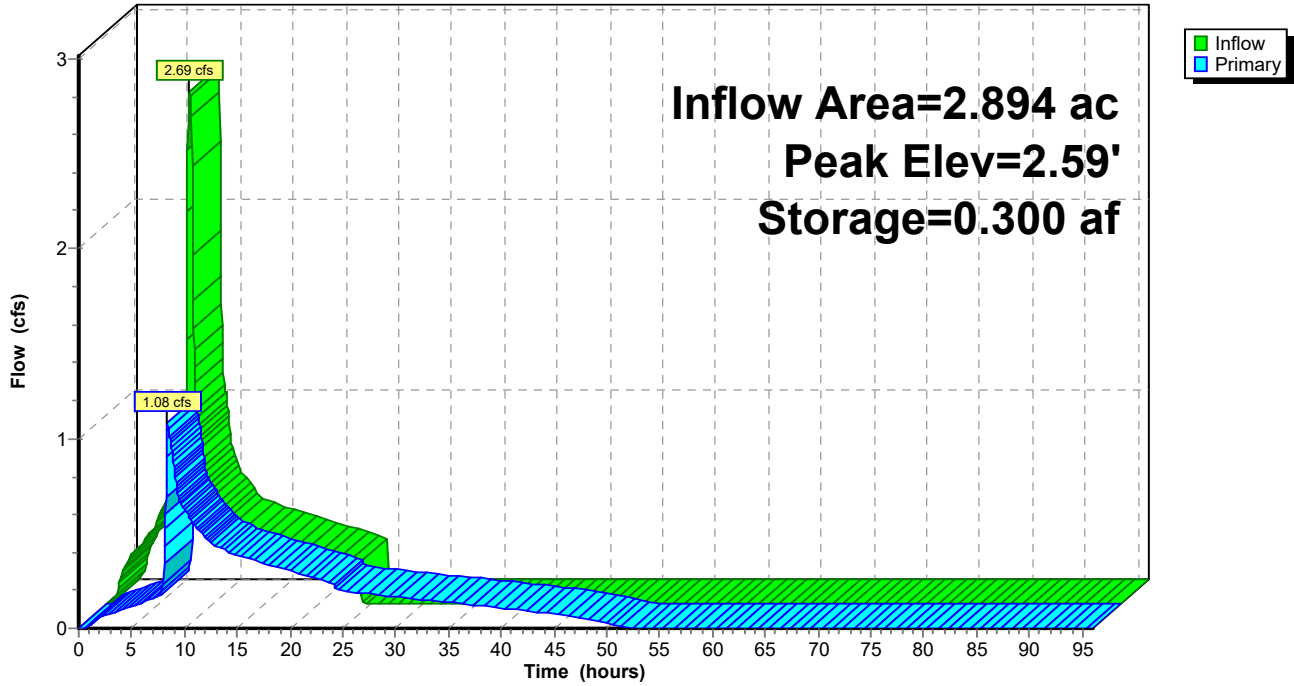
368.6 cy Field

137.9 cy Stone



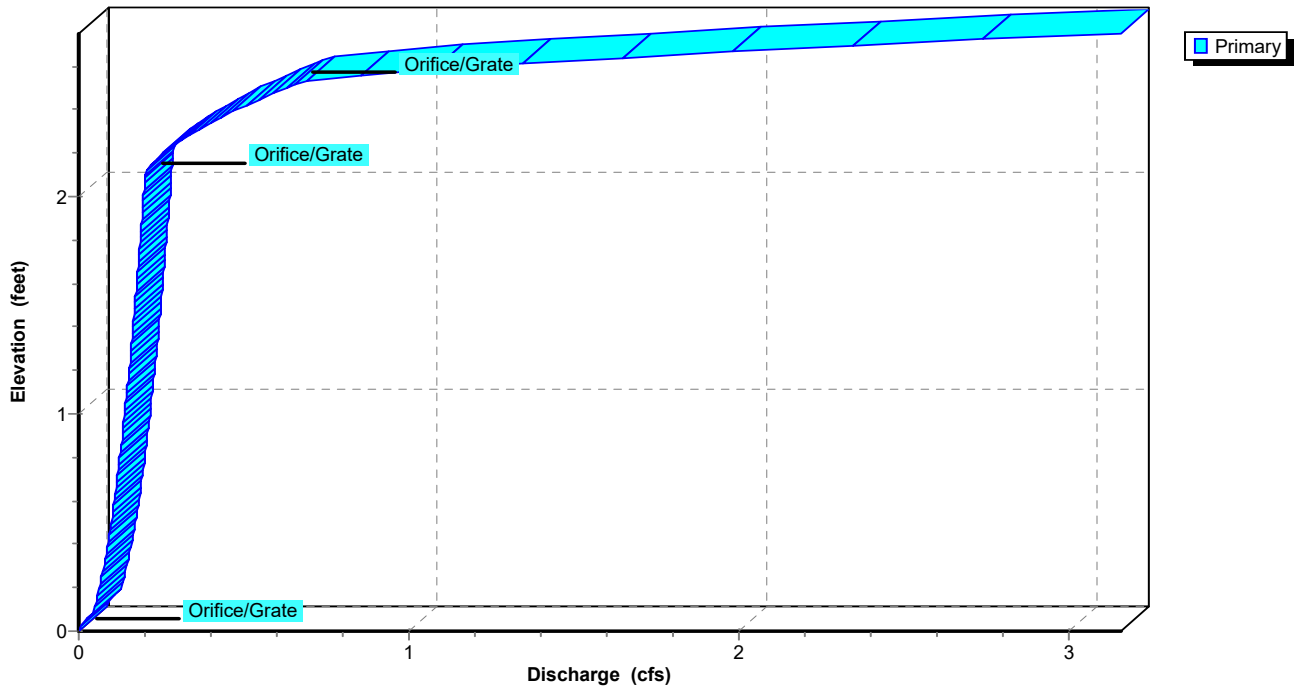
Pond 6P: Detention B

Hydrograph



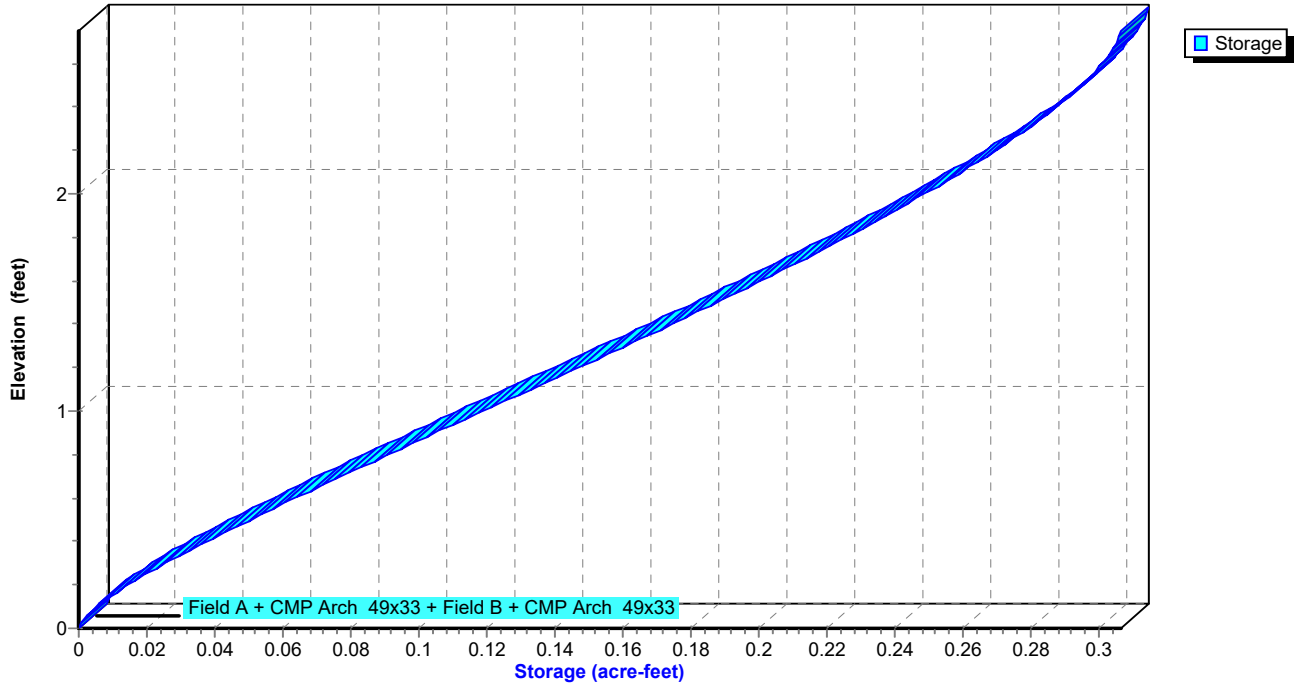
Pond 6P: Detention B

Stage-Discharge



Pond 6P: Detention B

Stage-Area-Storage



Summary for Subcatchment 1S: Predeveloped Basin A

Runoff = 6.51 cfs @ 8.24 hrs, Volume= 2.753 af, Depth= 2.21"

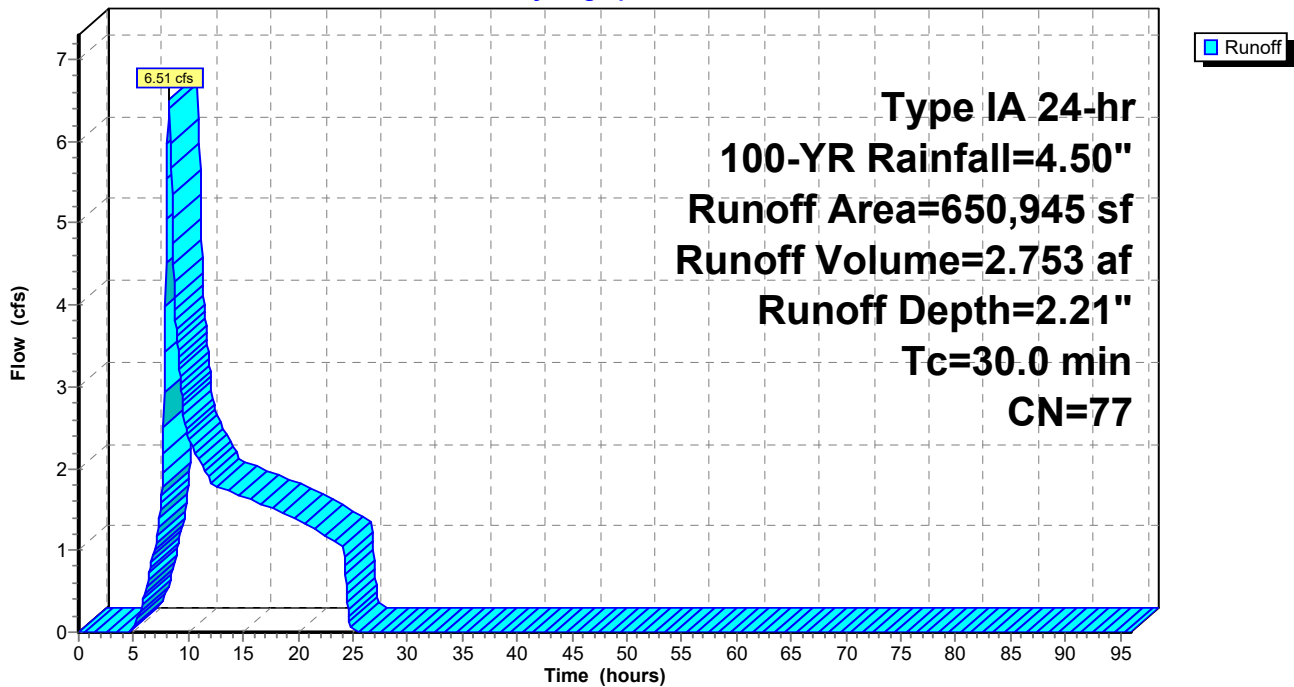
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
* 650,945	77	>75% Grass cover, Good, HSG D
650,945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 1S: Predeveloped Basin A

Hydrograph



Summary for Subcatchment 2S: Developed Basin A

Runoff = 16.11 cfs @ 7.85 hrs, Volume= 5.310 af, Depth= 4.26"

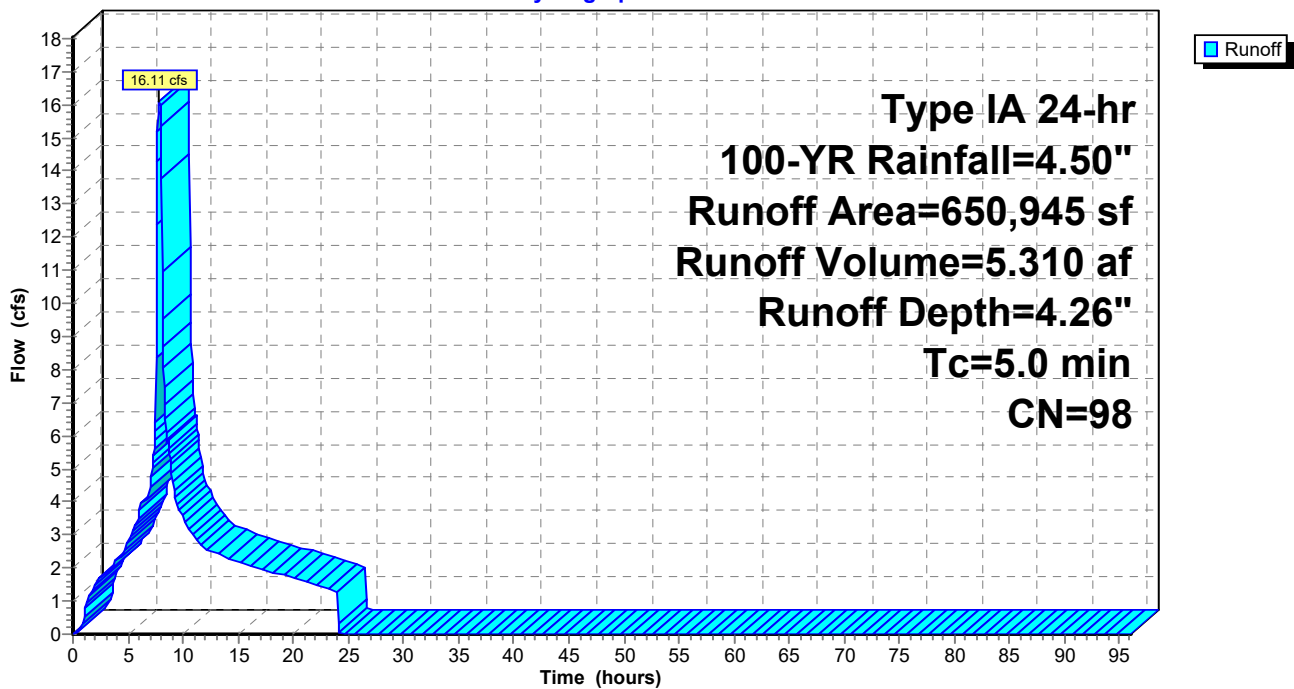
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
* 650,945	98	
650,945		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Developed Basin A

Hydrograph



Summary for Subcatchment 5S: Developed Basin B

Runoff = 3.12 cfs @ 7.85 hrs, Volume= 1.028 af, Depth= 4.26"

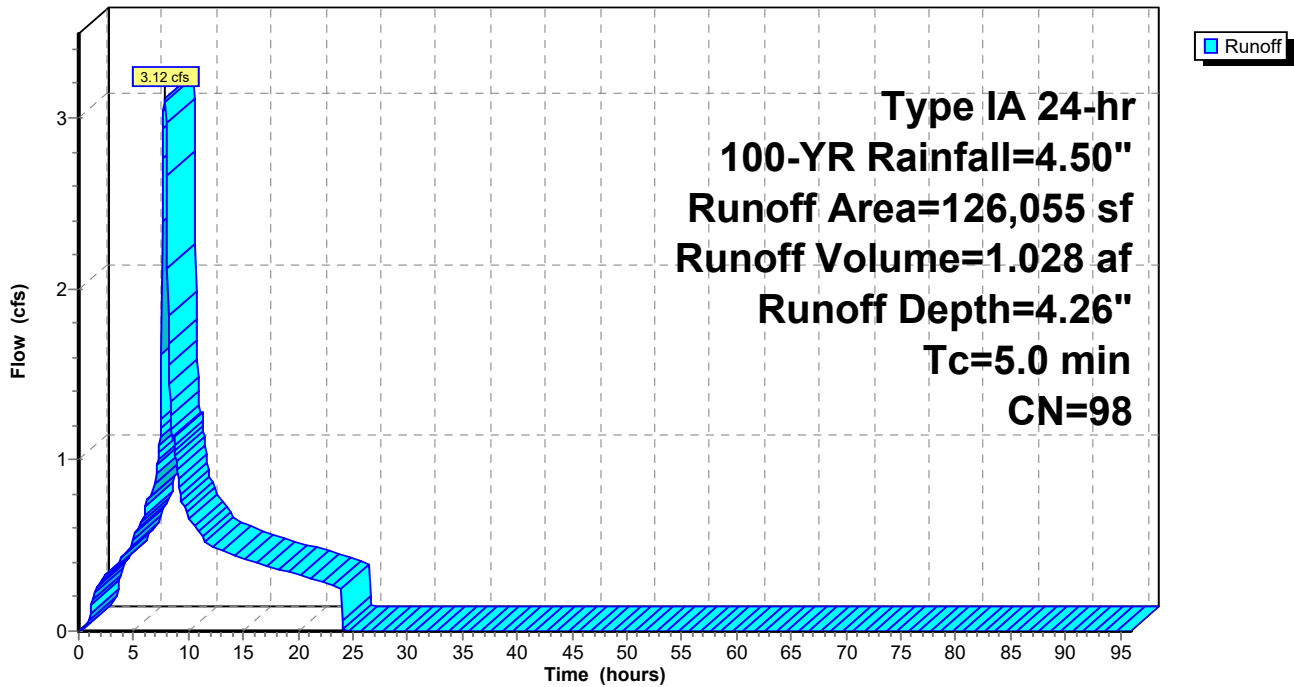
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100-YR Rainfall=4.50"

	Area (sf)	CN	Description
*	69,225	98	Concrete
*	56,830	98	Roof
	126,055	98	Weighted Average
	126,055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: Developed Basin B

Hydrograph



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 100-YR Rainfall=4.50"

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Summary for Subcatchment 7S: Predeveloped Basin B

Runoff = 1.51 cfs @ 7.89 hrs, Volume= 0.533 af, Depth= 2.21"

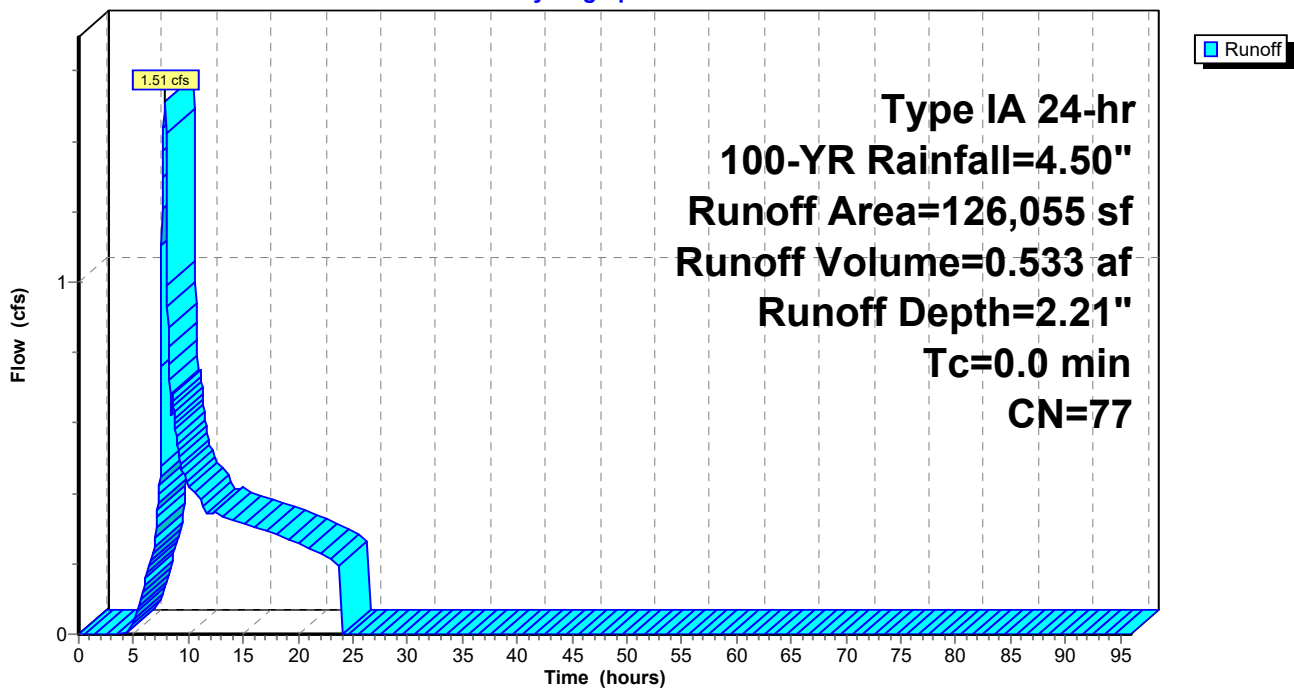
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
* 126,055	77	
126,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, 20

Subcatchment 7S: Predeveloped Basin B

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 14.944 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100-YR event
 Inflow = 16.11 cfs @ 7.85 hrs, Volume= 5.310 af
 Outflow = 6.59 cfs @ 8.40 hrs, Volume= 5.310 af, Atten= 59%, Lag= 32.6 min
 Primary = 6.59 cfs @ 8.40 hrs, Volume= 5.310 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 4.28' @ 8.40 hrs Surf.Area= 0.131 ac Storage= 1.942 af

Plug-Flow detention time= 742.7 min calculated for 5.307 af (100% of inflow)
 Center-of-Mass det. time= 743.7 min (1,399.9 - 656.2)

Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1.947 af	52.0" Round Pipe Storage L= 5,750.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	3.85'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

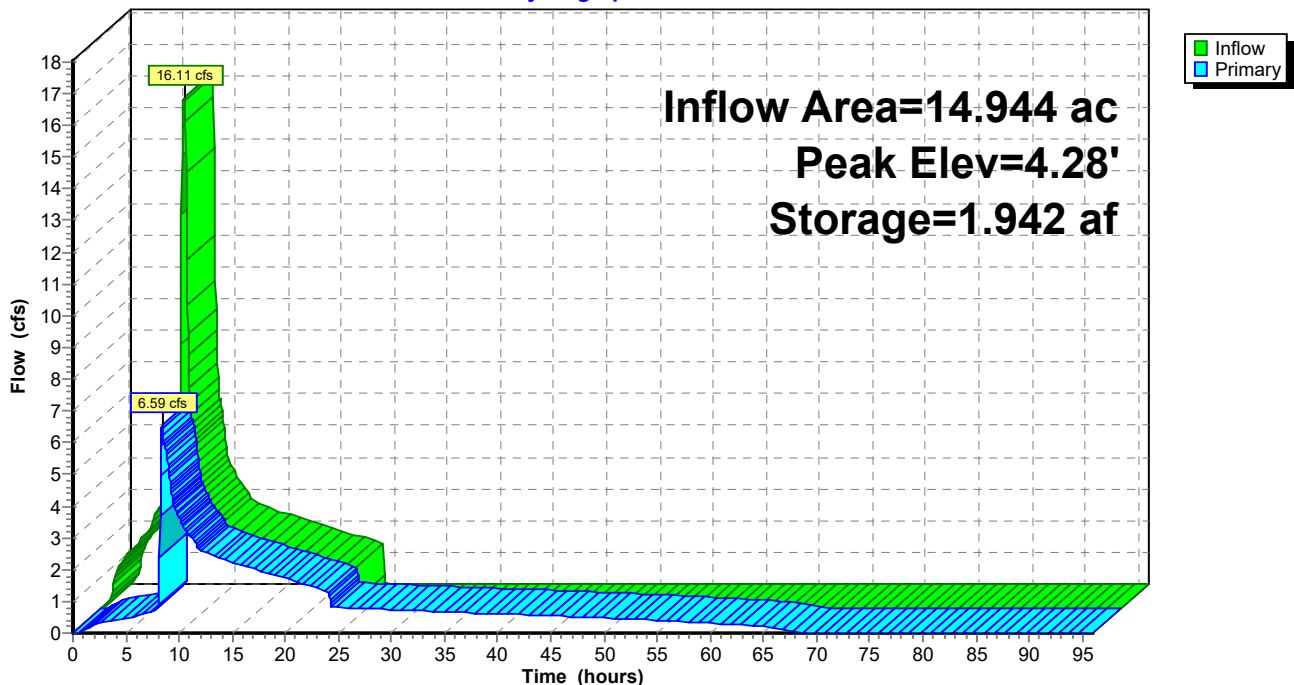
Primary OutFlow Max=6.58 cfs @ 8.40 hrs HW=4.28' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.87 cfs @ 9.96 fps)

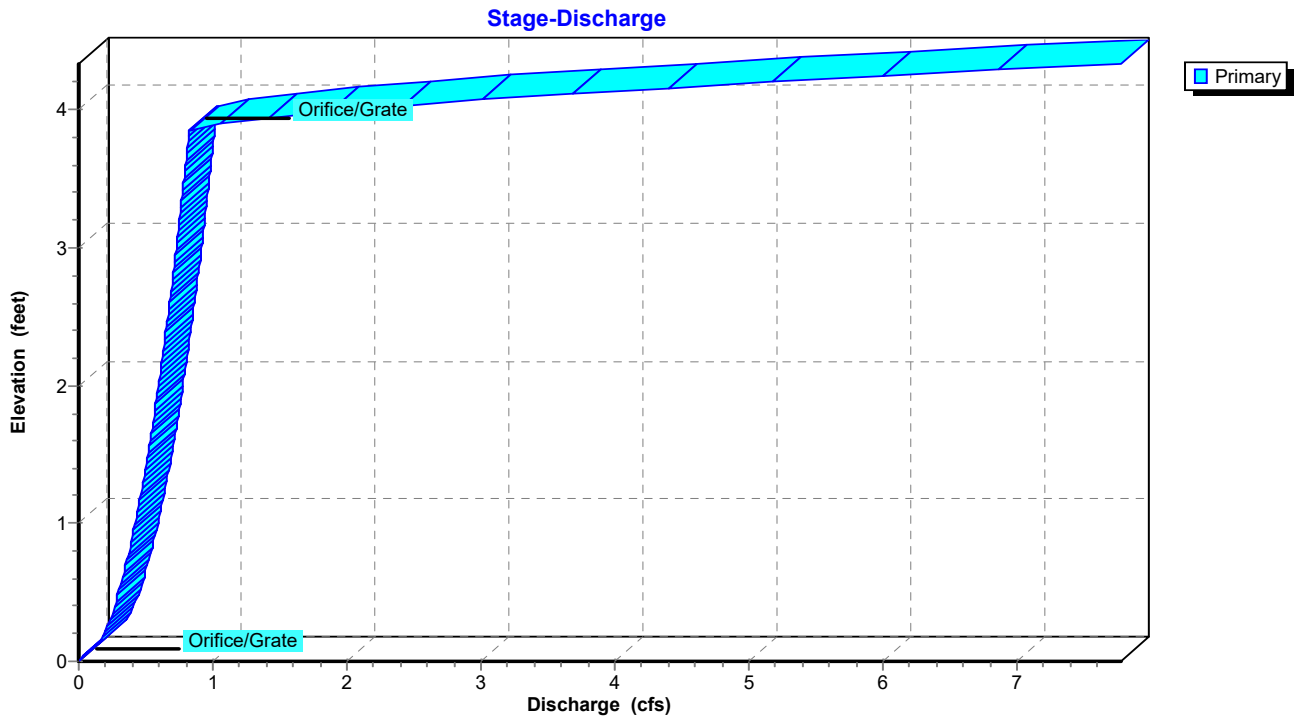
2=Orifice/Grate (Weir Controls 5.71 cfs @ 2.13 fps)

Pond 3P: Detention A

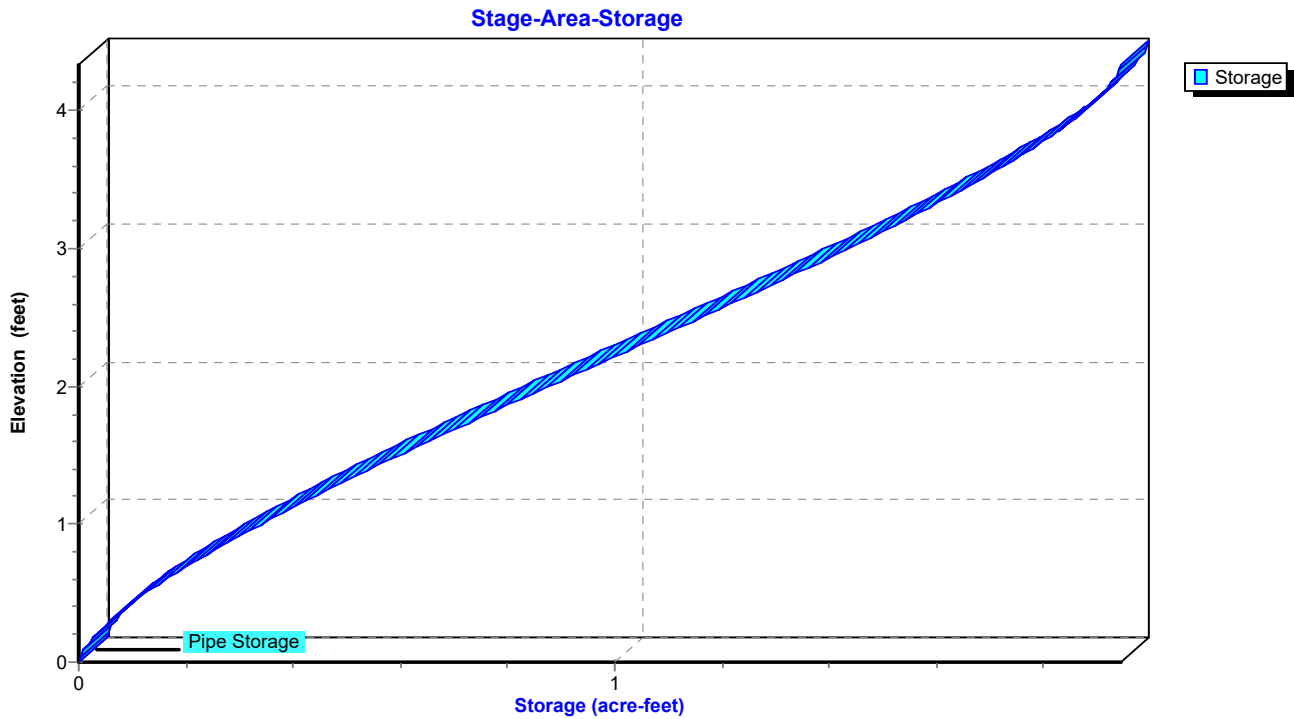
Hydrograph



Pond 3P: Detention A



Pond 3P: Detention A



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 100-YR Rainfall=4.50"

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Summary for Pond 6P: Detention B

Inflow Area = 2.894 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100-YR event
Inflow = 3.12 cfs @ 7.85 hrs, Volume= 1.028 af
Outflow = 3.02 cfs @ 8.02 hrs, Volume= 1.028 af, Atten= 3%, Lag= 9.9 min
Primary = 3.02 cfs @ 8.02 hrs, Volume= 1.028 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 2.74' @ 8.02 hrs Surf.Area= 0.177 ac Storage= 0.306 af

Plug-Flow detention time= 468.1 min calculated for 1.028 af (100% of inflow)
Center-of-Mass det. time= 468.7 min (1,125.0 - 656.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.000 af	20.41'W x 200.00'L x 2.75'H Field A 0.258 af Overall - 0.163 af Embedded = 0.094 af x 0.0% Voids
#2A	0.00'	0.163 af	CMP Arch 49x33 x 40 Inside #1 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 40 Chambers in 4 Rows
#3B	0.00'	0.000 af	25.85'W x 140.00'L x 2.75'H Field B 0.228 af Overall - 0.143 af Embedded = 0.085 af x 0.0% Voids
#4B	0.00'	0.143 af	CMP Arch 49x33 x 35 Inside #3 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 35 Chambers in 5 Rows
		0.306 af	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	2.3" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	2.10'	6.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	2.52'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.86 cfs @ 8.02 hrs HW=2.73' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.23 cfs @ 7.96 fps)

2=Orifice/Grate (Orifice Controls 0.65 cfs @ 3.10 fps)

3=Orifice/Grate (Weir Controls 1.99 cfs @ 1.50 fps)

Pond 6P: Detention B - Chamber Wizard Field A

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

10 Chambers/Row x 20.00' Long = 200.00' Row Length

4 Rows x 49.0" Wide + 16.3" Spacing x 3 = 20.41' Base Width

33.0" Chamber Height = 2.75' Field Height

40 Chambers x 178.0 cf = 7,118.3 cf Chamber Storage

11,224.6 cf Field - 7,118.3 cf Chambers = 4,106.3 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 7,118.3 cf = 0.163 af

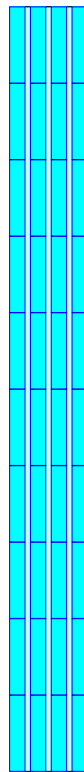
Overall Storage Efficiency = 63.4%

Overall System Size = 200.00' x 20.41' x 2.75'

40 Chambers

415.7 cy Field

152.1 cy Stone



Pond 6P: Detention B - Chamber Wizard Field B

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

7 Chambers/Row x 20.00' Long = 140.00' Row Length

5 Rows x 49.0" Wide + 16.3" Spacing x 4 = 25.85' Base Width

33.0" Chamber Height = 2.75' Field Height

35 Chambers x 178.0 cf = 6,228.5 cf Chamber Storage

9,952.3 cf Field - 6,228.5 cf Chambers = 3,723.8 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 6,228.5 cf = 0.143 af

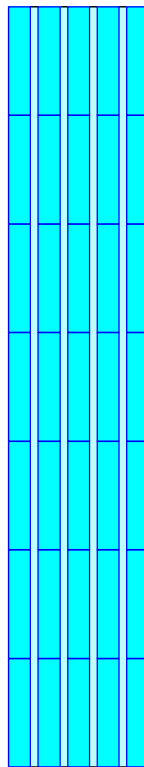
Overall Storage Efficiency = 62.6%

Overall System Size = 140.00' x 25.85' x 2.75'

35 Chambers

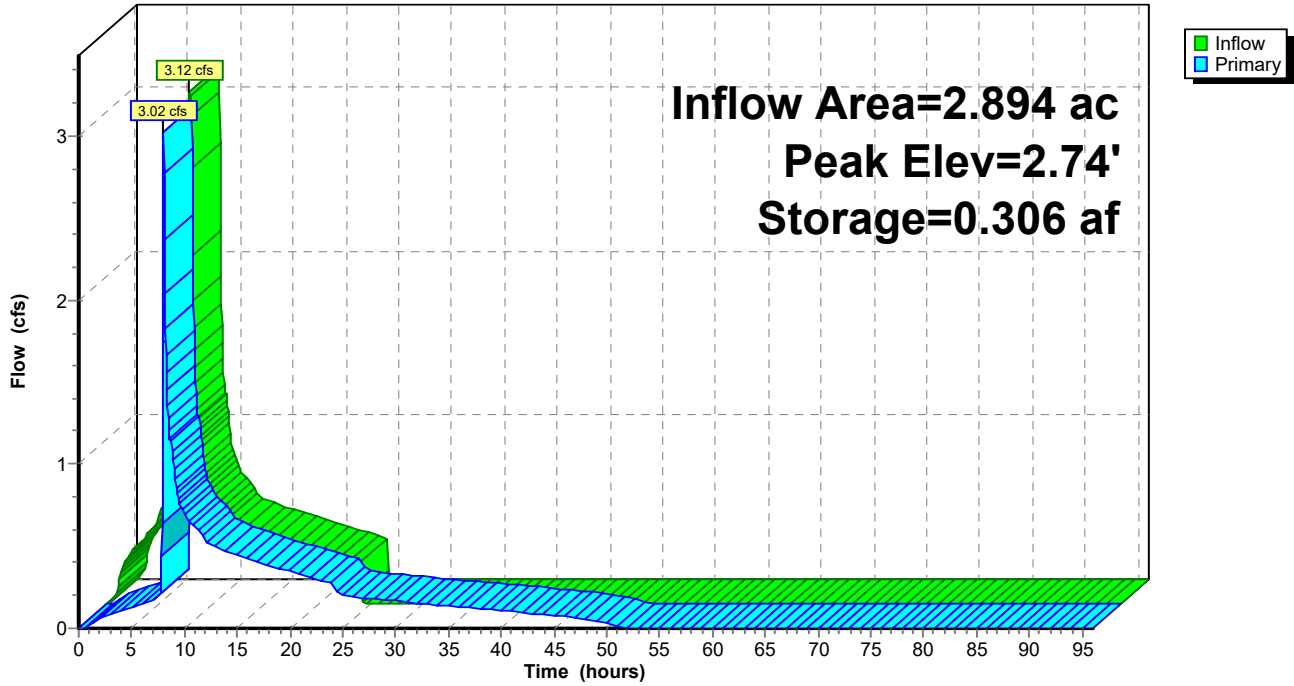
368.6 cy Field

137.9 cy Stone



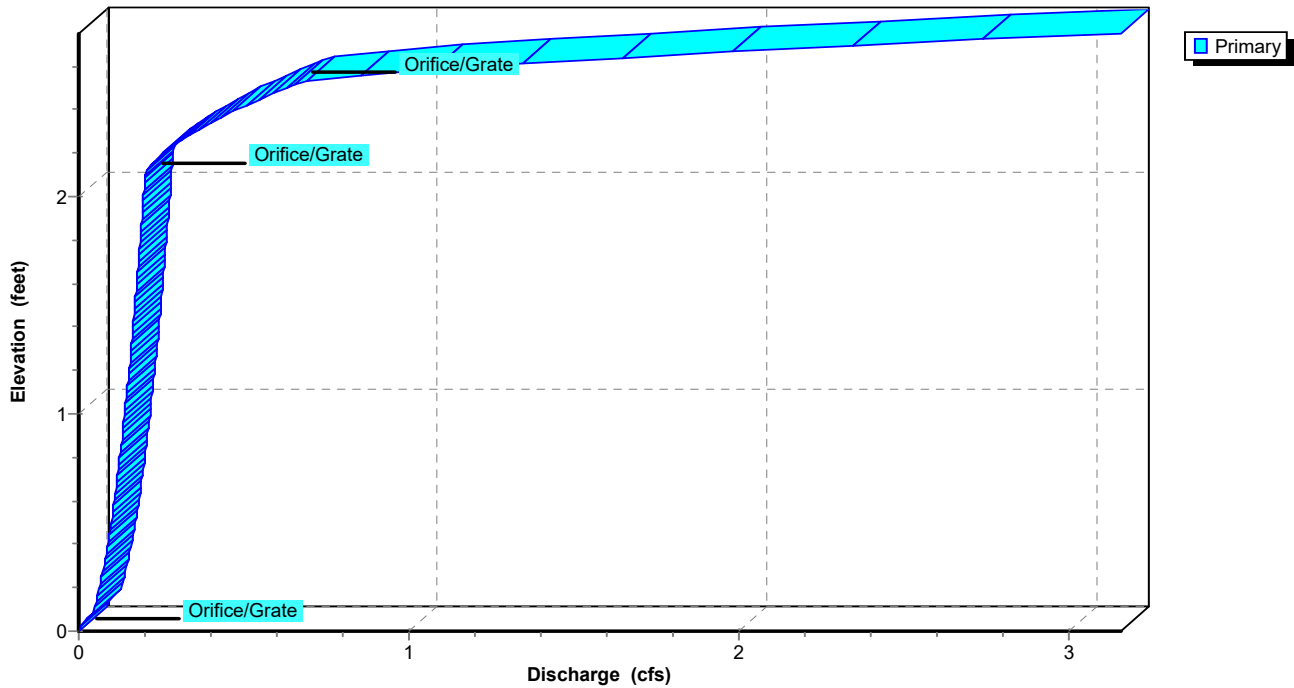
Pond 6P: Detention B

Hydrograph



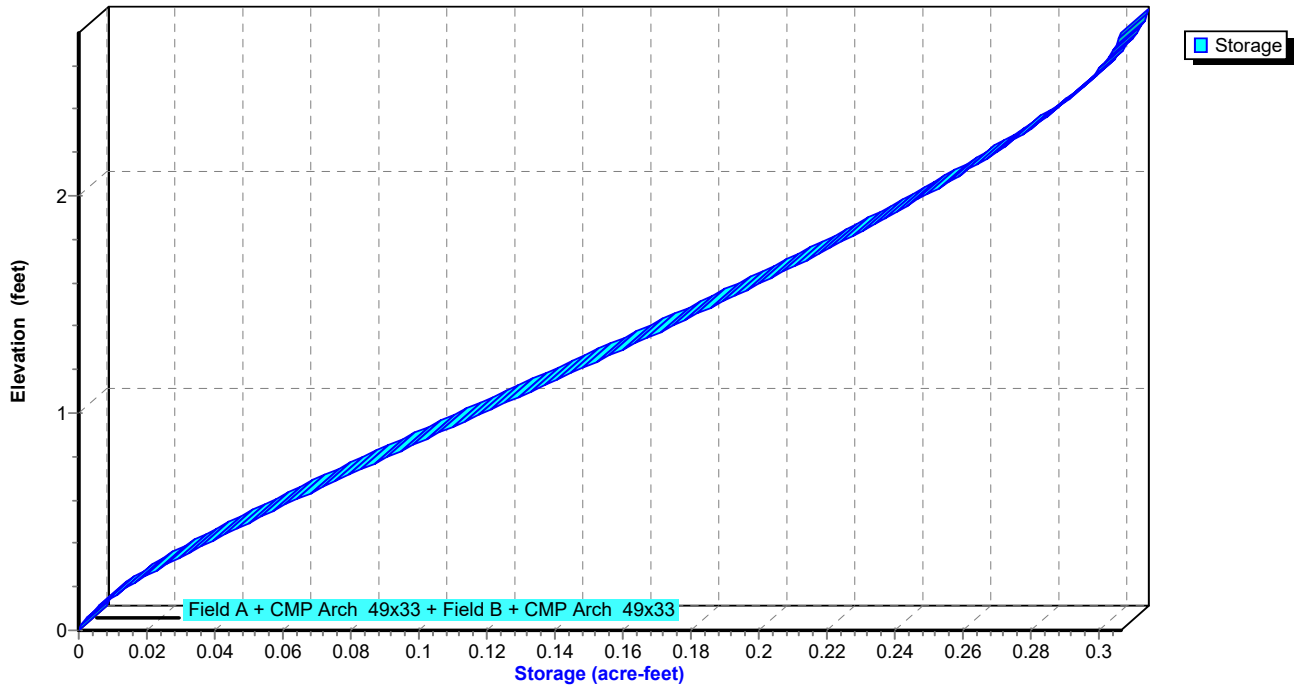
Pond 6P: Detention B

Stage-Discharge



Pond 6P: Detention B

Stage-Area-Storage



Summary for Subcatchment 1S: Predeveloped Basin A

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

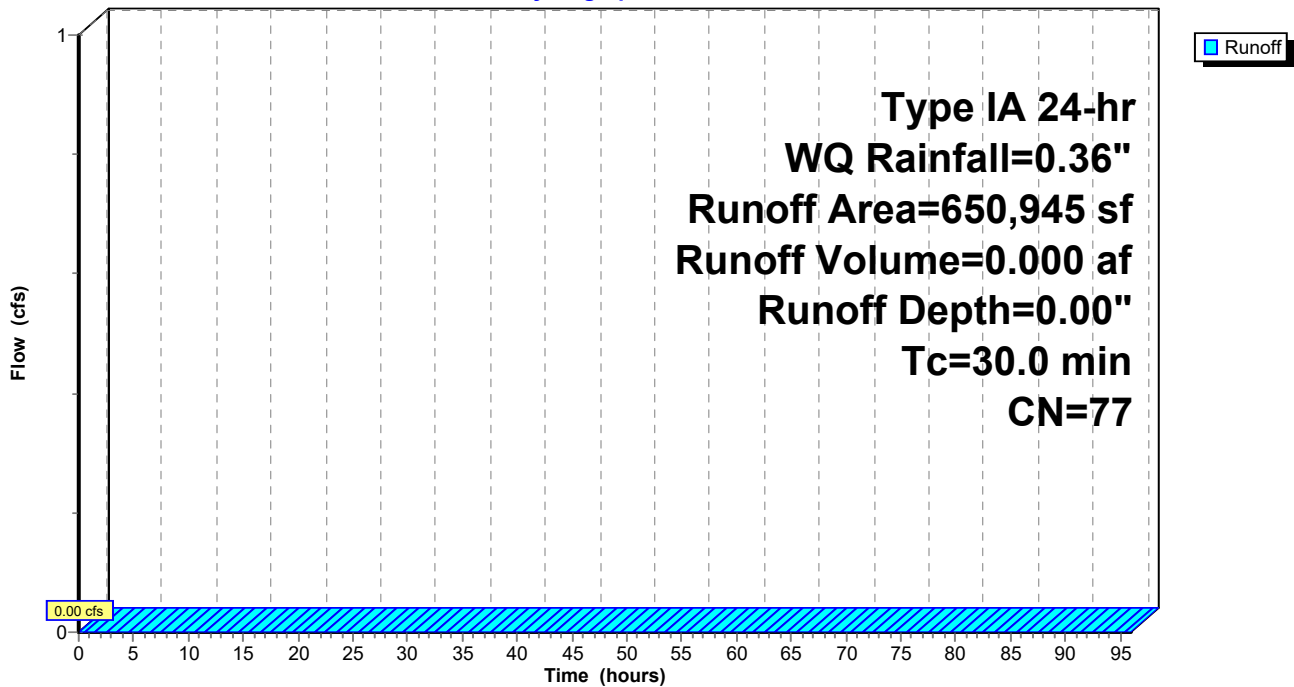
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
* 650,945	77	>75% Grass cover, Good, HSG D
650,945		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 1S: Predeveloped Basin A

Hydrograph



Summary for Subcatchment 2S: Developed Basin A

Runoff = 0.71 cfs @ 7.95 hrs, Volume= 0.242 af, Depth= 0.19"

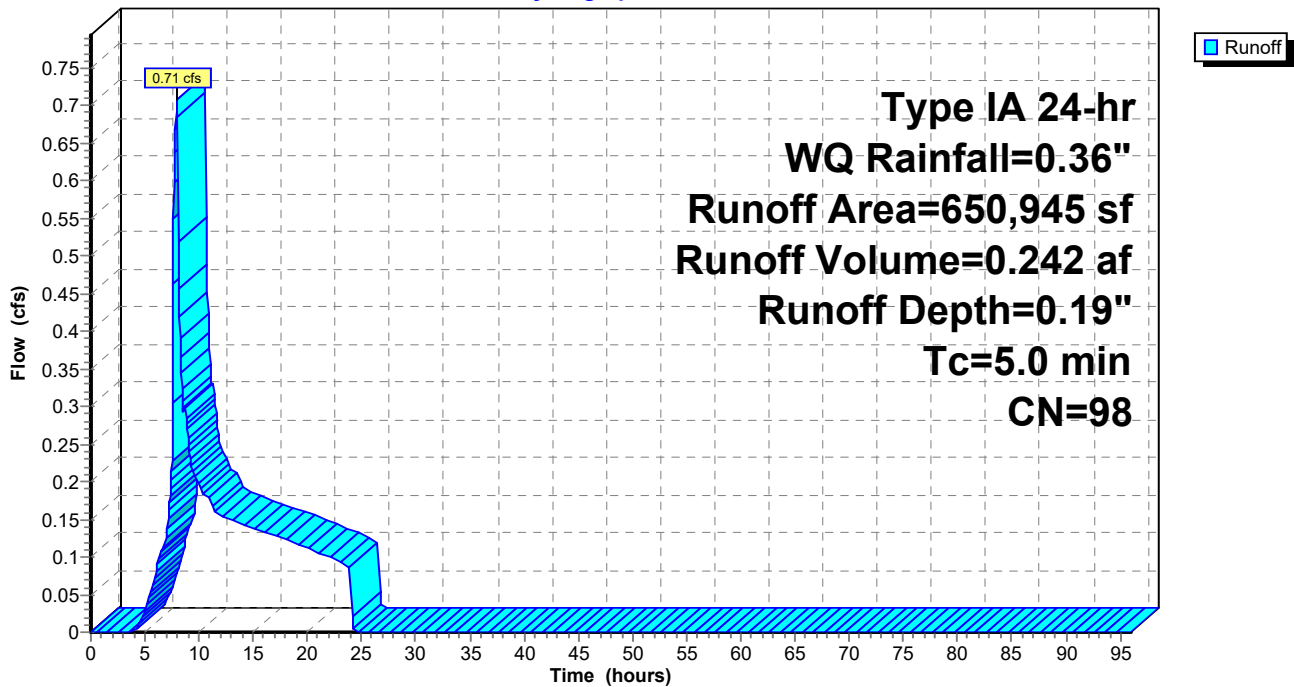
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
* 650,945	98	
650,945		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 2S: Developed Basin A

Hydrograph



Summary for Subcatchment 5S: Developed Basin B

Runoff = 0.14 cfs @ 7.95 hrs, Volume= 0.047 af, Depth= 0.19"

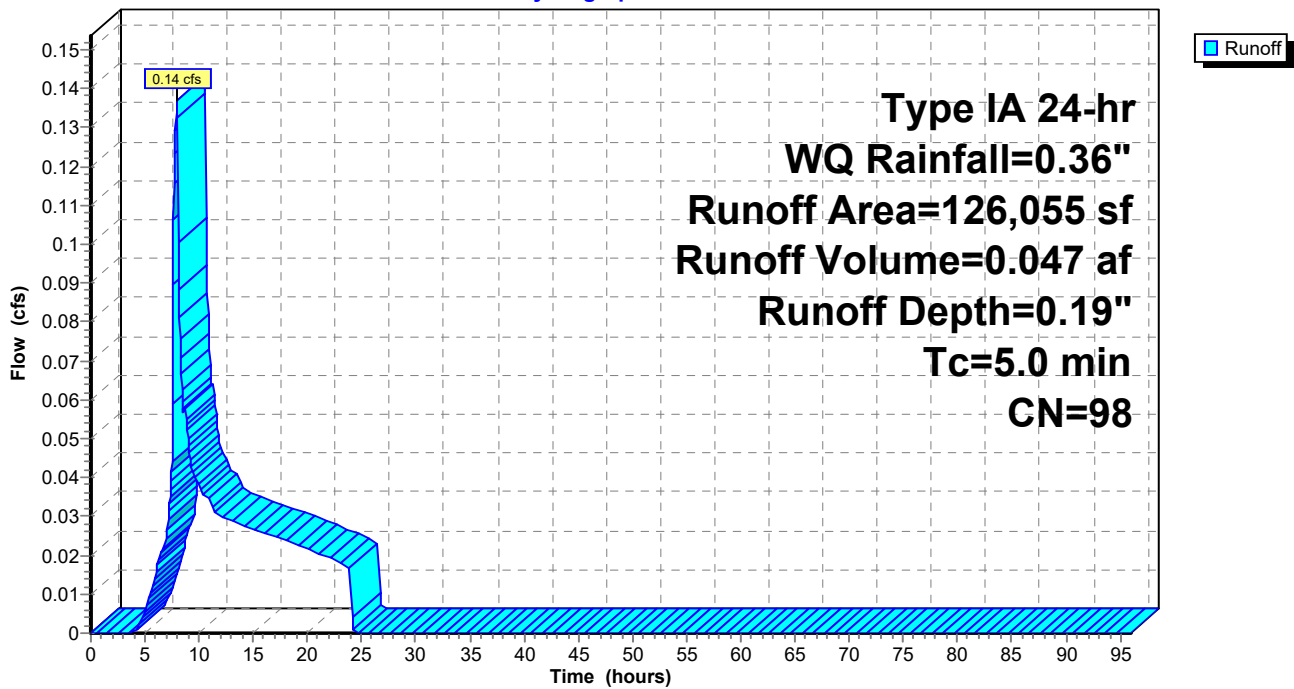
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=0.36"

	Area (sf)	CN	Description
*	69,225	98	Concrete
*	56,830	98	Roof
	126,055	98	Weighted Average
	126,055		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 5S: Developed Basin B

Hydrograph



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr WQ Rainfall=0.36"

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Summary for Subcatchment 7S: Predeveloped Basin B

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

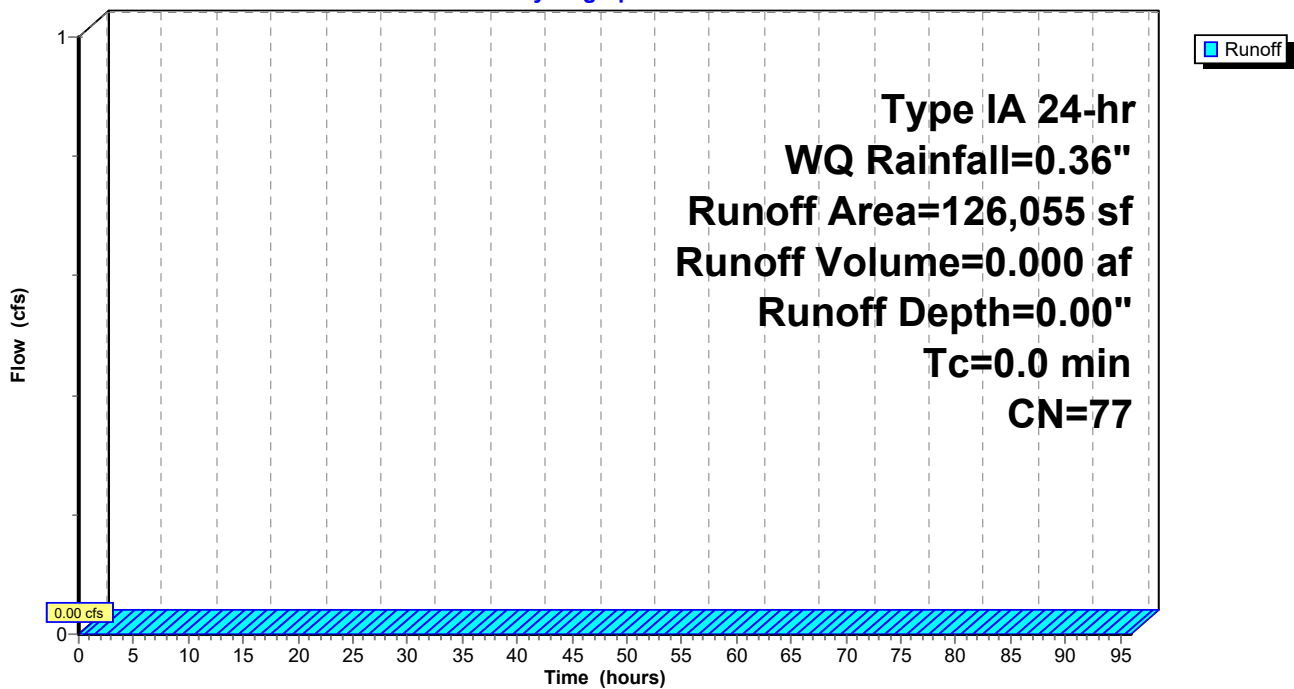
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
* 126,055	77	
126,055		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
0.0					Direct Entry, 20

Subcatchment 7S: Predeveloped Basin B

Hydrograph



Summary for Pond 3P: Detention A

Inflow Area = 14.944 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ event
 Inflow = 0.71 cfs @ 7.95 hrs, Volume= 0.242 af
 Outflow = 0.21 cfs @ 9.69 hrs, Volume= 0.242 af, Atten= 71%, Lag= 104.4 min
 Primary = 0.21 cfs @ 9.69 hrs, Volume= 0.242 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 0.24' @ 9.69 hrs Surf.Area= 0.263 ac Storage= 0.043 af

Plug-Flow detention time= 110.3 min calculated for 0.242 af (100% of inflow)
 Center-of-Mass det. time= 110.5 min (897.8 - 787.3)

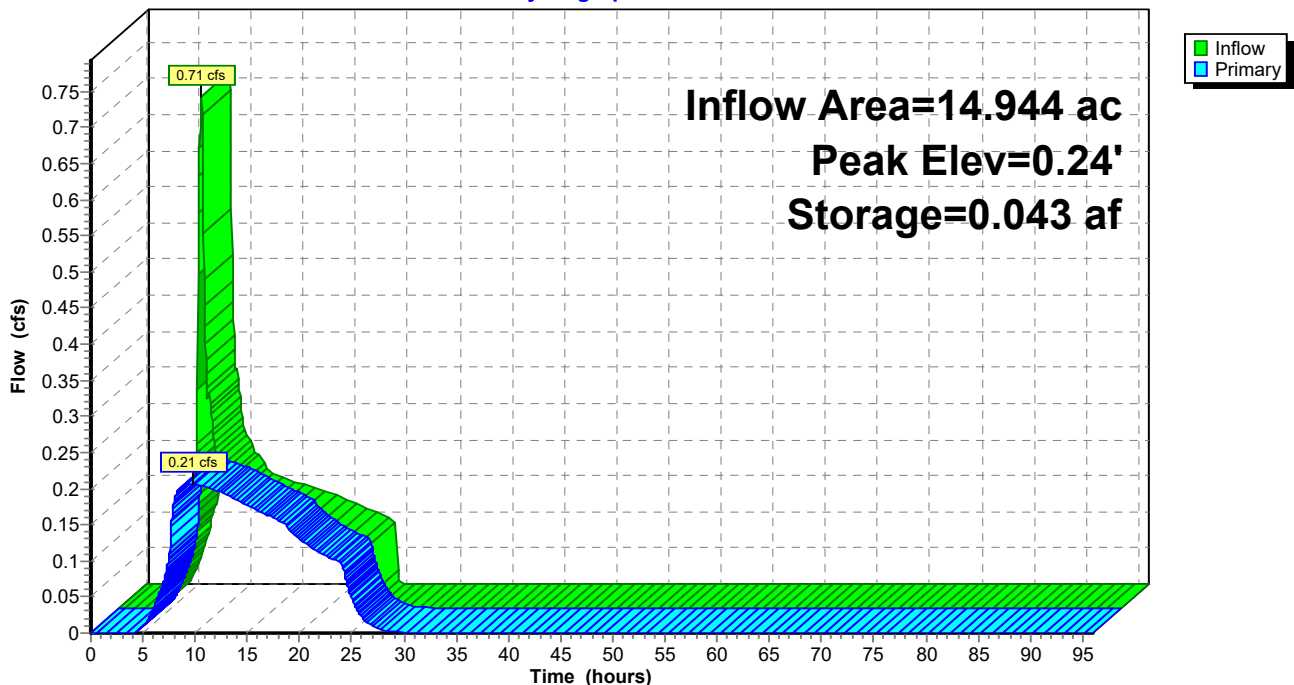
Volume	Invert	Avail.Storage	Storage Description
#1	0.00'	1.947 af	52.0" Round Pipe Storage L= 5,750.0'

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	4.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	3.85'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

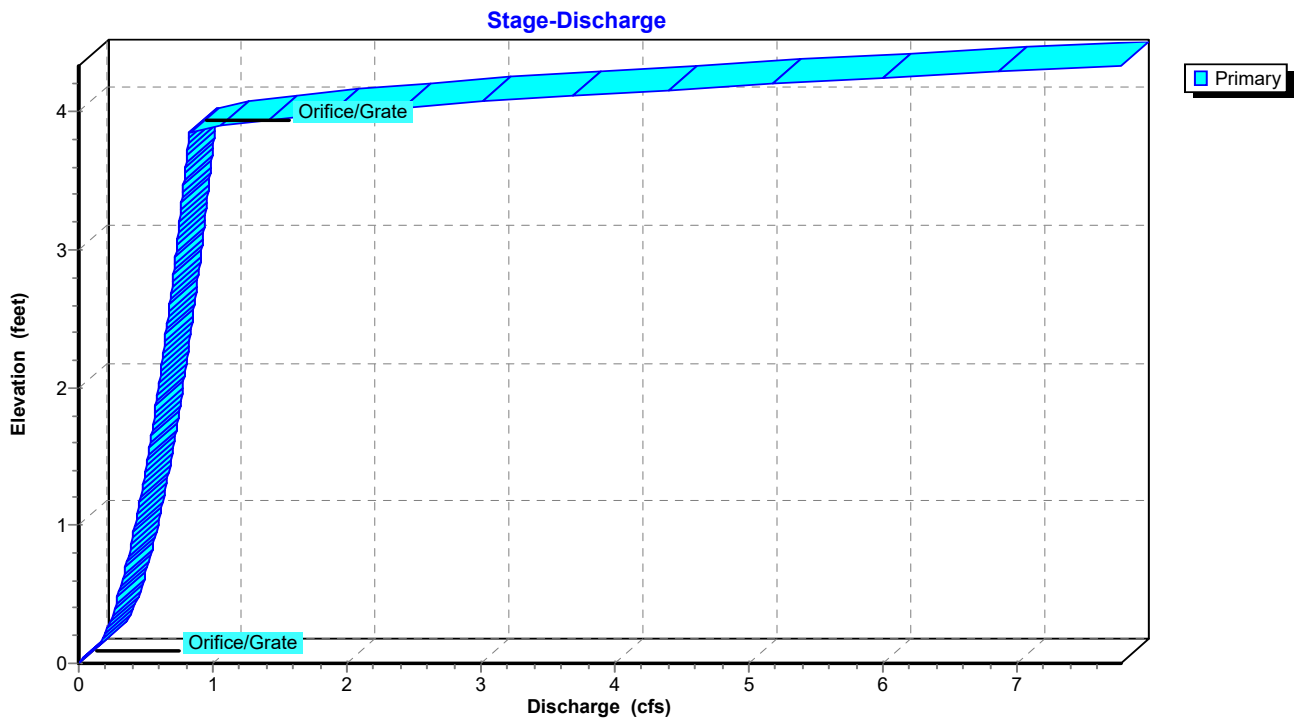
Primary OutFlow Max=0.21 cfs @ 9.69 hrs HW=0.24' (Free Discharge)
 1=Orifice/Grate (Orifice Controls 0.21 cfs @ 2.37 fps)
 2=Orifice/Grate (Controls 0.00 cfs)

Pond 3P: Detention A

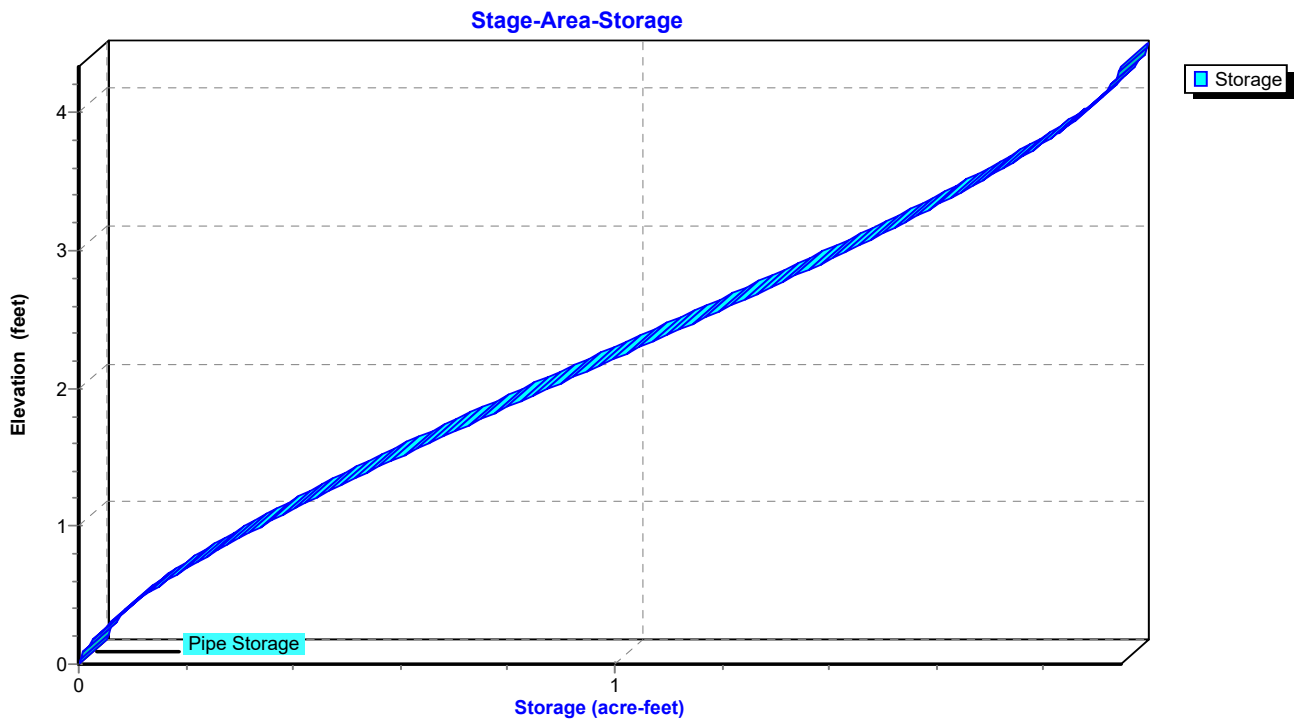
Hydrograph



Pond 3P: Detention A



Pond 3P: Detention A



Walgraves

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Type IA 24-hr WQ Rainfall=0.36"

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Summary for Pond 6P: Detention B

Inflow Area = 2.894 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ event
 Inflow = 0.14 cfs @ 7.95 hrs, Volume= 0.047 af
 Outflow = 0.05 cfs @ 9.04 hrs, Volume= 0.047 af, Atten= 65%, Lag= 65.5 min
 Primary = 0.05 cfs @ 9.04 hrs, Volume= 0.047 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 0.12' @ 9.04 hrs Surf.Area= 0.177 ac Storage= 0.007 af

Plug-Flow detention time= 74.3 min calculated for 0.047 af (100% of inflow)
 Center-of-Mass det. time= 74.4 min (861.7 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	0.00'	0.000 af	20.41'W x 200.00'L x 2.75'H Field A 0.258 af Overall - 0.163 af Embedded = 0.094 af x 0.0% Voids
#2A	0.00'	0.163 af	CMP Arch 49x33 x 40 Inside #1 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 40 Chambers in 4 Rows
#3B	0.00'	0.000 af	25.85'W x 140.00'L x 2.75'H Field B 0.228 af Overall - 0.143 af Embedded = 0.085 af x 0.0% Voids
#4B	0.00'	0.143 af	CMP Arch 49x33 x 35 Inside #3 Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf Overall Size= 49.0"W x 33.0"H x 20.00'L 35 Chambers in 5 Rows
		0.306 af	Total Available Storage

Storage Group A created with Chamber Wizard

Storage Group B created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	0.00'	2.3" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	2.10'	6.0" W x 5.0" H Vert. Orifice/Grate C= 0.600
#3	Primary	2.52'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.05 cfs @ 9.04 hrs HW=0.12' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.05 cfs @ 1.68 fps)

2=Orifice/Grate (Controls 0.00 cfs)

3=Orifice/Grate (Controls 0.00 cfs)

Pond 6P: Detention B - Chamber Wizard Field A

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

10 Chambers/Row x 20.00' Long = 200.00' Row Length

4 Rows x 49.0" Wide + 16.3" Spacing x 3 = 20.41' Base Width

33.0" Chamber Height = 2.75' Field Height

40 Chambers x 178.0 cf = 7,118.3 cf Chamber Storage

11,224.6 cf Field - 7,118.3 cf Chambers = 4,106.3 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 7,118.3 cf = 0.163 af

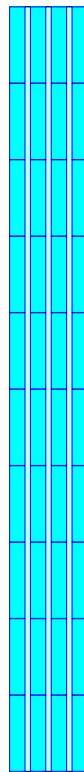
Overall Storage Efficiency = 63.4%

Overall System Size = 200.00' x 20.41' x 2.75'

40 Chambers

415.7 cy Field

152.1 cy Stone



Pond 6P: Detention B - Chamber Wizard Field B

Chamber Model = CMP Arch 49x33 (1/2" Corrugated Pipe Arch, AISI Handbook 1994, Table 2.18)

Effective Size= 49.0"W x 33.0"H => 8.90 sf x 20.00'L = 178.0 cf

Overall Size= 49.0"W x 33.0"H x 20.00'L

49.0" Wide + 16.3" Spacing = 65.3" C-C Row Spacing

7 Chambers/Row x 20.00' Long = 140.00' Row Length

5 Rows x 49.0" Wide + 16.3" Spacing x 4 = 25.85' Base Width

33.0" Chamber Height = 2.75' Field Height

35 Chambers x 178.0 cf = 6,228.5 cf Chamber Storage

9,952.3 cf Field - 6,228.5 cf Chambers = 3,723.8 cf Stone x 0.0% Voids = 0.0 cf Stone Storage

Chamber Storage = 6,228.5 cf = 0.143 af

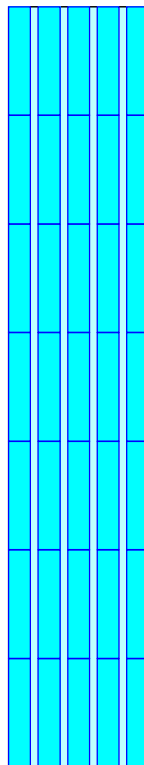
Overall Storage Efficiency = 62.6%

Overall System Size = 140.00' x 25.85' x 2.75'

35 Chambers

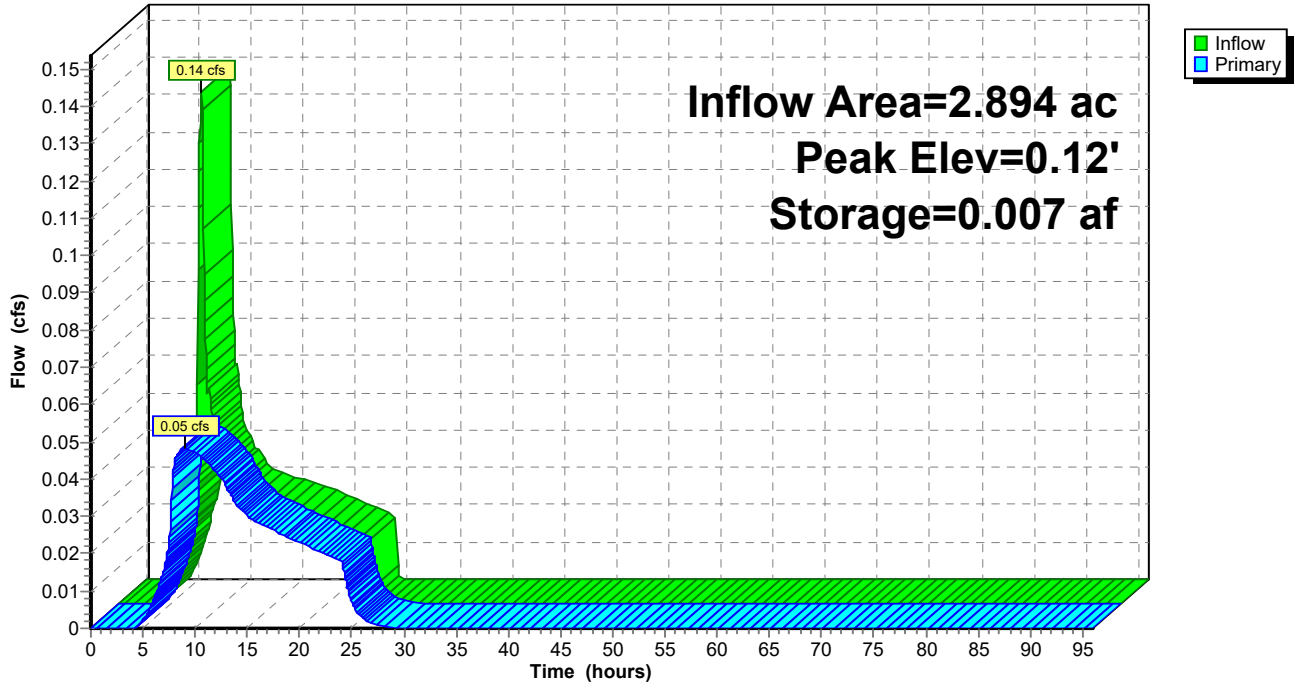
368.6 cy Field

137.9 cy Stone



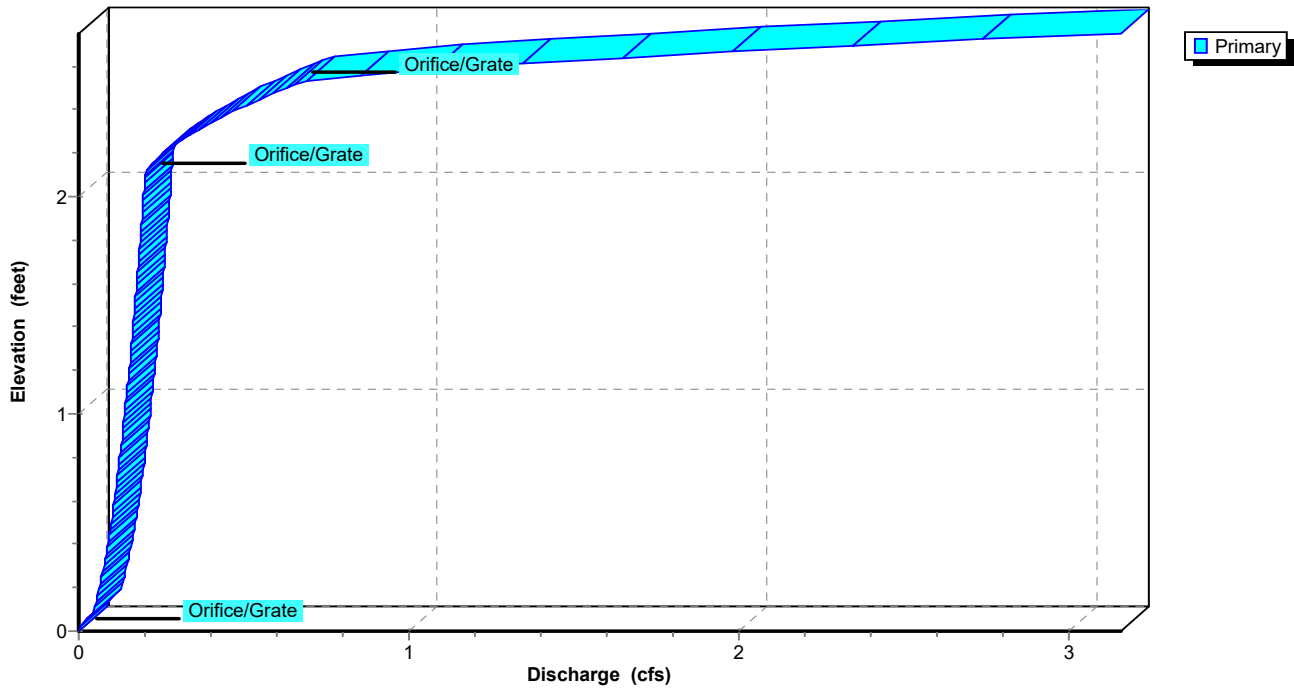
Pond 6P: Detention B

Hydrograph

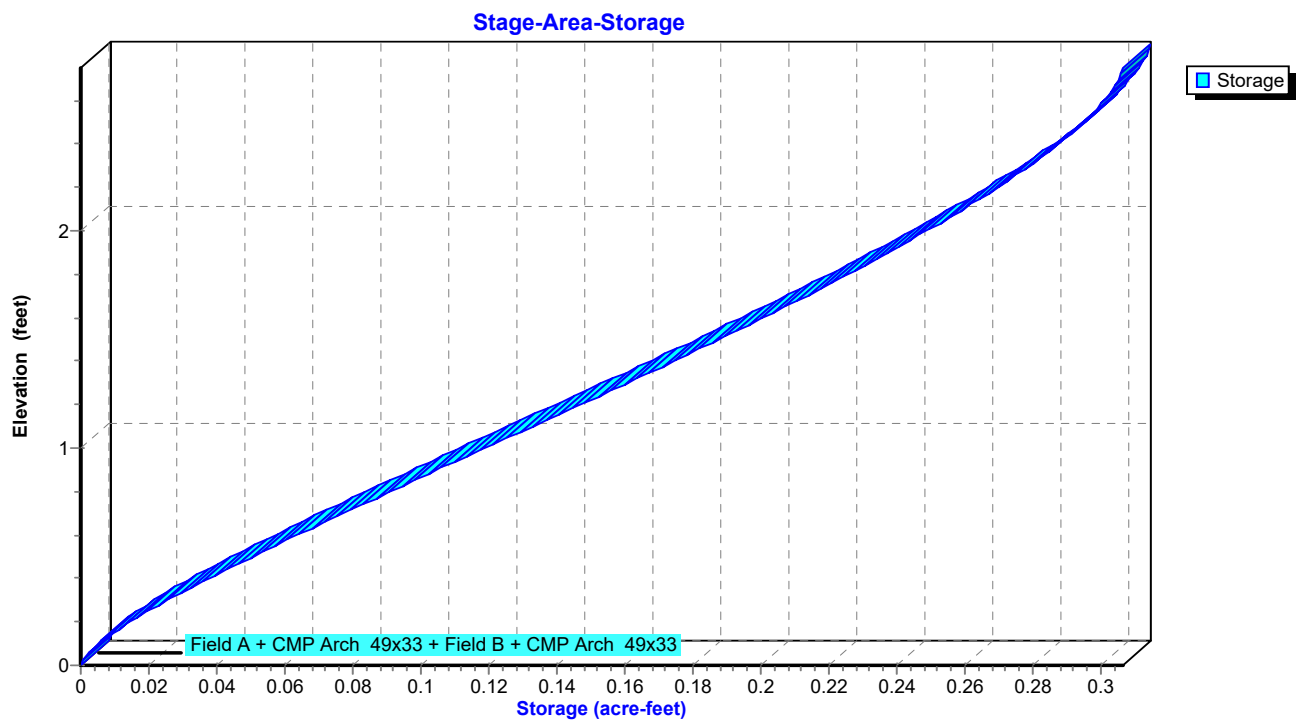


Pond 6P: Detention B

Stage-Discharge



Pond 6P: Detention B





Hedges Creek

STORMWATER REPORT

11345 SW Herman Road
Tualatin, Oregon

Revised February 25, 2022

January 25, 2022

April 25, 2022

The information contained in this report was prepared by
and under direct supervision of the undersigned:

Craig Harris, PE

AAI Engineering

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Suite 100

Beaverton, Oregon 97005

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craigh@aaieng.com

AAI Project Number: A20120.10

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Stormwater Calculations

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Operations and Maintenance Manual

Hedges Creek

I. Project Summary

This report has been prepared to outline the existing and proposed on-site stormwater conditions for the Hedges Creek project. This report is based on topographic survey, GIS information and field observations.

The project site is located in Tualatin, Oregon. The total site area is approximately 922,022 square feet (21.17 acres). The site currently consists of an open field and slopes from south to north.

The primary purpose of this project is to develop the site for three new shell warehouse buildings, parking and drive aisle. The onsite improvements will consist of 750,581 square feet (17.23 acres) of total impervious area. In addition to the onsite improvements, stormwater management will be provided, including conveyance, water quality treatment, and flow control with detention.

II. Stormwater Design

No runoff from adjacent properties is anticipated to be captured by the proposed facilities. In addition, all site impervious runoff will be completely managed on site and will not drain onto adjacent properties. The stormwater management for this project is designed according to the requirements outlined in the Oregon DEQ Section 401 Water Quality Certification Post-Construction Stormwater Management Plan Submission Guidelines, SLOPES V stormwater requirements, Clean Water Services Design and Construction Standards, and City of Tualatin Construction Code.

The soils on site have been tested for infiltration, resulting in a raw rate of 0.1-0.2 in/hour. The native soil is low-infiltration silt, and it has been determined that incorporating infiltration into the stormwater design is not feasible.

The site is hydraulically divided into several basins. The basins collect runoff from roofs and onsite impervious areas including parking, drive areas, and sidewalks. Pavement areas runoff is collected in sumped catch basins for pretreatment, while roof drain runoff is collected and routed to sumped manholes for treatment.

Two northern basins, including two surface parking areas, will address water quality treatment by using the vegetated corridor as a filter strips, per CWS R&O 19-5 4.09.12. A total area of 2,540 square feet of improved vegetated corridor will be able to treat ±40,550 square feet of impervious area according to CWS Simplified Sizing. These filter strips will have 1' wide gravel trenches along the upper end to create a level discharge into the treatment area. The remaining basins (699,048 square feet) will be treated post-detention using Bio-Clean's stormwater biofiltration system vaults sized using a water quality event of 0.36" with rainfall over 4 hours for the respective basin areas.

After the stormwater is filtered, most flows are routed to underground detention systems where stormwater is detained to predeveloped flow rates through the use of a flow control tee. The orifices in the flow control tees are designed to restrict post-developed flows to pre-developed rates during the 2-

Hedges Creek

and 10-year events. Flows in excess of these events will bypass the flow control systems. Two small basins with a combined area of $\pm 40,550$ square feet will not enter detention systems due to a lack of hydraulic drop available. However, orifices for the detention systems have been designed accounting for these basins. The sum of the flows from the complete system results in flows matching the predeveloped flow rates for the site.

Once all stormwater has been treated for the water quality treatment event and detained as necessary, it will be discharged into adjacent wetland surrounding Hedges Creek to the north of the site.

III. Conveyance Calculations

All proposed storm mains and services are sized to convey up to the 25-yr storm event.

IV. Downstream Analysis

No negative impacts are anticipated downstream as the proposed system will discharge directly into the wetland that receives runoff from the existing site, and there are no downstream structures. Treatment and flow-matching will prevent the wetland and creek from any potential negative effects from the development.

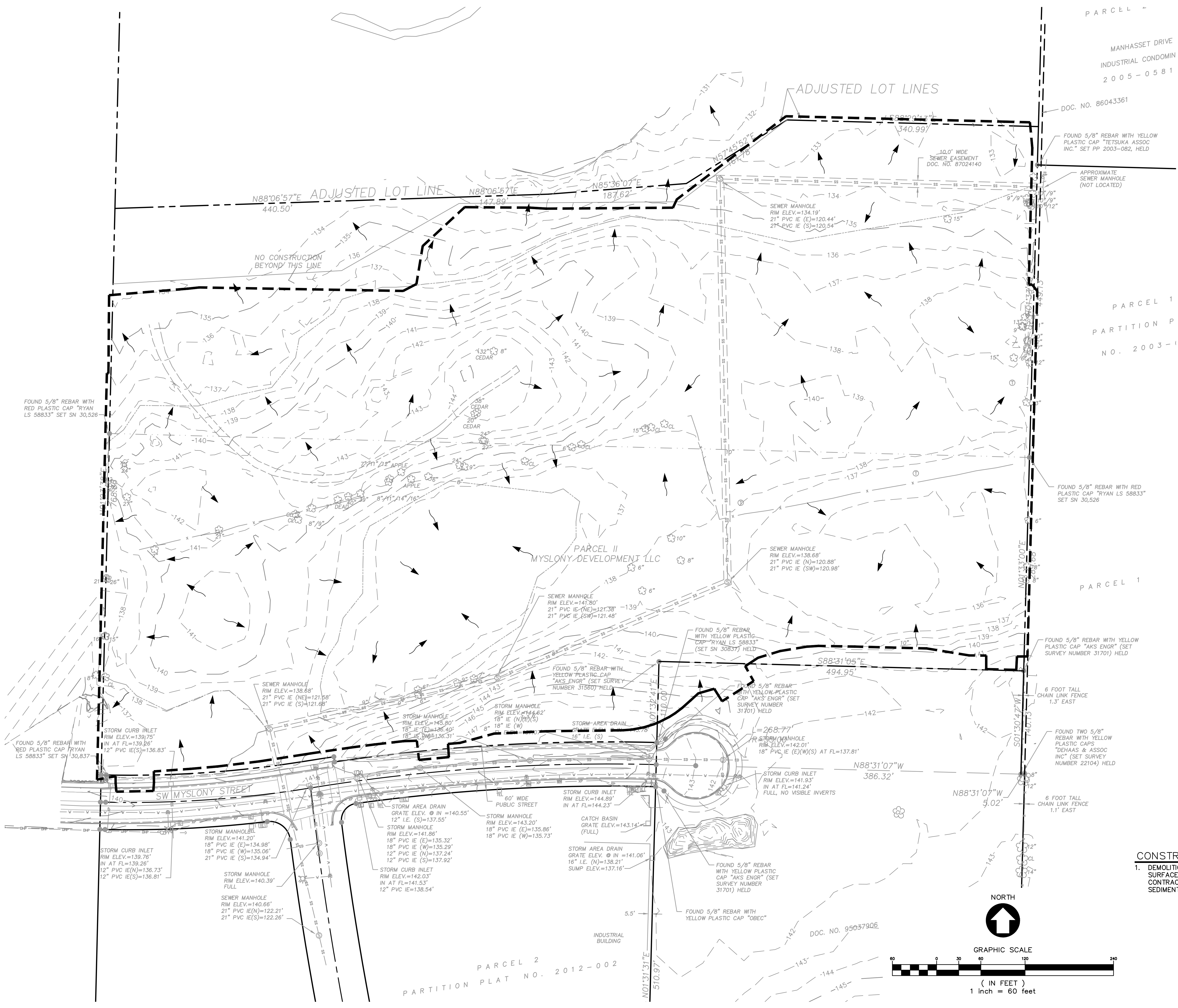
VI. Engineering Conclusion

Based on the requirements for this project, the proposed site facilities are adequately designed to manage the proposed development conditions and should be approved as designed.

Appendix A

Existing Conditions

F:\2020\A20120.10 - Wadgroves\Civil\Drawings\1200C\A20120.EC20 - EX COND.dwg : Apr. 25, 22 - 2:27 PM thorn.tmc



EROSION CONTROL PLAN NOTES

- APPROVAL OF THIS EROSION/SEDIMENTATION CONTROL (ESC) PLAN DOES NOT CONSTITUTE AN APPROVAL OF PERMANENT ROAD OR DRAINAGE DESIGN (E.G., SIZE AND LOCATION OF ROADS, RESTRICTORS, CHANNELS, RETENTION FACILITIES, UTILITIES, ETC.).
- THE IMPLEMENTATION OF THESE ESC PLANS AND THE CONSTRUCTION, MAINTENANCE, REPLACEMENT, AND UPGRADING OF THESE ESC FACILITIES IS THE RESPONSIBILITY OF THE CONTRACTOR UNTIL ALL CONSTRUCTION IS COMPLETED AND APPROVED AND PERMANENT VEGETATION/LANDSCAPING IS ESTABLISHED.
- THE BOUNDARIES OF THE CLEARING LIMITS SHOWN ON THIS PLAN SHALL BE CLEARLY FLAGGED IN THE FIELD PRIOR TO CONSTRUCTION. DURING THE CONSTRUCTION PERIOD, NO DISTURBANCE BEYOND THE FLAGGED CLEARING LIMITS SHALL BE PERMITTED. THE FLAGGING SHALL BE MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
- THE ESC FACILITIES SHOWN ON THIS PLAN MUST BE CONSTRUCTED IN CONJUNCTION WITH ALL CLEARING AND GRADING ACTIVITIES, AND IN SUCH A MANNER AS TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT ENTER THE DRAINAGE SYSTEM, ROADWAYS, OR VIOLATE APPLICABLE WATER STANDARDS.
- THE ESC FACILITIES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIREMENTS FOR ANTICIPATED SITE CONDITIONS. DURING THE CONSTRUCTION PERIOD, THESE ESC FACILITIES SHALL BE UPGRADED AS NEEDED FOR UNEXPECTED STORM EVENTS AND TO ENSURE THAT SEDIMENT AND SEDIMENT LADEN WATER DO NOT LEAVE THE SITE.
- THE ESC FACILITIES SHALL BE INSPECTED DAILY BY THE CONTRACTOR AND MAINTAINED AS NECESSARY TO ENSURE THEIR CONTINUED FUNCTIONING.
- THE ESC FACILITIES ON INACTIVE SITES MAY REDUCE FREQUENCY OF INSPECTIONS WHERE STABILIZATION STEPS IN SECTION 2.2.20 HAVE BEEN COMPLETED. AFTER BECOMING INACTIVE, THE ESC FACILITIES SHALL BE INSPECTED AND MAINTAINED TWICE THE FIRST MONTH, NO LESS THAN 14 CALENDAR DAYS APART, THEN A MINIMUM OF ONCE A MONTH OR WITHIN THE 24 HOURS FOLLOWING A STORM EVENT.
- AT NO TIME SHALL MORE THAN ONE FOOT OF SEDIMENT BE ALLOWED TO ACCUMULATE WITHIN A TRAPPED CATCH BASIN. ALL CATCH BASINS AND CONVEYANCE LINES SHALL BE CLEANED PRIOR TO PAVING. THE CLEANING OPERATION SHALL NOT FLUSH SEDIMENT LADEN WATER INTO THE DOWNSTREAM SYSTEM.
- STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES MAY BE REQUIRED TO ENSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.

PRE-CONSTRUCTION, CLEARING AND DEMOLITION NOTES

- ALL BASE ESC MEASURES (INLET PROTECTION, PERIMETER SEDIMENT CONTROL, GRAVEL CONSTRUCTION ENTRANCES, ETC.) MUST BE IN PLACE, FUNCTIONAL, AND APPROVED IN AN INITIAL INSPECTION, PRIOR TO COMMENCEMENT OF CONSTRUCTION ACTIVITIES.
- SEDIMENT BARRIERS APPROVED FOR USE INCLUDE SEDIMENT FENCE, BERMS CONSTRUCTED OUT OF MULCH, CHIPPINGS, OR OTHER SUITABLE MATERIAL, STRAW WATTLES, OR OTHER APPROVED MATERIALS.
- SENSITIVE RESOURCES INCLUDING, BUT NOT LIMITED TO, TREES, WETLANDS, AND RIPARIAN PROTECTION AREAS SHALL BE CLEARLY DELINEATED WITH ORANGE CONSTRUCTION FENCING OR CHAIN LINK FENCING IN A MANNER THAT IS CLEARLY VISIBLE TO ANYONE IN THE AREA. NO ACTIVITIES ARE PERMITTED TO OCCUR BEYOND THE CONSTRUCTION BARRIER.
- CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT THE BEGINNING OF CONSTRUCTION AND MAINTAINED FOR THE DURATION OF THE PROJECT. ADDITIONAL MEASURES INCLUDING, BUT NOT LIMITED TO, STREET SWEEPING AND VACUUMING, MAY BE REQUIRED TO INSURE THAT ALL PAVED AREAS ARE KEPT CLEAN FOR THE DURATION OF THE PROJECT.
- RUN-ON AND RUN-OFF CONTROLS SHALL BE IN PLACE AND FUNCTIONING PRIOR TO BEGINNING SUBSTANTIAL CONSTRUCTION ACTIVITIES. RUN-ON AND RUN-OFF CONTROL MEASURES INCLUDE: SLOPE DRAINS (WITH OUTLET PROTECTION), CHECK DAMS, SURFACE ROUGHENING, AND BANK STABILIZATION.

LEGEND

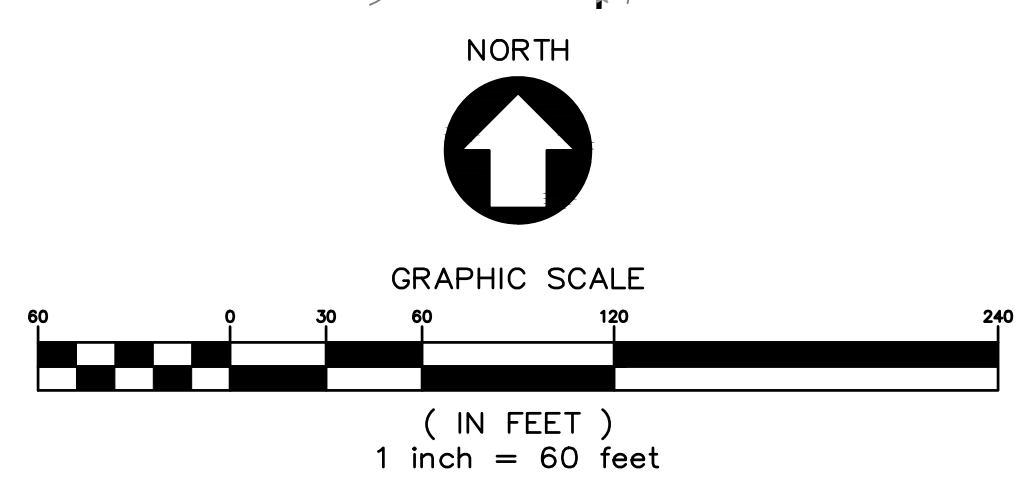
EXISTING CONTOUR MINOR	--- 102 ---
EXISTING CONTOUR MAJOR	--- 100 ---
LIMIT OF DISTURBANCE	-----
FLOW ARROW	→

CONSTRUCTION SEQUENCING & STORM FACILITY NOTES

- DEMOLITION WILL REMOVE IMPERVIOUS SURFACES. UNTIL NEW IMPERVIOUS SURFACES ARE INSTALLED, STORMWATER WILL BE INFILTRATED IN PLACE. CONTRACTOR TO INSTALL EROSION CONTROL MEASURES AS NEEDED TO PREVENT SEDIMENT LADEN RUNOFF FROM LEAVING THE SITE.

CONTRACTOR SHALL ENSURE THAT POSITIVE DRAINAGE IS MAINTAINED ACROSS EXPOSED AREAS AND NO LOW POINTS ARE CREATED ON-SITE AHEAD OF HOLIDAYS/WEEKENDS OR WHEN THERE IS ANY CHANCE OF RAIN.

THESE EROSION AND SEDIMENT CONTROL PLANS ASSUME "DRY WEATHER" CONSTRUCTION "WET WEATHER" CONSTRUCTION MEASURES NEED TO BE APPLIED BETWEEN OCTOBER 1ST AND MAY 31ST



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 503.620.3630 | fax | 503.620.5539 | fax | www.aaing.com

HEDGES CREEK
 TUALATIN, OR

SHEET TITLE

EXISTING CONDITIONS

DATE: 03/04/22

DRAWN: HJD

CHECKED: CNH

REVISIONS:

CONTRACTOR SHALL ENSURE THAT POSITIVE DRAINAGE IS MAINTAINED ACROSS EXPOSED AREAS AND NO LOW POINTS ARE CREATED ON-SITE AHEAD OF HOLIDAYS/WEEKENDS OR WHEN THERE IS ANY CHANCE OF RAIN.

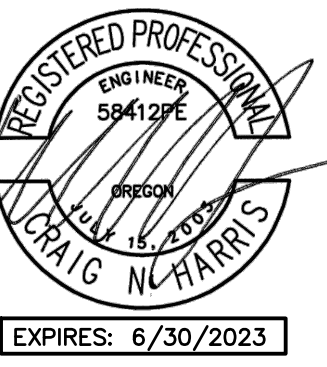
CONTRACTOR SHALL ENSURE THAT POSITIVE DRAINAGE IS MAINTAINED ACROSS EXPOSED AREAS AND NO LOW POINTS ARE CREATED ON-SITE AHEAD OF HOLIDAYS/WEEKENDS OR WHEN THERE IS ANY CHANCE OF RAIN.

SHEET NUMBER

EC2.0

JOB NUMBER: A20120.10

Appendix B
Hardscape Plan



AAI ENGINEERING INC.
4875 SW Center Drive, Suite 100, Beaverton, OR 97005
503.638.0888 Fax 503.638.0888

PHELAN
DEVELOPMENT
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660

HEDGES CREEK
TUALATIN, OR

SHEET TITLE

SITE PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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SHEET NUMBER

C1.0

JOB NUMBER: A20120.10

SHEET NOTES

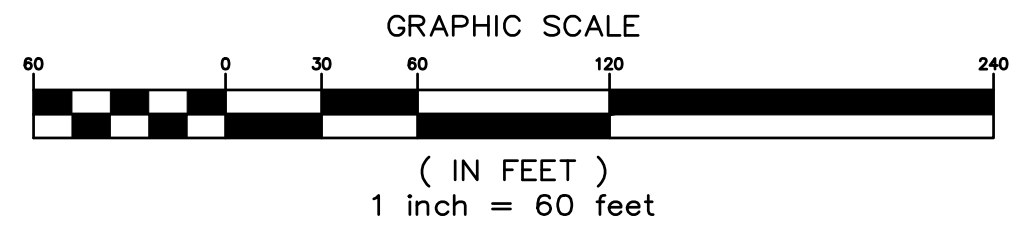
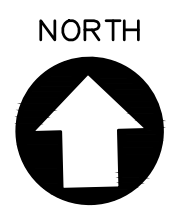
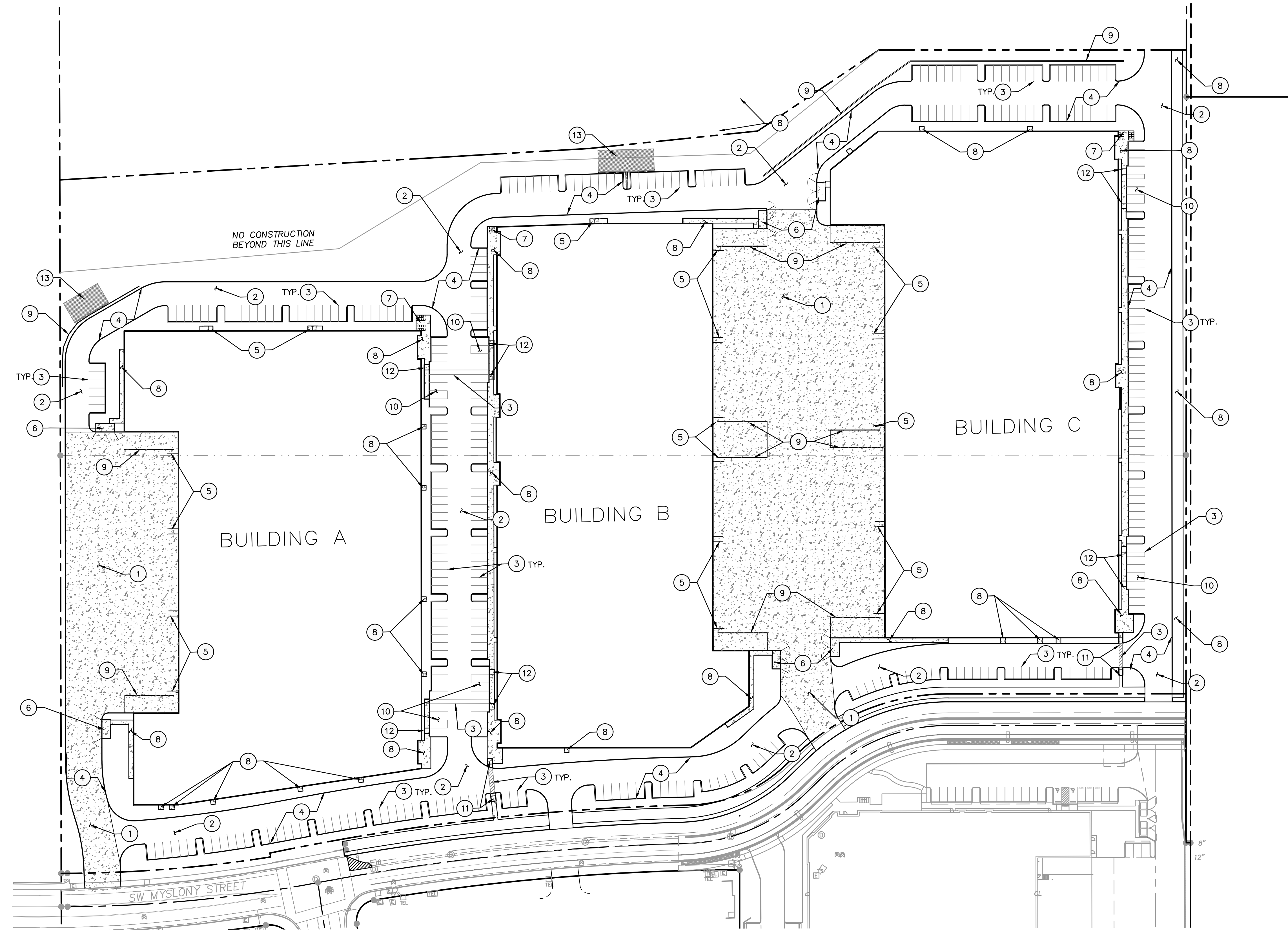
1. SEE ARCHITECTURAL PLANS FOR ADDITIONAL SITE INFORMATION.
2. THE CONTRACTOR SHALL HAVE A FULL SET OF THE CURRENT APPROVED CONSTRUCTION DOCUMENTS INCLUDING ADDENDA ON THE PROJECT SITE AT ALL TIMES.
3. THE CONTRACTOR SHALL KEEP THE ENGINEER AND JURISDICTION INFORMED OF CONSTRUCTION PROGRESS TO FACILITATE SITE OBSERVATIONS AT REQUIRED INTERVALS. 24-HOUR NOTICE IS REQUIRED.

(X) CONSTRUCTION NOTES

1. INSTALL CONCRETE TRUCK DRIVING SURFACE PER DETAIL 2/C4.0
2. INSTALL ASPHALT SURFACING PER DETAIL 1/C4.0
3. INSTALL STRIPING. SEE ARCHITECTURAL PLANS.
4. INSTALL CURB PER DETAIL 4/C4.0
5. INSTALL STAIRS. SEE ARCHITECTURAL PLANS.
6. INSTALL TRASH ENCLOSURE. SEE ARCHITECTURAL PLANS.
7. INSTALL BICYCLE PARKING. SEE ARCHITECTURAL PLANS.
8. INSTALL SIDEWALK PER DETAIL 3/C4.0
9. INSTALL DESIGN BUILD WALL
10. INSTALL ADA PARKING PER DETAIL 7/C4.0
11. INSTALL ADA CURB RAMP PER DETAIL 5/C4.0
12. INSTALL ADA CURB RAMP PER DETAIL 6/C4.0
13. INSTALL VEGETATIVE CORRIDOR AS FILTER STRIP PER CWS DETAIL 770/C4.4

LEGEND

- PROPERTY LINE
- CONCRETE SURFACING

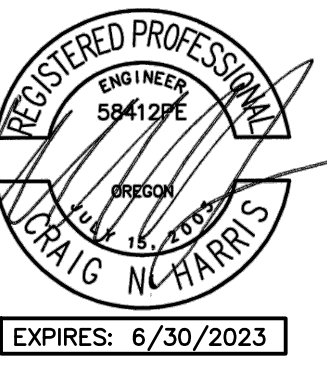


3/01/2022

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Appendix C

Storm Plan and Details



AAI ENGINEERING
4875 SW Center Drive, Suite 100, Beaverton, OR 97005
503.638.0888

PHELAN
DEVELOPMENT
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660



HEDGES CREEK
TUALATIN, OR

SHEET TITLE

GRADING OVERVIEW

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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SHEET NUMBER

C2.0

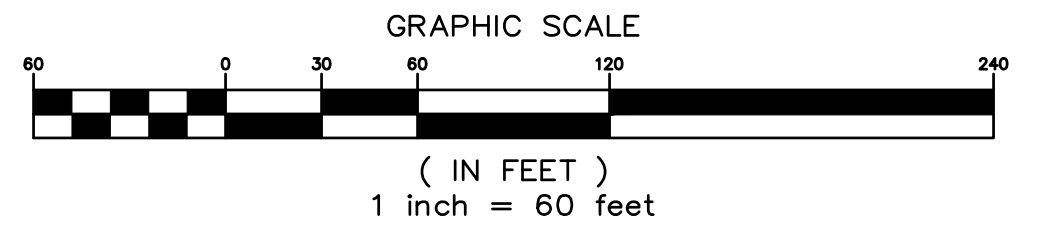
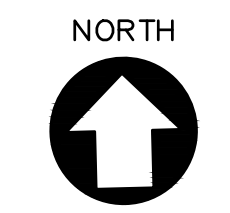
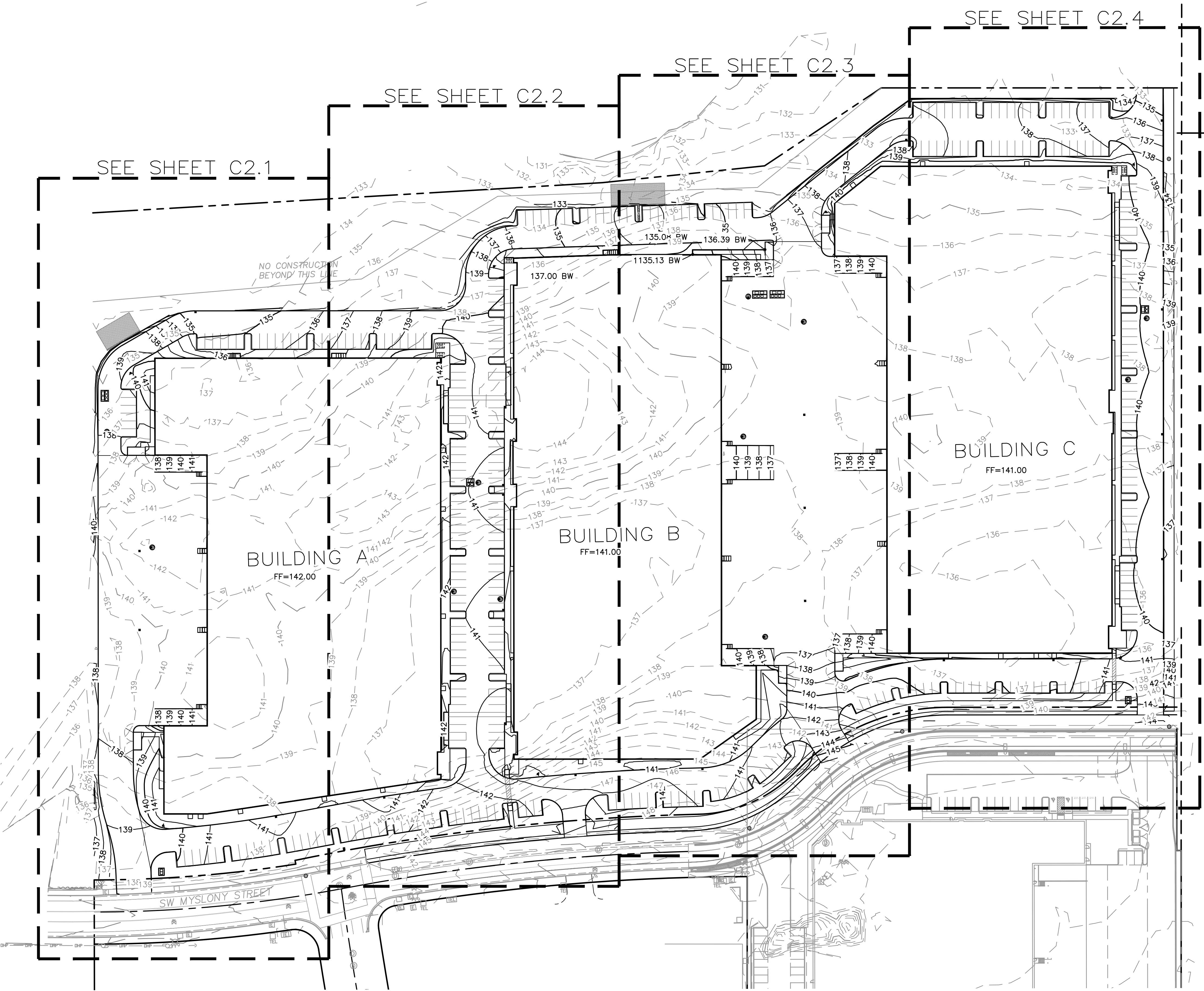
JOB NUMBER: A20120.10

SHEET NOTES

1. CURB HEIGHTS ARE 6" UNLESS NOTED OTHERWISE.
2. LANDINGS ON ACCESSIBLE ROUTES SHALL NOT EXCEED 2% IN ANY DIRECTION.
3. ALL ACCESSIBLE ROUTES SHALL COMPLY WITH CURRENT ADA ACCESSIBILITY GUIDELINES FOR BUILDING AND FACILITIES (ADAAG).
4. ALL WALKWAYS FROM ACCESSIBLE UNITS ARE DESIGNED TO NOT REQUIRE HANDRAILS. THEREFORE, RAMPS WITH SLOPES STEEPER THAN 5.0% AND LESS THAN 8.33% SHALL NOT EXCEED 0.5' RISE OR 6.0' LENGTH.
5. FINISH GRADES ARE TO BE BROUGHT TO WITHIN 0.08 FT IN 10 FT OF THE GRADES SHOWN AT SUBGRADE AND TO WITHIN 0.03 FT IN 10 FT AT FINISH GRADE. CONTRACTOR TO ALLOW FOR PLACEMENT OF REQUIRED TOPSOIL IN ROUGH GRADING.
6. GRADING ELEVATIONS AS SHOWN ON SITE AND LANDSCAPE PLANS ARE FINISHED GRADE WHICH INCLUDES SUBGRADE SOIL, TOPSOIL, SOIL AMENDMENTS, ROCKERY AND RUNOFF PROTECTION CONTRACTOR IS RESPONSIBLE TO COORDINATE GRADING WITH BOTH EXCAVATOR AND LANDSCAPE CONTRACTOR.

LEGEND

EXISTING CONTOUR MINOR	- - - - -	102
EXISTING CONTOUR MAJOR	— — — — —	100
PROPOSED CONTOUR MINOR	- - - - -	102
PROPOSED CONTOUR MAJOR	— — — — —	100



3/01/2022

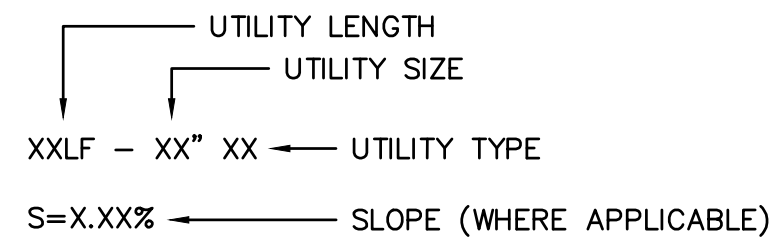
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SHEET NOTES

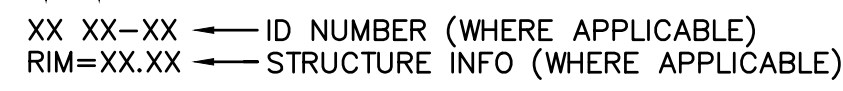
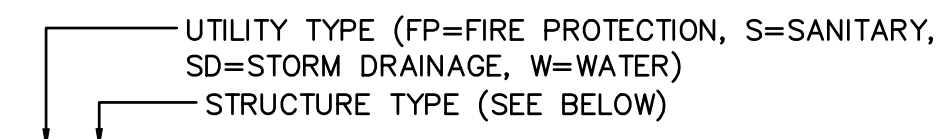
- ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
- THIS PLAN IS GENERALLY DIAGRAMMATIC. IT DOES NOT SHOW EVERY JOINT, BEND, FITTING, OR ACCESSORY REQUIRED FOR CONSTRUCTION.
- CLEAN OUTS SHALL BE INSTALLED IN CONFORMANCE WITH UPC CHAPTER SEVEN, SECTION 707 AND SECTION 719. THIS PLAN MAY NOT SHOW ALL REQUIRED CLEAN OUTS.
- DOMESTIC WATER AND FIRE LINES AND ACCESSORIES BETWEEN THE WATER METER AND THE BUILDING SHALL BE INSTALLED BY A LICENSED PLUMBER EMPLOYED BY A LICENSED PLUMBING CONTRACTOR.
- UTILITIES WITHIN FIVE FEET OF A BUILDING SHALL BE CONSTRUCTED OF MATERIALS APPROVED FOR INTERIOR USE AS DESCRIBED IN THE CURRENT EDITION OF THE UPC.
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- CONTRACTOR TO VERIFY SANITARY AND WATER SIZING AND INVERTS WITH APPROVED PLUMBING PLANS PRIOR TO ORDERING MATERIALS OR BEGINNING CONSTRUCTION OF SAID UTILITIES.
- ALL STORM AND SANITARY FITTINGS TO BE ECCENTRIC FITTINGS UNLESS OTHERWISE NOTED.

LABEL LEGEND

PIPE LABELS



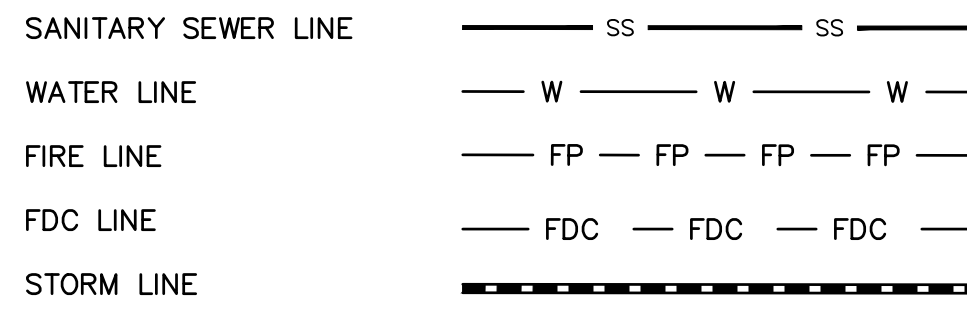
STRUCTURE LABELS



STRUCTURE TYPES

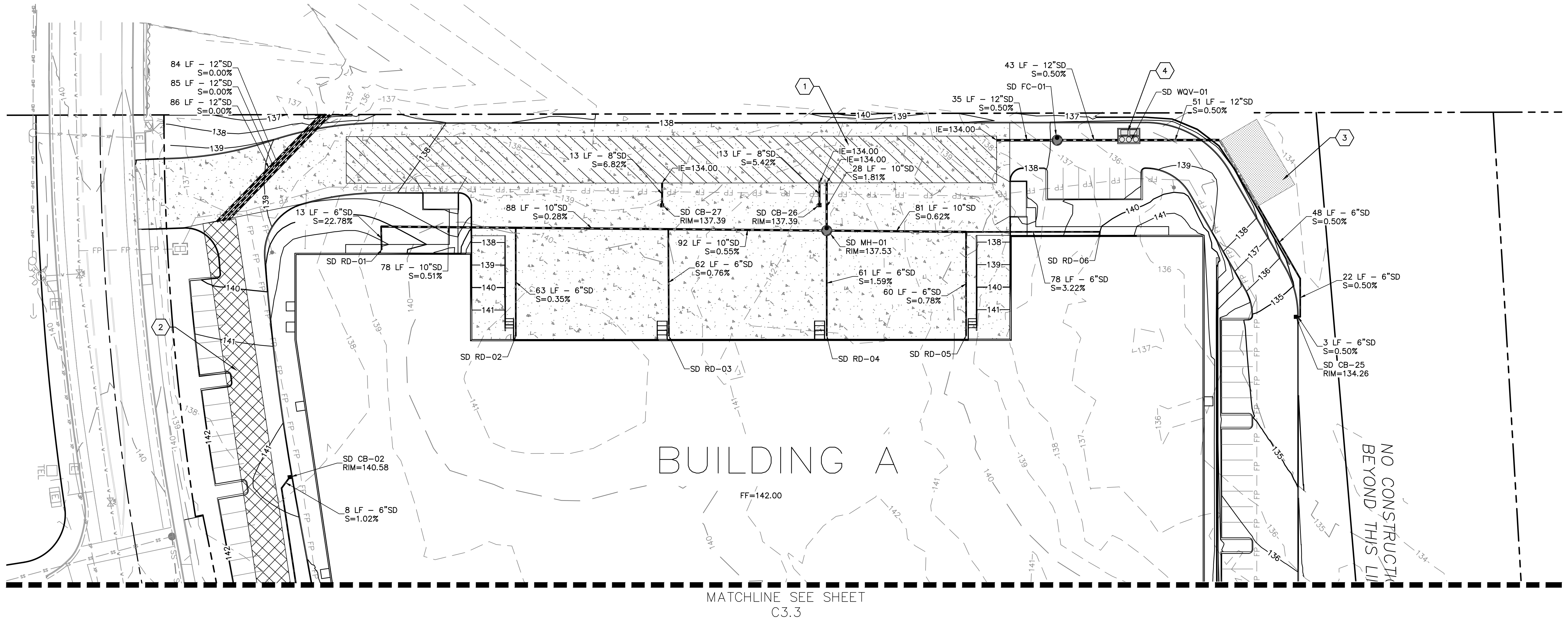
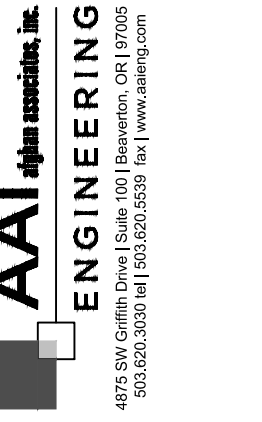
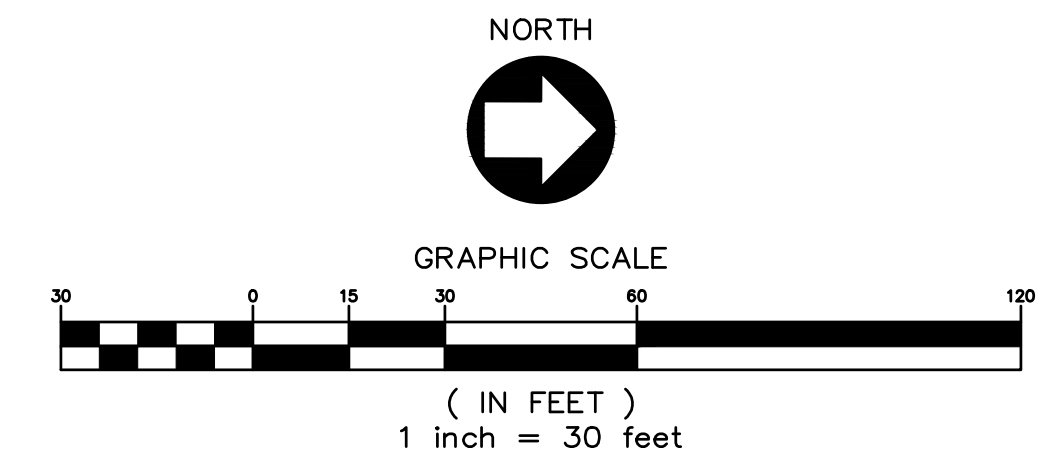
TYPE	DESCRIPTION
BF	BACKFLOW PREVENTION DEVICE PER DETAIL 3/C4.1
CB	CATCH BASIN PER DETAIL 2/C4.1
FCMH	FLOW CONTROL MANHOLE PER DETAIL 5/C4.1
FV	FIRE VAULT PER DETAIL 614/C4.2
MH	MANHOLE PER DETAIL 010/C4.2
WQV	WATER QUALITY VAULT
WM	WATER METER PER DETAIL 634/C4.1

LEGEND



STORM NOTES

- INSTALL CULTEC CHAMBERS (SYSTEM #1). REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATION.
- INSTALL CULTECH CHAMBERS FOR FLOOD STORAGE DIVIDED INTO TWO SECTIONS. REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATIONS.
- INSTALL VEGETATIVE CORRIDOR AS FILTER STRIP PER CWS DETAIL 770/C4.4.
- INSTALL MODULAR WETLANDS VAULT PER DETAIL ON SHEET C4.3



HEDGES CREEK
TUALATIN, OR

SHEET TITLE

STORM PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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SHEET NUMBER

C3.2

JOB NUMBER: A20120.10

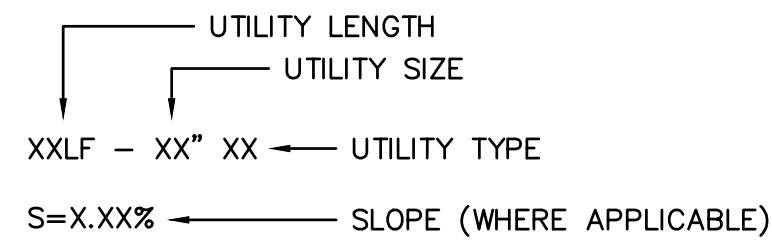
3/01/2022

SHEET NOTES

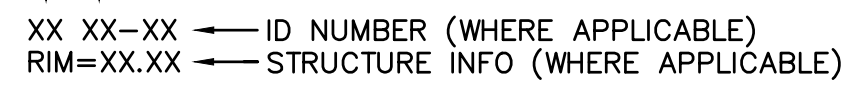
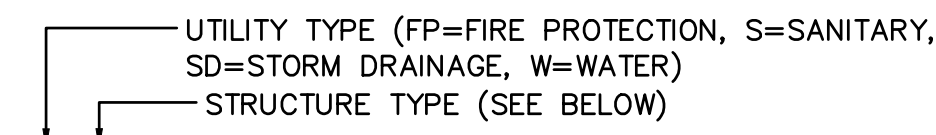
- ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
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- ALL STORM AND SANITARY FITTINGS TO BE ECCENTRIC FITTINGS UNLESS OTHERWISE NOTED.

LABEL LEGEND

PIPE LABELS



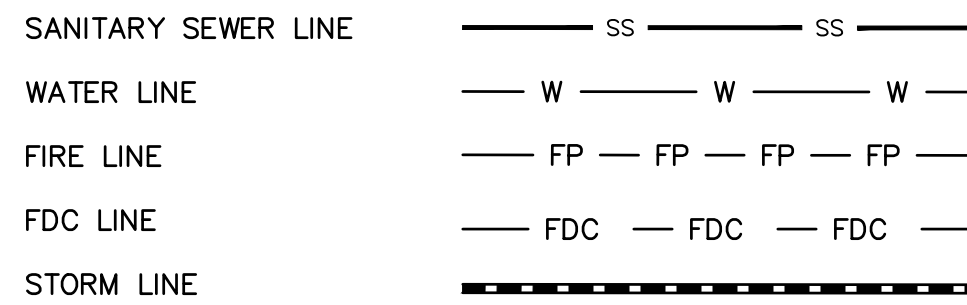
STRUCTURE LABELS



STRUCTURE TYPES

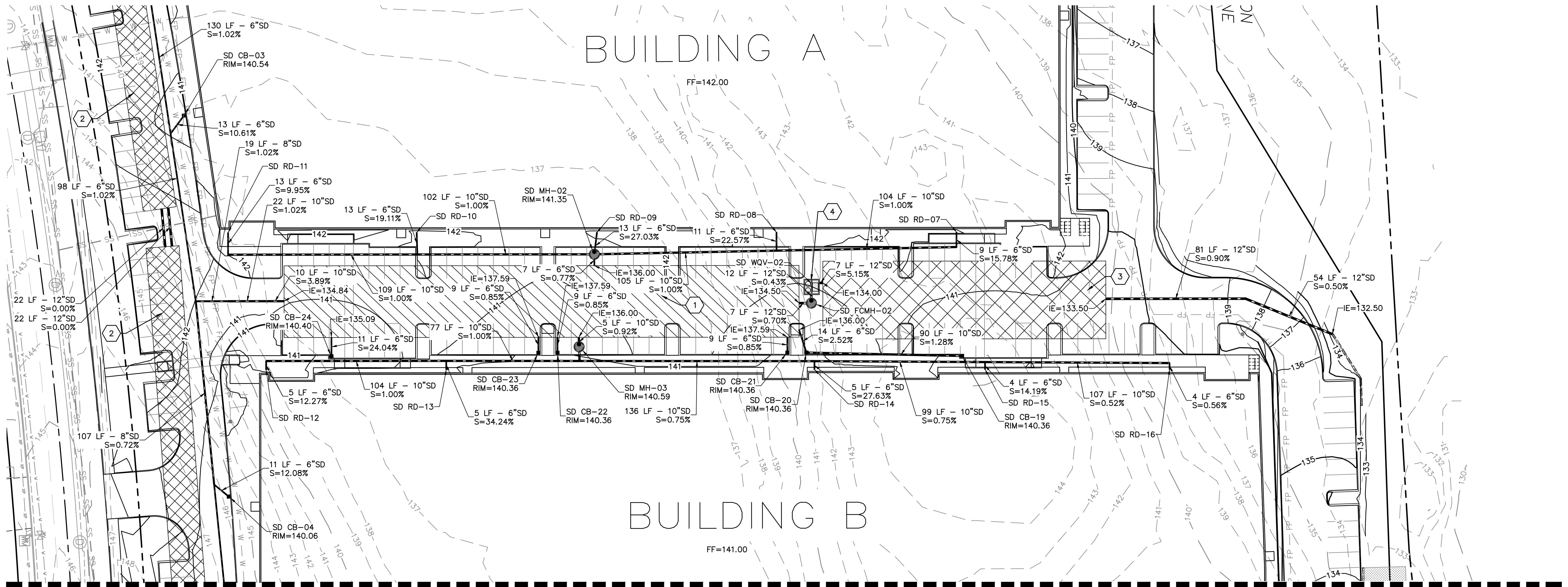
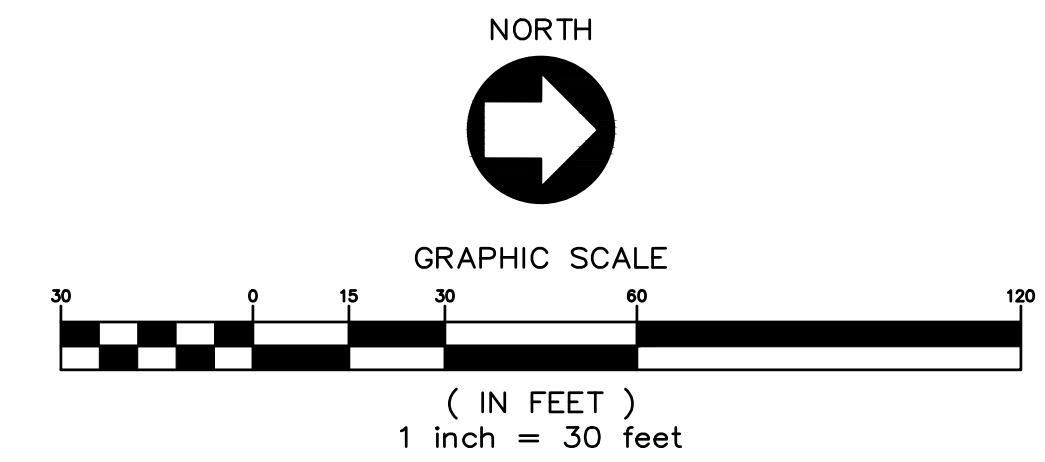
TYPE	DESCRIPTION
BF	BACKFLOW PREVENTION DEVICE PER DETAIL 3/C4.1
CB	CATCH BASIN PER DETAIL 2/C4.1
FCMH	FLOW CONTROL MANHOLE PER DETAIL 5/C4.1
FV	FIRE VAULT PER DETAIL 614/C4.2
MH	MANHOLE PER DETAIL 010/C4.2
WQV	WATER QUALITY VAULT
WM	WATER METER PER DETAIL 634/C4.1

LEGEND



STORM NOTES

- INSTALL CULTEC CHAMBERS (SYSTEM #2). REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATION.
- INSTALL CULTECH CHAMBERS FOR FLOOD STORAGE DIVIDED INTO TWO SECTIONS (SYSTEM #1F). REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATIONS.
- INSTALL CULTECH CHAMBERS FOR FLOOD STORAGE (SYSTEM #2F). REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATIONS.
- INSTALL MODULAR WETLANDS VAULT PER DETAIL ON SHEET C4.3.



HEDGES CREEK
 TUALATIN, OR

SHEET TITLE

STORM PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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SHEET NUMBER

C3.3

JOB NUMBER: A20120.10

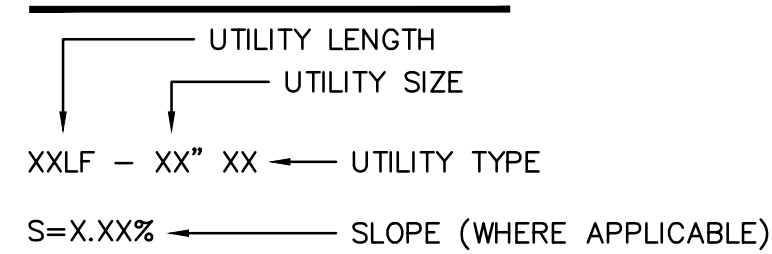
3/01/2022

SHEET NOTES

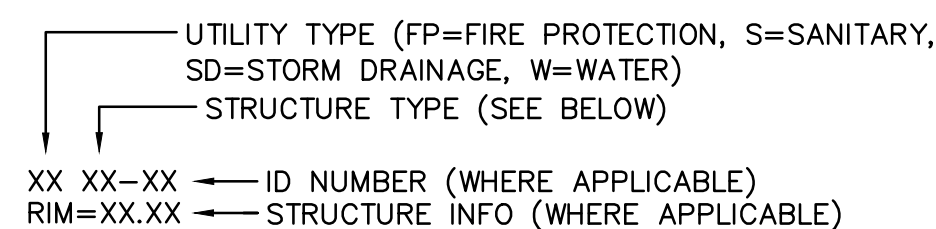
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LABEL LEGEND

PIPE LABELS



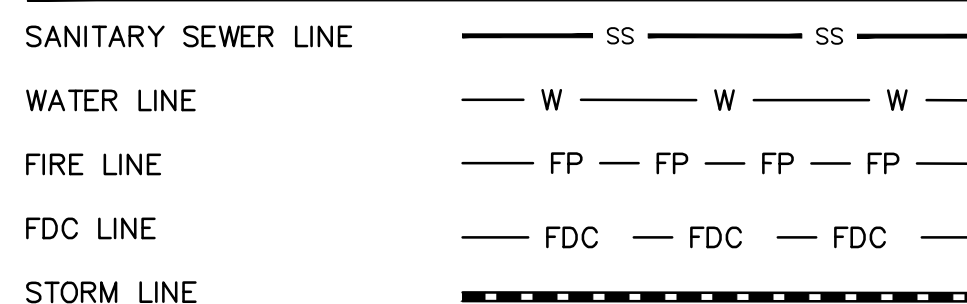
STRUCTURE LABELS



STRUCTURE TYPES

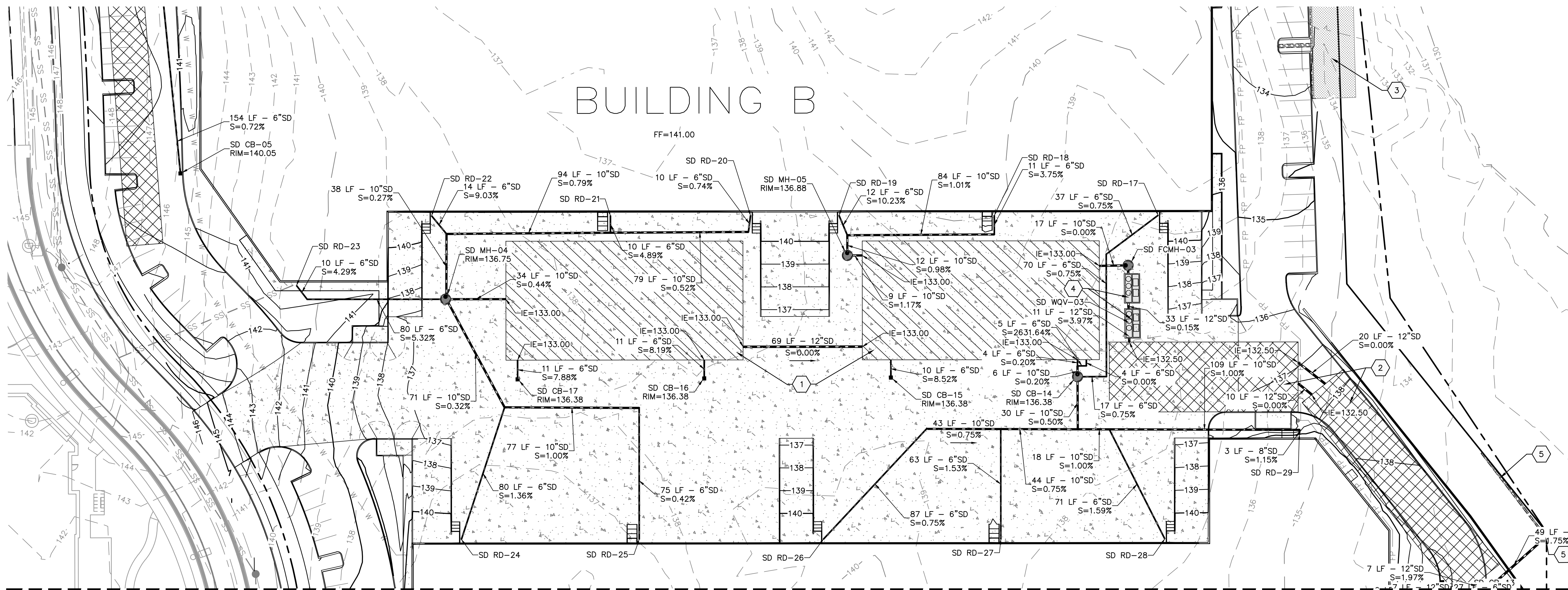
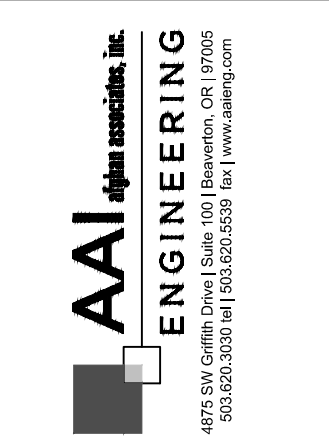
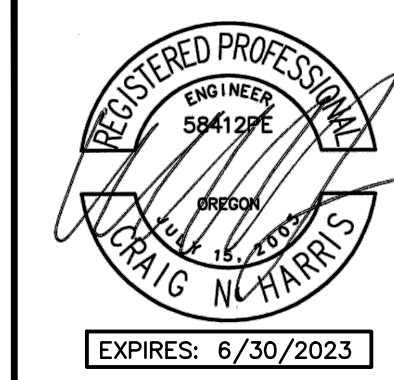
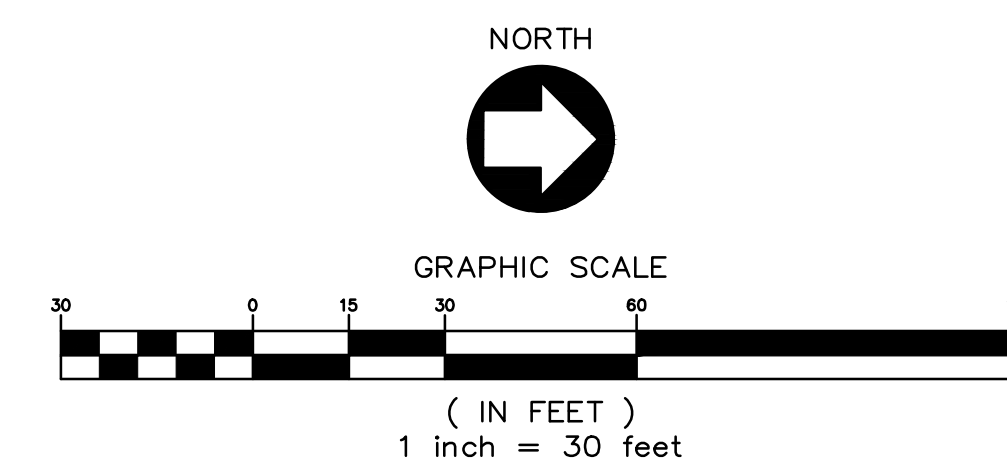
TYPE	DESCRIPTION
BF	BACKFLOW PREVENTION DEVICE PER DETAIL 3/C4.1
CB	CATCH BASIN PER DETAIL 2/C4.1
FCMH	FLOW CONTROL MANHOLE PER DETAIL 5/C4.1
FV	FIRE VAULT PER DETAIL 614/C4.2
MH	MANHOLE PER DETAIL 010/C4.2
WQV	WATER QUALITY VAULT
WM	WATER METER PER DETAIL 634/C4.1

LEGEND



STORM NOTES

- INSTALL CULTEC CHAMBERS DIVIDED INTO TWO (SYSTEM #3). REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATIONS.
- INSTALL CULTECH CHAMBERS FOR FLOOD STORAGE DIVIDED INTO FOUR SECTIONS (SYSTEM #3F). REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATIONS.
- INSTALL VEGETATIVE CORRIDOR AS FILTER STRIP PER CWS DETAIL 770/C4.4.
- INSTALL MODULAR WETLANDS VAULT PER DETAIL ON SHEET C4.3.
- INSTALL ANIMAL GUARD AT STORM PIPE DISCHARGE POINT



MATCHLINE SEE SHEET C3.5

SHEET TITLE
STORM PLAN

DATE: 08/02/2021
DRAWN: KPM
CHECKED: CNH

REVISIONS:

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SHEET NUMBER

C3.4

3/01/2022

JOB NUMBER: A20120.10

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SHEET NOTES

- ALL SANITARY PIPING SHALL BE PVC 3034 OR APPROVED EQUAL UNLESS NOTED OTHERWISE.
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- ALL STORM AND SANITARY FITTINGS TO BE ECCENTRIC FITTINGS UNLESS OTHERWISE NOTED.

PIPE LABELS

UTILITY LENGTH
UTILITY SIZE
XXLF - XX" XX — UTILITY TYPE
S=X.XX% — SLOPE (WHERE APPLICABLE)

STRUCTURE LABELS

UTILITY TYPE (FP=FIRE PROTECTION, S=SANITARY, SD=STORM DRAINAGE, W=WATER)
STRUCTURE TYPE (SEE BELOW)
XX XX-XX — ID NUMBER (WHERE APPLICABLE)
RIM=XX.XX — STRUCTURE INFO (WHERE APPLICABLE)

STRUCTURE TYPES

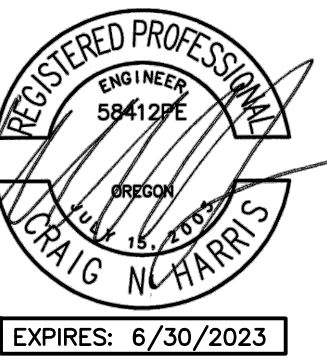
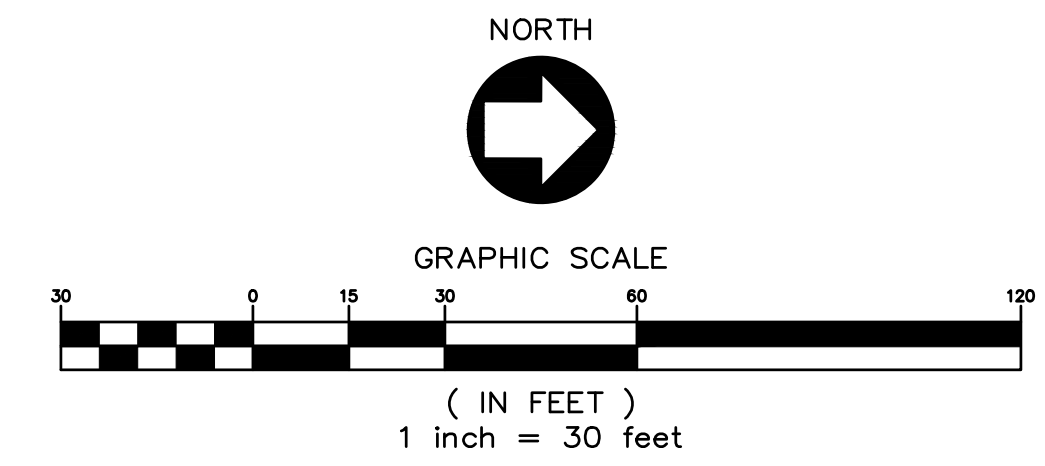
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MH	MANHOLE PER DETAIL 010/C4.2
WQV	WATER QUALITY VAULT
WM	WATER METER PER DETAIL 634/C4.1

LEGEND

SANITARY SEWER LINE — SS — SS — SS —
WATER LINE — W — W — W —
FIRE LINE — FP — FP — FP — FP —
FDC LINE — FDC — FDC — FDC —
STORM LINE — — — — —

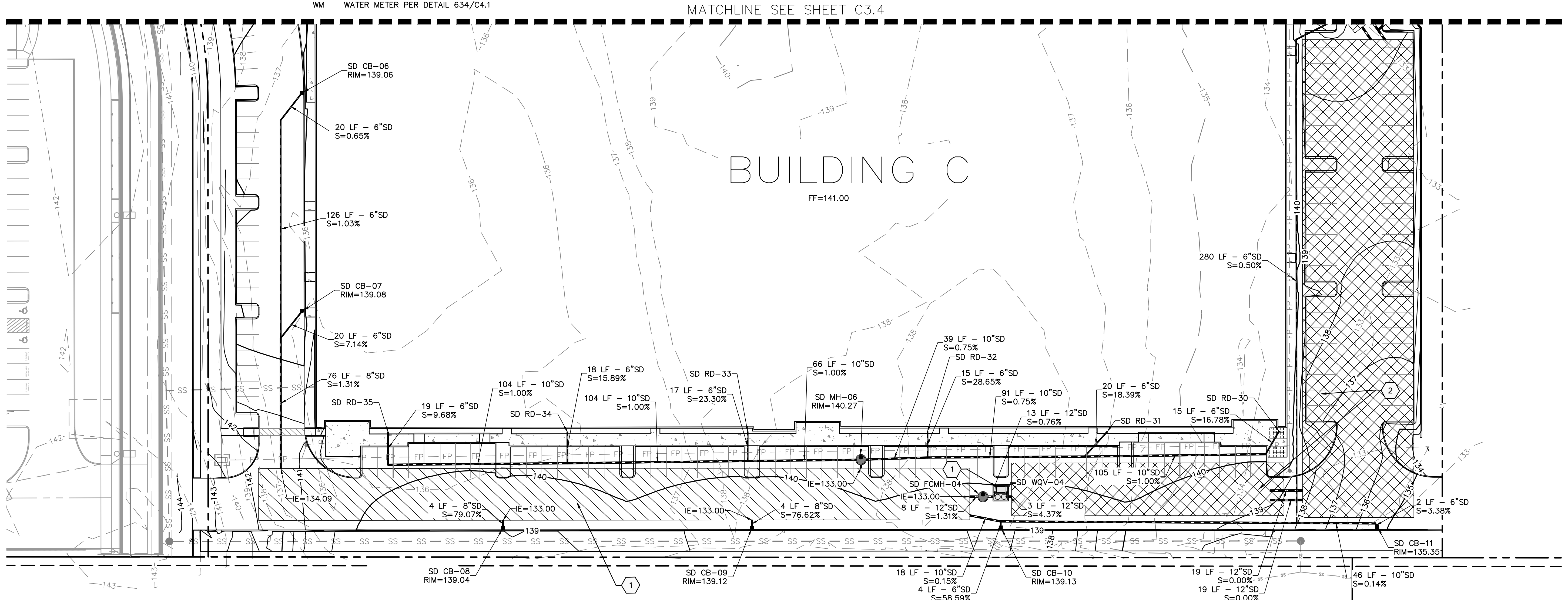
STORM NOTES

- INSTALL CULTEC CHAMBERS (SYSTEM #4). REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATIONS.
- INSTALL CULTECH CHAMBERS FOR FLOOD STORAGE DIVIDED INTO FOUR SECTIONS (SYSTEM #3F). REFER TO MANUFACTURER'S DETAILS FOR SPECIFICATIONS.
- INSTALL MODULAR WETLANDS VAULT PER DETAIL ON SHEET C4.4.



AAI ENGINEERING INC.
4875 SW Center Drive, Suite 100, Beaverton, OR 97005
503.638.0888 Fax 503.638.0888

PHELAN
ENGINEERING
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660



SHEET TITLE

STORM PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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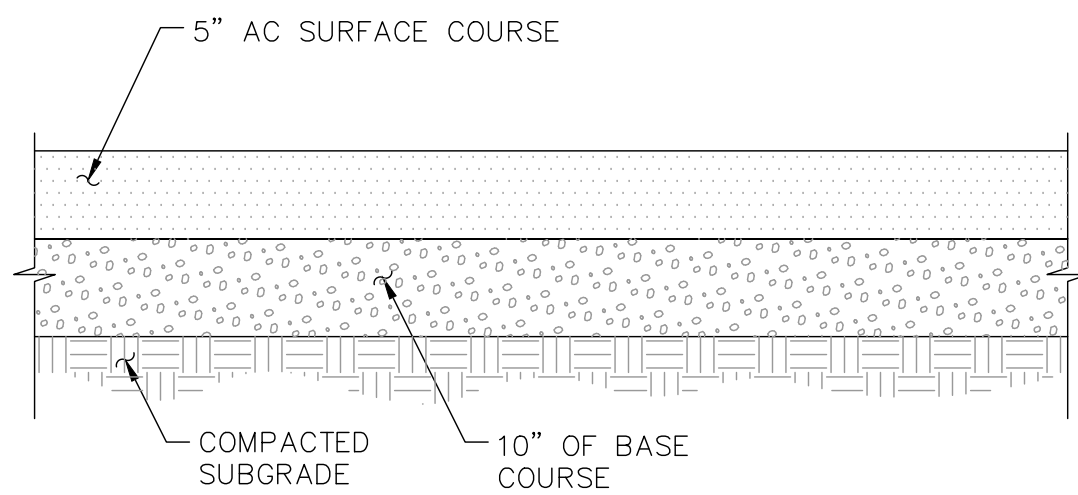
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SHEET NUMBER

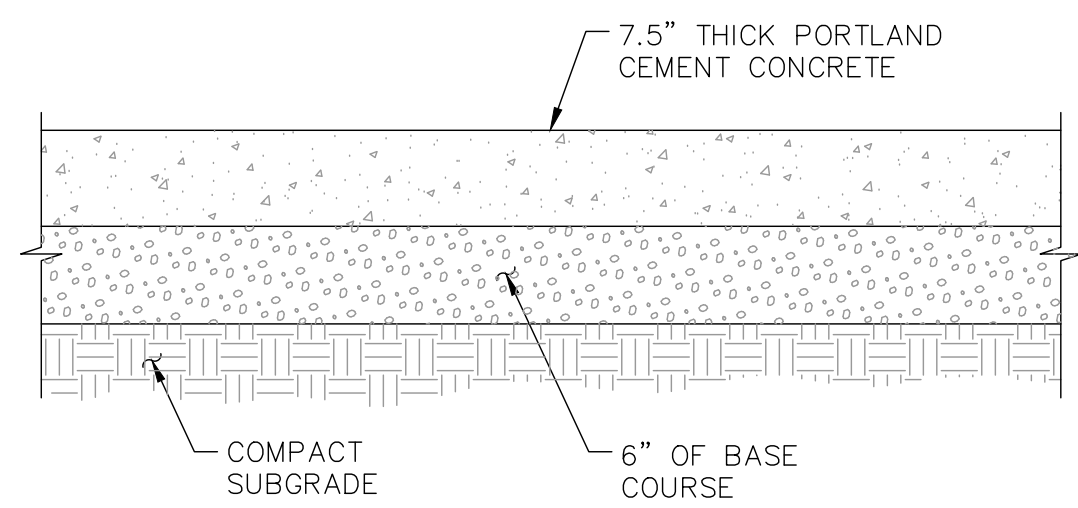
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JOB NUMBER: A20120.10

3/01/2022

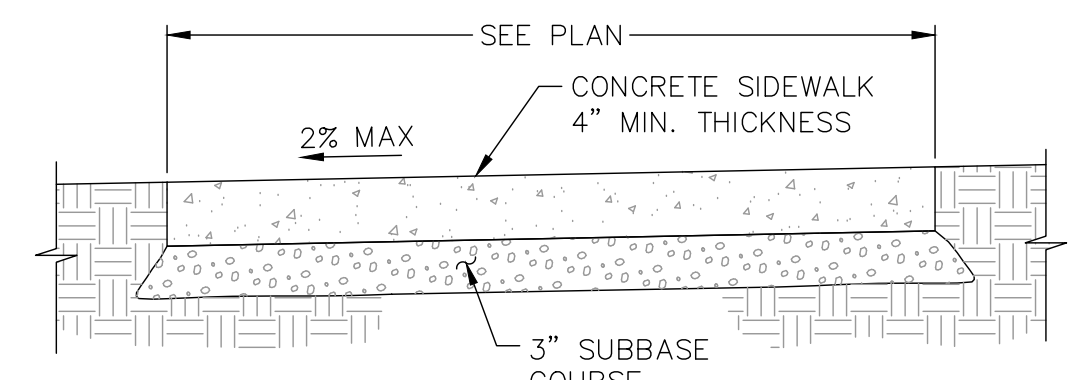


1 STANDARD ASPHALT PAVEMENT SECTION
SCALE: NTS



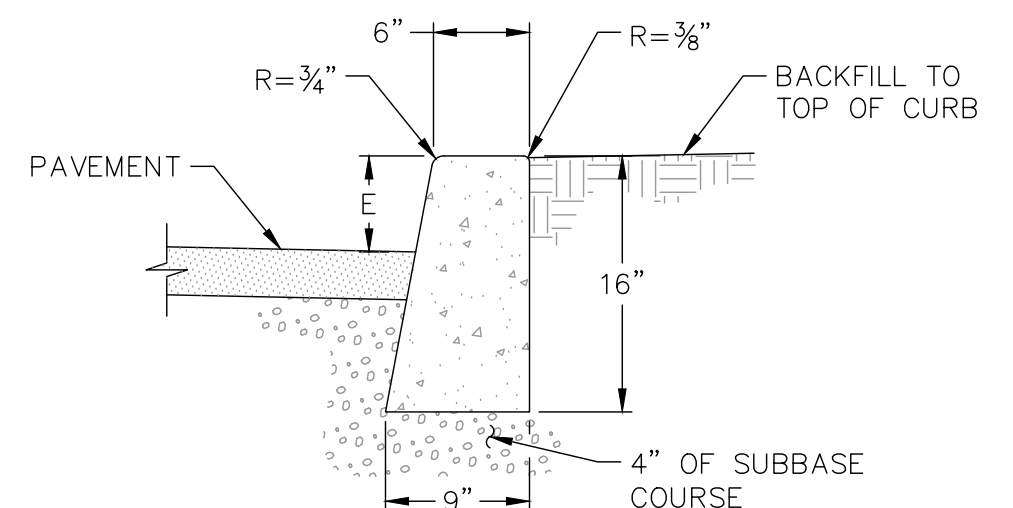
2 CONCRETE PAVEMENT SECTION
SCALE: NTS

NOTES:
1. - CONSTRUCT CONTRACTION JOINTS AT 15' MAX. SPACING AND AT RAMPS. CONSTRUCT EXPANSION JOINTS AT 200' MAX. SPACING AT POINTS OF TANGENCY AND AT ENDS OF EACH DRIVEWAY.
2. PROVIDE MEDIUM TO COARSE BROOM FINISH.



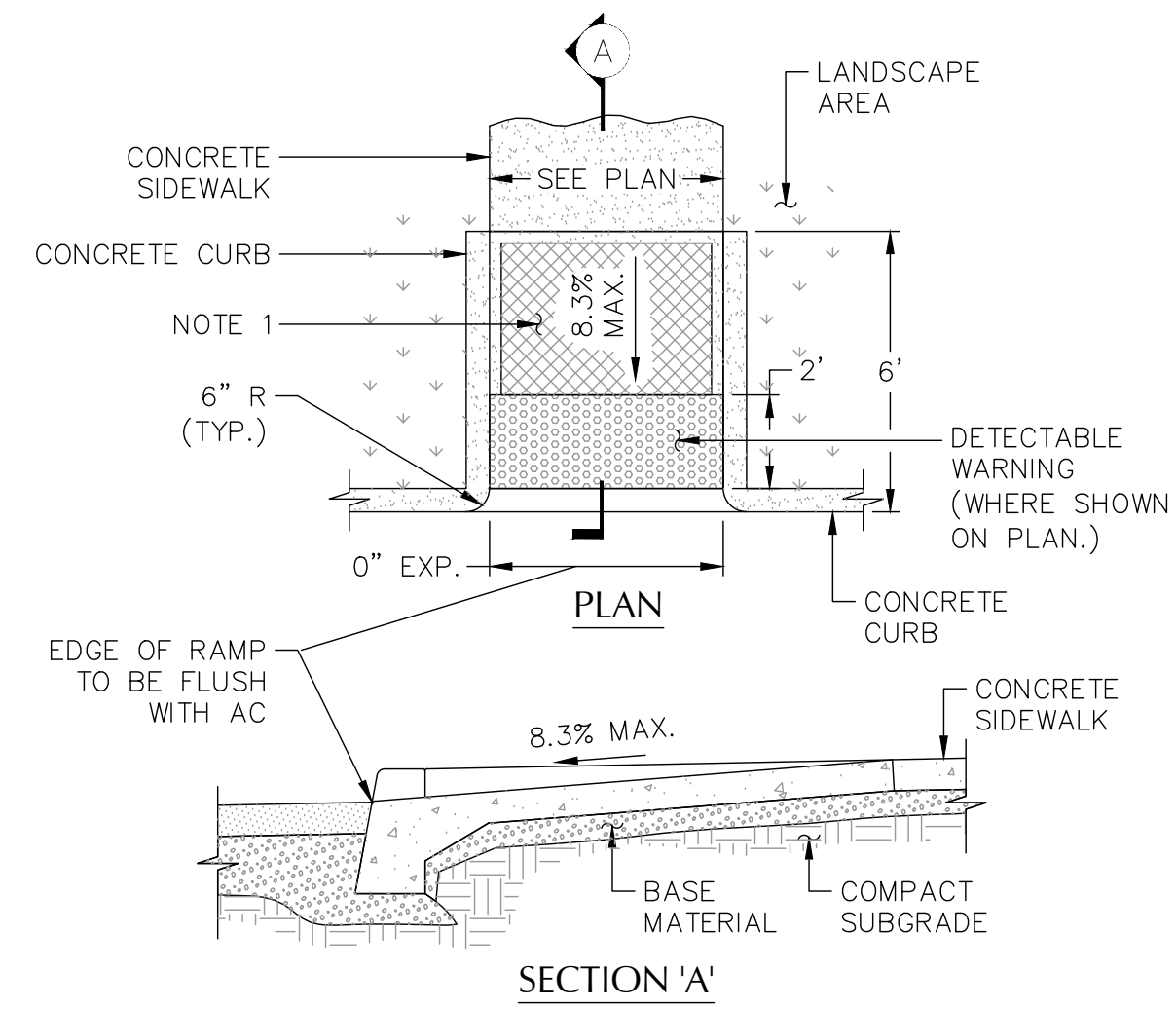
3 CONCRETE SIDEWALK
SCALE: NTS

NOTES:
1. CONSTRUCT CONTRACTION JOINTS AT 15' MAX. SPACING AND AT RAMPS. CONSTRUCT EXPANSION JOINTS AT 200' MAX. SPACING, AT POINTS OF TANGENCY AND AT ENDS OF EACH DRIVEWAY, UNLESS NOTED OTHERWISE.
2. CONCRETE SHALL BE 3000 P.S.I AT 28 DAYS, 6 SACK MIX, SLUMP RANGE OF 1-1/2" TO 3".
3. PANELS SHALL BE 5 FEET LONG.
4. EXPANSION JOINTS TO BE PLACED AT SIDES OF DRIVEWAY APPROACHES, UTILITY VAULTS, WHEELCHAIR RAMPS, AND AT SPACING NOT TO EXCEED 45 FEET.
5. FOR SIDEWALKS ADJACENT TO THE CURB AND POURED AT THE SAME TIME AS THE CURB, THE JOINT BETWEEN THEM SHALL BE A TROVELED JOINT WITH A MINIMUM 1/2" RADIUS.
6. SIDEWALK SHALL HAVE A MINIMUM THICKNESS OF 6 INCHES IF MOUNTABLE CURB IS USED OR IF SIDEWALK IS INTENDED AS PORTION OF DRIVEWAY. OTHERWISE SIDEWALK SHALL HAVE A MINIMUM THICKNESS OF 4 INCHES.
7. DRAIN BLOCKOUTS IN CURBS SHALL BE EXTENDED TO BACK OF SIDEWALK WITH 3" DIA. PVC PIPE AT 2% SLOPE. CONTRACTION JOINT TO BE PLACED OVER PIPE.



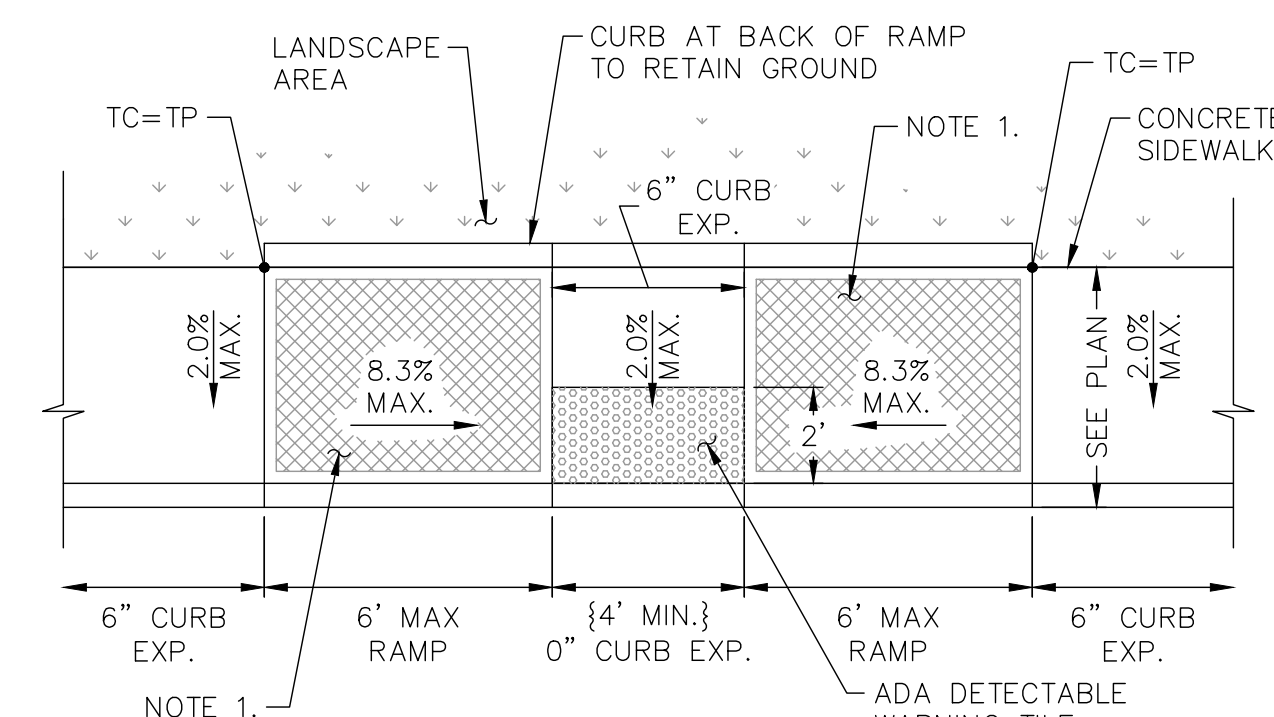
4 CONCRETE CURB - STANDARD
SCALE: NTS

NOTES:
1. CURB EXPOSURE 'E' = 6", TYP. VARY AS SHOWN ON PLANS OR AS DIRECTED.
2. CONSTRUCT CONTRACTION JOINTS AT 15' MAX. SPACING AND AT RAMPS. CONSTRUCT EXPANSION JOINTS AT 200' MAX. SPACING AT POINTS OF TANGENCY AND AT ENDS OF EACH DRIVEWAY.
3. TOPS OF ALL CURBS SHALL SLOPE TOWARD THE ROADWAY AT 2% UNLESS OTHERWISE SHOWN OR AS DIRECTED.
4. DIMENSIONS ARE NOMINAL AND MAY VARY TO CONFORM WITH CURB MACHINE AS APPROVED BY THE ENGINEER.



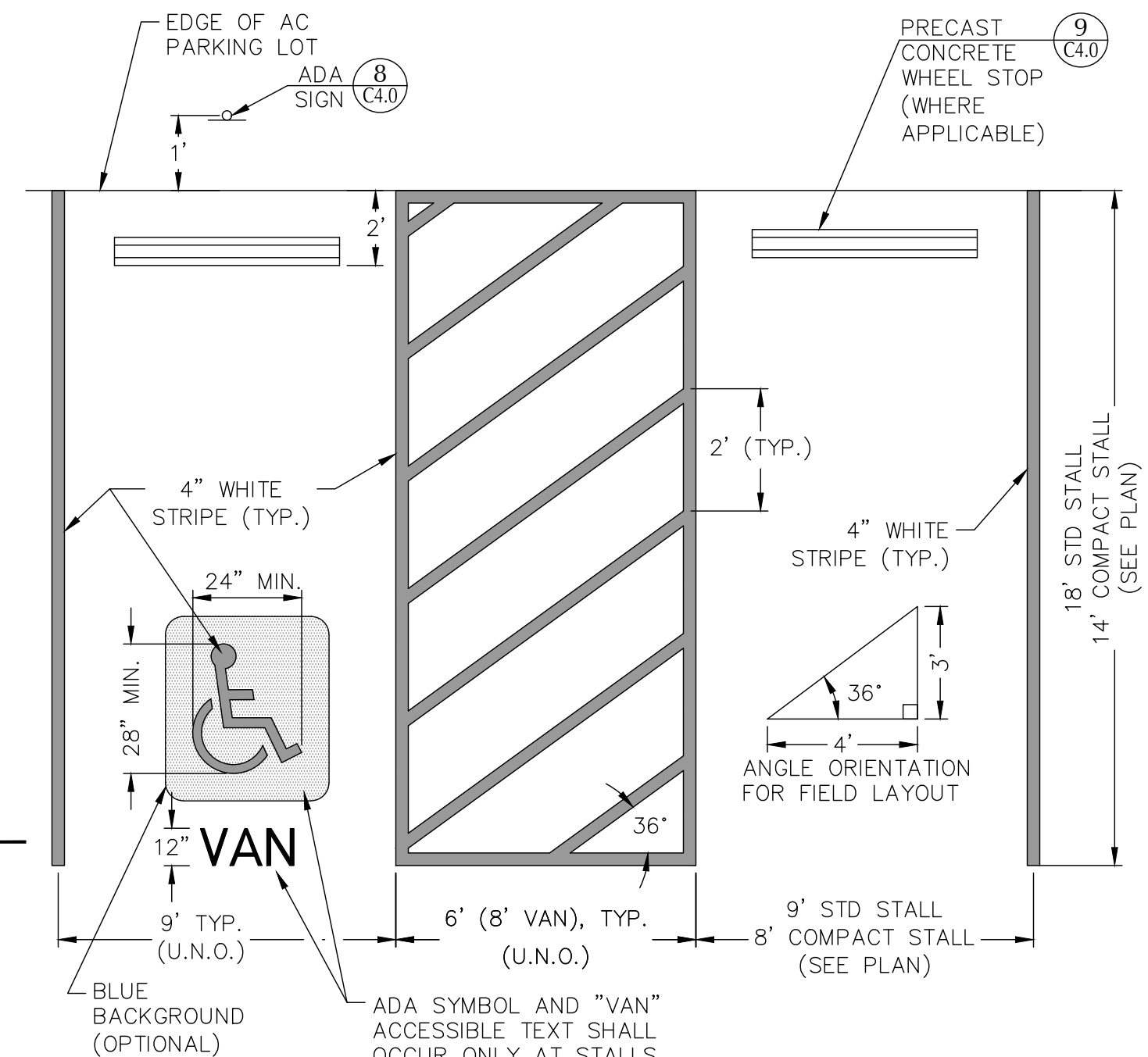
5 CURB RAMP - TYPE 2
SCALE: NTS

NOTES:
1. PROVIDE RAMP TEXTURING WITH AN EXPANDED METAL GRATE PLACED ON AND REMOVED FROM WET CONCRETE TO LEAVE A DIAMOND PATTERN. EACH DIAMOND SHALL BE 1 1/4" LONG BY 1/2" WIDE WITH THE LONG SECTION AXIS ORIENTED PERPENDICULAR TO THE CURB. THE GROOVES SHALL BE 1/8" DEEP BY 1/4" WIDE.



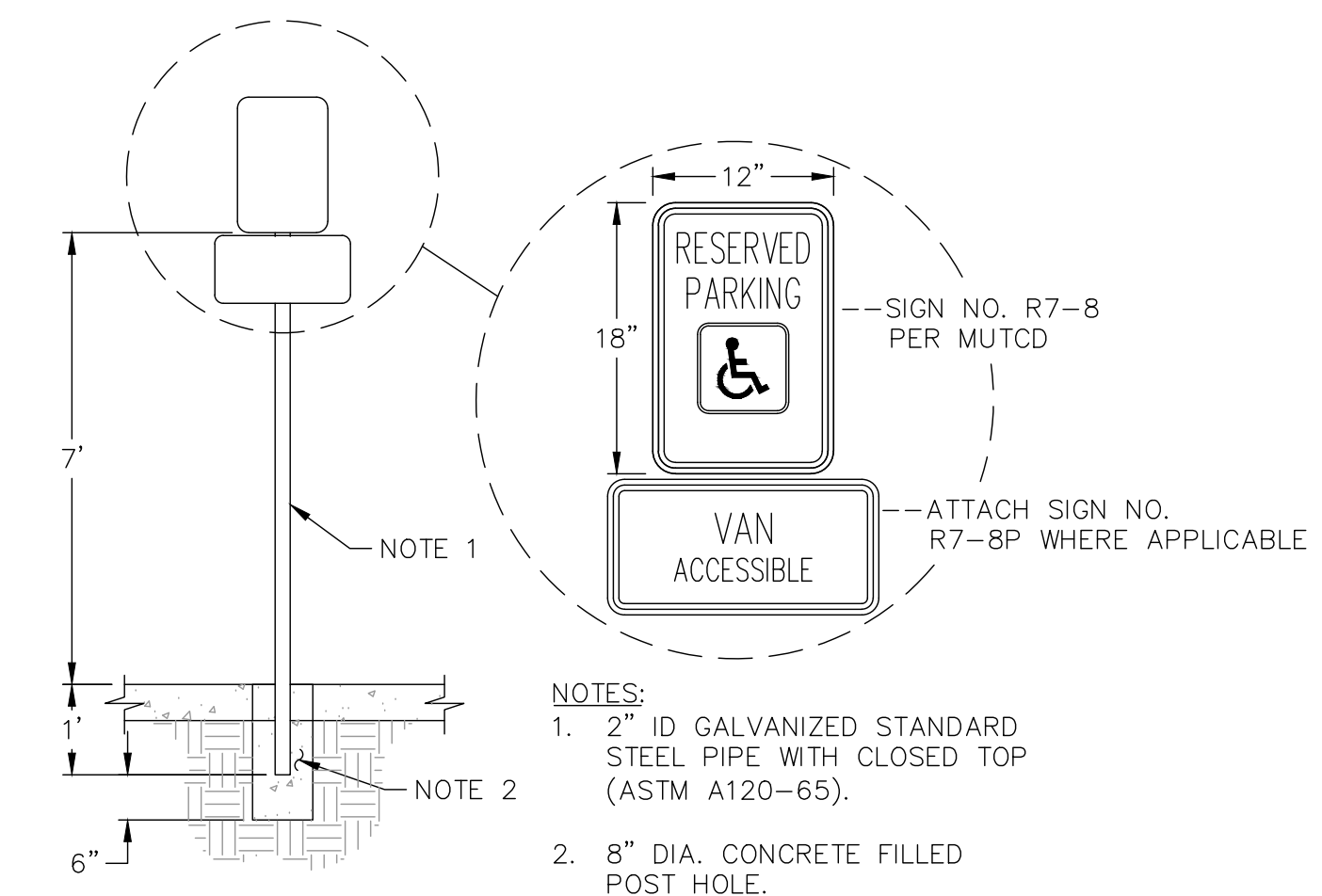
6 CURB RAMP - TYPE 5
SCALE: NTS

NOTES:
1. PROVIDE RAMP TEXTURING WITH AN EXPANDED METAL GRATE PLACED ON AND REMOVED FROM WET CONCRETE TO LEAVE A DIAMOND PATTERN. EACH DIAMOND SHALL BE 1 1/4" LONG BY 1/2" WIDE WITH THE LONG SECTION AXIS ORIENTED PERPENDICULAR TO THE CURB. THE GROOVES SHALL BE 1/8" DEEP BY 1/4" WIDE.



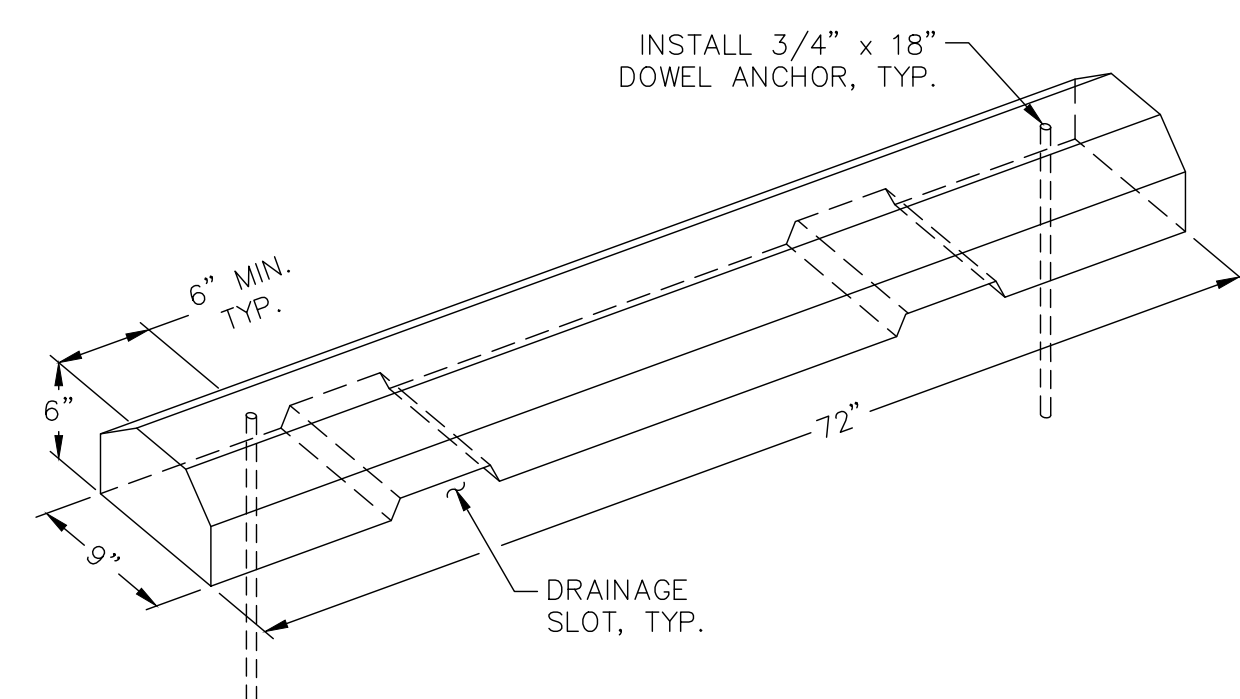
7 TYPICAL PARKING LAYOUT
SCALE: NTS

NOTES:
1. DIMENSIONS ARE NOMINAL AND MAY VARY TO CONFORM WITH CURB MACHINE AS APPROVED BY THE ENGINEER.



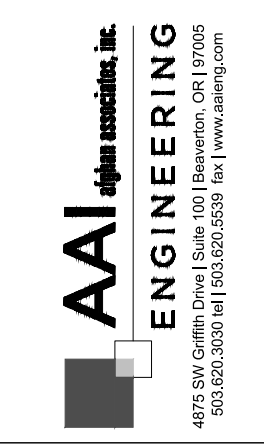
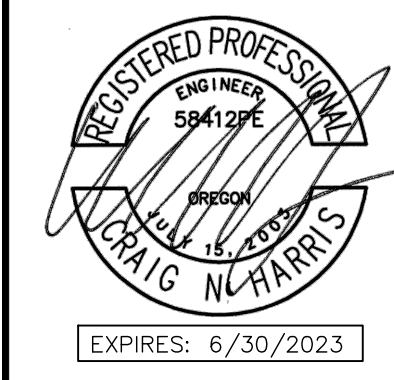
8 ADA PARKING SIGN - TYPE 1
SCALE: NTS

NOTES:
1. 2" ID GALVANIZED STANDARD STEEL PIPE WITH CLOSED TOP (ASTM A120-65).
2. 8" DIA. CONCRETE FILLED POST HOLE.



9 PRECAST CONCRETE WHEEL STOP
SCALE: NTS

NOTES:
1. DIMENSIONS ARE NOMINAL AND MAY VARY TO CONFORM TO MANUFACTURER'S PRODUCTS APPROVED BY ENGINEER.

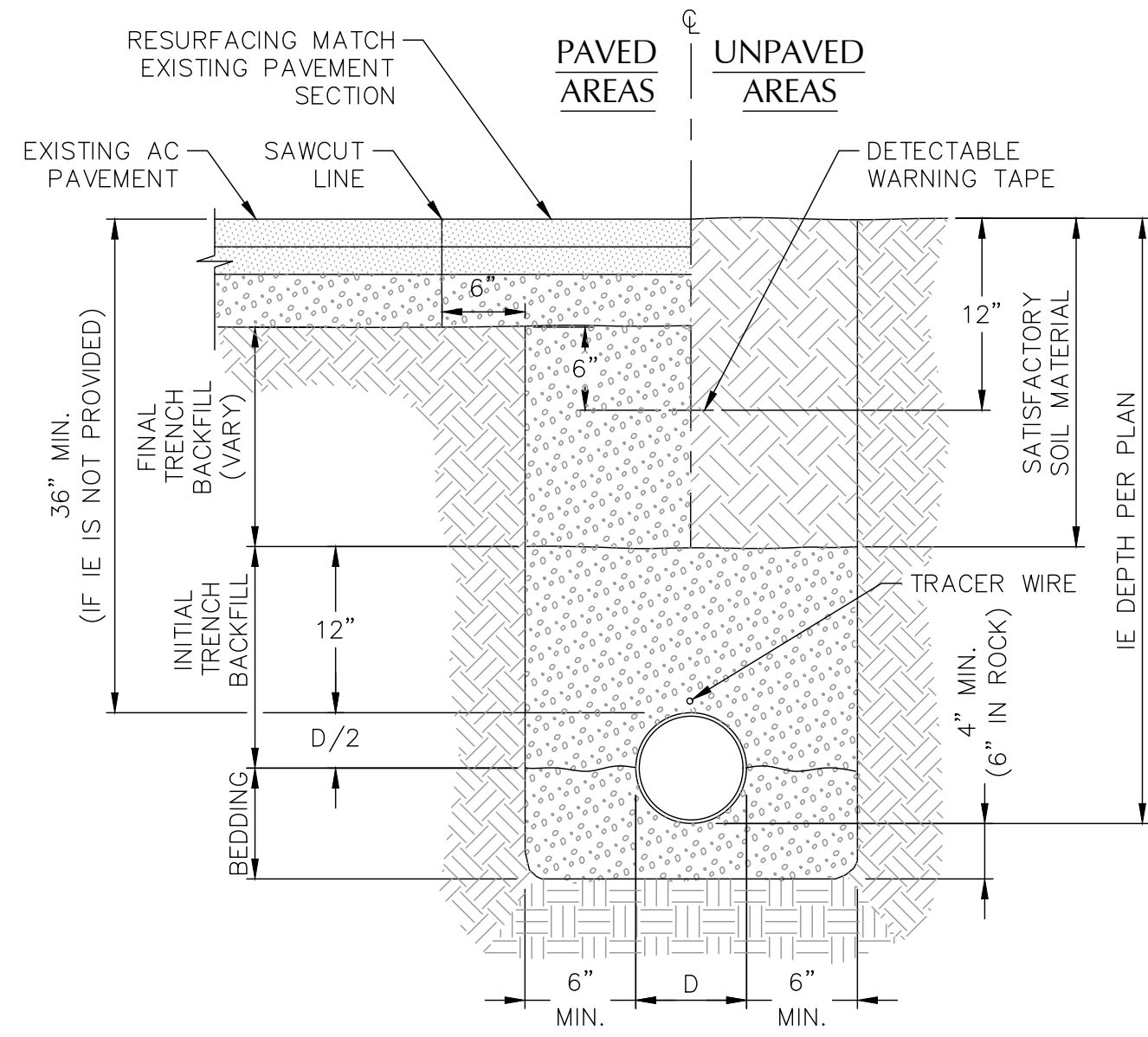


HEDGES CREEK
TUALATIN, OR

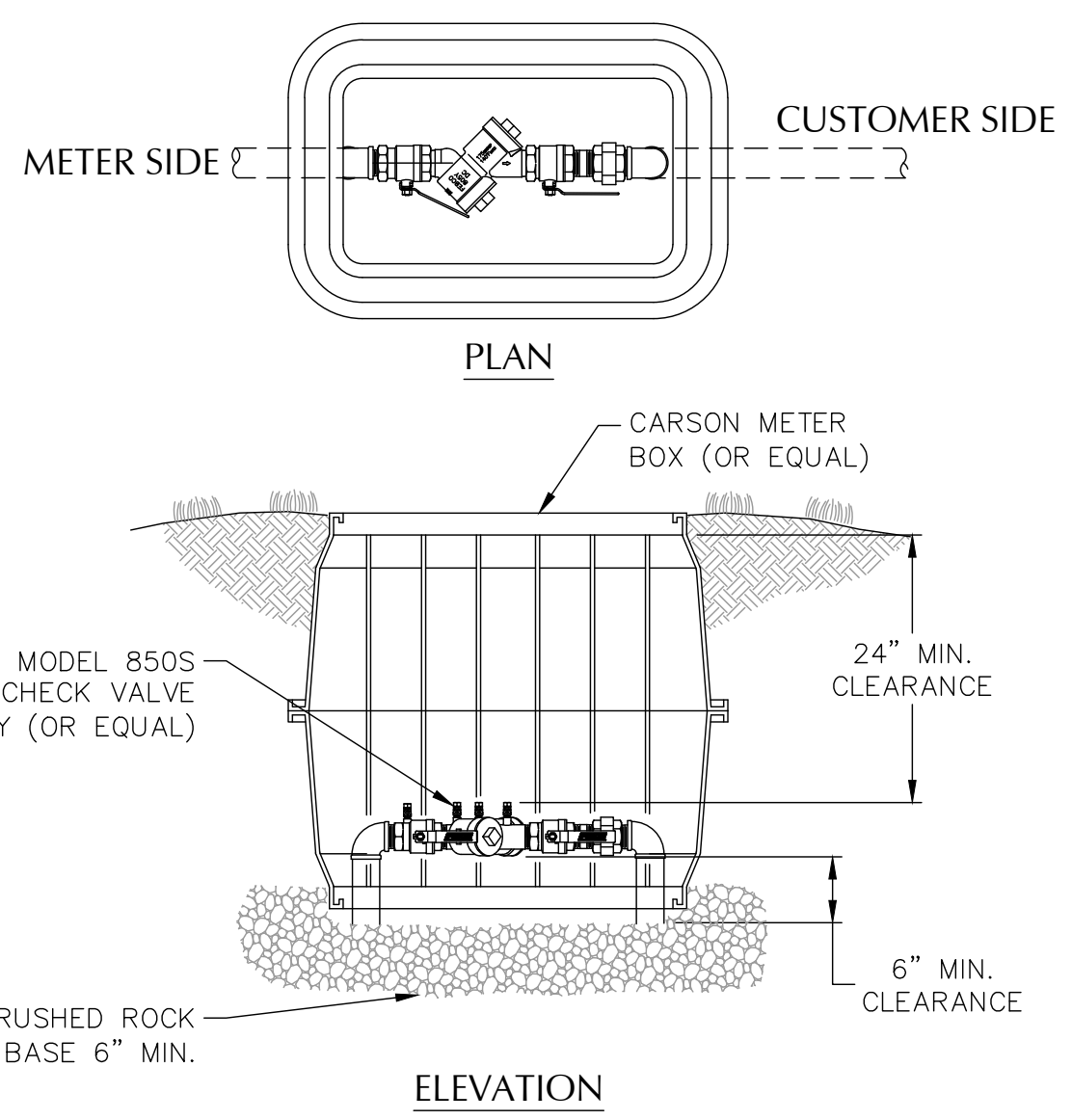
SHEET TITLE
DETAILS
DATE: 08/02/2021
DRAWN: KPM
CHECKED: CNH
REVISIONS:

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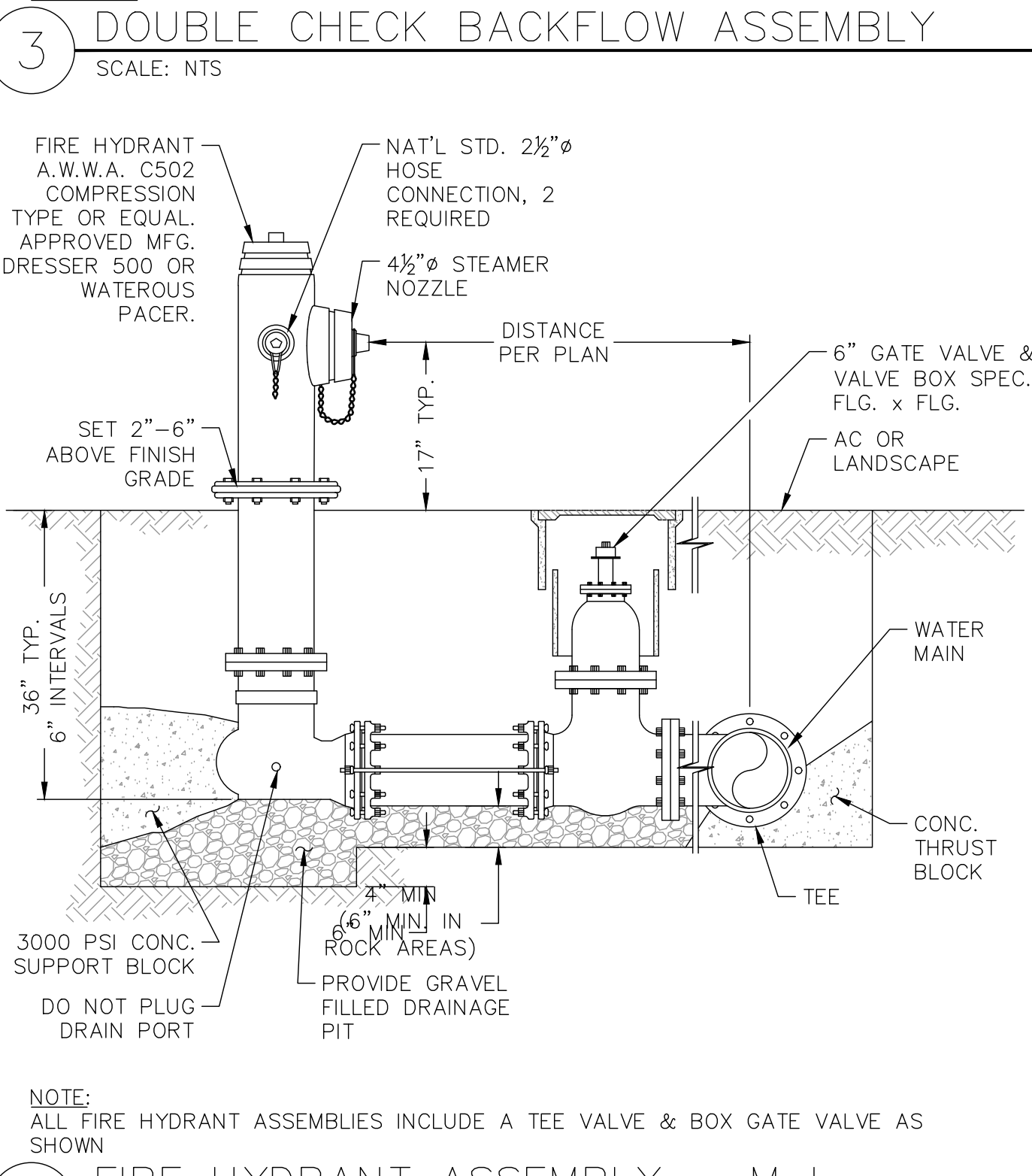
SHEET NUMBER
C4.0



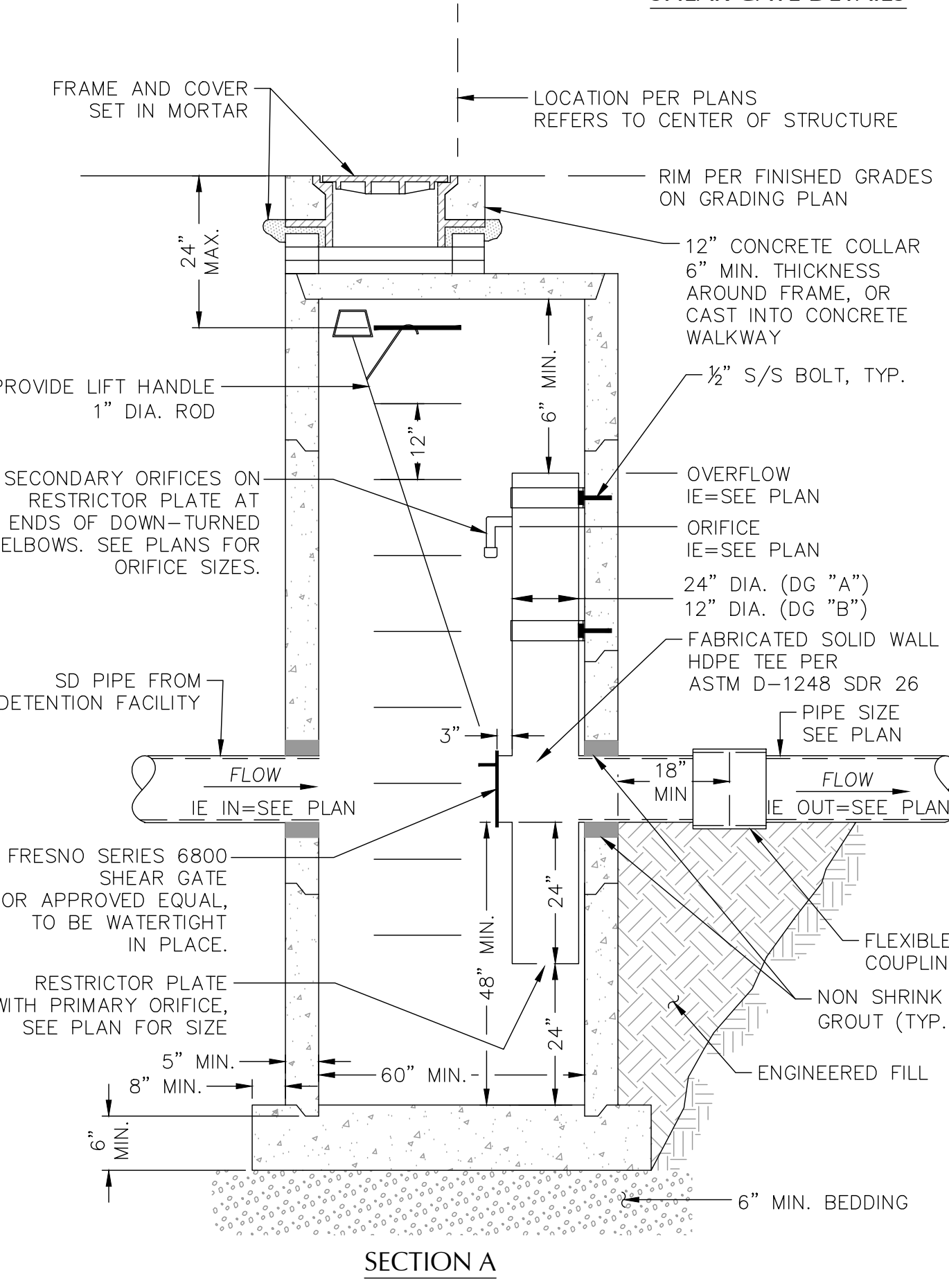
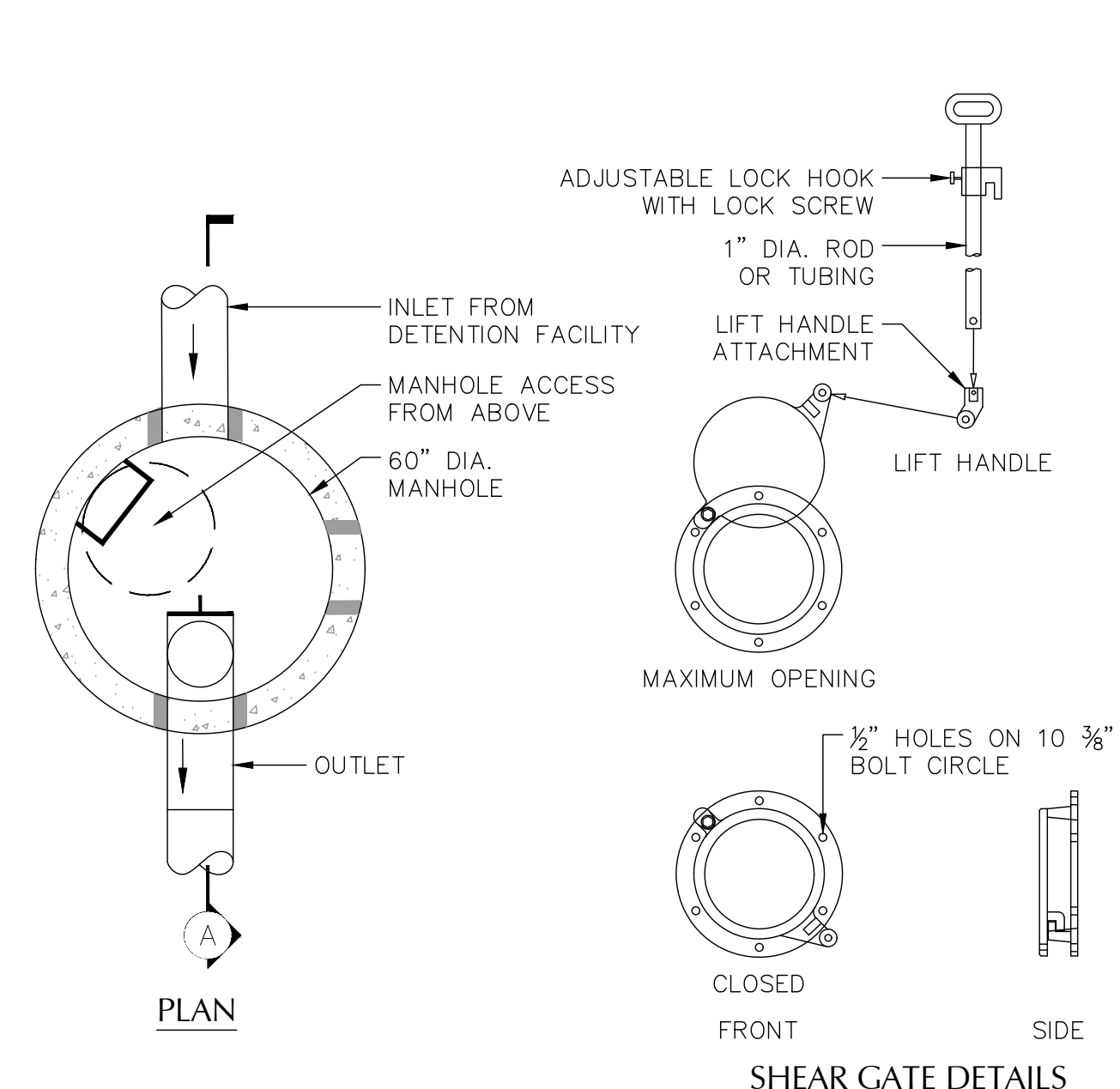
1 TYPICAL PIPE BEDDING AND BACKFILL
SCALE: NTS



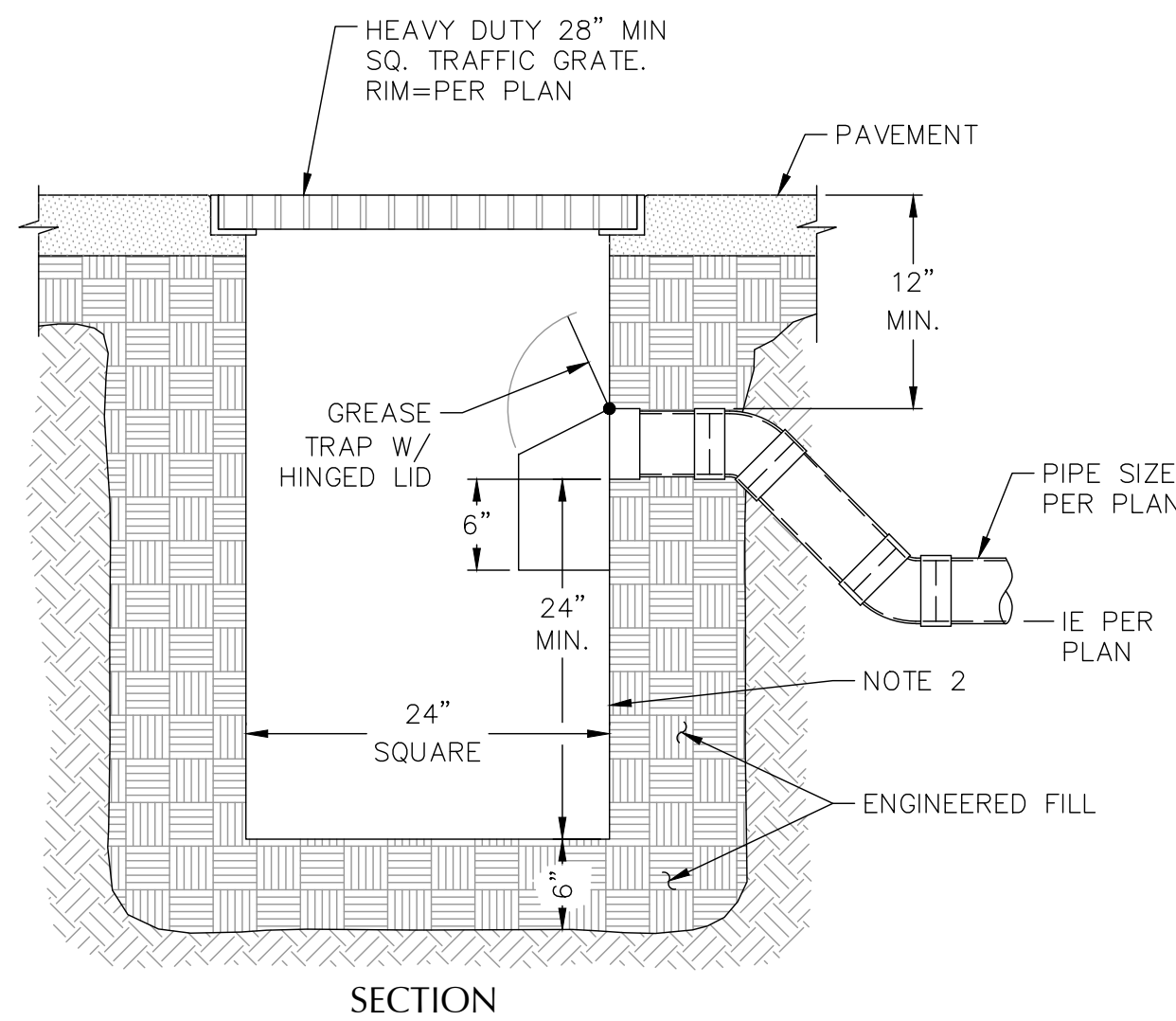
2 DOUBLE CHECK BACKFLOW ASSEMBLY
SCALE: NTS



3 FIRE HYDRANT ASSEMBLY - M.J.
SCALE: NTS



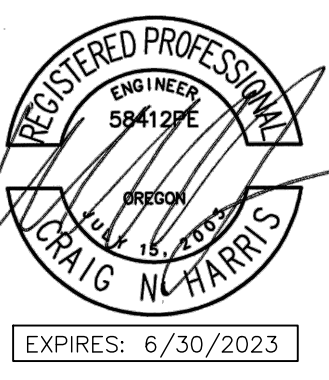
4 FLOW CONTROL MANHOLE
SCALE: NTS



5 TRAPPED CATCH BASIN
SCALE: NTS

NOTE:
ALL FIRE HYDRANT ASSEMBLIES INCLUDE A TEE VALVE & BOX GATE VALVE AS SHOWN

NOTE:
INSTALLATION SHOWN IS ONLY A SUGGESTION. THE DISTANCE FROM BOTTOM OF DEVICE TO FINISH GRADE, FREEZE PROTECTION, AND CLEARANCE FOR TESTING & REPAIR ARE THE MAJOR CONSIDERATIONS FOR INSTALLATION. PLUGS TO BE INSTALLED IN TEST COCKS OF BELOW GROUND INSTALLATIONS (NO DISSIMILAR METALS). IF FREEZE PROTECTION IS PROVIDED, THE 24\"/>



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450 Newport Center Drive, Suite 405
Newport Beach, CA 92660

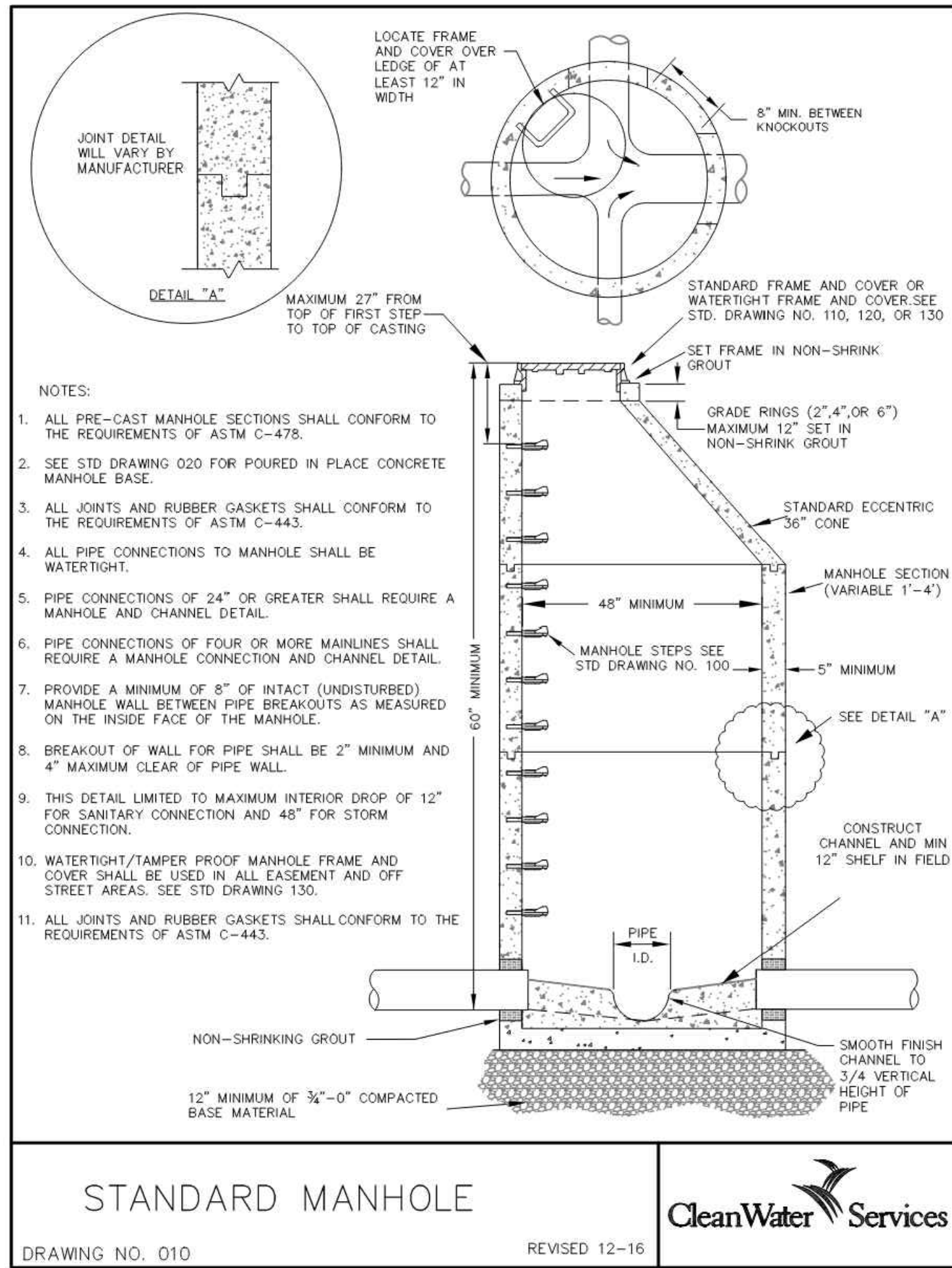


HEDGES CREEK
TUALATIN, OR

SHEET TITLE
DETAILS
DATE: 08/02/2021
DRAWN: KPM
CHECKED: CNH
REVISIONS:

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SHEET NUMBER

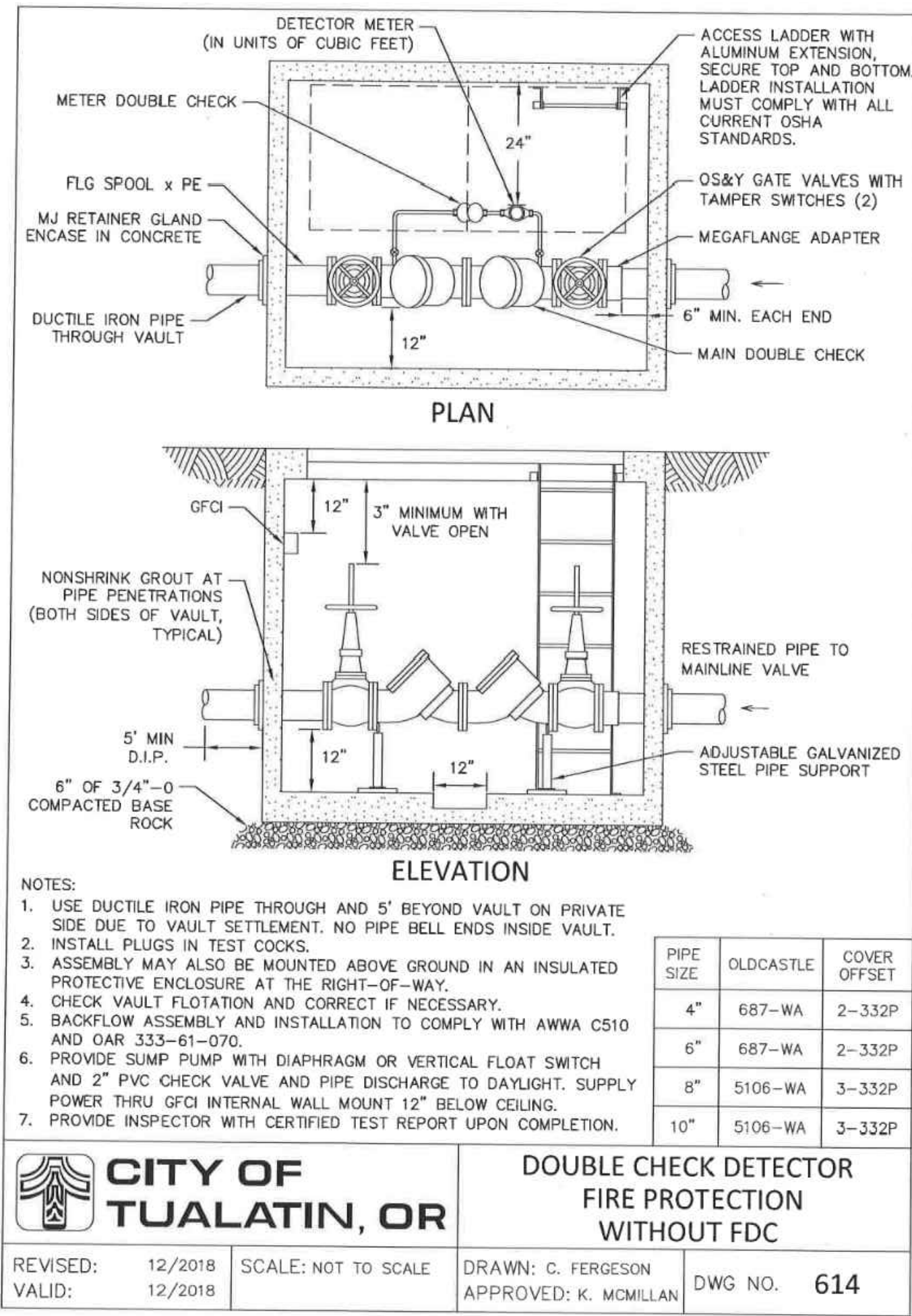
C4.1



STANDARD MANHOLE

DRAWING NO. 010

REVISED 12-16



CITY OF TUALATIN, OR

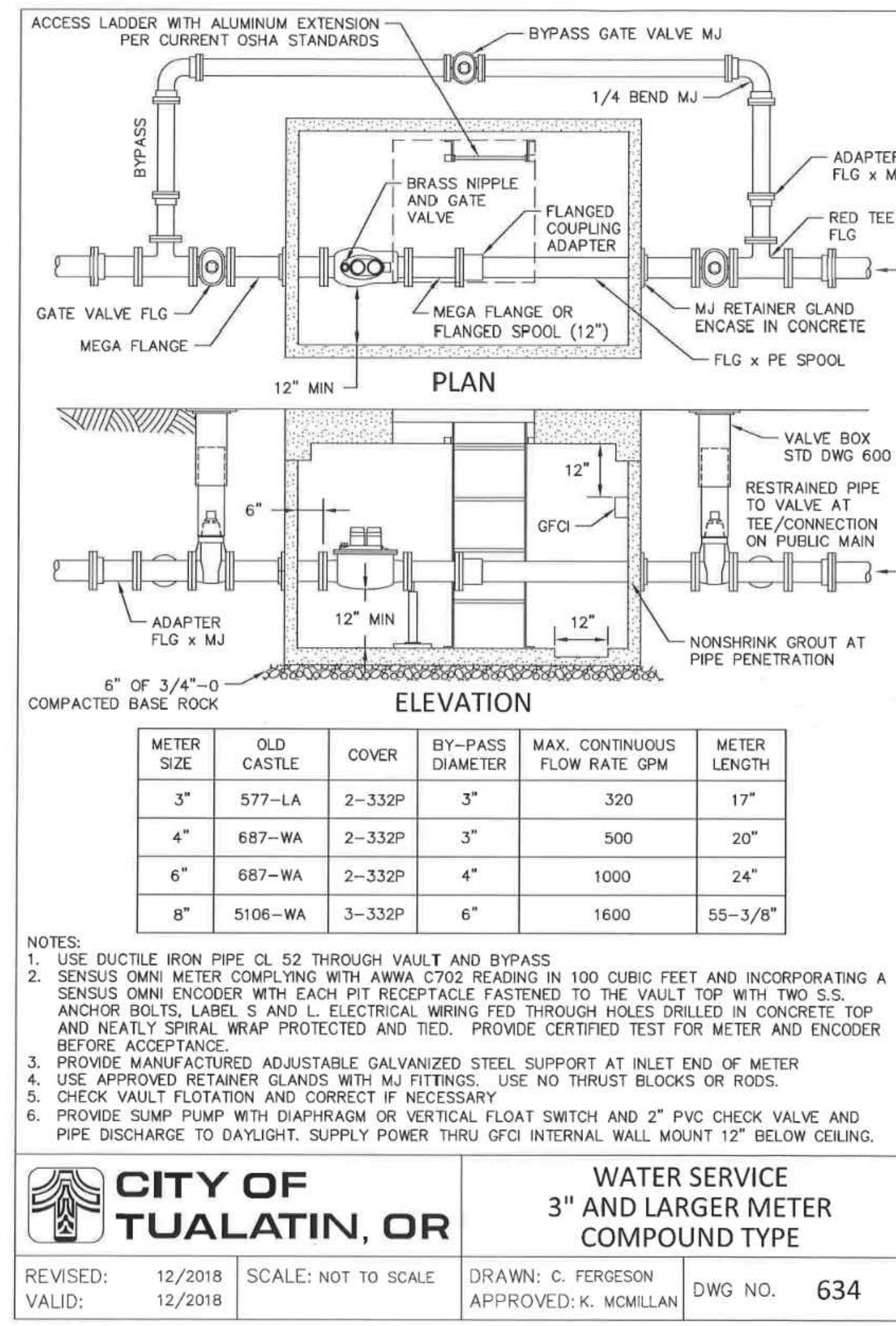
DOUBLE CHECK DETECTOR FIRE PROTECTION WITHOUT FDC

REVISED: 12/2018
VALID: 12/2018

SCALE: NOT TO SCALE

DRAWN: C. FERGESON
APPROVED: K. MCMILLAN

DWG NO. 614



CITY OF TUALATIN, OR

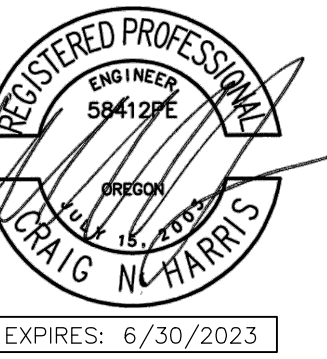
WATER SERVICE 3" AND LARGER METER COMPOUND TYPE

REVISED: 12/2018
VALID: 12/2018

SCALE: NOT TO SCALE

DRAWN: C. FERGESON
APPROVED: K. MCMILLAN

DWG NO. 634



HEDGES CREEK
TUALATIN, OR

SHEET TITLE

DETAILS

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

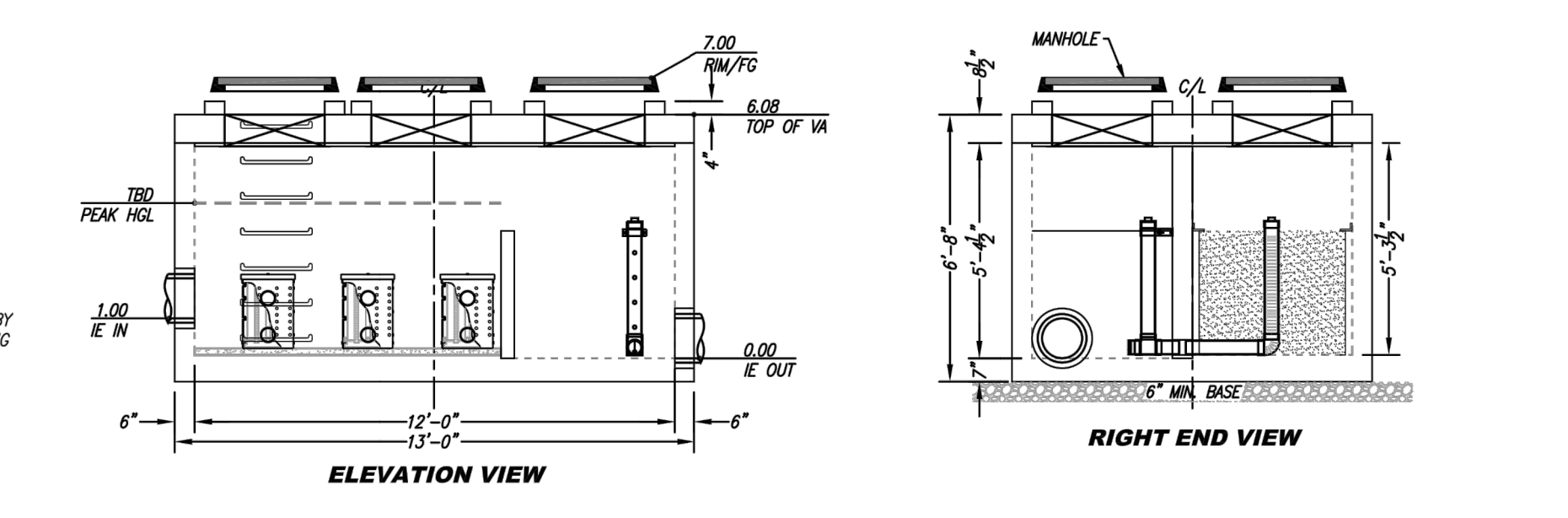
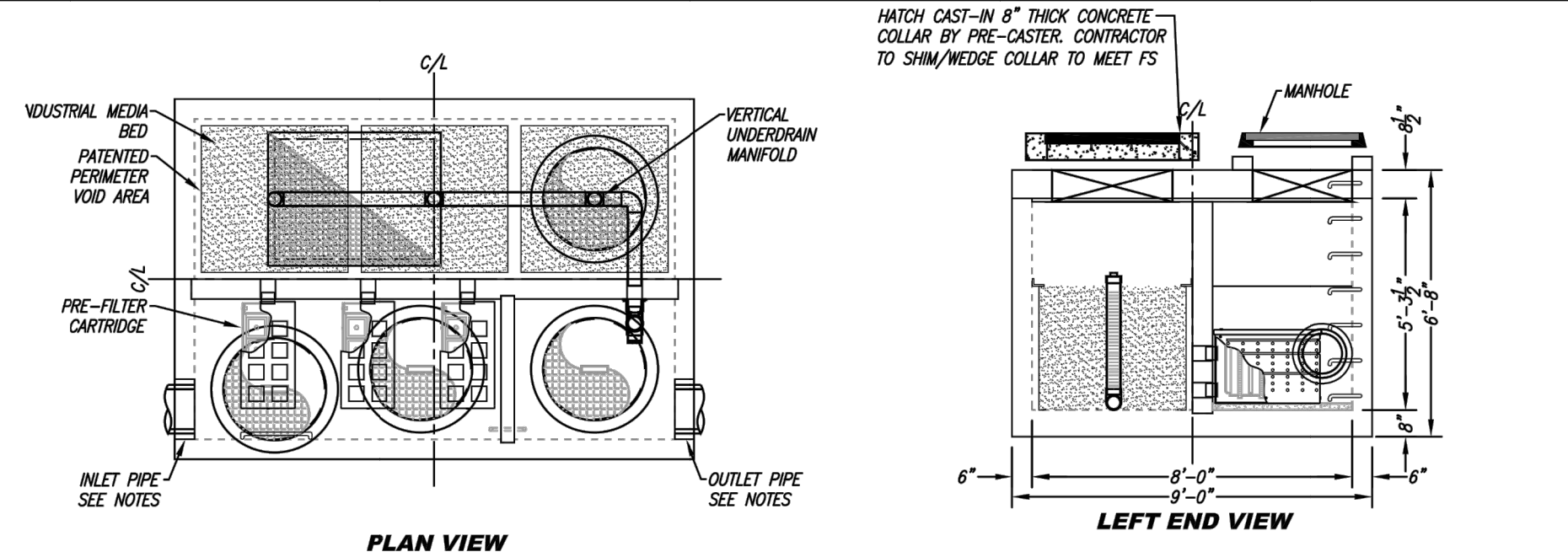
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SHEET NUMBER

C4.2

SITE SPECIFIC DATA			
PROJECT NUMBER	15270		
PROJECT NAME	HEDGES CREEK		
PROJECT LOCATION	TUALATIN, OR		
STRUCTURE ID	SYSTEM #1		
TREATMENT REQUIRED		FLOW BASED (CFS)	
VOLUME BASED (CF)	N/A		
PEAK BYPASS REQUIRED (CFS) - IF APPLICABLE	TBD		
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE	1.00	CPEP	12"
OUTLET PIPE	0.00	CPEP	12"
PRE-TREATMENT		BIOFILTRATION	DISCHARGE
RIM ELEVATION	7.00	7.00	7.00
SURFACE LOAD	HS-20	HS-20	HS-20
FRAME & COVER	2EA #30"	36"X48" & #30"	#30"
WETLANDMEDIA VOLUME (CY)	4.71		
ORIFICE SIZE (DIA. INCHES)	5 EA #1.41"		
NOTES: INDUSTRIAL MEDIA NEEDED			



INTERNAL BYPASS DISCLOSURE:
 THE DESIGN AND CAPACITY OF THE PEAK CONVEYANCE METHOD TO BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD. HGL(S) AT PEAK FLOW SHALL BE ASSESSED TO ENSURE NO UPSTREAM FLOODING. PEAK HGL AND BYPASS CAPACITY SHOWN ON DRAWING ARE USED FOR GUIDANCE ONLY.

TREATMENT FLOW (CFS)	0.320
OPERATING HEAD (FT)	3.1
PRE-TREATMENT LOADING RATE (GPM/SF)	1.9
INDUSTRIAL MEDIA LOADING RATE (GPM/SF)	1.0

BioClean MWS-L-8-12-5'-4"-V-UG STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL
 A Forterra Company

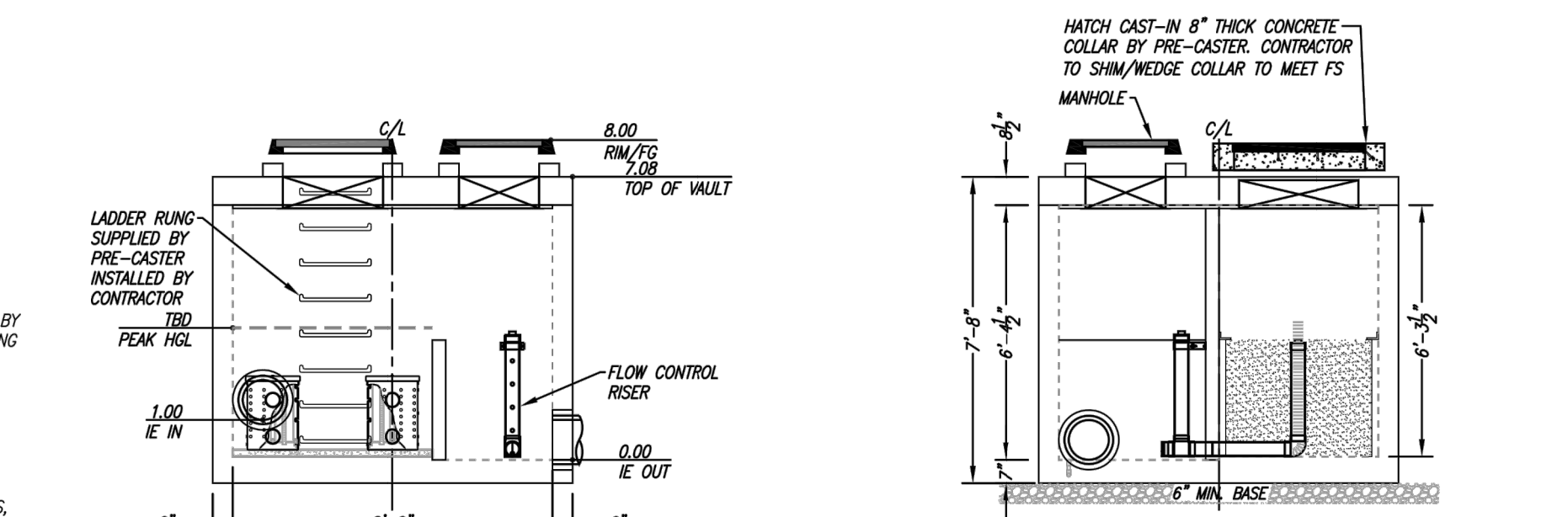
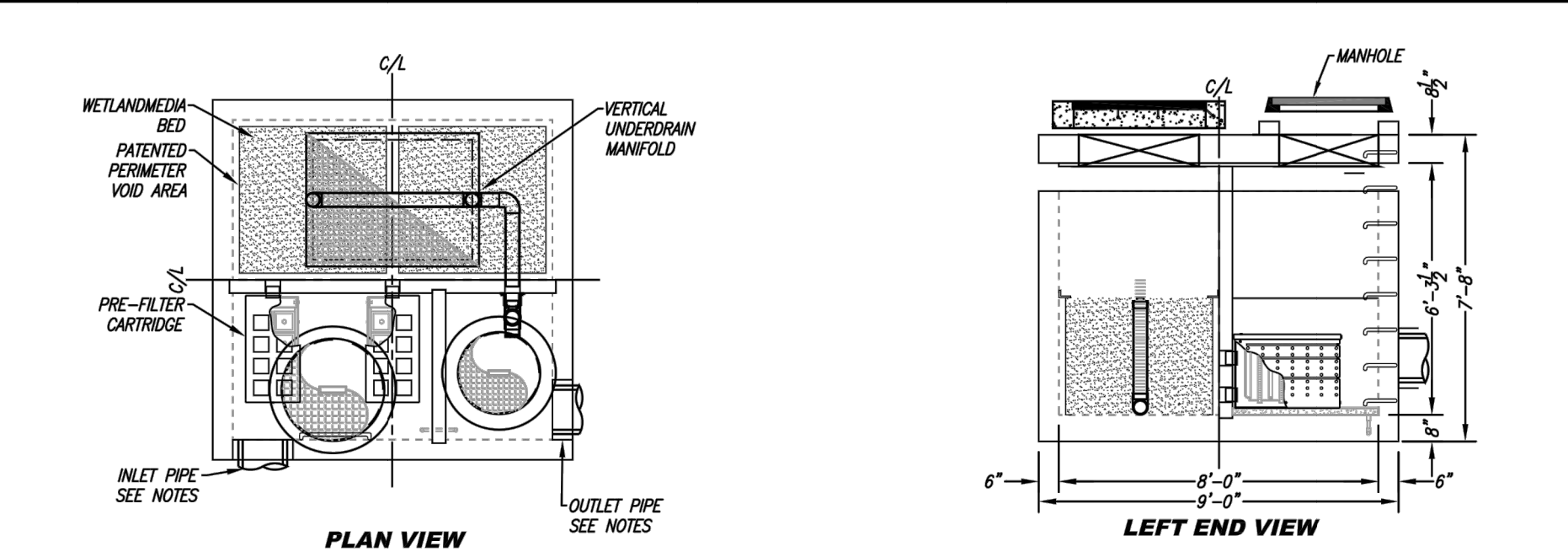
INSTALLATION NOTES

- CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
- UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
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- CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

- MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
- ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.

SITE SPECIFIC DATA			
PROJECT NUMBER	15270		
PROJECT NAME	HEDGES CREEK		
PROJECT LOCATION	TUALATIN, OR		
STRUCTURE ID	SYSTEM #2		
TREATMENT REQUIRED		FLOW BASED (CFS)	
VOLUME BASED (CF)	0.20		
PEAK BYPASS REQUIRED (CFS) - IF APPLICABLE	N/A		
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	1.00	CPEP	12"
OUTLET PIPE	0.00	CPEP	12"
PRE-TREATMENT		BIOFILTRATION	DISCHARGE
RIM ELEVATION	8.00	8.00	8.00
SURFACE LOAD	HS-20	HS-20	HS-20
FRAME & COVER	#30"	36" X 48"	#24"
WETLANDMEDIA VOLUME (CY)	2.97		
ORIFICE SIZE (DIA. INCHES)	5 EA #1.12"		
NOTES: PRELIMINARY NOT FOR CONSTRUCTION. INDUSTRIAL MEDIA NEEDED			



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TREATMENT FLOW (CFS)	0.20
OPERATING HEAD (FT)	2.9
PRE-TREATMENT LOADING RATE (GPM/SF)	1.8
INDUSTRIAL MEDIA LOADING RATE (GPM/SF)	1.0

BioClean MWS-L-8-8-6'-4"-V-UG STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL
 A Forterra Company

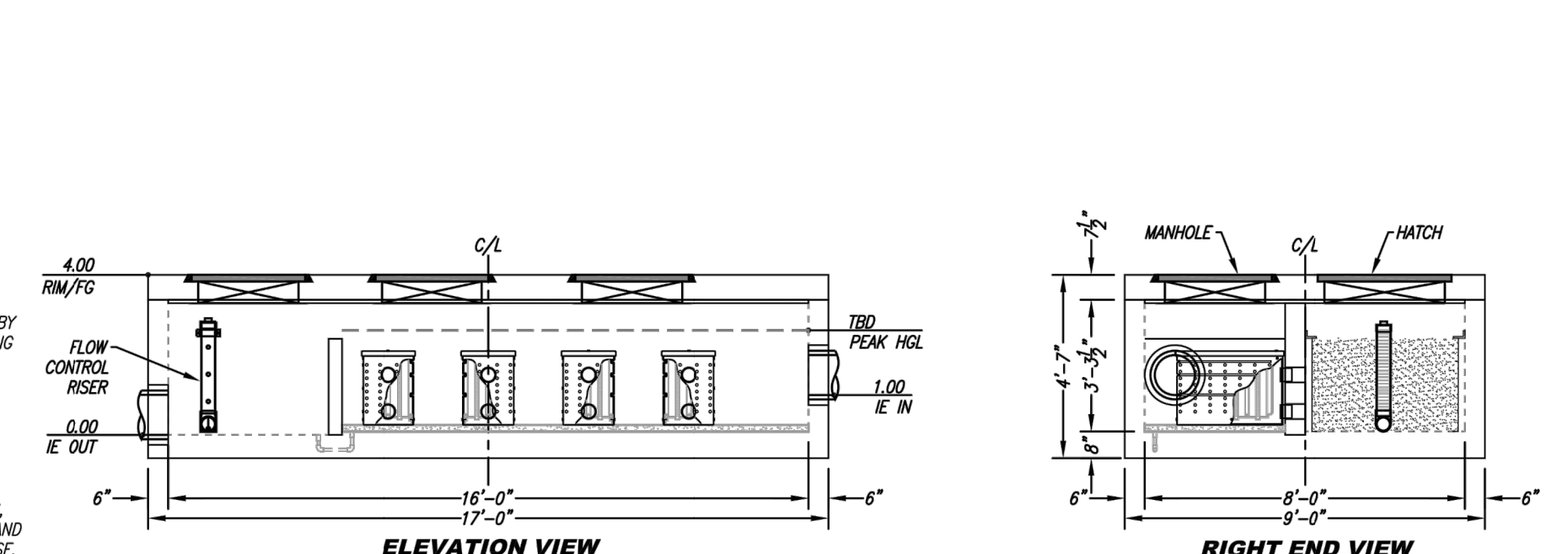
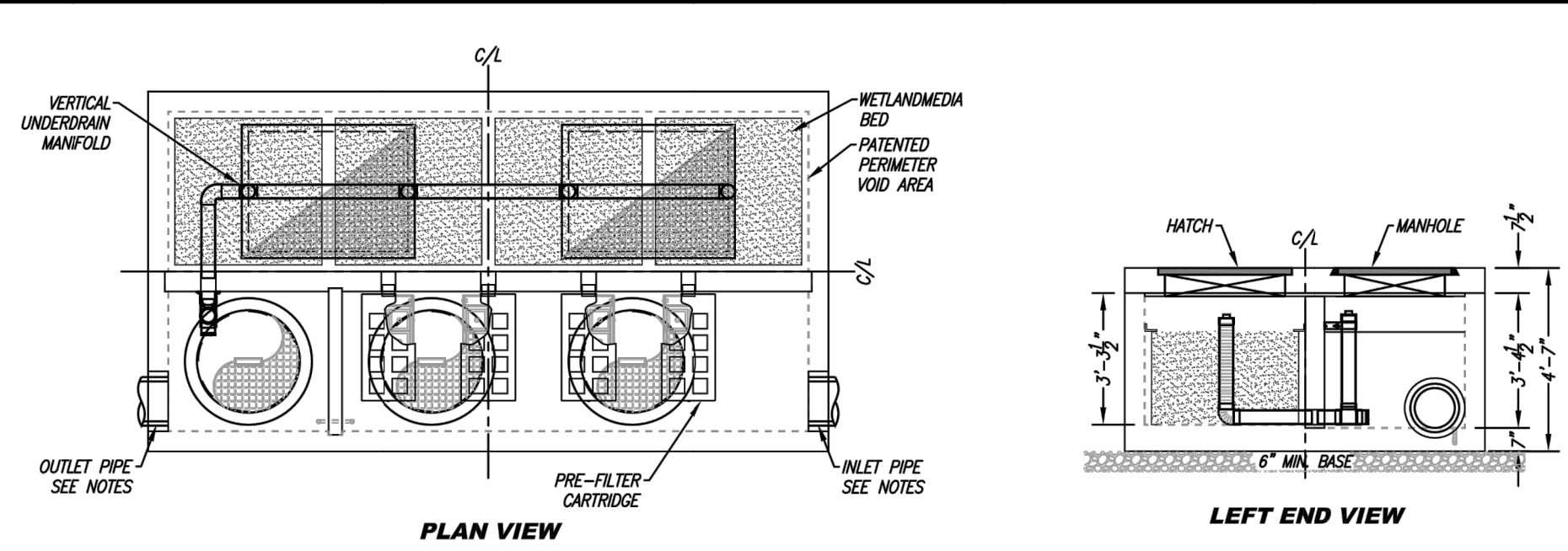
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SITE SPECIFIC DATA			
PROJECT NUMBER	15270		
PROJECT NAME	HEDGES CREEK		
PROJECT LOCATION	TUALATIN, OR		
STRUCTURE ID	SYSTEM #3, UNIT1		
TREATMENT REQUIRED		FLOW BASED (CFS)	
VOLUME BASED (CF)	N/A		
PEAK BYPASS REQUIRED (CFS) - IF APPLICABLE	TBD		
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	1.00	CPEP	12"
OUTLET PIPE	0.00	CPEP	12"
PRE-TREATMENT		BIOFILTRATION	DISCHARGE
RIM ELEVATION	4.00	4.00	4.00
SURFACE LOAD	HS-20	HS-20	HS-20
FRAME & COVER	2EA #30"	2EA 36" X 48"	#30"
INDUSTRIAL MEDIA VOLUME (CY)	4.73		
ORIFICE SIZE (DIA. INCHES)	5 EA # 1.61"		
NOTES: PRELIMINARY NOT FOR CONSTRUCTION. *TOTAL TWO MWS IS NEEDED TO PROVIDE TREATMENT FLOW RATE. INDUSTRIAL MEDIA NEEDED.			



INTERNAL BYPASS DISCLOSURE:
 THE DESIGN AND CAPACITY OF THE PEAK CONVEYANCE METHOD TO BE REVIEWED AND APPROVED BY THE ENGINEER OF RECORD. HGL(S) AT PEAK FLOW SHALL BE ASSESSED TO ENSURE NO UPSTREAM FLOODING. PEAK HGL AND BYPASS CAPACITY SHOWN ON DRAWING ARE USED FOR GUIDANCE ONLY.

TREATMENT FLOW (CFS)	0.31
OPERATING HEAD (FT)	2.3
PRE-TREATMENT LOADING RATE (GPM/SF)	1.4
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

BioClean MWS-L-8-16-3'-4"-V-UG STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL
 A Forterra Company

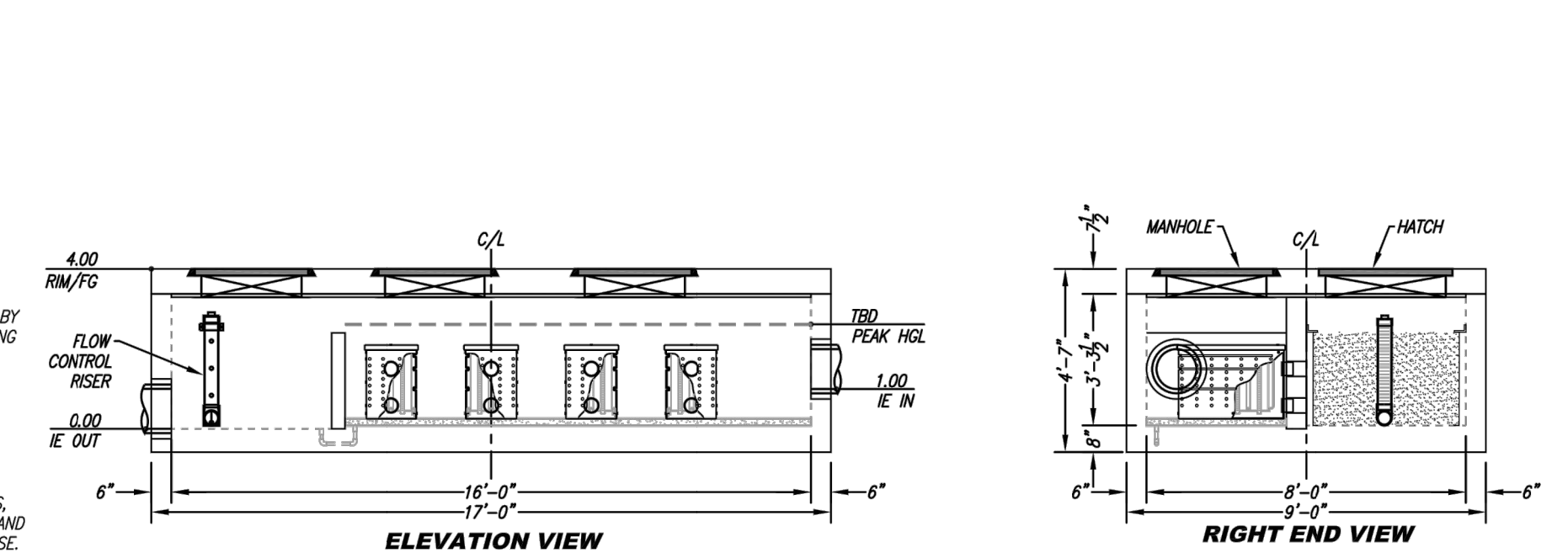
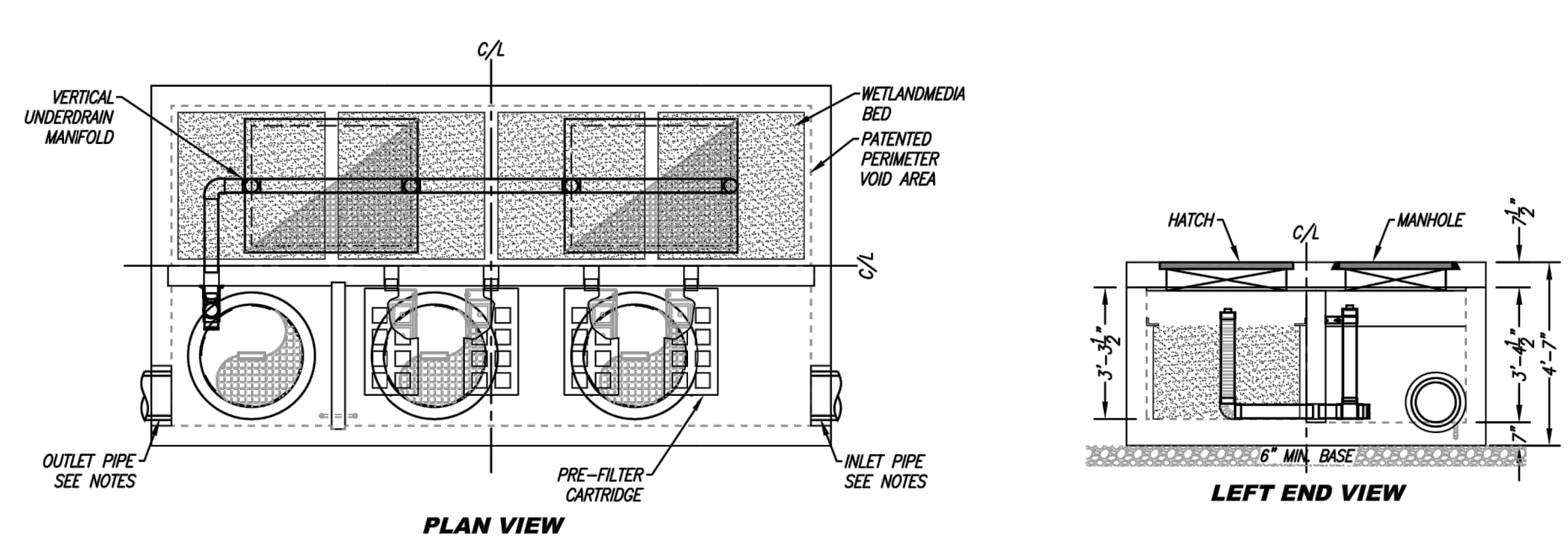
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GENERAL NOTES

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SITE SPECIFIC DATA			
PROJECT NUMBER	15270		
PROJECT NAME	HEDGES CREEK		
PROJECT LOCATION	TUALATIN, OR		
STRUCTURE ID	SYSTEM #3, UNIT2		
TREATMENT REQUIRED		FLOW BASED (CFS)	
VOLUME BASED (CF)	N/A		
PEAK BYPASS REQUIRED (CFS) - IF APPLICABLE	TBD		
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	1.00	CPEP	12"
OUTLET PIPE	0.00	CPEP	12"
PRE-TREATMENT		BIOFILTRATION	DISCHARGE
RIM ELEVATION	4.00	4.00	4.00
SURFACE LOAD	HS-20	HS-20	HS-20
FRAME & COVER	2EA #30"	2EA 36" X 48"	#30"
INDUSTRIAL MEDIA VOLUME (CY)	4.73		
ORIFICE SIZE (DIA. INCHES)	5 EA # 1.61"		
NOTES: PRELIMINARY NOT FOR CONSTRUCTION. *TOTAL TWO MWS IS NEEDED TO PROVIDE TREATMENT FLOW RATE. INDUSTRIAL MEDIA NEEDED.			



INTERNAL BYPASS DISCLOSURE:
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TREATMENT FLOW (CFS)	0.31
OPERATING HEAD (FT)	2.3
PRE-TREATMENT LOADING RATE (GPM/SF)	1.4
WETLAND MEDIA LOADING RATE (GPM/SF)	1.0

BioClean MWS-L-8-16-3'-4"-V-UG STORMWATER BIOFILTRATION SYSTEM STANDARD DETAIL
 A Forterra Company

INSTALLATION NOTES

- CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
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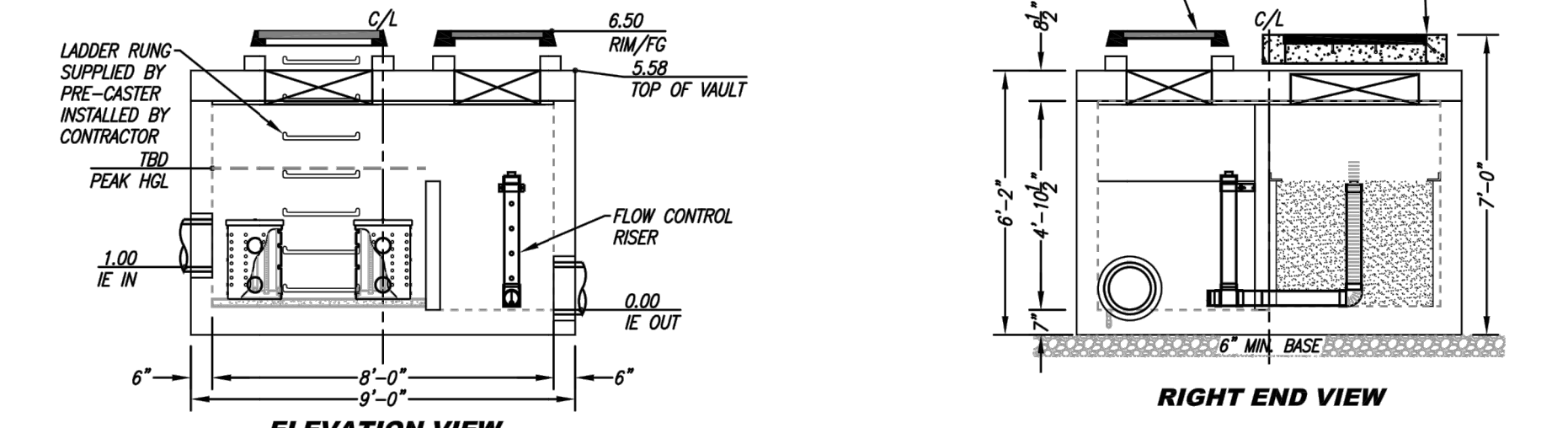
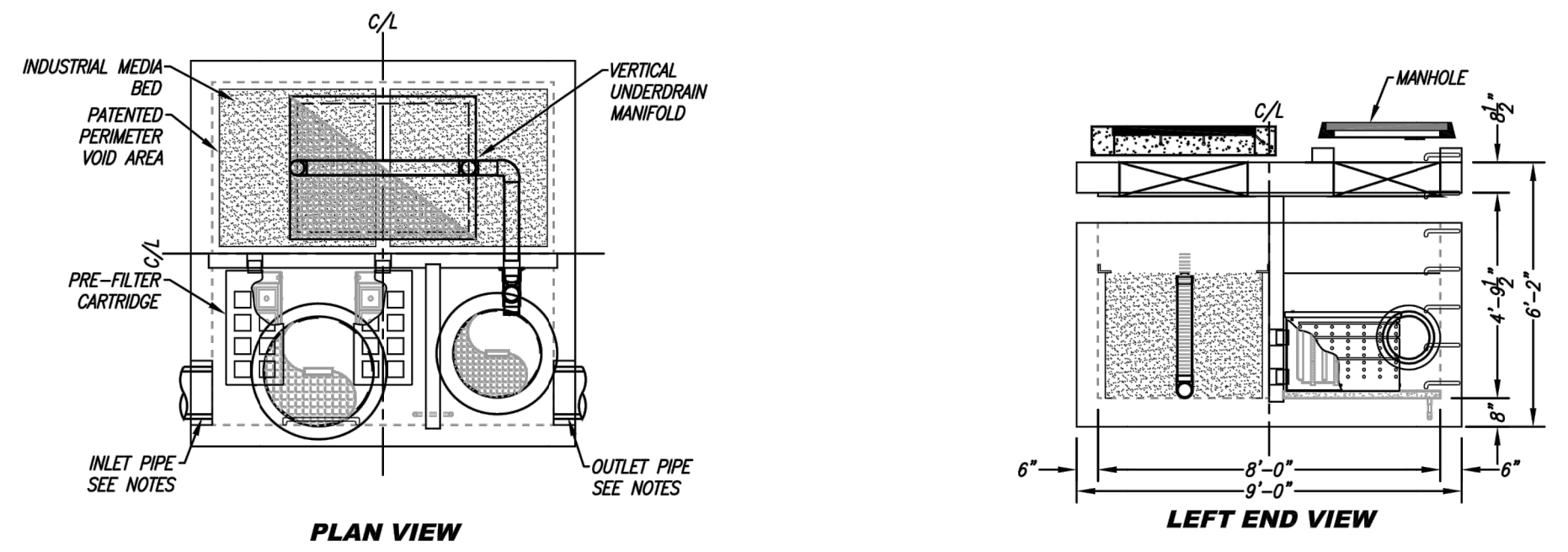
SITE SPECIFIC DATA			
PROJECT NUMBER	15270		
PROJECT NAME	HEDGES CREEK		
PROJECT LOCATION	TUALATIN, OR		
STRUCTURE ID	SYSTEM #4		
TREATMENT REQUIRED			
VOLUME BASED (CF)	FLOW BASED (CFS)		
N/A	0.18		
TREATMENT HGL AVAILABLE (FT)	N/A		
PEAK BYPASS REQUIRED (CFS) - IF APPLICABLE	TBD		
PIPE DATA	I.E.	MATERIAL	DIAMETER
INLET PIPE 1	1.00	CPEP	12"
OUTLET PIPE	0.00	CPEP	12"
	PRETREATMENT	BIOFILTRATION	DISCHARGE
RIM ELEVATION	6.50	6.50	6.50
SURFACE LOAD	HS-20	HS-20	HS-20
FRAME & COVER	#30"	36" X 48"	#24"
WETLAND MEDIA VOLUME (CY)	2.97		
ORIFICE SIZE (DIA. INCHES)	5 EA #1.12"		
NOTES: PRELIMINARY NOT FOR CONSTRUCTION. INDUSTRIAL MEDIA NEEDED			

INSTALLATION NOTES

- CONTRACTOR TO PROVIDE ALL LABOR, EQUIPMENT, MATERIALS AND INCIDENTALS REQUIRED TO OFFLOAD AND INSTALL THE SYSTEM AND APPURTENANCES IN ACCORDANCE WITH THIS DRAWING AND THE MANUFACTURER'S SPECIFICATIONS, UNLESS OTHERWISE STATED IN MANUFACTURER'S CONTRACT.
- UNIT MUST BE INSTALLED ON LEVEL BASE. MANUFACTURER RECOMMENDS A MINIMUM 6" LEVEL ROCK BASE UNLESS SPECIFIED BY THE PROJECT ENGINEER. CONTRACTOR IS RESPONSIBLE FOR VERIFYING PROJECT ENGINEER'S RECOMMENDED BASE SPECIFICATIONS.
- CONTRACTOR TO SUPPLY AND INSTALL ALL EXTERNAL CONNECTING PIPES. ALL PIPES MUST BE FLUSH WITH INSIDE SURFACE OF CONCRETE (PIPES CANNOT INTRUDE BEYOND FLUSH). INVERT OF OUTFLOW PIPE MUST BE FLUSH WITH DISCHARGE CHAMBER FLOOR. ALL PIPES SHALL BE SEALED WATER TIGHT PER MANUFACTURER'S STANDARD CONNECTION DETAIL.
- CONTRACTOR RESPONSIBLE FOR INSTALLATION OF ALL PIPES, RISERS, MANHOLES, AND HATCHES. CONTRACTOR TO GROUT ALL MANHOLES AND HATCHES TO MATCH FINISHED SURFACE UNLESS SPECIFIED OTHERWISE.
- VEGETATION SUPPLIED AND INSTALLED BY OTHERS. ALL UNITS WITH VEGETATION MUST HAVE DRIP OR SPRAY IRRIGATION SUPPLIED AND INSTALLED BY OTHERS.
- CONTRACTOR RESPONSIBLE FOR CONTACTING BIO CLEAN FOR ACTIVATION OF UNIT. MANUFACTURER'S WARRANTY IS VOID WITHOUT PROPER ACTIVATION BY A BIO CLEAN REPRESENTATIVE.

GENERAL NOTES

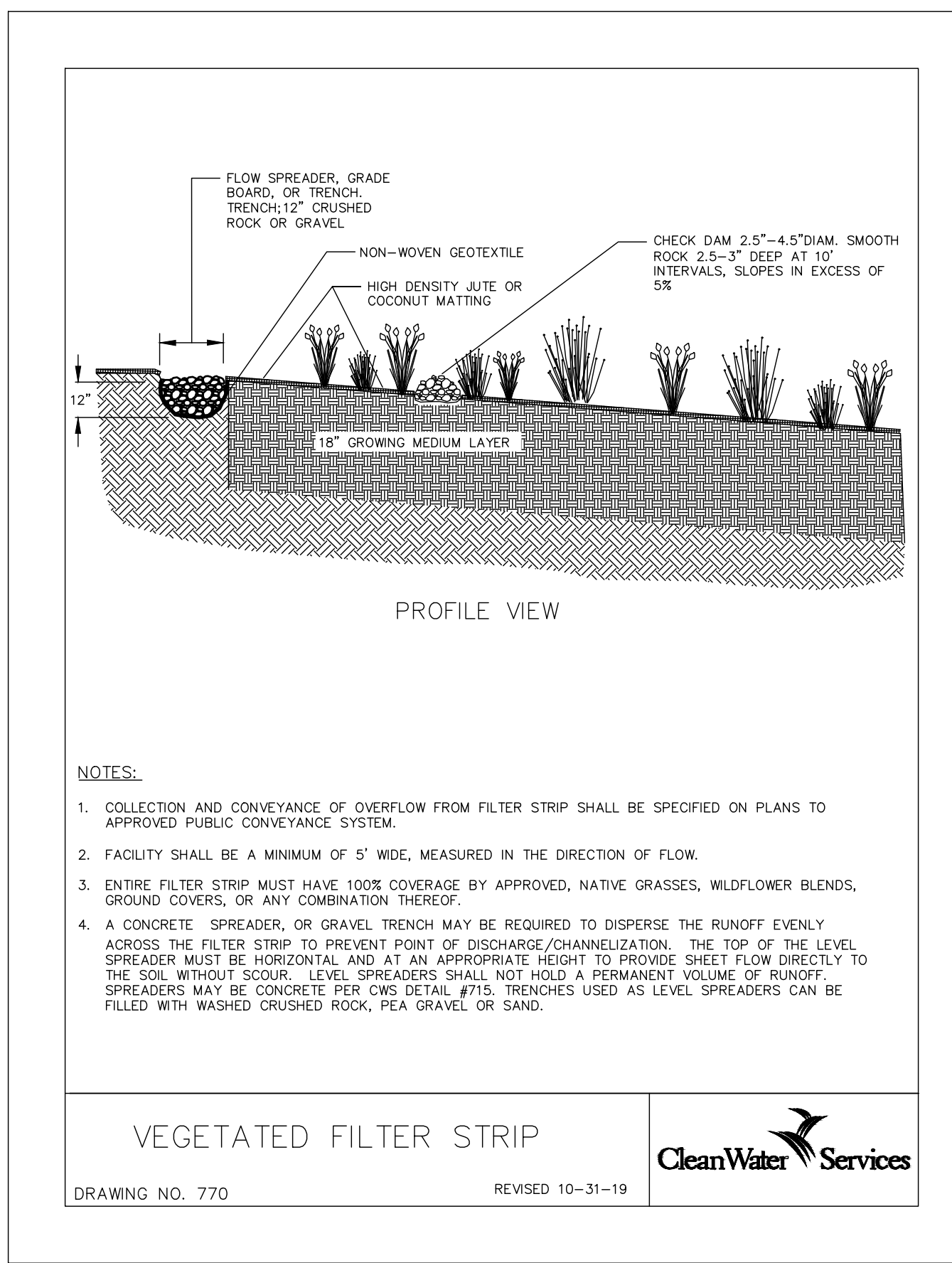
- MANUFACTURER TO PROVIDE ALL MATERIALS UNLESS OTHERWISE NOTED.
- ALL DIMENSIONS, ELEVATIONS, SPECIFICATIONS AND CAPACITIES ARE SUBJECT TO CHANGE. FOR PROJECT SPECIFIC DRAWINGS DETAILING EXACT DIMENSIONS, WEIGHTS AND ACCESSORIES PLEASE CONTACT BIO CLEAN.



INTERNAL BYPASS DISCLOSURE:

TREATMENT FLOW (CFS)	0.20
OPERATING HEAD (FT)	2.9
PRETREATMENT LOADING RATE (GPM/SF)	1.8
INDUSTRIAL MEDIA LOADING RATE (GPM/SF)	1.0

MWS-L-8-8-4'-10"-V-UG
 STORMWATER BIOFILTRATION SYSTEM
 STANDARD DETAIL



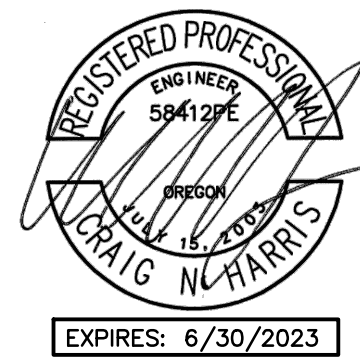
- NOTES:
- COLLECTION AND CONVEYANCE OF OVERFLOW FROM FILTER STRIP SHALL BE SPECIFIED ON PLANS TO APPROVED PUBLIC CONVEYANCE SYSTEM.
 - FACILITY SHALL BE A MINIMUM OF 5' WIDE, MEASURED IN THE DIRECTION OF FLOW.
 - ENTIRE FILTER STRIP MUST HAVE 100% COVERAGE BY APPROVED, NATIVE GRASSES, WILDFLOWER BLENDS, GROUND COVERS, OR ANY COMBINATION THEREOF.
 - A CONCRETE SPREADER, OR GRAVEL TRENCH MAY BE REQUIRED TO DISPERSE THE RUNOFF EVENLY ACROSS THE FILTER STRIP TO PREVENT POINT OF DISCHARGE/CHANNELIZATION. THE TOP OF THE LEVEL SPREADER MUST BE HORIZONTAL AND AT AN APPROPRIATE HEIGHT TO PROVIDE SHEET FLOW DIRECTLY TO THE SOIL WITHOUT SCOUR. LEVEL SPREADERS SHALL NOT HOLD A PERMANENT VOLUME OF RUNOFF. SPREADERS MAY BE CONCRETE PER CWS DETAIL #715. TRENCHES USED AS LEVEL SPREADERS CAN BE FILLED WITH WASHED CRUSHED ROCK, PEA GRAVEL OR SAND.

VEGETATED FILTER STRIP
 DRAWING NO. 770
 REVISED 10-31-19
 CleanWater Services

WETLANDS
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BioClean
 A Forterra Company

Appendix D
Basin Map



AAI ENGINEERING
445 SW Green Street, Suite 100, Beaverton, OR 97005
503.638.0000 | aai@aaie.com

PHELAN
DEVELOPMENT
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660

HEDGES CREEK
TUALATIN, OR

SHEET TITLE

BASIN MAP

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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ENGINEERING INC.

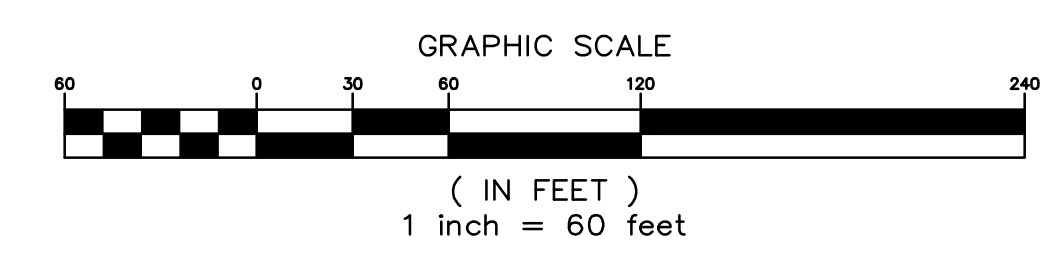
SHEET NUMBER

JOB NUMBER: A20120.10

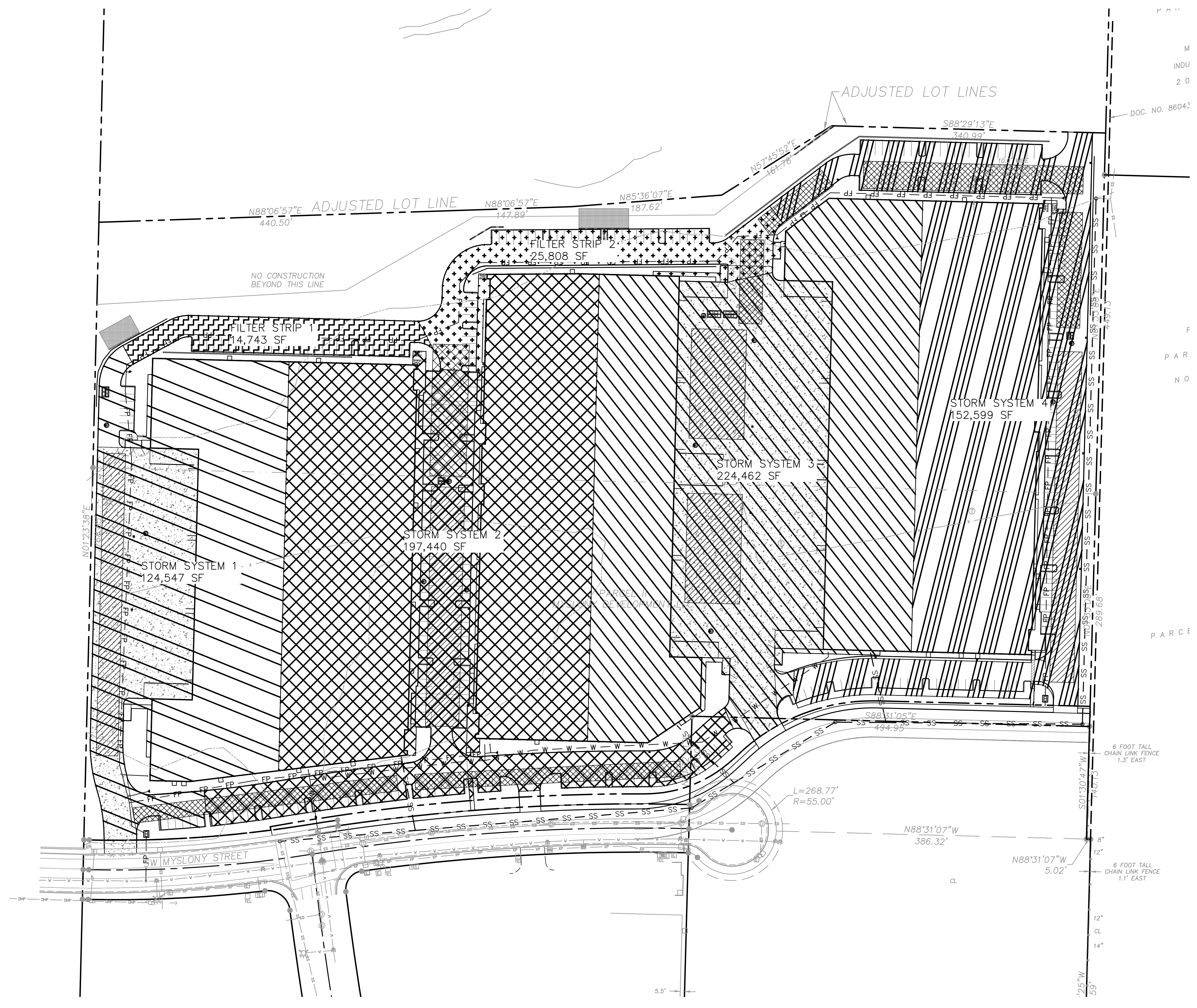
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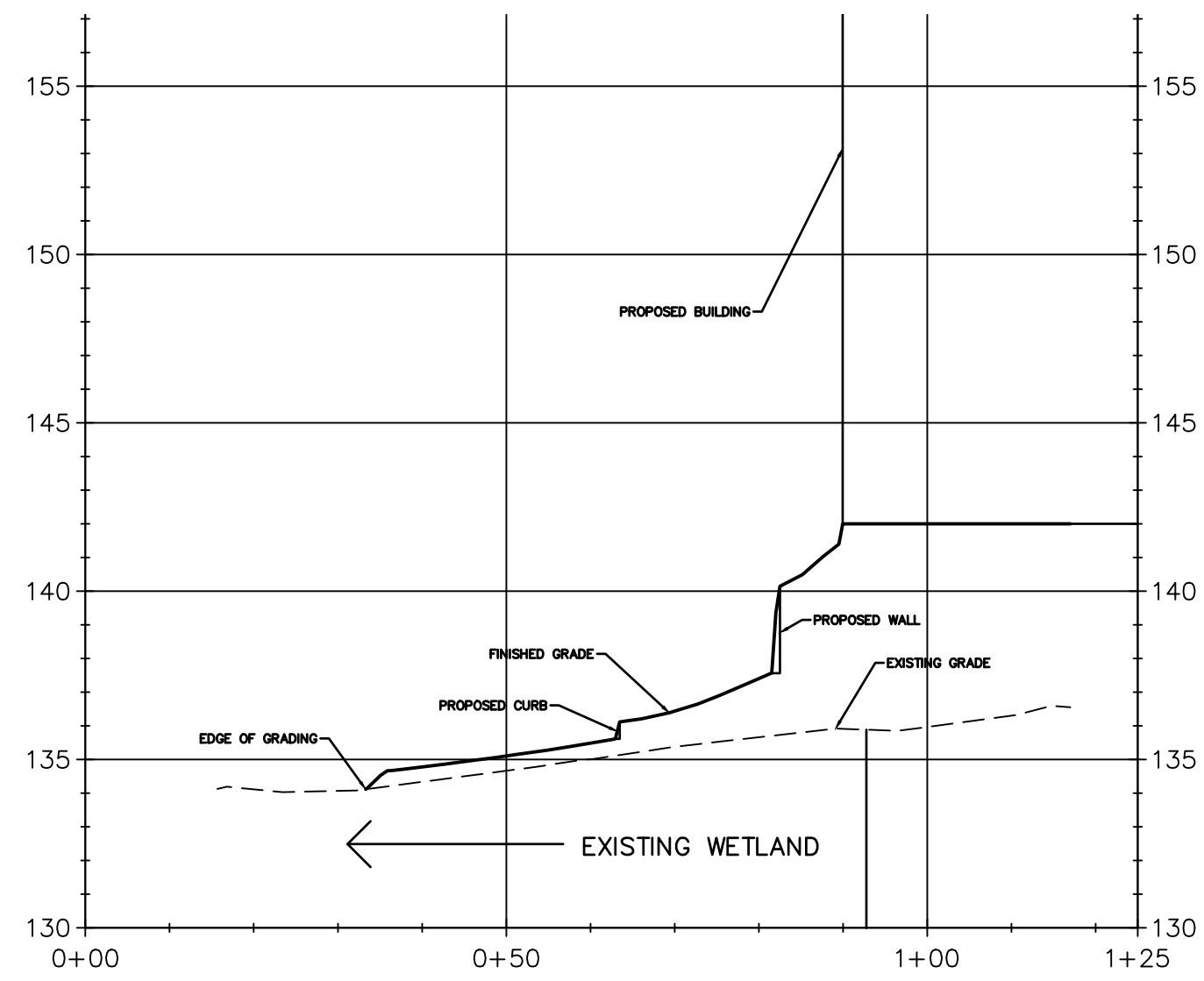


3/01/2022



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Appendix E
Erosion Control Plans



WETLAND CROSS SECTION

SCALE: HORZ: 1" = 20'
VERT: 1" = 5'



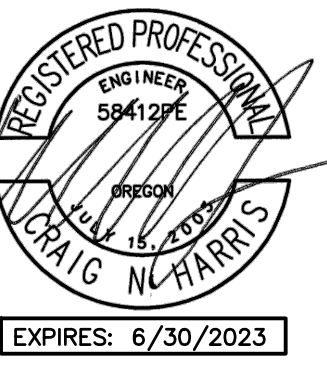
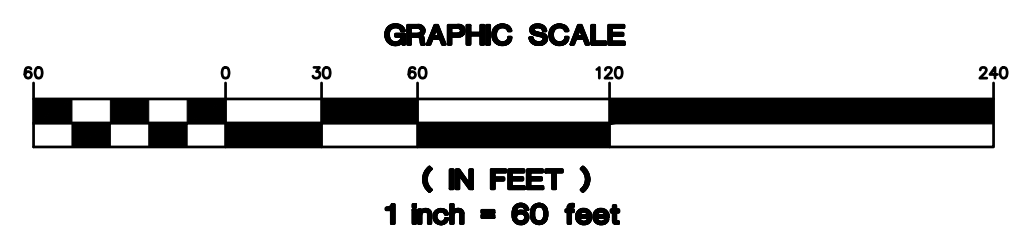
DOC. NO. 8604336

SHEET NOTES

1. CURB HEIGHTS ARE 6" UNLESS NOTED OTHERWISE.
2. LANDINGS ON ACCESSIBLE ROUTES SHALL NOT EXCEED 2% IN ANY DIRECTION.
3. ALL ACCESSIBLE ROUTES SHALL COMPLY WITH CURRENT ADA ACCESSIBILITY GUIDELINES FOR BUILDING AND FACILITIES (ADAAG).
4. ALL WALKWAYS FROM ACCESSIBLE UNITS ARE DESIGNED TO NOT REQUIRE HANDRAILS. THEREFORE, RAMPS WITH SLOPES STEEPER THAN 5.0% AND LESS THAN 8.33% SHALL NOT EXCEED 0.5' RISE OR 6.0' LENGTH.
5. FINISH GRADES ARE TO BE BROUGHT TO WITHIN 0.08 FT IN 10 FT OF THE GRADES SHOWN AT SUBGRADE AND TO WITHIN 0.03 FT IN 10 FT AT FINISH GRADE. CONTRACTOR TO ALLOW FOR PLACEMENT OF REQUIRED TOPSOIL IN ROUGH GRADING.
6. GRADING ELEVATIONS AS SHOWN ON SITE AND LANDSCAPE PLANS ARE FINISHED GRADE WHICH INCLUDES SUBGRADE SOIL, TOPSOIL, SOIL AMENDMENTS, ROCKERY AND RUNOFF PROTECTION CONTRACTOR IS RESPONSIBLE TO COORDINATE GRADING WITH BOTH EXCAVATOR AND LANDSCAPE CONTRACTOR.

LEGEND

EXISTING CONTOUR MINOR	-102-
EXISTING CONTOUR MAJOR	100
PROPOSED CONTOUR MINOR	102
PROPOSED CONTOUR MAJOR	100
SEDIMENT FENCE	[Symbol]
FLOW ARROW	[Symbol]
INLET PROTECTION	[Symbol]



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PHELAN ENGINEERING
DEVELOPMENT
450 Newport Center Drive, Suite 405
Newport Beach, CA 92660

HEDGES CREEK
TUALATIN, OR

SHEET TITLE
GRADING AND EROSION CONTROL PLAN

DATE: 08/02/2021

DRAWN: KPM

CHECKED: CNH

REVISIONS:

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SHEET NUMBER

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JOB NUMBER: A20120.10

2/23/2022

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Appendix F
Geotechnical Report

REPORT OF GEOTECHNICAL ENGINEERING SERVICES

**New Commercial Buildings and Site Infrastructure
Walgraeves Property, 11345 SW Herman Road
Tualatin, Oregon**

**Geotech
Solutions Inc.**

July 20, 2020

GSI Project: phelan-19-7-gi

July 20, 2020

phelan-19-7-gi

Phelan Development

Tania Chavez; tchavez@phelandevco.com

Mike DeArmey mdearmey@phelandevco.com

Kyle Bertelsen; kyle@phelandevco.com

REPORT OF GEOTECHNICAL ENGINEERING SERVICES Commercial Buildings and Site Infrastructure Walgraeves Property, 11345 Herman Road, Tualatin, Oregon

As authorized, herein we present our report of geotechnical engineering services for the proposed project. Based on information you provided roughly 15 acres of the site is to be developed with three commercial tilt-up concrete buildings of 49,000 and 168,000 square feet. Building loads are expected to be up to 200 kips for columns, 6 kips per foot for walls, and 500 psf for floors. Truck docks, pavement, and utilities are planned. The purpose of our work was to investigate the soil conditions and provide geotechnical engineering for design by others. Our specific scope of work included the following:

- Provide principal-level geotechnical project management including client communications, management of field and subcontracted services, report writing, analyses, and invoicing.
- Review previous reports, geologic maps and vicinity geotechnical information as indicators of subsurface conditions.
- Complete a site reconnaissance to observe surface features relevant to geotechnical issues, such as topography, vegetation, presence and condition of springs, exposed soils and rock, and evidence of previous grading.
- Identify exploration locations and complete a “one call” public locate and a private utility locate for locatable utilities (limited to metallic or with tracer wire). As-built utilities are also requested from the owner. Un-locatable utilities are the responsibility of the owner, and our scope does not include any related utility repair.
- Explore subsurface conditions with the following:
 - Advance 5 CPT probes, including 3 up to 80 feet and 2 up to 50 feet or refusal to encounter stiff soils or rock, and include shear wave velocity testing in one CPT and ppd testing in each.
 - Excavate up to 12 test pits to depths of up to 12 feet.
- Classify and sample materials encountered and maintain a detailed log of the explorations.
- Complete same day falling head infiltration testing on one test pit.
- Determine the moisture content of selected samples obtained from the explorations and complete soil classification testing as necessary, and organic content testing for organic soils if encountered.
- Provide recommendations for earthwork including site preparation, slope inclinations, potential for rock excavation, reuse of any existing fill in place or stabilization such as geogrid or cement amending, seasonal material usage, compaction criteria, utility trench backfill, and the need for subsurface drainage.
- Evaluate site liquefaction potential and estimate site deformations and provide qualitative means to address unsuitable deformations if needed.
- If organic or highly compressible soils are present, evaluate the need for preloading or surcharging including heights, materials and rough timing estimates, or qualitative means if stabilization such as

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deep soil mixing, deep drains or use of pile supported buildings. For piles include analyses of two types in collaboration with structural engineers provided loading, including vertical and lateral capacities, embedment, and installation criteria.

- Provide recommendations for shallow foundations including suitable soils, stabilization, bearing pressures, sliding coefficient, and a seismic site class.
- Provide recommendations for slab support, including a subgrade modulus, underslab rock thickness and materials, and the need for stabilization, and underslab drainage if needed.
- Provide recommendations for building and site cantilevered retaining walls, including lateral earth pressures, foundations, resistance to lateral loads, backfill, and drainage.
- If site MSE walls are planned provide soil parameters for design by others, including soil strength, unit weight, bearing, drainage, backfill, and temporary slope cuts.
- Provide recommendations for pavements including subgrade preparation and stabilization, and base rock and asphalt concrete and portland cement concrete thicknesses.
- Provide a written report summarizing the results of our geotechnical evaluation.

SITE OBSERVATIONS AND CONDITIONS

Surface Conditions

The property is located in the southern portion of the 11345 SW Herman Road address, immediately north of the eastern terminus of SW Myslony Street in Tualatin, Oregon as shown on the attached **Site Plan**. The site is relatively gently sloping down from the south to the north in the southern building areas, and relatively flat beyond that. An apparent low area is present in the southwest in a tilled field. Elevation changes for the east and west building pads are up to roughly 5 feet, with the central pad up to 10 feet. The site is vegetated primarily with grass that is currently grazed, scattered brush, and brush lines with shallow Myslony Creek to the west and north. Aerial photos show little change in the last 25 years. The Tualatin River is roughly one mile to the northwest and north. Adjacent developments are low rise industrial and commercial.

Subsurface Conditions

General – Subsurface conditions at the site were explored by test pits and cone penetrometer probes in July, 2020. Twelve test pits were distributed across the proposed site development area and advanced to depths of up to 12 feet with a backhoe. Five cone penetrometer probes were completed to depths of 52 to 72 feet to refusal in high tip resistance soils. Approximate exploration locations are shown on the attached **Site Plan**. Specific subsurface conditions observed at each exploration are described in the attached **Logs**.

Our explorations encountered a primary root zone of roughly 4 to 7 inches in roughly one foot of tilled agricultural soils in most of the test pits, with expected root zones of one foot or more near trees and heavier brush. Underlying the topsoil most explorations encountered an upper soft to medium stiff silt layer, which included organic silt and peat in the southern-most explorations, underlain by layered sand and silt with dense sand or weathered rock presenting refusal at depth. These units are described in further detail in the following sections.

Upper Silt Unit

This unit extended to depths of generally 4 to 10 feet in our explorations, and in the southern explorations included very soft soils, organic silt, and some layers of non-fibrous fine peat (where more than 60% of the material was organic by dry weight in one sample – organic test results attached). The

silt was generally soft to medium stiff and dry in the upper 1-3 feet in our mid-summer explorations, with moisture contents ranging from 8% where dry and inorganic, to 65% where moist with some organics. The silt is often very soft in the wet season. The silt has a low plasticity, moderate dry strength, but low strength when remolded in wet conditions. The organic portions of the silt, including fine peat, are very soft, highly compressible, and have a very low strength. Moisture contents in organic silt and peat ranged from 65% to over 307%, with organic contents of 22% to 64%.

Cone readings indicate low tip resistance and high friction ratios where organic.

Layered Silt and Sand

This unit extends below the upper silt unit to depths of roughly 45 to 55 feet in the CPT logs, and includes layers of dense sand from the 9 to 15 foot range. This unit was deposited in catastrophic flooding and is layered in rhythmites, as can be seen on the attached CPT logs. Occasional presence of gravel may represent depositional scour products from nearby basalt scour channels, and gravelly layers were noted near the base of most of the southwestern test pits. Moisture contents were as low as 13% where gravelly, and 37% where primarily silt. Tip resistance generally ranged from 20 to 80 tsf below the dense sand section, with friction ratios of 1.5-3.5%. Shear wave velocities in this unit in explorations to the south ranged from roughly 600-1000 ft/sec.

Lower Silt Unit

This unit was encountered in a roughly 10 foot thickness below the layered sand and silt. The friction ratios were higher at 2.5-5% and indicated some clay content, with lower tip resistance.

Terminal Unit

Tip resistance refusal or total system pressure refusal was met in each CPT at depths of 52 to 72 feet. This lower unit is interpreted as likely residual soils from weathered basalt.

Laboratory Testing – Laboratory testing included moisture content testing, organic content testing, and qualitative plasticity evaluations for classification, and are attached. Consolidation testing and CPT correlations from the southern neighboring site were also used.

Infiltration Testing – Cased, double ring configuration falling head infiltration testing was completed in TP-10 at a depth of 4 feet. After initial saturation, readings were taken over time and the lowest rate time interval from testing indicated a raw rate ranging from 0.1 to 0.2 in³/hr/in². This is a typical low rate for the areas silt soils and is a raw rate not to be used for design.

Groundwater – We observe significant and rapid groundwater seepage in the southwestern test pits at depths of 9 to 10 feet in our mid-summer explorations. CPT pore pressure dissipation testing indicated water levels at 3 to 8 feet. However, due to the low permeability of the silt soils, perched ground water conditions likely exist at shallow depths during wet periods and during the wet season, particularly in the lower site areas which in the southwest may include ponding.

CONCLUSIONS AND RECOMMENDATIONS

General

Based on the results of our explorations, laboratory testing, and engineering analyses, it is our opinion that the site can be developed following the recommendations contained herein. Southern site areas

contain compressible organic soil, and ground improvement and fill settlement monitoring are required in this area. To the north the proposed structures can be supported on continuous perimeter footings and interior spread footings connected by grade beams or a reinforced slab to address moderate risk liquefaction deflections. Construction in all but the driest late summer conditions will require extensive stabilization in the form of cement amending or working blankets and haul roads. Our geotechnical engineering recommendations are provided in the following sections.

Site Preparation

General - Prior to earthwork construction, the site must be prepared by removing any existing structures, utilities, and any loose surficial or undocumented fill. Any excavation resulting from the aforementioned preparation must be brought back to grade with structural fill. Site preparation for earthwork will also require the removal of the root zone and topsoil from all pavement, building, hardscaping, and fill areas. The root zone thickness observed in our explorations was generally 4-6 inches, but tilled organics are present to generally one foot. Deeper stripping depths may be required in areas of loose organic soil.

Root balls from trees and shrubs may extend several feet and grubbing operations can cause considerable subgrade disturbance. All disturbed material must be removed to undisturbed subgrade and backfilled with structural fill. In general, roots greater than one inch in diameter must be removed as well as areas of concentrated smaller roots.

The test pit excavations were backfilled using relatively minimal compactive effort. Therefore, soft spots can be expected at these locations. We recommend that test pits located in the building area be completely removed and replaced with structural fill. Test pits located within paved areas must be removed to a depth of 3.0 feet below finished subgrade and the resulting excavation brought back to grade with structural fill.

Stabilization and Soft Areas - After stripping, we must be contacted to evaluate the exposed subgrade. This evaluation can be done by proof rolling in dry conditions or probing during wet conditions. Soft areas will require over-excavation and backfilling with well graded, angular crushed rock compacted as structural fill, overlying a separation geosynthetic such as a Propex Geotex 801 or equivalent. A geogrid may also be required, such as a Tensar BXSQ 2020 or equivalent black punched and drawn biaxial geogrid.

As an alternative to the methods described above, stabilization may be possible by soil amendment using portland cement. Amendment requires an experienced contractor using specialty spreading and mixing equipment. Typically, 5 to 6 percent cement is used for an amendment (i.e. mix) depth of 12 inches. However, the materials used and quantities can vary based on moisture and organic contents, plasticity, and required amendment depth. Compaction and grading of amended soils must be completed within 4 hours of mixing, and the amended soil must be allowed to cure for 4 days prior to trafficking. Generally, 50 percent of mixed particles should pass a No. 4 sieve.

The permeability of amended soil is very low. The surface of amended soils in building and pavement areas must therefore be sloped at a minimum of 0.5 percent to prevent collection of surface water during construction. Amended soils must be removed from all landscape areas prior to planting.

Working Blankets and Haul Roads - Construction equipment must not operate directly on the subgrade, as it is susceptible to disturbance and softening. Rock working blankets and haul roads placed over a geosynthetic in a thickened advancing pad can be used to protect subgrades. We recommend that sound, angular, pit run or crushed basalt with no more than 6 percent passing a #200 sieve be used to construct haul roads and working blankets, overlying the preceding separation geosynthetic. Working blankets must be at least 12 inches thick, and haul roads at least 24 inches thick. If the preceding geogrid is used these can be reduced to 10 inches and 18 inches, respectively. Alternatively, the soils could be amended to a minimum depth of 16 inches and covered with a minimum of 3 inches of crushed rock. Some repair of working blankets and haul roads should be expected.

The preceding rock and amendment thicknesses are the minimum recommended. Subgrade protection is the responsibility of the contractor and thicker sections may be required based on subgrade conditions during construction and type and frequency of construction equipment.

Earthwork

Fill – The on-site fine grained in-organic soil can be used for structural fill if properly moisture conditioned. Use of this material will not be feasible during wet conditions. Even during dry summer conditions, the on-site soils will require drying by scarification and frequent mixing in thin lifts. The upper few feet may require adding moisture in mid-summer conditions. Once moisture contents are within 3 percent of optimum, the material must be compacted to at least 92 percent relative to ASTM D1557 (modified proctor) using a tamping foot type compactor. Fill must be placed in lifts no greater than 10 inches in loose thickness. In addition to meeting density specifications, fill will also need to pass a proof roll using a loaded dump truck, water truck, or similar size equipment.

In wet conditions, fill must be imported granular soil with less than 6 percent fines, such as clean crushed or pit run rock. This material must also be compacted to 95 percent relative to ASTM D1557. Alternatively, fills can be amended. We must be consulted to evaluate amendment of fills, as the amendment materials, quantities, and processes need to be adapted to actual site conditions at the time of amendment. Amending fill soils is more difficult than amending soils in-situ due to equipment access on very soft material. Typically, all-wheel-drive spreading equipment with off road tires, a high-powered mixer, 5 percent cement, and a mixing depth 2 inches greater than the lift thickness would be a starting point. Building fills with amended soil would allow for all lifts except the final to be placed consecutively without significant cure time.

Trenches – Utility trenches may encounter ground water seepage and moderate to severe caving must be expected where seepage is present, including flowing conditions in sandy soils if encountered. Shoring of utility trenches will be required for depths greater than 4 feet and where groundwater seepage is present. We recommend that the type and design of the shoring system be the responsibility of the contractor, who is in the best position to choose a system that fits the overall plan of operation.

Depending on the excavation depth and amount of groundwater seepage, dewatering may be necessary for construction of underground utilities. Flow rates for dewatering are likely to vary depending on location, soil type, and the season during which the excavation occurs. The dewatering systems, if necessary, must be capable of adapting to variable flows.

Pipe bedding must be installed in accordance with the pipe manufacturers' recommendations. If groundwater is present in the base of the utility trench excavation, we recommend overexcavating the trench by 12 to 18 inches and placing trench stabilization material in the base. Trench stabilization material must consist of well-graded, crushed rock or crushed gravel with a maximum particle size of 4 inches and be free of deleterious materials. The percent passing the U.S. Standard No. 200 Sieve must be less than 5 percent by weight when tested in accordance with ASTM C 117.

Trench backfill above the pipe zone must consist of well graded, angular crushed rock or sand fill with no more than 7 percent passing a #200 sieve. Trench backfill must be compacted to 92 percent relative to ASTM D-1557, and construction of hard surfaces, such as sidewalks or pavement, must not occur within one week of backfilling.

Seismic Design

General - In accordance with the International Building Code (IBC) as adapted by State of Oregon Structural Specialty Code (SOSSC) and based on our explorations, testing, and experience in the site vicinity, the site class if F, but the low period structures planned should be evaluated using the parameters associated with Site Class D.

Liquefaction and Lateral Spreading - Liquefaction can occur in loose, saturated, non-plastic soils. Strong shaking, such as that experienced during earthquakes, causes the densification and subsequent settlement of these soils and high pore pressures which greatly weaken the soil. Some less plastic sand and sandy layers in the profile at depth are subject to deformation or liquefaction in design level crustal and CSZ (Cascadia Subduction Zone) earthquakes. Free field settlements were generally calculated at 3 to 7 inches total in the top 60 feet, with 1-2 inches coming from 10-30 feet in depth. Differential settlement at building levels is estimated at 1-2 inches over a few hundred feet. This movement can be addressed using the foundation recommendations herein.

Lateral spreading is not expected on the relatively flat site, as it is also roughly one mile from a free face of the Tualatin River.

Fill Settlement Monitoring and Ground Improvement

The southern portion of the site has underlying highly compressible soils and organic silt layers up to 5 feet thick starting at depths of 2 to 4 feet. The explorations where these soils were encountered are shown on the attached **Site Plan**. In the thickest of these soils, settlement of up to 4 inches under 5 feet of new fill, or 500 psf floor slab loads could occur, higher when these loads are combined. In addition, long term settlement is expected. Because of the magnitude of the settlement and variation in compressible thickness of these layers, differential settlement would be high. Therefore, in building areas underlain by these soils we recommend ground improvement and fill settlement monitoring. Ground improvement such as rigid inclusions of grout or aggregate piers (discussed later in this report) is likely suitable. Doing ground improvement prior to mass filling may be more suitable for speed, cost, and settlement reasons for the modest building loads planned. Fill settlement should be monitored using settlement plates. We should be consulted once a grading plan is finalized to assist with plate locations, with at least 6 plates likely needed. Plates must be surveyed to the nearest 0.01 feet prior to filling, then twice a week during filling and weekly thereafter as determined by the geotechnical engineer and the ground improvement designer.

Foundations

Southern compressible soils and ground improvement - The southern portion of the site has underlying highly compressible organic silt layers up to 5 feet thick starting at depths of 2 to 4 feet. The explorations where these soils were encountered are shown on the attached Site Plan. These soils could compress up to 4 inches under 200 kip column loads and 6 kip per foot wall loads, with differential settlement high due to the variable presence and thickness of these soils. We analyzed use of over-excavation to 4 feet and replacement with crushed rock pads. This reduced settlement to about 2 inches, but likely at a higher cost than some forms of ground improvement. Therefore, we recommend use of designed ground improvement (and settlement monitoring of fills) in the area shown in the attached figure. Ground improvement is a specialty contractor design build system. With proper ground improvement, conventional foundations can be used.

For the preceding site and loading conditions, ground improvement in the form of aggregate piers or rigid inclusions is likely the best option. Most often in this locale short aggregate piers are used. That process includes augering out soil and installing lifts of heavily rammed/compacted rock in the resulting hole. This provides an improved overall stiffness for building support. Such piers would need to extend to a depth estimated at 11 feet below the existing ground surface in order to penetrate the organic soils. The specialty contractor must design the actual system depth. We expect that summer construction would not require extensive use of casing as our test pits did not exhibit caving at shallow depths. Wet sandy layers encountered may require casing in any season, particularly where seepage is present. Typically, aggregate piers are concentrated under foundation elements, and spaced at 9 to 12 feet under slab areas. Piers are typically 30 to 48 inches in diameter.

Foundation Bearing Pressures - Bearing pressures in the southern area can be designed by the specialty contractor depending on the intensity of the ground improvement. We recommend using a bearing pressure of 2,500 psf over properly designed ground improvement and fill for consistency with the northern areas.

Because of liquefaction, we recommend perimeter continuous footings and interior spread footings that are connected by reinforced grade beams or are tied to a reinforced slab. Foundations must bear in the native medium stiff or stiffer silt, properly constructed structural fill, or ground improvement. Footings must be embedded at least 18 inches below the lowest adjacent, exterior grade. Footings can be designed for an allowable net bearing pressure of 2,500 psf when founded as recommended. The preceding bearing pressure can be increased to 5,000 psf for temporary wind and seismic loads.

Continuous footings should be no less than 18 inches wide, and pad footings should be no less than 24 inches wide. Resistance to lateral loads can be obtained by a passive equivalent fluid pressure of 350 pcf against suitable footings, ignoring the top 12 inches of embedment, and by a footing base friction coefficient of 0.35. Each of these includes a safety factor of 1.5. Properly founded footings are expected to settle less than a total of 1 inch, with less than 1/2 inch differentially.

If footing construction is to occur in wet conditions, a few inches of crushed rock should be placed at the base of footings to reduce subgrade disturbance and softening during construction.

Slabs

The ground improvement contractor must evaluate expected settlement from fill and building slab loads in the southern area. The goal is to design for floor loads up to 500 psf with less than one inch of post construction settlement, which is the load and settlement expected from the non-improved northern areas. In dry summer conditions, where the slabs are poured prior to the wet season, a minimum of six inches of clean, angular crushed rock with no more than 5 % passing a #200 sieve is recommended for under slab rock. Increased rock thicknesses and stabilization will be required for construction in wet conditions and where used as a working blanket or haul road per the **Stabilization** section in this report. Prior to slab rock placement the subgrade will need to be evaluated by us by probing or observing a proof rolling using a fully loaded dump truck or similar load. Underslab rock must be compacted to 92 % compaction relative to ASTM D1557, and must pass a proof roll. In addition, any areas contaminated with fines must be removed and replaced with clean rock. If the base rock is saturated or trapping water, this water must be removed prior to slab placement.

Floor Moisture - Some flooring manufacturers require specific slab moisture levels and/or vapor barriers to validate the warranties on their products. A properly installed and protected vapor flow retardant can reduce slab moistures. If moisture sensitive floor coverings or operations are planned, we recommend a vapor barrier be used. Typically, a reinforced product or thicker product (such as a 15 mil STEGO wrap or equivalent) can be used. Experienced contractors using special concrete mix design and placement have been successful placing concrete directly over the vapor barrier which overlies the rock. This reduces the issue of water trapped in the rock between the slab and vapor barrier, which otherwise requires removal. In either case, slab moisture must be tested/monitored until it meets floor covering manufacturer's recommendations.

Retaining Walls

General - The following recommendations are based on the assumptions that (1) Walls are conventional concrete cantilever walls (2) Wall backfill consists of level, well-drained, angular, granular material, (3) Walls are less than 5 feet in height, and (4) No surcharges such as stockpiled soil or equipment are placed within 5 feet of the wall.

Walls restrained against rotation should be designed using an equivalent fluid pressure of 50 pcf. Walls not restrained against rotation should be designed using an equivalent fluid pressure of 30 pcf. Seismic design for roughly one inch of deflection can be evaluated for a seismically induced rectangular wall pressure of 11H (to determine if this controls wall design or the preceding static condition).

Wall foundations should be designed as recommended herein for shallow foundations.

Backfill - Retaining walls should be backfilled with clean, imported, granular soil with less than 6 percent fines, such as clean sand or rock. This material should also be compacted to a minimum of 92 percent relative to ASTM D-1557 (modified proctor). Within 3 feet of the wall, backfill should be compacted to not more than 90 percent relative to ASTM D-1557 using hand-operated equipment. Retaining structures typically rotate and displace up to 1 percent of the wall height during development of active pressures behind the wall. We therefore recommend that construction of improvements adjacent to the top of walls be delayed until approximately two weeks after wall construction and backfill.

Drainage

General - We recommend installing perimeter foundation drains around all exterior foundations. The surface around the building perimeter must be sloped to drain away from the building. As stated previously, our retaining wall recommendations are based on fully drained conditions. All retaining walls must include a drain constructed as described in the following section.

Foundation and Wall Drains - Foundation and retaining wall drains should consist of a two-foot wide zone of drain rock encompassing a 4-inch diameter perforated pipe, all enclosed with a non-woven filter fabric. The drain rock should have no more than 2 percent passing a #200 sieve and should extend to within one foot of the ground surface. The geosynthetic should have an AOS of a #70 sieve, a minimum permittivity of 1.0 sec⁻¹, and a minimum puncture resistance of 80 pounds (such as a Propex Geotex 601 or approved equivalent). For walls a composite drain board such as an Amerdrain 500/520 could be used above the footing drain for wall drainage. In either case one foot of low permeability soil (such as the on-site silt) should be placed over the fabric at the top of the drain to isolate the drain from surface runoff.

Infiltration

Design - Based on the results of our testing and analyses, infiltration rates in the silt unit are very low, and combined with the high seasonal ground water, preclude using infiltration systems.

Pavement

Asphalt Concrete – At the time of this report we did not have specific information regarding the type and frequency of expected traffic. We therefore developed new asphalt concrete pavement thicknesses for areas exposed to passenger vehicles only and areas exposed to up to 25 trucks per day based on a 20-year design life with a mix of 3-to 5-axle trucks. Traffic volumes can be revised if specific data is available.

Our pavement analyses is based on AASHTO methods and subgrade of structural fill, cement amended fill, or undisturbed medium stiff or better native silt having a resilient modulus of 6,000 psi and prepared as recommended herein. We have also assumed that roadway construction will be completed during an extended period of dry weather. The results of our analyses based on these parameters are provided in the table below. Each of these sections can support a 75,000 GVW fire truck.

<u>Traffic</u>	<u>18K ESAL's</u>	<u>AC (inches)</u>	<u>CR (inches)</u>
Passenger Vehicle Only	-	3	6
Up to 10 Trucks Per Day	75,000	3.5	9
Up to 25 Trucks Per Day	188,000	4.5	9
Up to 50 Trucks Per Day	376,000	5	10

The thicknesses listed in the preceding table are the minimum acceptable for construction during an extended period of dry summer weather where the roadway is not used as a haul road or working blanket and will not be trafficked in wet conditions prior to paving. Increased rock thicknesses and stabilization will be required for such uses and for all construction during wet conditions per the **Stabilization** and **Working Blankets and Haul Roads** sections in this report. Crushed rock must conform to ODOT base rock standards and have less than 6 percent passing the #200 sieve. Asphalt

concrete must be ½” dense graded level 2 HMAC compacted to a minimum of 91 percent of a Rice Density.

Portland Cement Concrete - We developed PCC pavement thicknesses at the site for the assumed one-way traffic levels as shown in the table below. Each of these sections is based on AASHTO methods with no reduction for wander and a composite modulus of subgrade reaction of 350 pci (AASHTO Figure 3.3 with $M_r = 6,000$ psi and 6 inches crushed rock base). Other parameters include 4,000 psi compressive strength portland cement concrete (PCC), and plain jointed concrete **without** load transfer devices or tied concrete shoulders. PCC pavements over trench backfill should not be placed within one week of fill installation unless survey data indicates that settlement of the backfill is complete. Increased rock sections are required for wet season and wet conditions per **Working Blankets and Haul Roads** herein.

Traffic	18k ESALS	PCC (inches)	CRB (inches)
Up to 10 Trucks Per Day	75,000	6	6
Up to 25 Trucks Per Day	188,000	7	6
Up to 50 Trucks Per Day	376,000	7.5	6

Subgrade Preparation - The pavement subgrade must be prepared in accordance with the **Earthwork and Site Preparation** recommendations presented in this report. All pavement subgrades must pass a wheel roll prior to paving. Soft areas must be repaired per the preceding **Stabilization** section.

LIMITATIONS AND OBSERVATION DURING CONSTRUCTION

We have prepared this report for use by Phelan Development and the design and construction teams for this project only. The information herein could be used for bidding or estimating purposes but must not be construed as a warranty of subsurface conditions. We have made observations only at the aforementioned locations and only to the stated depths. These observations do not reflect soil types, strata thicknesses, water levels or seepage that may exist between observations. We must be consulted to observe all foundation bearing surfaces, subgrade stabilization, proof rolling of slab and pavement subgrades, installation of structural fill, subsurface drainage, and cut and fill slopes. We must be consulted to review final design and specifications in order to see that our recommendations are suitably followed. If any changes are made to the anticipated locations, loads, configurations, or construction timing, our recommendations may not be applicable, and we must be consulted. The preceding recommendations must be considered preliminary, as actual soil conditions may vary. In order for our recommendations to be final, we must be retained to observe actual subsurface conditions encountered. Our observations will allow us to interpret actual conditions and adapt our recommendations if needed.

Within the limitations of scope, schedule and budget, our services have been executed in accordance with the generally accepted practices in this area at the time this report was prepared. No warranty, expressed or implied, is given.

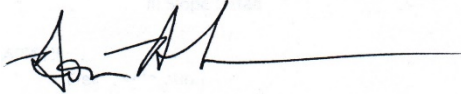


July 20, 2020

phelan-19-7-gi

We appreciate the opportunity to work with you on this project and look forward to our continued involvement. Please call if you have any questions.

Sincerely,



Don Rondema, MS, PE, GE
Principal



Attachments – Site Plan, Guidelines for Classification, Test Pit Logs, CPT Logs, Moisture Contents, Organic Contents.



BASE PHOTO FROM GOOGLE EARTH 2019

Test Pit # Depth (ft) Soil Description

Explorations completed on July 16, 2020 with a John Deere 310E Backhoe (Approx. 15,000 pounds).

TP-1

Location: NE portion of site.

Surface conditions: Medium grass.

- 0 – 2 Medium stiff, brown SILT, with trace roots and trace gravel; dry. primary root zone 5 inches.
- 2 – 3 Stiff, brown SILT, with trace gravel and trace sand; moist.
- 3 – 5 Dense, gray/brown medium SAND, with some silt and some gravels/cobbles; moist.
- 5 – 12 Very dense, gray/brown coarse SAND, with some gravels/cobbles and trace silt; moist becoming wet at 7'.

No caving. Slow seepage below 7 feet.

TP-2

Location: E portion of site.

Surface conditions: Medium grass.

- 0 – 2 Medium stiff, brown SILT, with trace roots and trace gravel; dry. primary root zone 7 inches.
- 2 – 4 Stiff, brown SILT, with some gravel and trace sand; moist.
- 4 – 8 Dense, brown silty fine SAND, with trace gravels/cobbles; moist.
- 8 – 12 Dense, brown/gray medium to coarse SAND, with some gravels; moist.

No caving. No seepage.

TP-3

Location: E portion of site.

Surface conditions: Medium grass.

- 0 – 1 Medium stiff, brown SILT, with trace roots and trace gravel; dry. primary root zone 7 inches.
- 1 – 4 Stiff, brown SILT, with some gravel; moist.
- 4 – 12 Dense, brown, medium to coarse SAND, with some gravels and some silt; moist. 8 ft becomes with trace silt.

No caving. No seepage.

TP-4

Location: SE portion of site.

Surface conditions: Medium grass.

- 0 – 2 Medium stiff, brown SILT, with trace roots; dry. primary root zone 6 inches.
- 2 – 7 Soft, black ORGANIC SILT; moist to wet.
- 7 – 12 Loose, gray fine SAND with some silt; wet

No caving. Rapid seepage below 11'.

Test Pit # **Depth (ft)** **Soil Description**

TP-5

Location: SE portion of site.

Surface conditions: Medium grass.

- 0 – 2 Medium stiff, brown SILT, with trace roots; dry. primary root zone 5 inches.
- 2 – 4 Stiff, brown/red/orange SILT; moist.
- 4 – 7 Dense, gray/orange silty SAND; moist.
- 7 – 12 Dense, gray fine SAND, with trace to some silt; moist.

No caving. Rapid seepage at 12'.

TP-6

Location: S portion of site.

Surface conditions: Tilled soil.

- 0 – 1 Very soft, brown SILT, trace roots; dry.
- 1 – 2 Medium stiff, brown SILT; moist.
- 2 – 6 Dense, gray/orange sandy SILT; moist.
- 6 – 7 Soft, dark brown ORGANIC SILT; moist.
- 7 – 11 Loose, gray fine SAND, with some silt; moist.
9 ft Becomes with trace silt, wet.
- 11 – 12 Dense, gray coarse gravelly SAND with trace cobbles and silt; wet.

Minor caving near 10 feet. Rapid seepage below 10'.

TP-7

Location: Central portion of site.

Surface conditions: Medium grass.

- 0 – 3 Medium stiff, brown SILT, with trace roots and trace gravel; dry. primary root zone 6 inches.
- 3 – 5 Stiff, brown SILT, with some gravel; moist.
- 5 – 12 Dense, brown and brownish-gray, medium to coarse SAND, with some gravels and trace silt; moist.

No caving. No seepage.

TP-8

Location: Central portion of site.

Surface conditions: Medium grass.

- 0 – 1 Medium stiff, brown SILT, with trace roots and trace gravel; dry. primary root zone 5 inches.
- 1 – 5 Stiff, brown SILT, with some gravel; moist.
- 5 – 12 Dense, brown and brownish-gray, medium to coarse SAND, with some gravels and trace silt; moist.

No caving. No seepage.

Test Pit # Depth (ft) Soil Description

TP-9

Location: S portion of site.

Surface conditions: Tilled soil.

- 0 – 1 Loose, brown SILT, trace roots; dry.
- 1 – 3 Medium stiff, brown SILT; moist.
- 3 – 8 Very soft, dark brown ORGANIC SILT to PEAT; moist.
- 8 – 11 Medium dense, gray fine SAND, with some silt and trace gravel; moist
- 11 – 12 Dense, gray coarse gravelly SAND with occasional cobbles; wet.

No caving. Rapid seepage below 10'.

TP-10

Location: SW portion of site.

Surface conditions: Tilled soil.

- 0 – 1 Loose, brown SILT, trace roots; dry.
- 1 – 2 Soft, brown SILT; moist.
- 2 – 6 Soft, dark brown/gray SILT; moist.
- 6 – 8 Loose, brown/gray silty SAND; moist
- 8 – 10 Medium dense, gray fine SAND, with some silt and trace gravel; moist
- 10 – 12 Dense, gray coarse gravelly SAND with occasional cobble; moist.

No caving. Rapid seepage below 10'.

TP-11

Location: SW portion of site.

Surface conditions: Tilled soil.

- 0 – 1 Loose, brown SILT, trace roots; dry. primary root zone 6 inches.
- 1 – 3 Medium stiff, brown SILT; moist.
- 3 – 8 Soft, dark brown ORGANIC SILT; moist.
- 8 – 9 Medium dense, gray fine SAND, with some silt and trace gravel; moist
- 9 – 12 Dense, gray coarse gravelly SAND with occasional cobbles; wet.

No caving. Rapid seepage below 10'.

TP-12

Location: SW portion of site.

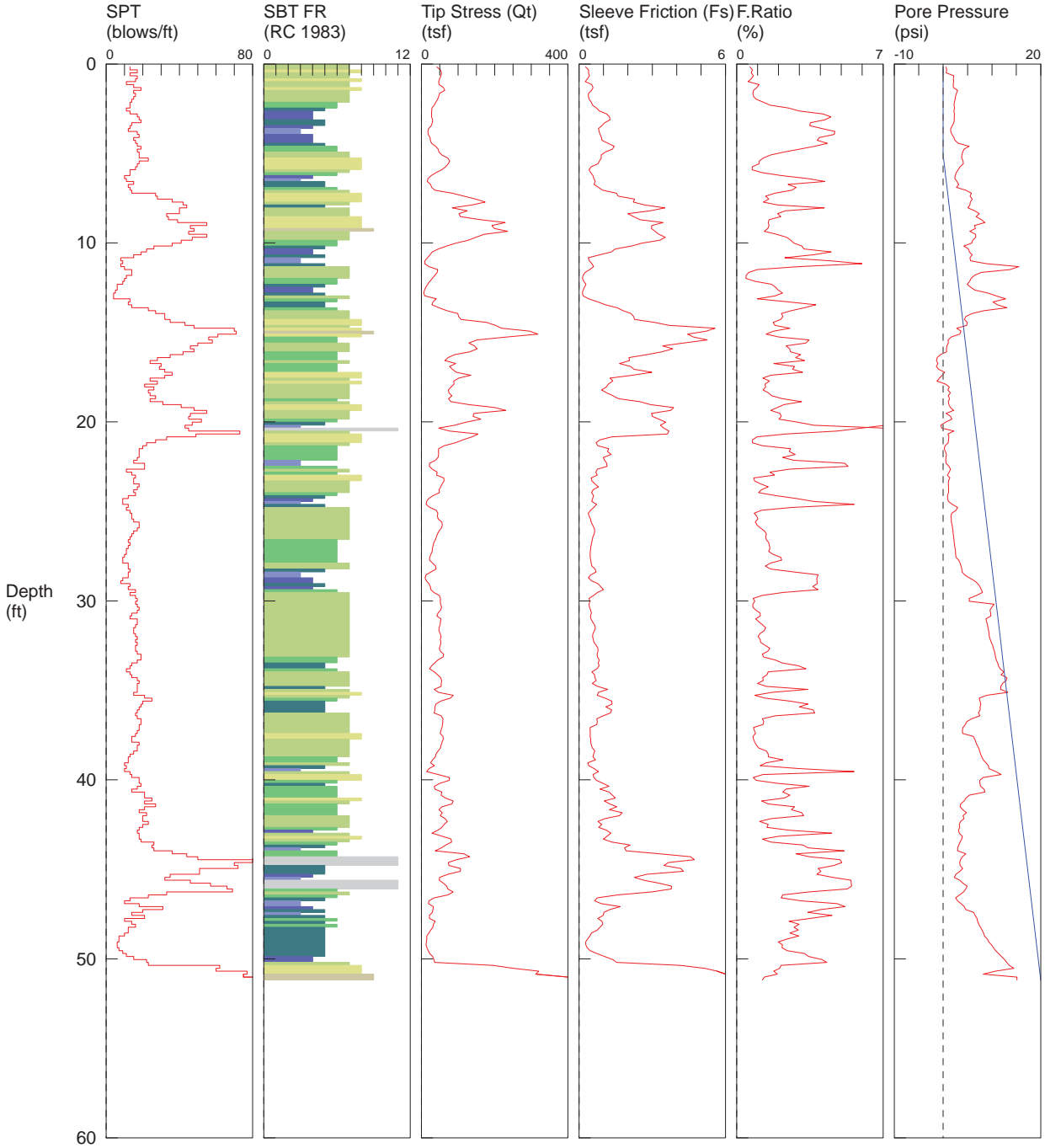
Surface conditions: Tilled soil.

- 0 – 1 Loose, brown SILT, trace roots; dry. primary root zone 8 inches.
- 1 – 3 Medium stiff, brown SILT; moist.
- 3 – 7 Soft, dark brown ORGANIC SILT to PEAT; moist.
- 7 – 10 Medium dense, gray fine SAND, with some silt and trace gravel; moist
8 ft becomes dense and medium to coarse with some gravel.
- 10 – 12 Dense, gray coarse gravelly SAND with trace cobbles; wet.

No caving. Rapid seepage below 10'.

Geotech Solutions / P-1 / 11345 SW Herman Rd Tualatin

OPERATOR: OGE DMM
 CONE ID: DDG1532
 HOLE NUMBER: P-1
 TEST DATE: 7/14/2020 8:58:13 AM
 TOTAL DEPTH: 51.181 ft

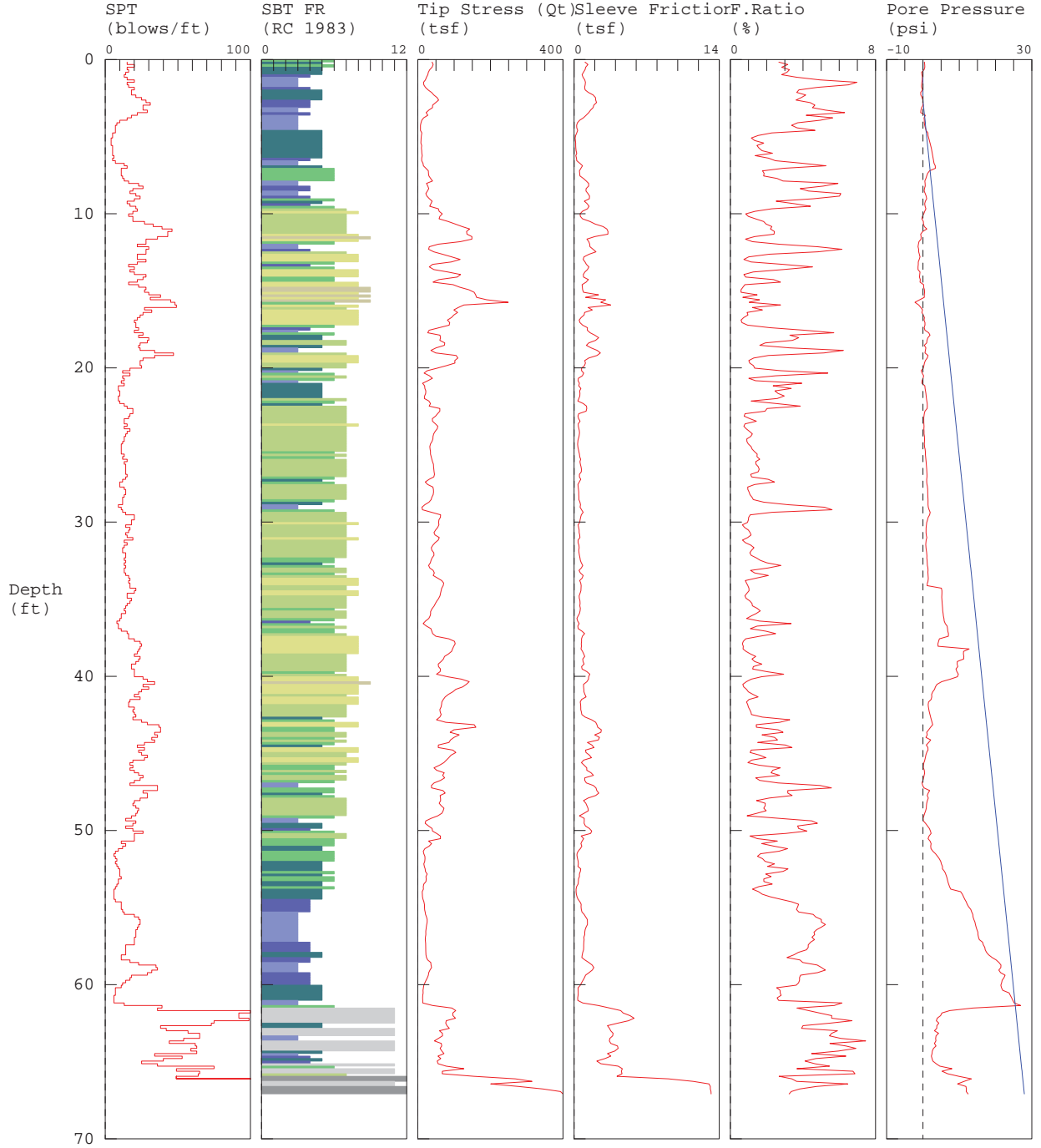


- | | | | |
|--------------------------|-----------------------------|----------------------------|--------------------------------|
| 1 sensitive fine grained | 4 silty clay to clay | 7 silty sand to sandy silt | 10 gravelly sand to sand |
| 2 organic material | 5 clayey silt to silty clay | 8 sand to silty sand | 11 very stiff fine grained (*) |
| 3 clay | 6 sandy silt to clayey silt | 9 sand | 12 sand to clayey sand (*) |

*SBT/SPT CORRELATION: UBC-1983

Geotech Solutions / P-2 / 11345 SW Herman Rd Tualatin

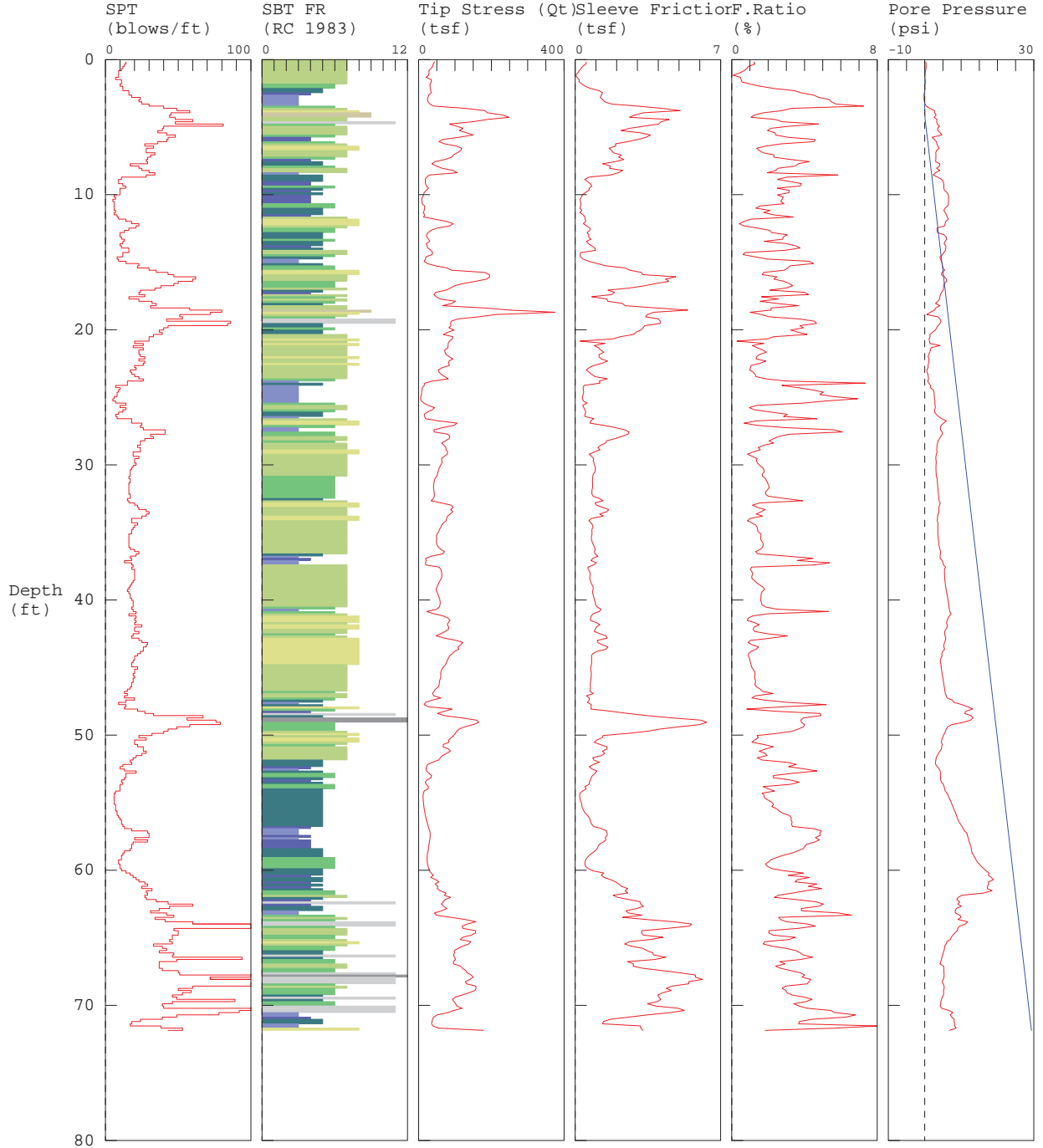
OPERATOR: OGE DMM
 CONE ID: DDG1532
 HOLE NUMBER: P-2
 TEST DATE: 7/14/2020 10:06:14 AM
 TOTAL DEPTH: 67.093 ft



- | | | | |
|----------------------|-----------------------|-----------------------|--------------------------------|
| 1 sensitive fine gra | 4 silty clay to cl | 7 silty sand to sandy | 10 gravelly sand to sand |
| 2 organic materia | 5 clayey silt to silt | 8 sand to silty sa | 11 very stiff fine grained (*) |
| 3 clay | 6 sandy silt to claye | 9 sand | 12 sand to clayey sand (*) |
- *SBT/SPT CORRELATION: UBC-1983

Geotech Solutions / P-3 / 11345 SW Herman Rd Tualatin

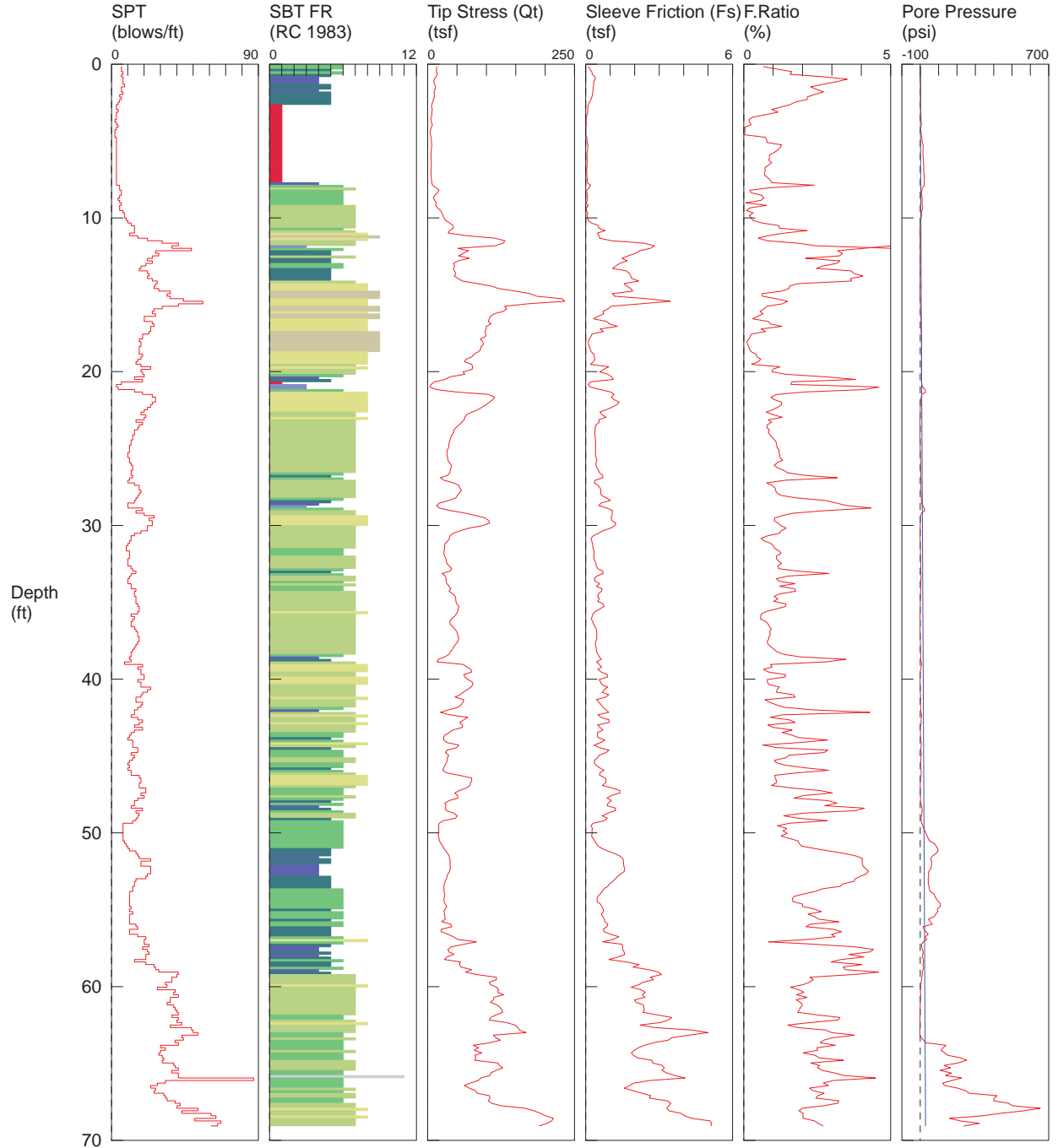
OPERATOR: OGE DMM
 CONE ID: DDG1532
 HOLE NUMBER: P-3
 TEST DATE: 7/14/2020 11:23:50 AM
 TOTAL DEPTH: 71.850 ft



- | | | | | | | | |
|---|--------------------|---|---------------------|---|---------------------|----|-----------------------------|
| 1 | sensitive fine gra | 4 | silty clay to cl | 7 | silty sand to sandy | 10 | gravelly sand to sand |
| 2 | organic materia | 5 | clayey silt to silt | 8 | sand to silty sa | 11 | very stiff fine grained (*) |
| 3 | clay | 6 | sandy silt to claye | 9 | sand | 12 | sand to clayey sand (*) |
- *SBT/SPT CORRELATION: UBC-1983

Geotech Solutions / P-4 / 11345 SW Herman Rd Tualatin

OPERATOR: OGE DMM
 CONE ID: DDG1532
 HOLE NUMBER: P-4
 TEST DATE: 7/15/2020 8:03:50 AM
 TOTAL DEPTH: 69.062 ft

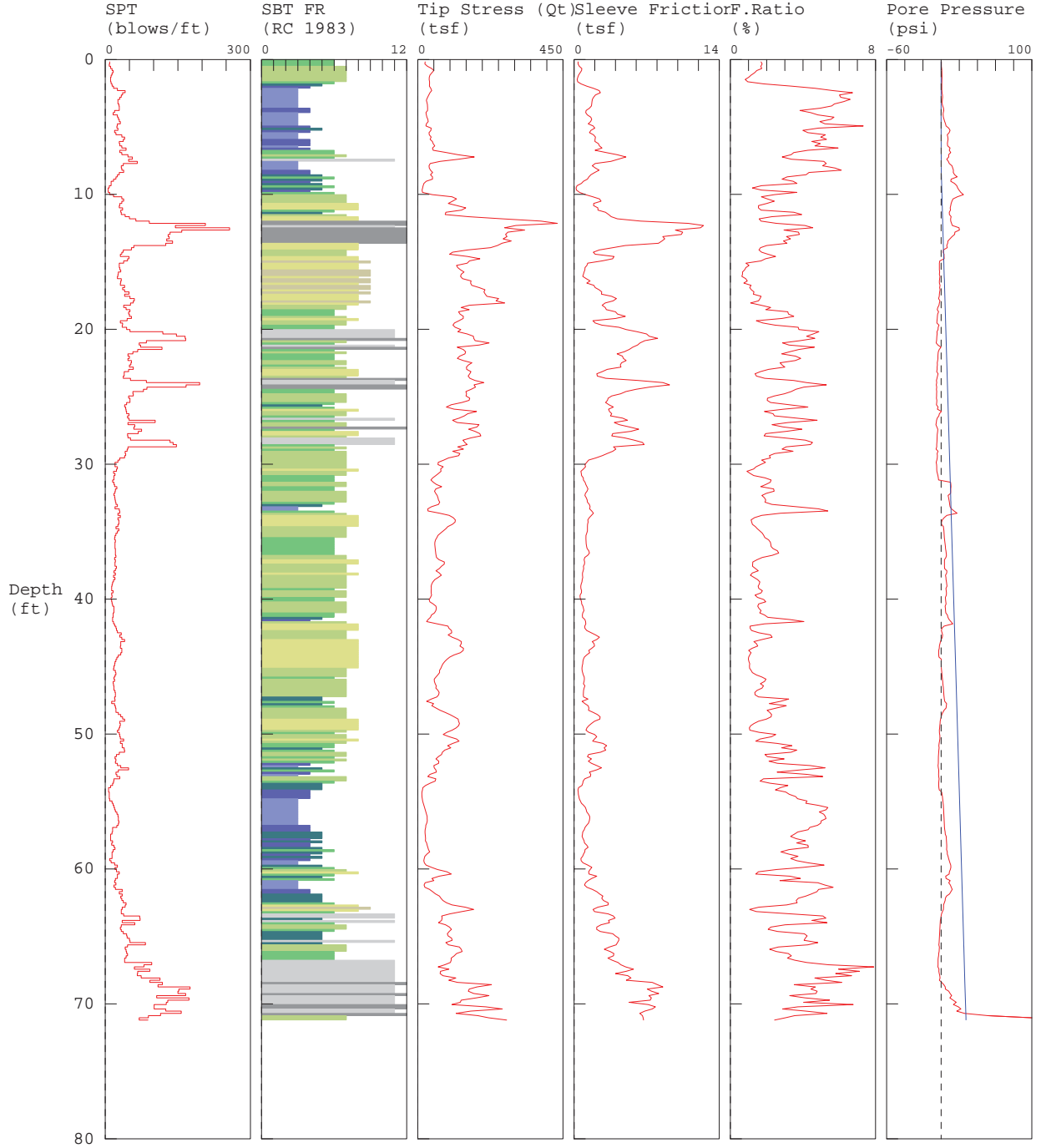


- | | | | |
|--------------------------|-----------------------------|----------------------------|--------------------------------|
| 1 sensitive fine grained | 4 silty clay to clay | 7 silty sand to sandy silt | 10 gravelly sand to sand |
| 2 organic material | 5 clayey silt to silty clay | 8 sand to silty sand | 11 very stiff fine grained (*) |
| 3 clay | 6 sandy silt to clayey silt | 9 sand | 12 sand to clayey sand (*) |

*SBT/SPT CORRELATION: UBC-1983

Geotech Solutions / P-5 / 11345 SW Herman Rd Tualatin

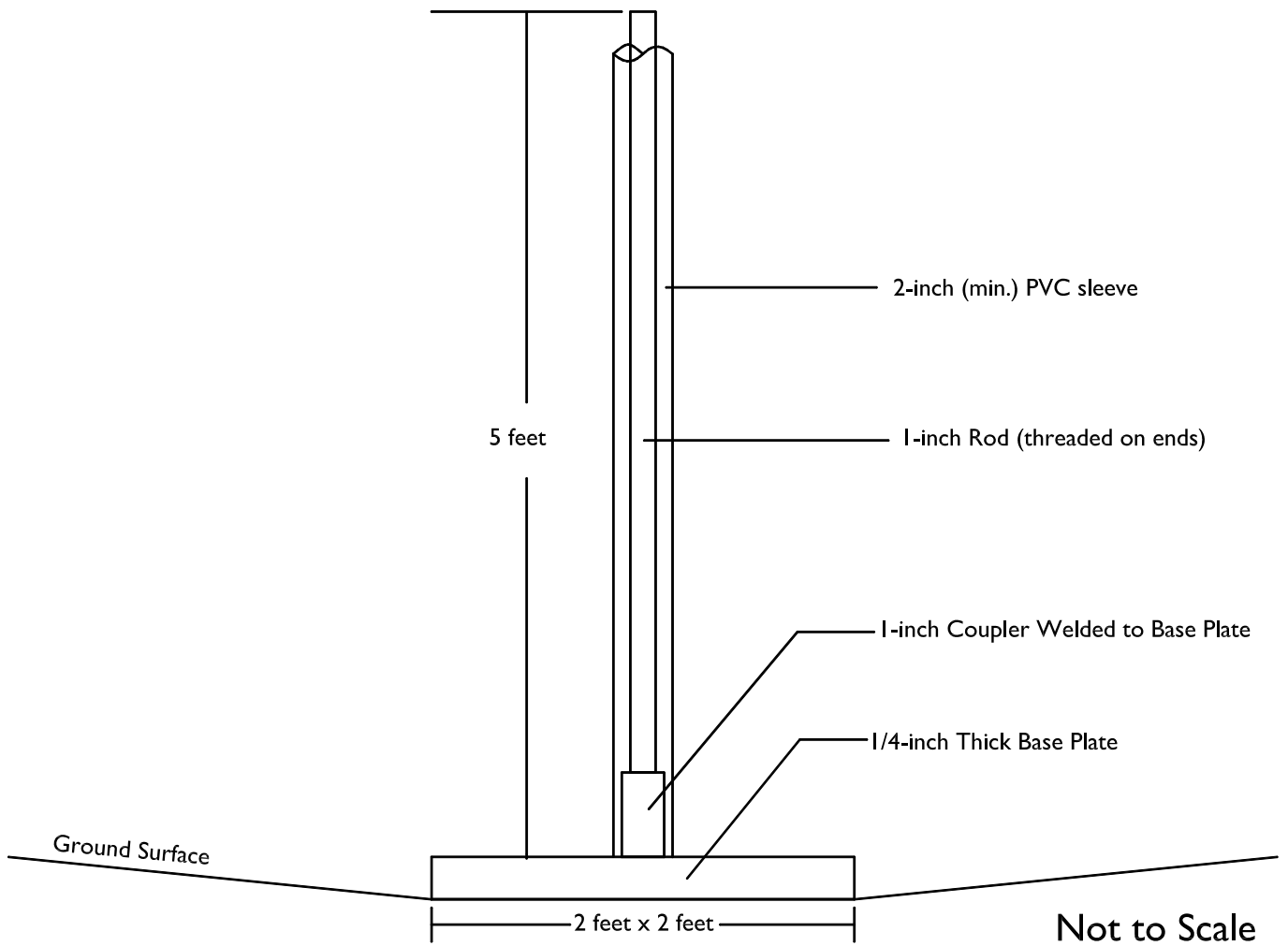
OPERATOR: OGE DMM
 CONE ID: DDG1532
 HOLE NUMBER: P-5
 TEST DATE: 7/15/2020 9:14:16 AM
 TOTAL DEPTH: 71.194 ft



- | | | | |
|----------------------|-----------------------|-----------------------|--------------------------------|
| 1 sensitive fine gra | 4 silty clay to cl | 7 silty sand to sandy | 10 gravelly sand to sand |
| 2 organic materia | 5 clayey silt to silt | 8 sand to silty sa | 11 very stiff fine grained (*) |
| 3 clay | 6 sandy silt to claye | 9 sand | 12 sand to clayey sand (*) |
- *SBT/SPT CORRELATION: UBC-1983

Exploration	Depth, ft	Moisture Content
TP-2	1.0	8%
TP-1	1.0	12%
TP-8	1.0	12%
TP-7	1.0	12%
TP-3	1.0	16%
TP-10	1.0	18%
TP-11	1.0	19%
TP-5	1.0	27%
TP-6	1.0	39%
TP-12	1.0	42%
TP-9	1.0	62%
TP-4	1.0	65%
TP-8	4.0	11%
TP-3	4.0	17%
TP-1	4.0	17%
TP-2	4.0	22%
TP-7	4.0	22%
TP-10	4.0	24%
TP-6	4.0	27%
TP-5	4.0	33%
TP-11	4.0	41%
TP-4	4.0	65%
TP-12	4.0	108%
TP-9	4.0	307%
TP-5	8.0	32%
TP-11	8.0	32%
TP-2	8.0	34%
TP-7	10.0	13%
TP-3	10.0	16%
TP-6	10.0	31%
TP-4	10.0	37%
TP-8	12.0	17%
TP-1	12.0	31%
TP-12	12.0	33%

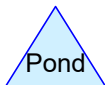
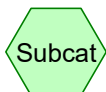
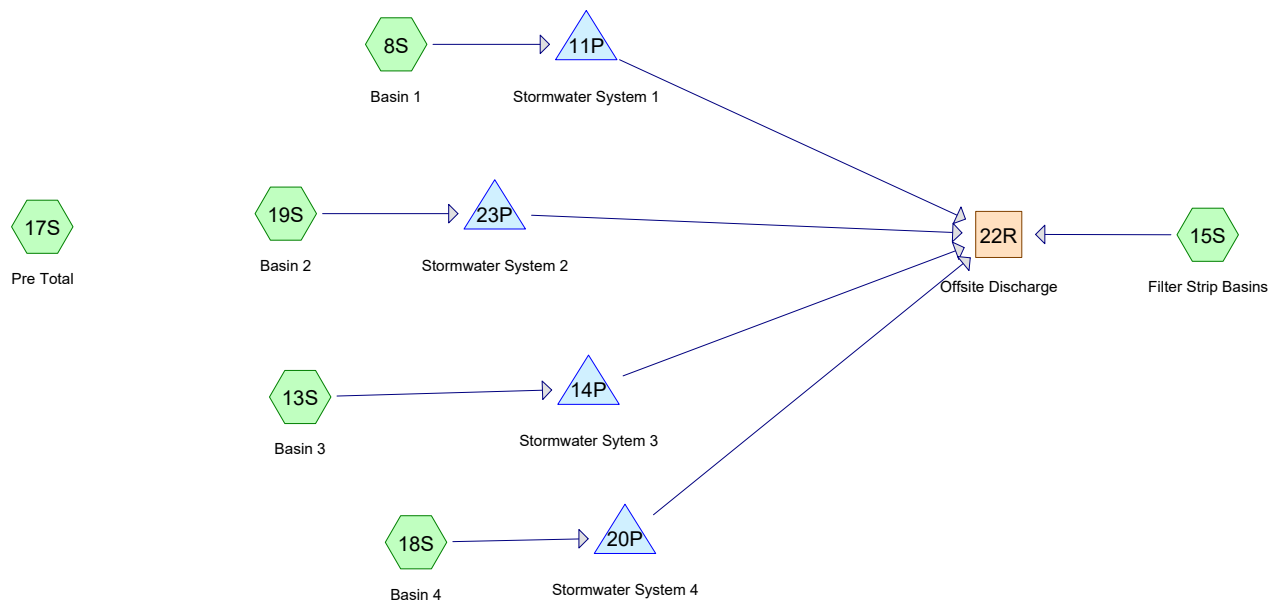
Exploration	Depth, ft	Organic Content
TP-9	4.0	60.4%
TP-12	4.0	22.3%



Note: Base plate should be seated level on firm soil.

Appendix G

Stormwater Calculations



Routing Diagram for Walgraves
 Prepared by AAI Engineering, Printed 5/3/2022
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Walgraves

Prepared by AAI Engineering

HydroCAD® 10.00-26 s/n 01638 © 2020 HydroCAD Software Solutions LLC

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Page 2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
17.002	98	(8S, 13S, 15S, 18S, 19S)
17.002	80	>75% Grass cover, Good, HSG D (17S)
34.004	89	TOTAL AREA

Walgraves

Prepared by AAI Engineering

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Page 3

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
17.002	HSG D	17S
17.002	Other	8S, 13S, 15S, 18S, 19S
34.004		TOTAL AREA

Walgraves

Prepared by AAI Engineering

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Page 4

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	0.000	17.002	17.002		8S, 13S, 15S, 18S, 19S
0.000	0.000	0.000	17.002	0.000	17.002	>75% Grass cover, Good	17S
0.000	0.000	0.000	17.002	17.002	34.004	TOTAL AREA	

Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 2-YR Rainfall=2.50"

Printed 5/3/2022

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8S: Basin 1	Runoff Area=125,547 sf 100.00% Impervious Runoff Depth=2.27" Tc=5.0 min CN=98 Runoff=1.69 cfs 0.545 af
Subcatchment13S: Basin 3	Runoff Area=224,462 sf 100.00% Impervious Runoff Depth=2.27" Tc=5.0 min CN=98 Runoff=3.02 cfs 0.975 af
Subcatchment15S: Filter Strip Basins	Runoff Area=40,551 sf 100.00% Impervious Runoff Depth=2.27" Tc=10.0 min CN=98 Runoff=0.54 cfs 0.176 af
Subcatchment17S: Pre Total	Runoff Area=740,599 sf 0.00% Impervious Runoff Depth=0.89" Tc=30.0 min CN=80 Runoff=2.48 cfs 1.259 af
Subcatchment18S: Basin 4	Runoff Area=152,599 sf 100.00% Impervious Runoff Depth=2.27" Tc=5.0 min CN=98 Runoff=2.05 cfs 0.663 af
Subcatchment19S: Basin 2	Runoff Area=197,440 sf 100.00% Impervious Runoff Depth=2.27" Tc=5.0 min CN=98 Runoff=2.65 cfs 0.858 af
Reach 22R: Offsite Discharge	Avg. Flow Depth=0.09' Max Vel=0.22 fps Inflow=1.25 cfs 2.839 af n=0.035 L=300.0' S=0.0008 '/' Capacity=29.46 cfs Outflow=1.10 cfs 2.828 af
Pond 11P: Stormwater System 1	Peak Elev=135.46' Storage=0.270 af Inflow=1.69 cfs 0.545 af Outflow=0.21 cfs 0.525 af
Pond 14P: Stormwater Sytem 3	Peak Elev=134.00' Storage=0.396 af Inflow=3.02 cfs 0.975 af Outflow=0.60 cfs 0.933 af
Pond 20P: Stormwater System 4	Peak Elev=134.72' Storage=0.452 af Inflow=2.05 cfs 0.663 af Outflow=0.17 cfs 0.625 af
Pond 23P: Stormwater System 2	Peak Elev=137.33' Storage=0.718 af Inflow=2.65 cfs 0.858 af Outflow=0.22 cfs 0.580 af

Total Runoff Area = 34.004 ac Runoff Volume = 4.477 af Average Runoff Depth = 1.58"
50.00% Pervious = 17.002 ac 50.00% Impervious = 17.002 ac

Summary for Subcatchment 8S: Basin 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 1.69 cfs @ 7.86 hrs, Volume= 0.545 af, Depth= 2.27"

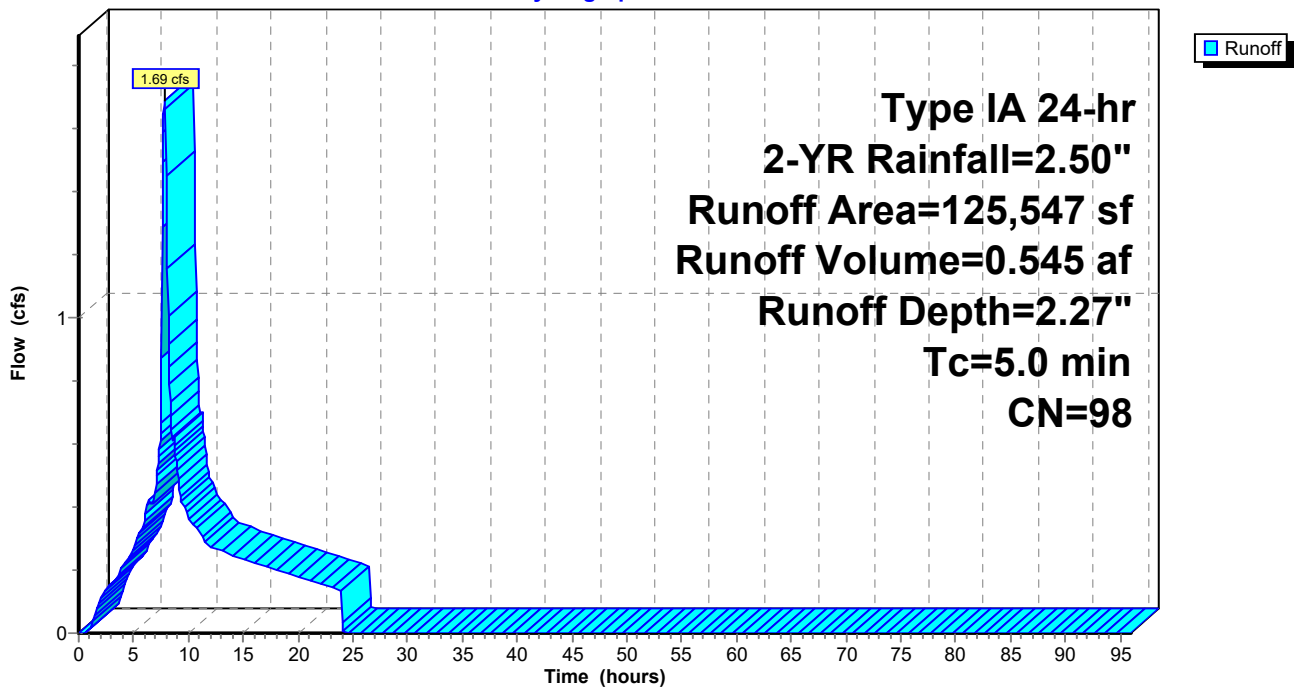
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
* 125,547	98	
125,547		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Basin 1

Hydrograph



Summary for Subcatchment 13S: Basin 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.02 cfs @ 7.86 hrs, Volume= 0.975 af, Depth= 2.27"

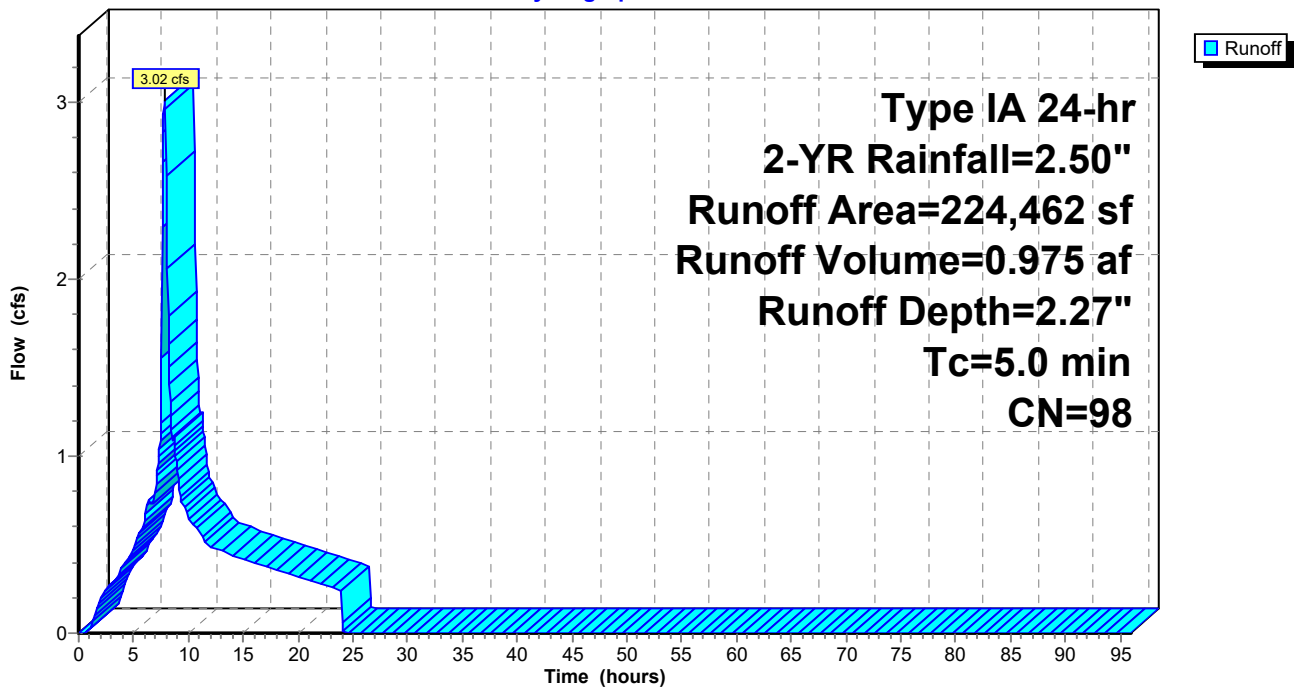
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
* 224,462	98	
224,462		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 13S: Basin 3

Hydrograph



Summary for Subcatchment 15S: Filter Strip Basins

Runoff = 0.54 cfs @ 7.94 hrs, Volume= 0.176 af, Depth= 2.27"

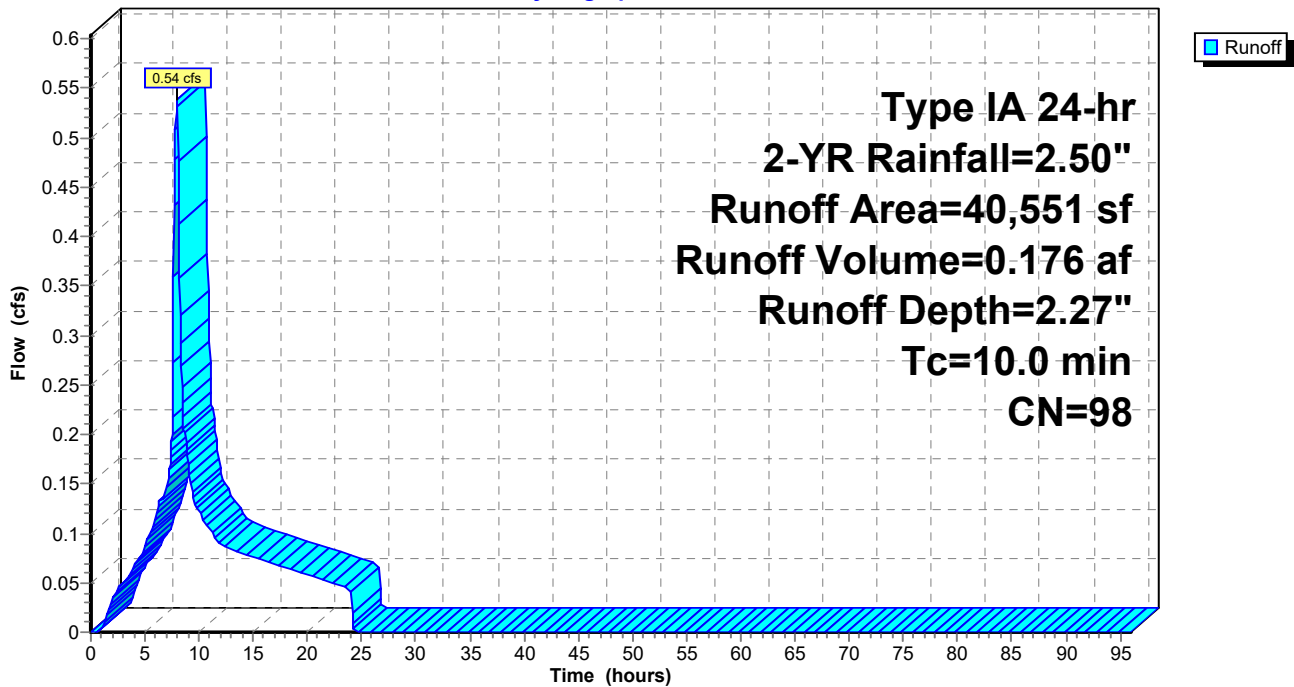
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
* 40,551	98	
40,551		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, 20

Subcatchment 15S: Filter Strip Basins

Hydrograph



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Type IA 24-hr 2-YR Rainfall=2.50"

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Summary for Subcatchment 17S: Pre Total

Runoff = 2.48 cfs @ 8.28 hrs, Volume= 1.259 af, Depth= 0.89"

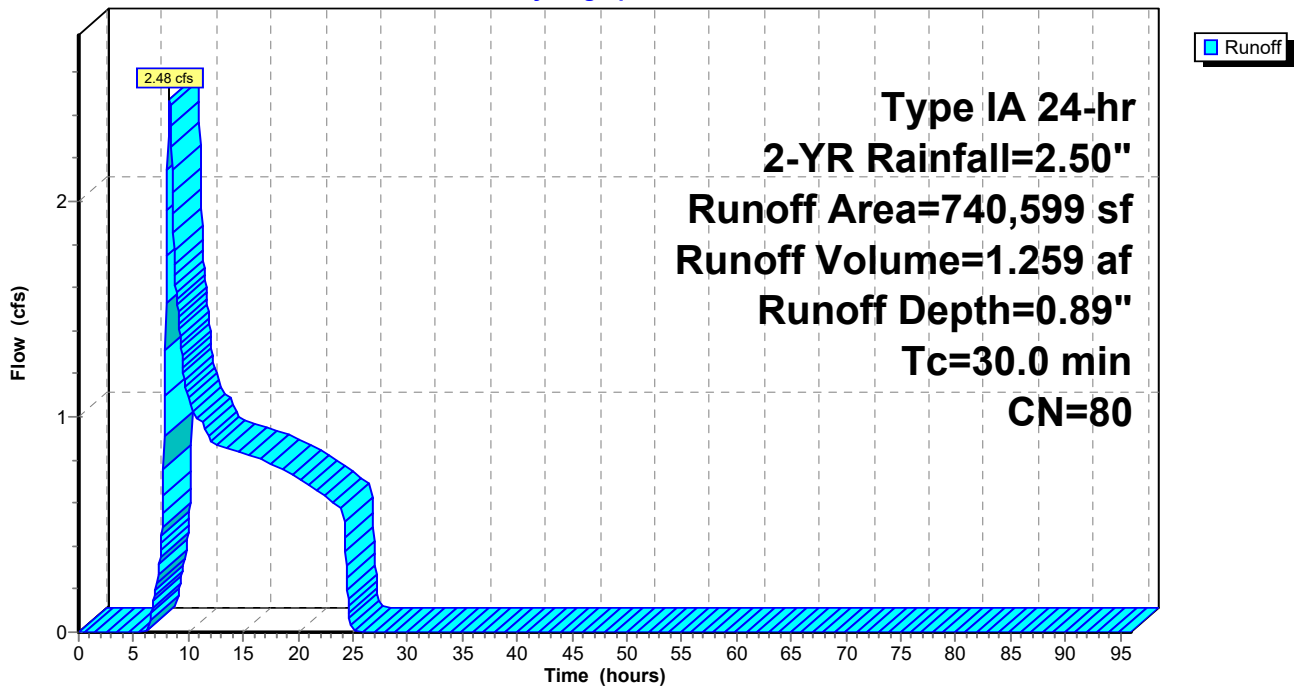
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
740,599	80	>75% Grass cover, Good, HSG D
740,599		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 17S: Pre Total

Hydrograph



Summary for Subcatchment 18S: Basin 4

[49] Hint: Tc<2dt may require smaller dt

Runoff = 2.05 cfs @ 7.86 hrs, Volume= 0.663 af, Depth= 2.27"

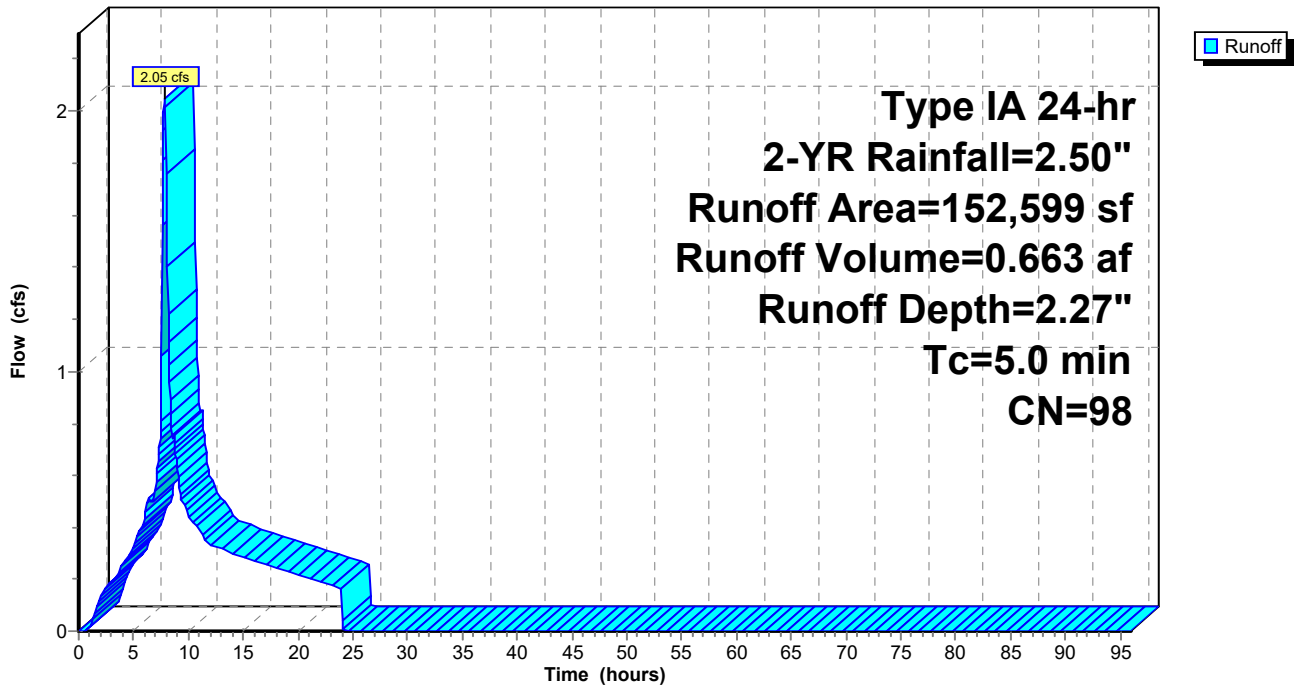
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
* 152,599	98	
152,599		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 18S: Basin 4

Hydrograph



Summary for Subcatchment 19S: Basin 2

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.65 cfs @ 7.86 hrs, Volume= 0.858 af, Depth= 2.27"

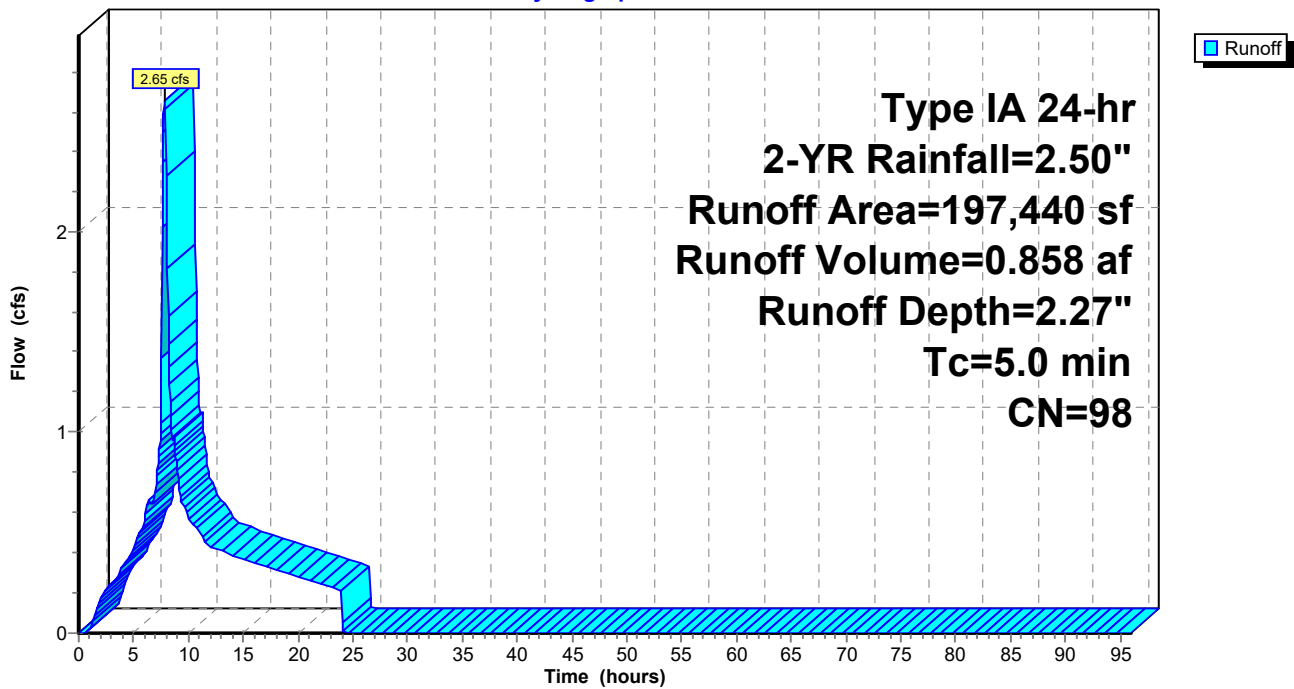
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, $dt= 0.05$ hrs
 Type IA 24-hr 2-YR Rainfall=2.50"

Area (sf)	CN	Description
* 197,440	98	
197,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 19S: Basin 2

Hydrograph



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Type IA 24-hr 2-YR Rainfall=2.50"

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Summary for Reach 22R: Offsite Discharge

Reach modeled with shallow side slopes to best mimic the overland flow created at the discharge points.

[81] Warning: Exceeded Pond 14P by 0.50' @ 0.00 hrs

[81] Warning: Exceeded Pond 20P by 0.50' @ 0.00 hrs

Inflow Area = 17.002 ac, 100.00% Impervious, Inflow Depth > 2.00" for 2-YR event
Inflow = 1.25 cfs @ 8.04 hrs, Volume= 2.839 af
Outflow = 1.10 cfs @ 8.63 hrs, Volume= 2.828 af, Atten= 11%, Lag= 35.8 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.22 fps, Min. Travel Time= 22.9 min
Avg. Velocity = 0.13 fps, Avg. Travel Time= 37.6 min

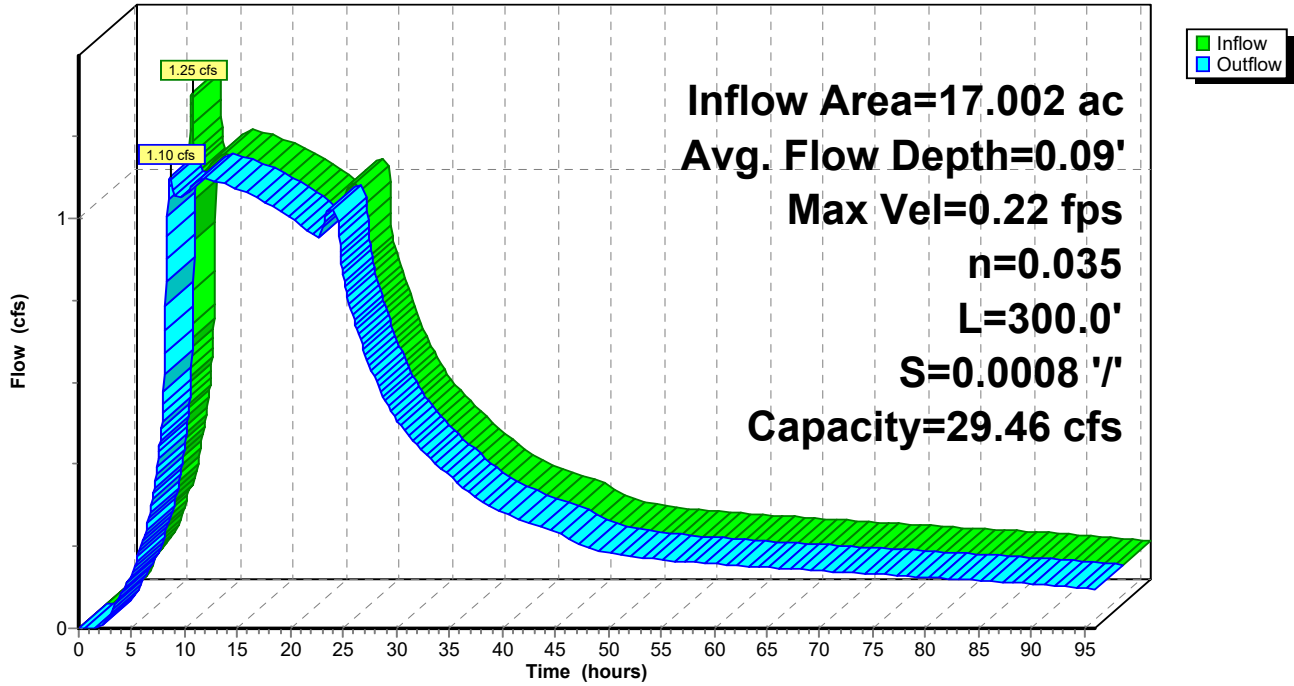
Peak Storage= 1,517 cf @ 8.25 hrs
Average Depth at Peak Storage= 0.09'
Bank-Full Depth= 0.50' Flow Area= 50.0 sf, Capacity= 29.46 cfs

50.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 100.0 ' ' Top Width= 150.00'
Length= 300.0' Slope= 0.0008 ' '
Inlet Invert= 133.00', Outlet Invert= 132.75'



Reach 22R: Offsite Discharge

Hydrograph



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Type IA 24-hr 2-YR Rainfall=2.50"

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Summary for Pond 11P: Stormwater System 1

Inflow Area = 2.882 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2-YR event
Inflow = 1.69 cfs @ 7.86 hrs, Volume= 0.545 af
Outflow = 0.21 cfs @ 16.91 hrs, Volume= 0.525 af, Atten= 87%, Lag= 543.1 min
Primary = 0.21 cfs @ 16.91 hrs, Volume= 0.525 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 135.46' @ 16.91 hrs Surf.Area= 0.246 ac Storage= 0.270 af

Plug-Flow detention time= 808.6 min calculated for 0.525 af (96% of inflow)
Center-of-Mass det. time= 780.3 min (1,452.3 - 671.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.149 af	28.33"W x 377.50'L x 2.04'H Field A 0.501 af Overall - 0.128 af Embedded = 0.373 af x 40.0% Voids
#2A	134.00'	0.128 af	Cultec C-100HD x 400 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 8 rows
		0.278 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.80'	2.5" Vert. Orifice/Grate C= 0.600
#3	Primary	135.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.21 cfs @ 16.91 hrs HW=135.46' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 6.74 fps)
- 2=Orifice/Grate (Orifice Controls 0.20 cfs @ 6.01 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 11P: Stormwater System 1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 8 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

50 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 375.50' Row Length +12.0" End Stone x 2 = 377.50' Base Length

8 Rows x 36.0" Wide + 4.0" Spacing x 7 + 12.0" Side Stone x 2 = 28.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

400 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 8 Rows = 5,591.9 cf Chamber Storage

21,837.3 cf Field - 5,591.9 cf Chambers = 16,245.4 cf Stone x 40.0% Voids = 6,498.2 cf Stone Storage

Chamber Storage + Stone Storage = 12,090.1 cf = 0.278 af

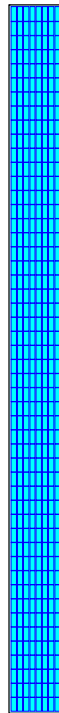
Overall Storage Efficiency = 55.4%

Overall System Size = 377.50' x 28.33' x 2.04'

400 Chambers

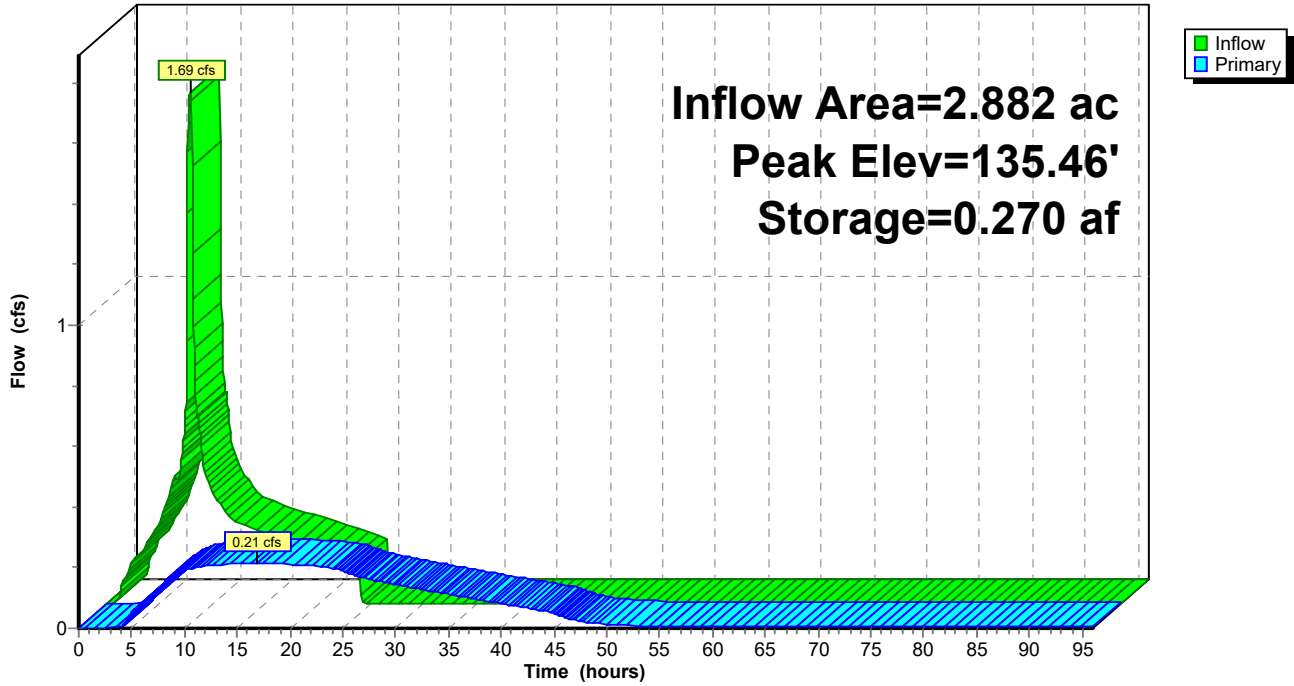
808.8 cy Field

601.7 cy Stone



Pond 11P: Stormwater System 1

Hydrograph



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Type IA 24-hr 2-YR Rainfall=2.50"

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Summary for Pond 14P: Stormwater Sytem 3

Inflow Area = 5.153 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2-YR event
Inflow = 3.02 cfs @ 7.86 hrs, Volume= 0.975 af
Outflow = 0.60 cfs @ 10.73 hrs, Volume= 0.933 af, Atten= 80%, Lag= 172.0 min
Primary = 0.60 cfs @ 10.73 hrs, Volume= 0.933 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 134.00' @ 10.73 hrs Surf.Area= 0.427 ac Storage= 0.396 af

Plug-Flow detention time= 653.5 min calculated for 0.933 af (96% of inflow)
Center-of-Mass det. time= 623.7 min (1,295.7 - 671.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.257 af	68.33"W x 272.50'L x 2.04'H Field A 0.873 af Overall - 0.231 af Embedded = 0.642 af x 40.0% Voids
#2A	133.00'	0.231 af	Cultec C-100HD x 720 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 20 rows
		0.488 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.05'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	134.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.60 cfs @ 10.73 hrs HW=134.00' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.03 cfs @ 5.90 fps)

2=Orifice/Grate (Orifice Controls 0.57 cfs @ 4.16 fps)

3=Orifice/Grate (Controls 0.00 cfs)

Pond 14P: Stormwater Sytem 3 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 20 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

36 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 270.50' Row Length +12.0" End Stone x 2 = 272.50' Base Length

20 Rows x 36.0" Wide + 4.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

720 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 20 Rows = 10,070.7 cf Chamber Storage

38,017.5 cf Field - 10,070.7 cf Chambers = 27,946.8 cf Stone x 40.0% Voids = 11,178.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,249.4 cf = 0.488 af

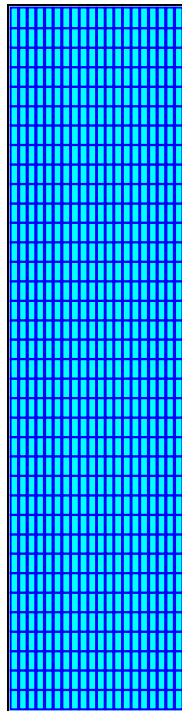
Overall Storage Efficiency = 55.9%

Overall System Size = 272.50' x 68.33' x 2.04'

720 Chambers

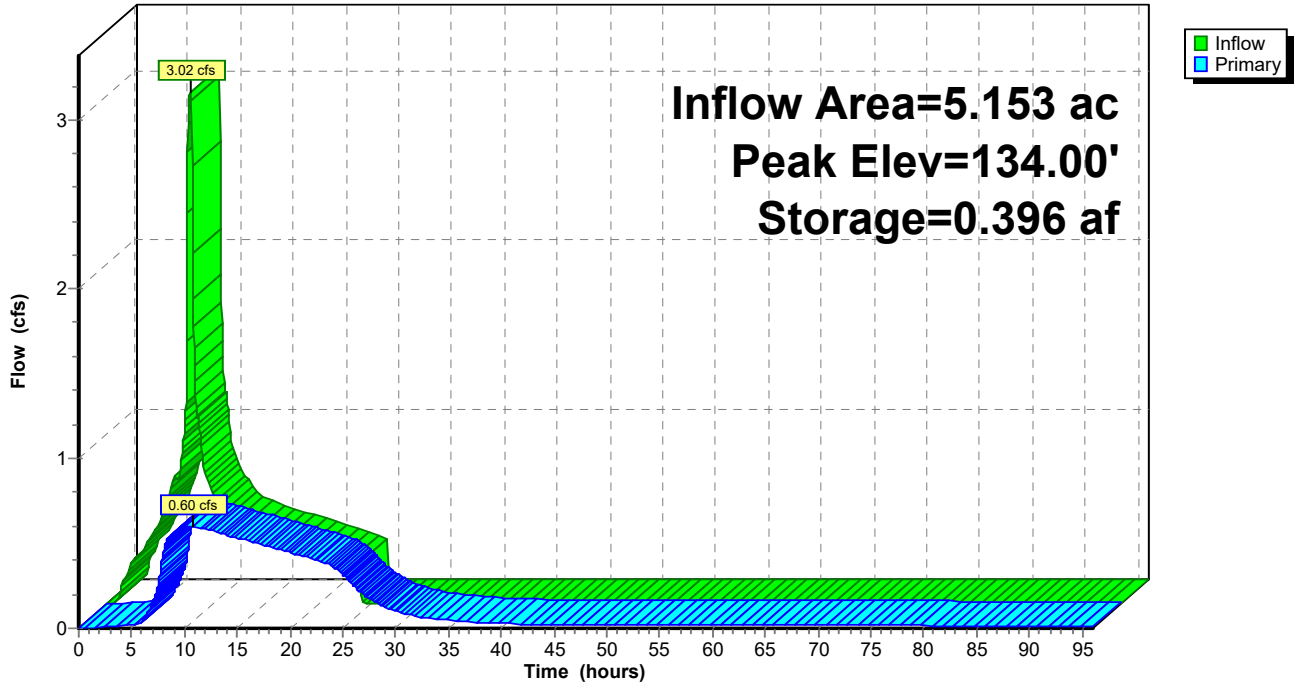
1,408.1 cy Field

1,035.1 cy Stone



Pond 14P: Stormwater Sytem 3

Hydrograph



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Type IA 24-hr 2-YR Rainfall=2.50"

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Summary for Pond 20P: Stormwater System 4

Inflow Area = 3.503 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2-YR event
Inflow = 2.05 cfs @ 7.86 hrs, Volume= 0.663 af
Outflow = 0.17 cfs @ 23.59 hrs, Volume= 0.625 af, Atten= 92%, Lag= 943.5 min
Primary = 0.17 cfs @ 23.59 hrs, Volume= 0.625 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 134.72' @ 23.59 hrs Surf.Area= 0.283 ac Storage= 0.452 af

Plug-Flow detention time= 1,750.3 min calculated for 0.625 af (94% of inflow)
Center-of-Mass det. time= 1,709.5 min (2,381.4 - 671.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.266 af	30.00'W x 411.50'L x 4.00'H Field A 1.134 af Overall - 0.468 af Embedded = 0.665 af x 40.0% Voids
#2A	133.00'	0.468 af	Cultec R-360HD x 555 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 555 Chambers in 5 Rows Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf
		0.734 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.00'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	136.25'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.17 cfs @ 23.59 hrs HW=134.72' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.09 cfs @ 7.17 fps)
- 2=Orifice/Grate (Orifice Controls 0.08 cfs @ 3.83 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 20P: Stormwater System 4 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length

5 Rows x 60.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 30.00' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

555 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 5 Rows = 20,402.4 cf Chamber Storage

49,380.0 cf Field - 20,402.4 cf Chambers = 28,977.6 cf Stone x 40.0% Voids = 11,591.0 cf Stone Storage

Chamber Storage + Stone Storage = 31,993.4 cf = 0.734 af

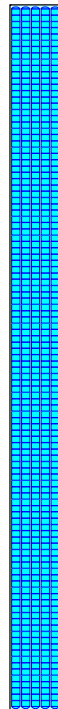
Overall Storage Efficiency = 64.8%

Overall System Size = 411.50' x 30.00' x 4.00'

555 Chambers

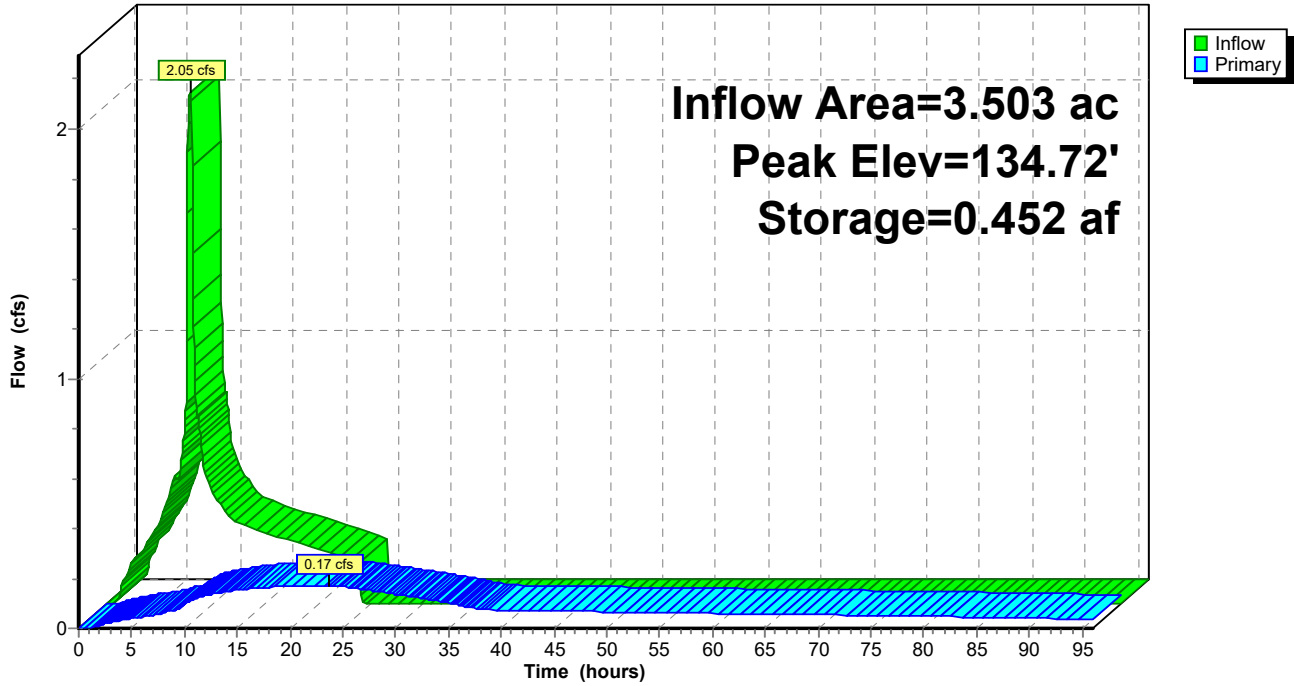
1,828.9 cy Field

1,073.2 cy Stone



Pond 20P: Stormwater System 4

Hydrograph



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Type IA 24-hr 2-YR Rainfall=2.50"

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Summary for Pond 23P: Stormwater System 2

Inflow Area = 4.533 ac, 100.00% Impervious, Inflow Depth = 2.27" for 2-YR event
Inflow = 2.65 cfs @ 7.86 hrs, Volume= 0.858 af
Outflow = 0.22 cfs @ 23.43 hrs, Volume= 0.580 af, Atten= 92%, Lag= 934.4 min
Primary = 0.22 cfs @ 23.43 hrs, Volume= 0.580 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 137.33' @ 23.43 hrs Surf.Area= 0.284 ac Storage= 0.718 af

Plug-Flow detention time= 2,268.5 min calculated for 0.579 af (68% of inflow)
Center-of-Mass det. time= 2,072.7 min (2,744.6 - 671.9)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.265 af	41.50"W x 297.83'L x 4.00'H Field A 1.135 af Overall - 0.473 af Embedded = 0.662 af x 40.0% Voids
#2A	134.00'	0.473 af	Cultec R-360HD x 560 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 560 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		0.738 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.50'	1.5" Vert. Orifice/Grate C= 0.600
#3	Primary	137.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.21 cfs @ 23.43 hrs HW=137.33' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.42 fps)
- 2=Orifice/Grate (Orifice Controls 0.10 cfs @ 8.01 fps)
- 3=Orifice/Grate (Weir Controls 0.09 cfs @ 0.54 fps)

Pond 23P: Stormwater System 2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

80 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 295.83' Row Length +12.0" End Stone x 2 = 297.83' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

560 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 20,611.5 cf Chamber Storage

49,440.3 cf Field - 20,611.5 cf Chambers = 28,828.9 cf Stone x 40.0% Voids = 11,531.6 cf Stone Storage

Chamber Storage + Stone Storage = 32,143.0 cf = 0.738 af

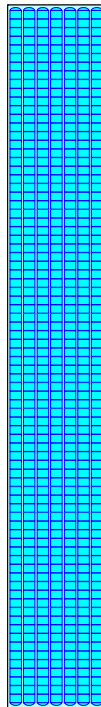
Overall Storage Efficiency = 65.0%

Overall System Size = 297.83' x 41.50' x 4.00'

560 Chambers

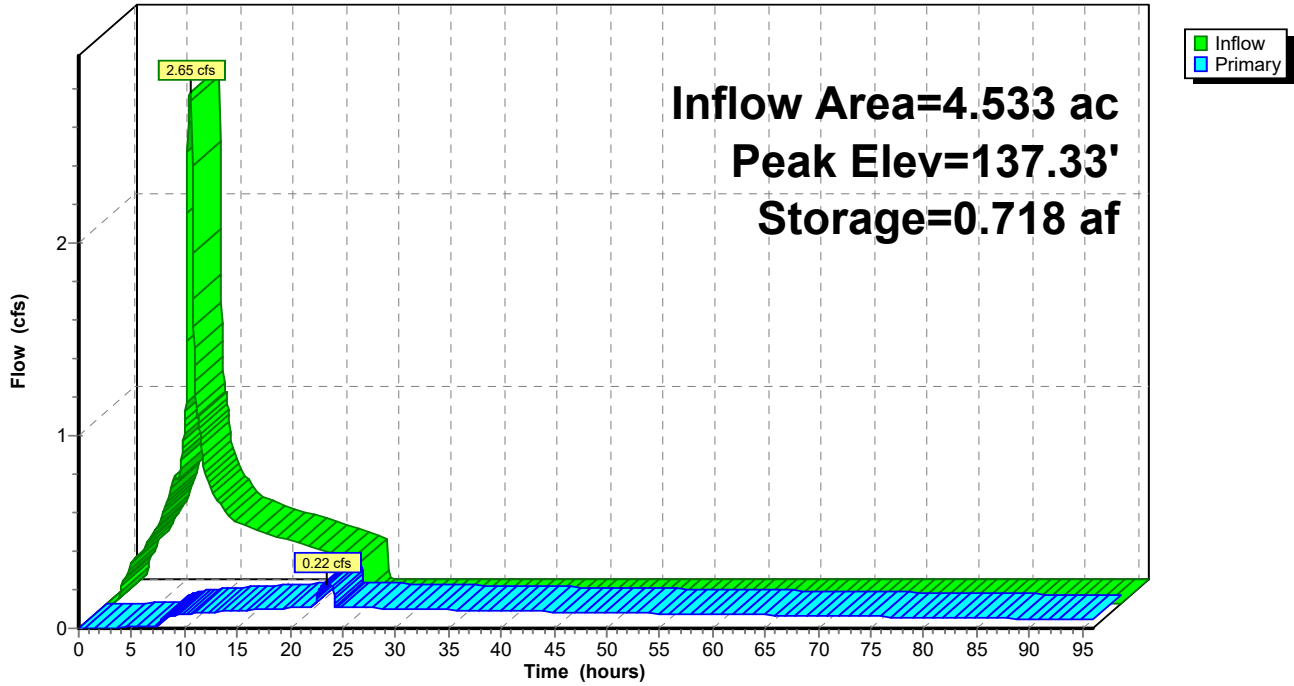
1,831.1 cy Field

1,067.7 cy Stone



Pond 23P: Stormwater System 2

Hydrograph



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Type IA 24-hr 5-YR Rainfall=3.10"

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8S: Basin 1	Runoff Area=125,547 sf 100.00% Impervious Runoff Depth=2.87" Tc=5.0 min CN=98 Runoff=2.12 cfs 0.689 af
Subcatchment13S: Basin 3	Runoff Area=224,462 sf 100.00% Impervious Runoff Depth=2.87" Tc=5.0 min CN=98 Runoff=3.78 cfs 1.231 af
Subcatchment15S: Filter Strip Basins	Runoff Area=40,551 sf 100.00% Impervious Runoff Depth=2.87" Tc=10.0 min CN=98 Runoff=0.68 cfs 0.222 af
Subcatchment17S: Pre Total	Runoff Area=740,599 sf 0.00% Impervious Runoff Depth=1.33" Tc=30.0 min CN=80 Runoff=4.15 cfs 1.878 af
Subcatchment18S: Basin 4	Runoff Area=152,599 sf 100.00% Impervious Runoff Depth=2.87" Tc=5.0 min CN=98 Runoff=2.57 cfs 0.837 af
Subcatchment19S: Basin 2	Runoff Area=197,440 sf 100.00% Impervious Runoff Depth=2.87" Tc=5.0 min CN=98 Runoff=3.33 cfs 1.083 af
Reach 22R: Offsite Discharge	Avg. Flow Depth=0.12' Max Vel=0.27 fps Inflow=2.33 cfs 3.660 af n=0.035 L=300.0' S=0.0008 '/' Capacity=29.46 cfs Outflow=2.03 cfs 3.650 af
Pond 11P: Stormwater System 1	Peak Elev=135.59' Storage=0.278 af Inflow=2.12 cfs 0.689 af Outflow=0.73 cfs 0.668 af
Pond 14P: Stormwater System 3	Peak Elev=134.38' Storage=0.460 af Inflow=3.78 cfs 1.231 af Outflow=1.17 cfs 1.188 af
Pond 20P: Stormwater System 4	Peak Elev=135.28' Storage=0.565 af Inflow=2.57 cfs 0.837 af Outflow=0.21 cfs 0.776 af
Pond 23P: Stormwater System 2	Peak Elev=137.36' Storage=0.723 af Inflow=3.33 cfs 1.083 af Outflow=0.46 cfs 0.805 af

Total Runoff Area = 34.004 ac Runoff Volume = 5.941 af Average Runoff Depth = 2.10"
50.00% Pervious = 17.002 ac 50.00% Impervious = 17.002 ac

Summary for Subcatchment 8S: Basin 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.12 cfs @ 7.86 hrs, Volume= 0.689 af, Depth= 2.87"

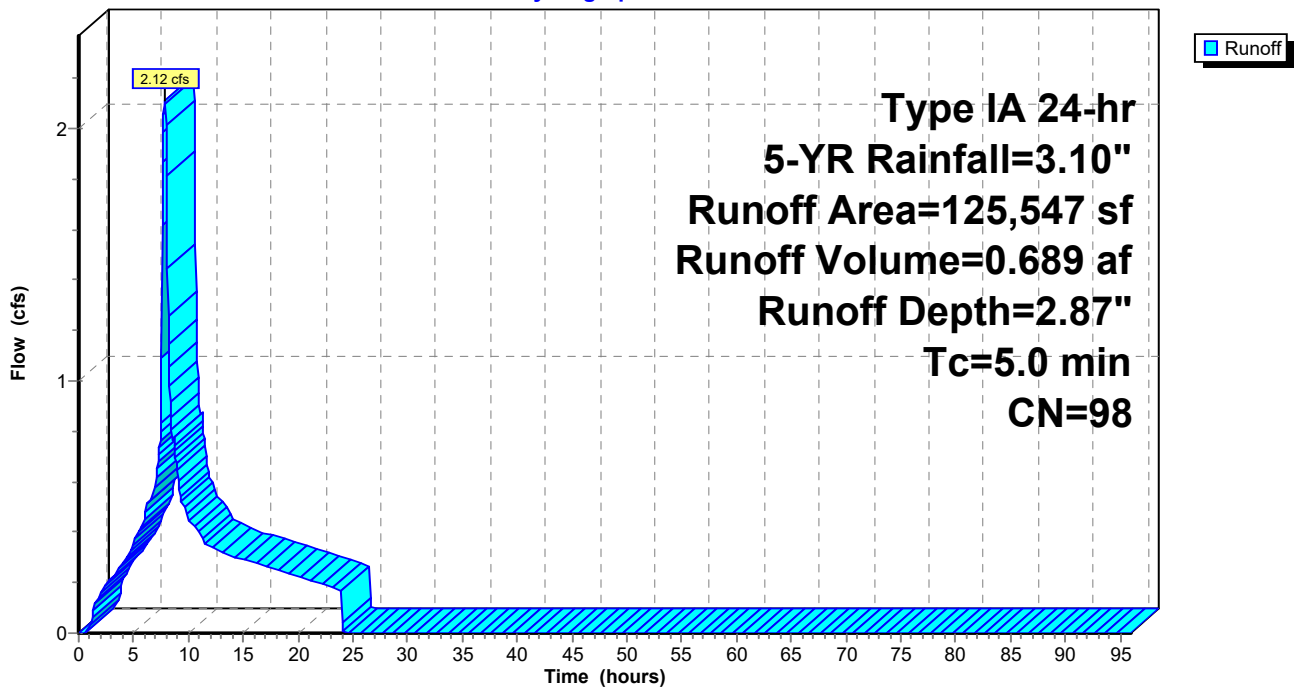
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
* 125,547	98	
125,547		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Basin 1

Hydrograph



Summary for Subcatchment 13S: Basin 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.78 cfs @ 7.86 hrs, Volume= 1.231 af, Depth= 2.87"

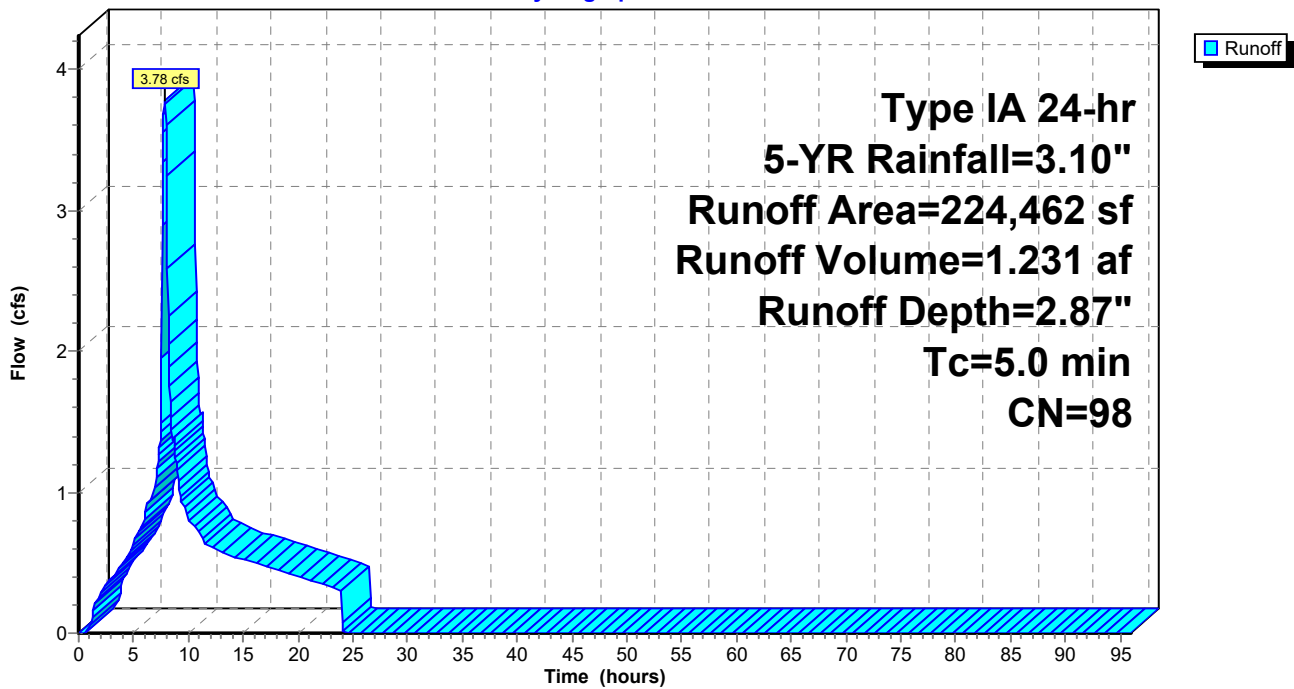
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
* 224,462	98	
224,462		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 13S: Basin 3

Hydrograph



Summary for Subcatchment 15S: Filter Strip Basins

Runoff = 0.68 cfs @ 7.94 hrs, Volume= 0.222 af, Depth= 2.87"

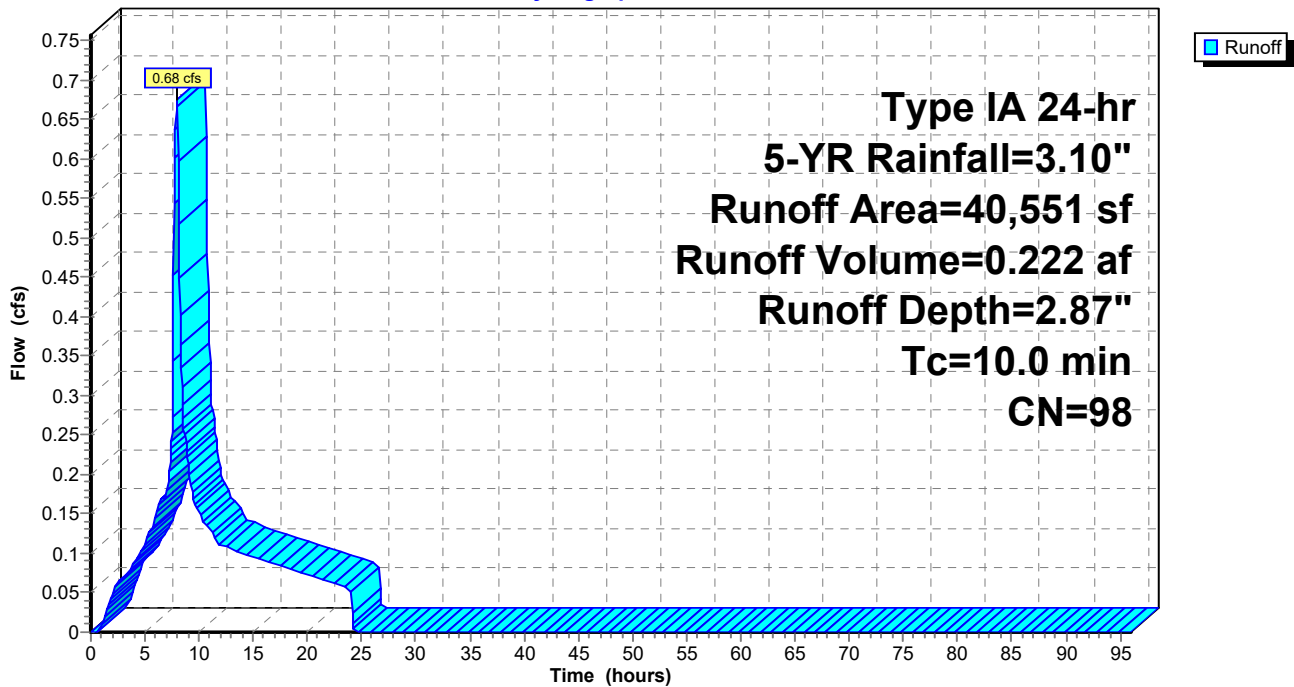
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
* 40,551	98	
40,551		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, 20

Subcatchment 15S: Filter Strip Basins

Hydrograph



Walgraves

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Type IA 24-hr 5-YR Rainfall=3.10"

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Summary for Subcatchment 17S: Pre Total

Runoff = 4.15 cfs @ 8.26 hrs, Volume= 1.878 af, Depth= 1.33"

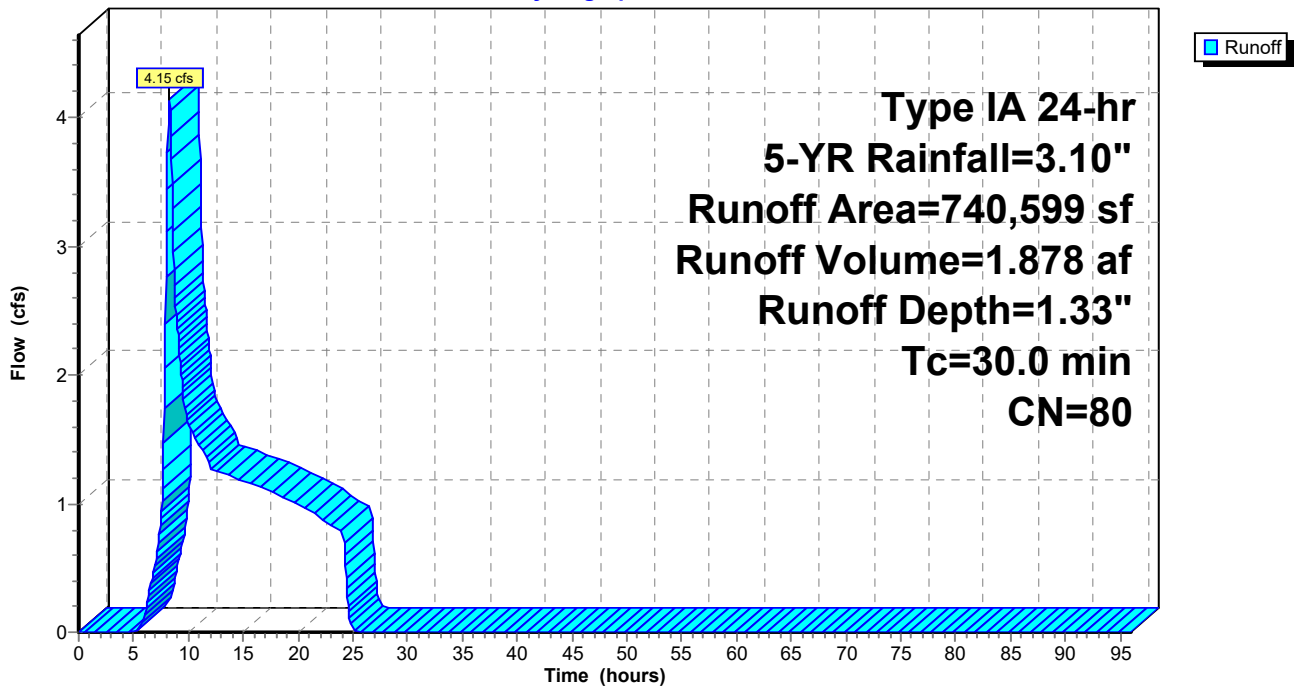
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
740,599	80	>75% Grass cover, Good, HSG D
740,599		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 17S: Pre Total

Hydrograph



Summary for Subcatchment 18S: Basin 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.57 cfs @ 7.86 hrs, Volume= 0.837 af, Depth= 2.87"

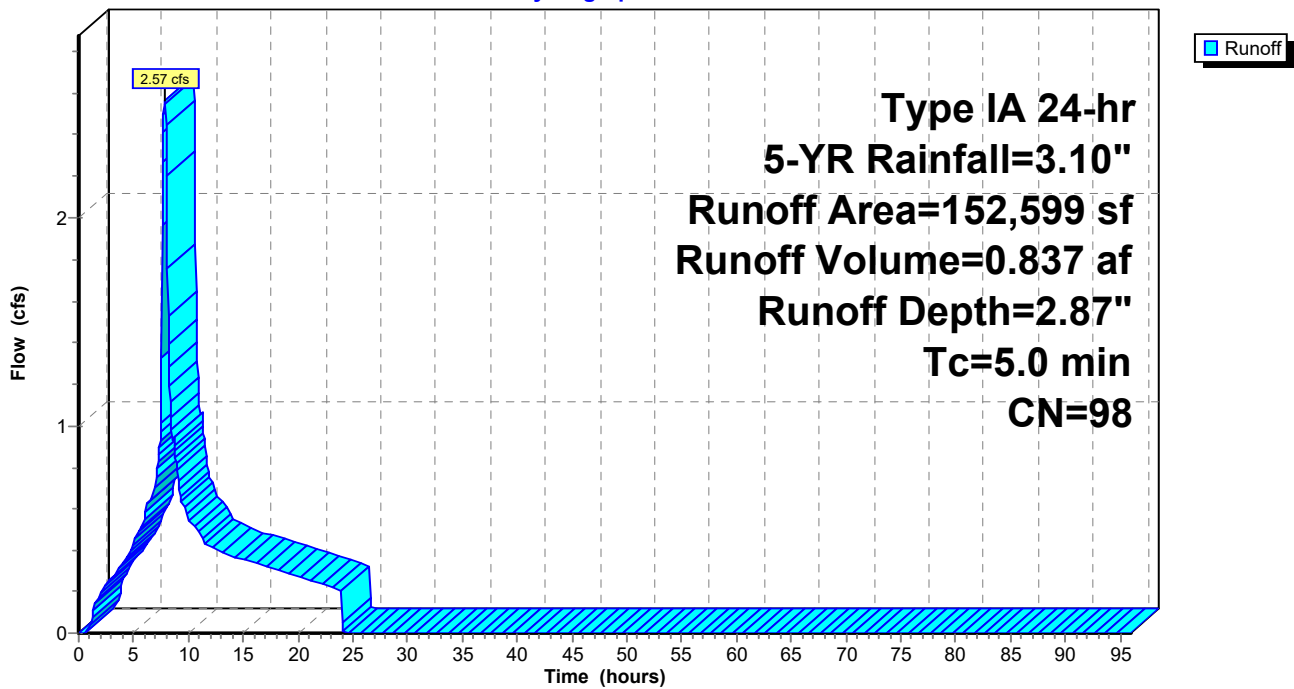
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
* 152,599	98	
152,599		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 18S: Basin 4

Hydrograph



Summary for Subcatchment 19S: Basin 2

[49] Hint: Tc<2dt may require smaller dt

Runoff = 3.33 cfs @ 7.86 hrs, Volume= 1.083 af, Depth= 2.87"

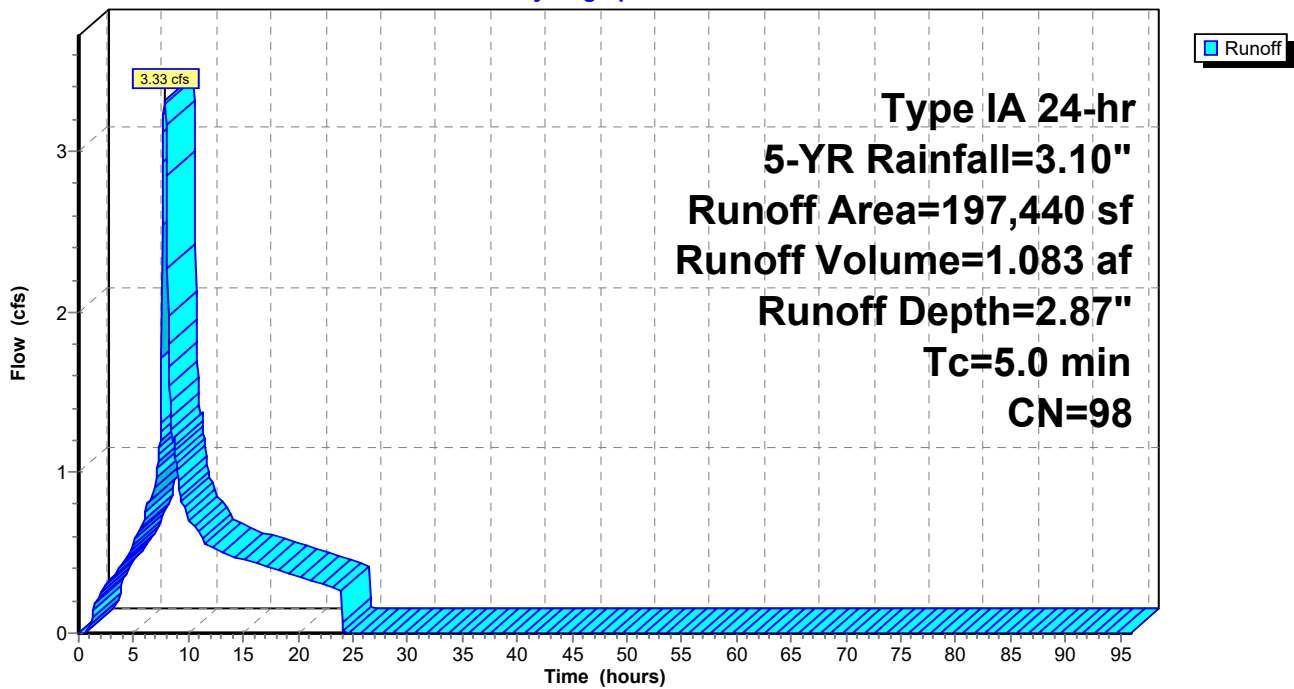
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 5-YR Rainfall=3.10"

Area (sf)	CN	Description
* 197,440	98	
197,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 19S: Basin 2

Hydrograph



Summary for Reach 22R: Offsite Discharge

Reach modeled with shallow side slopes to best mimic the overland flow created at the discharge points.

[81] Warning: Exceeded Pond 14P by 0.50' @ 0.00 hrs

[81] Warning: Exceeded Pond 20P by 0.50' @ 0.00 hrs

Inflow Area = 17.002 ac, 100.00% Impervious, Inflow Depth > 2.58" for 5-YR event
Inflow = 2.33 cfs @ 9.01 hrs, Volume= 3.660 af
Outflow = 2.03 cfs @ 9.58 hrs, Volume= 3.650 af, Atten= 13%, Lag= 34.6 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.27 fps, Min. Travel Time= 18.7 min
Avg. Velocity = 0.14 fps, Avg. Travel Time= 35.3 min

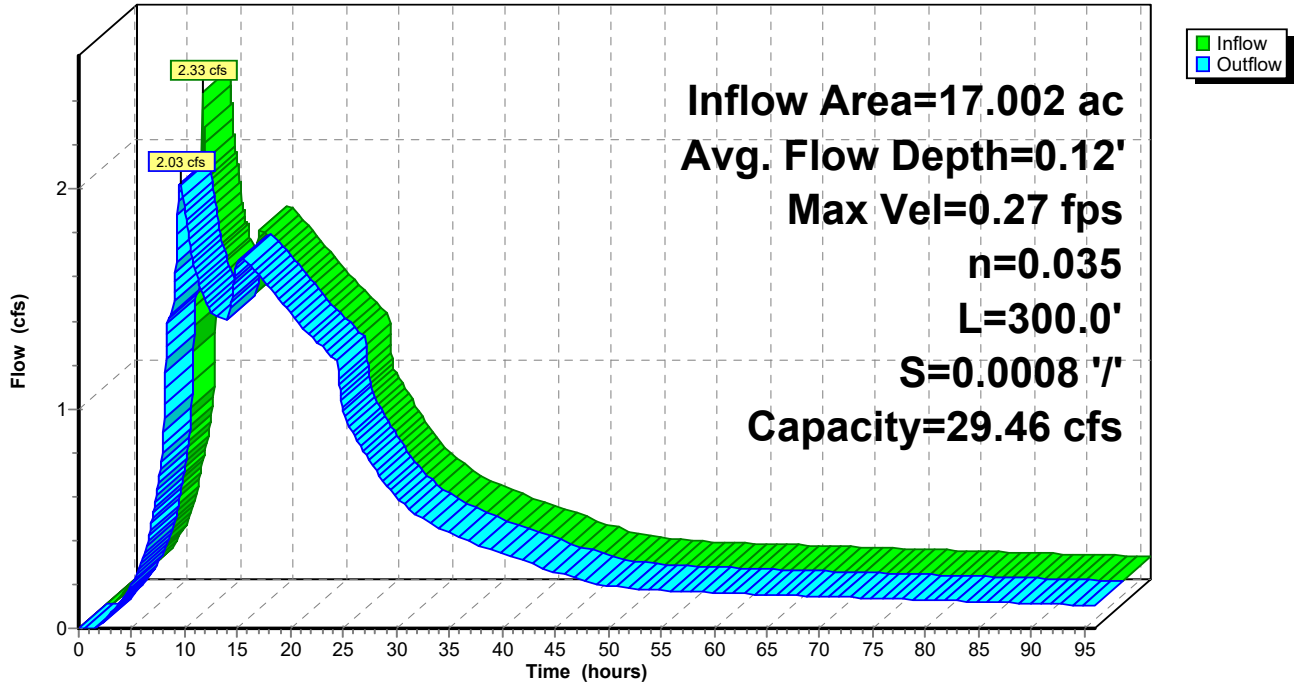
Peak Storage= 2,275 cf @ 9.27 hrs
Average Depth at Peak Storage= 0.12'
Bank-Full Depth= 0.50' Flow Area= 50.0 sf, Capacity= 29.46 cfs

50.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 100.0 ' ' Top Width= 150.00'
Length= 300.0' Slope= 0.0008 ' '
Inlet Invert= 133.00', Outlet Invert= 132.75'



Reach 22R: Offsite Discharge

Hydrograph



Summary for Pond 11P: Stormwater System 1

[93] Warning: Storage range exceeded by 0.04'

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=15)

Inflow Area = 2.882 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5-YR event
 Inflow = 2.12 cfs @ 7.86 hrs, Volume= 0.689 af
 Outflow = 0.73 cfs @ 9.01 hrs, Volume= 0.668 af, Atten= 65%, Lag= 69.0 min
 Primary = 0.73 cfs @ 9.01 hrs, Volume= 0.668 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 135.59' @ 9.01 hrs Surf.Area= 0.246 ac Storage= 0.278 af

Plug-Flow detention time= 691.9 min calculated for 0.668 af (97% of inflow)
 Center-of-Mass det. time= 668.9 min (1,334.4 - 665.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.149 af	28.33'W x 377.50'L x 2.04'H Field A 0.501 af Overall - 0.128 af Embedded = 0.373 af x 40.0% Voids
#2A	134.00'	0.128 af	Cultec C-100HD x 400 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 8 rows
		0.278 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.80'	2.5" Vert. Orifice/Grate C= 0.600
#3	Primary	135.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.70 cfs @ 9.01 hrs HW=135.58' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 6.95 fps)
- 2=Orifice/Grate (Orifice Controls 0.21 cfs @ 6.24 fps)
- 3=Orifice/Grate (Weir Controls 0.47 cfs @ 0.93 fps)

Pond 11P: Stormwater System 1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 8 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

50 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 375.50' Row Length +12.0" End Stone x 2 = 377.50' Base Length

8 Rows x 36.0" Wide + 4.0" Spacing x 7 + 12.0" Side Stone x 2 = 28.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

400 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 8 Rows = 5,591.9 cf Chamber Storage

21,837.3 cf Field - 5,591.9 cf Chambers = 16,245.4 cf Stone x 40.0% Voids = 6,498.2 cf Stone Storage

Chamber Storage + Stone Storage = 12,090.1 cf = 0.278 af

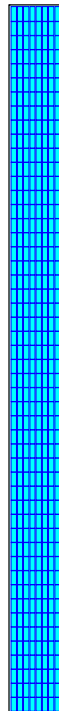
Overall Storage Efficiency = 55.4%

Overall System Size = 377.50' x 28.33' x 2.04'

400 Chambers

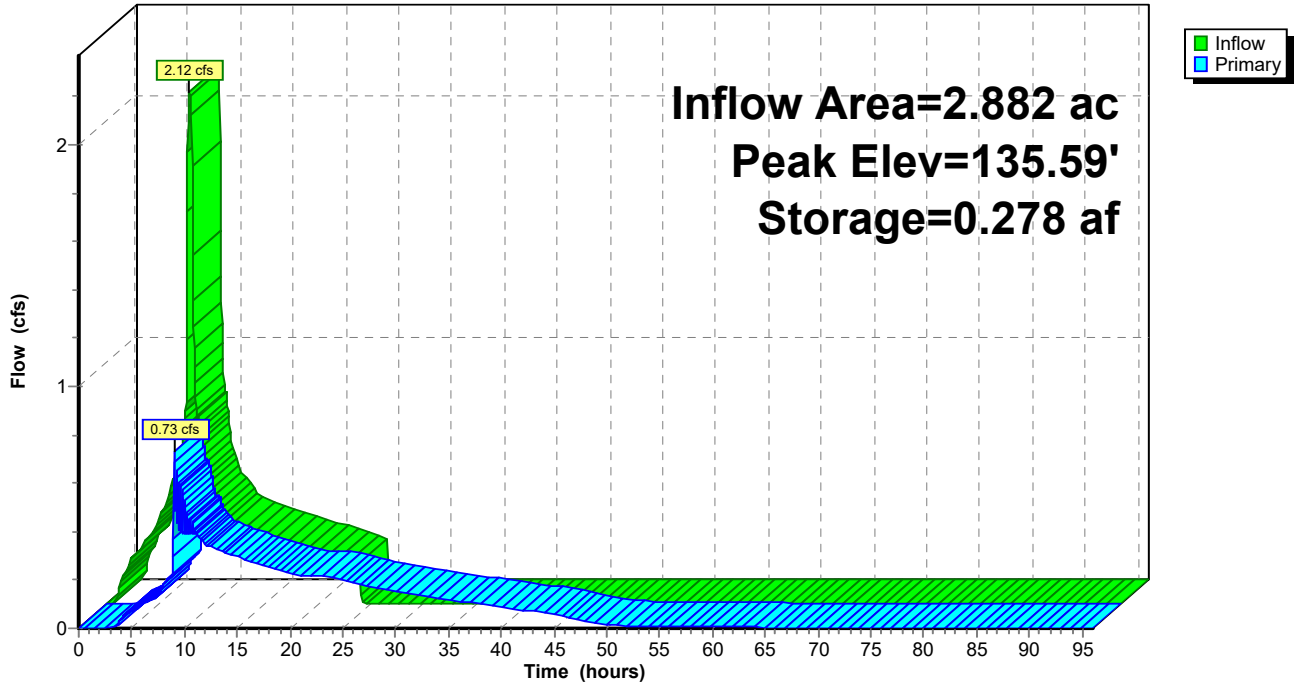
808.8 cy Field

601.7 cy Stone



Pond 11P: Stormwater System 1

Hydrograph



Walgraves

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Type IA 24-hr 5-YR Rainfall=3.10"

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Summary for Pond 14P: Stormwater Sytem 3

Inflow Area = 5.153 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5-YR event
Inflow = 3.78 cfs @ 7.86 hrs, Volume= 1.231 af
Outflow = 1.17 cfs @ 8.96 hrs, Volume= 1.188 af, Atten= 69%, Lag= 65.9 min
Primary = 1.17 cfs @ 8.96 hrs, Volume= 1.188 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 134.38' @ 8.96 hrs Surf.Area= 0.427 ac Storage= 0.460 af

Plug-Flow detention time= 579.2 min calculated for 1.188 af (96% of inflow)
Center-of-Mass det. time= 554.7 min (1,220.2 - 665.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.257 af	68.33"W x 272.50'L x 2.04'H Field A 0.873 af Overall - 0.231 af Embedded = 0.642 af x 40.0% Voids
#2A	133.00'	0.231 af	Cultec C-100HD x 720 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 20 rows
		0.488 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.05'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	134.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.17 cfs @ 8.96 hrs HW=134.38' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.60 fps)
- 2=Orifice/Grate (Orifice Controls 0.69 cfs @ 5.09 fps)
- 3=Orifice/Grate (Weir Controls 0.44 cfs @ 0.91 fps)

Pond 14P: Stormwater Sytem 3 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 20 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

36 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 270.50' Row Length +12.0" End Stone x 2 = 272.50' Base Length

20 Rows x 36.0" Wide + 4.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

720 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 20 Rows = 10,070.7 cf Chamber Storage

38,017.5 cf Field - 10,070.7 cf Chambers = 27,946.8 cf Stone x 40.0% Voids = 11,178.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,249.4 cf = 0.488 af

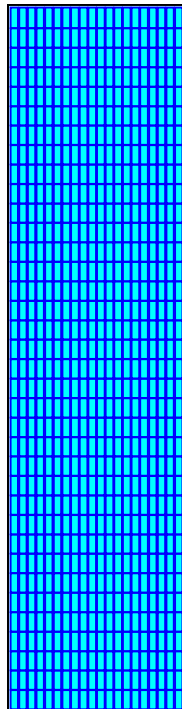
Overall Storage Efficiency = 55.9%

Overall System Size = 272.50' x 68.33' x 2.04'

720 Chambers

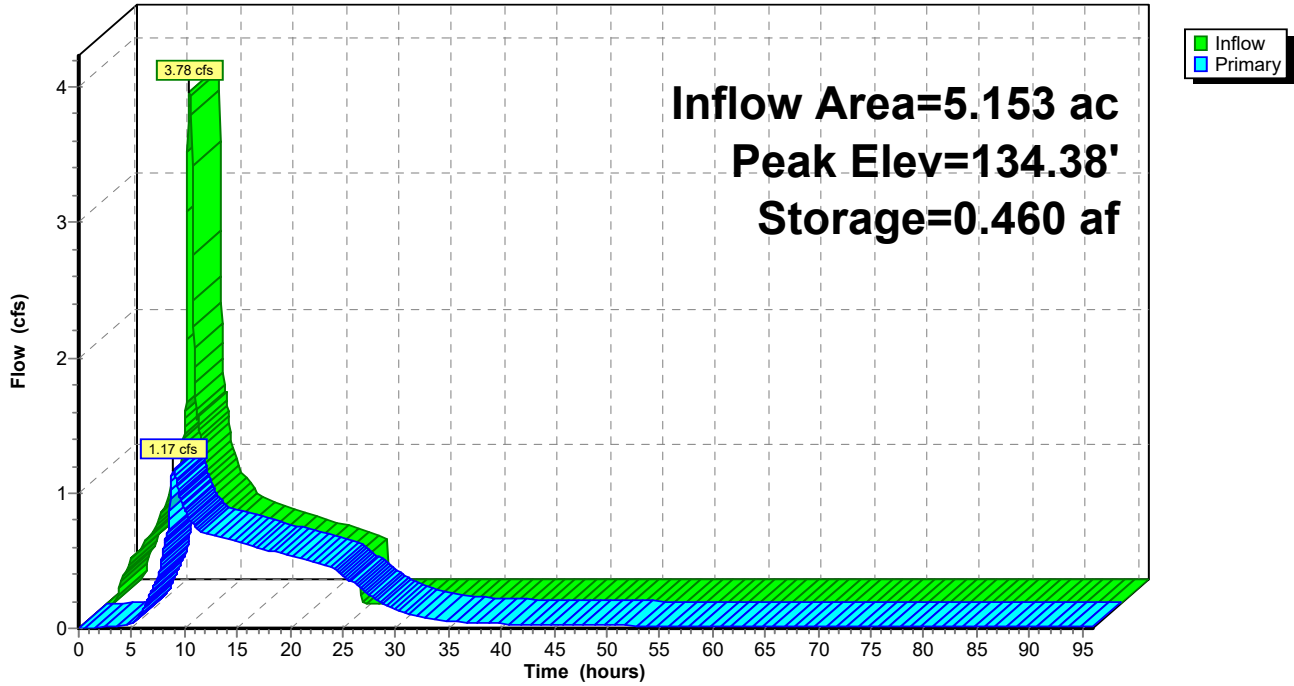
1,408.1 cy Field

1,035.1 cy Stone



Pond 14P: Stormwater Sytem 3

Hydrograph



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Type IA 24-hr 5-YR Rainfall=3.10"

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Summary for Pond 20P: Stormwater System 4

Inflow Area = 3.503 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5-YR event
Inflow = 2.57 cfs @ 7.86 hrs, Volume= 0.837 af
Outflow = 0.21 cfs @ 23.57 hrs, Volume= 0.776 af, Atten= 92%, Lag= 942.9 min
Primary = 0.21 cfs @ 23.57 hrs, Volume= 0.776 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 135.28' @ 23.57 hrs Surf.Area= 0.283 ac Storage= 0.565 af

Plug-Flow detention time= 1,668.1 min calculated for 0.776 af (93% of inflow)
Center-of-Mass det. time= 1,616.3 min (2,281.8 - 665.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.266 af	30.00'W x 411.50'L x 4.00'H Field A 1.134 af Overall - 0.468 af Embedded = 0.665 af x 40.0% Voids
#2A	133.00'	0.468 af	Cultec R-360HD x 555 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 555 Chambers in 5 Rows Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf
		0.734 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.00'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	136.25'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.21 cfs @ 23.57 hrs HW=135.28' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.10 cfs @ 8.03 fps)
- 2=Orifice/Grate (Orifice Controls 0.11 cfs @ 5.27 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 20P: Stormwater System 4 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length

5 Rows x 60.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 30.00' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

555 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 5 Rows = 20,402.4 cf Chamber Storage

49,380.0 cf Field - 20,402.4 cf Chambers = 28,977.6 cf Stone x 40.0% Voids = 11,591.0 cf Stone Storage

Chamber Storage + Stone Storage = 31,993.4 cf = 0.734 af

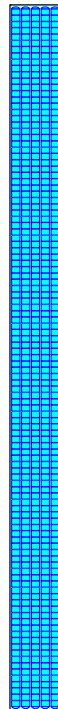
Overall Storage Efficiency = 64.8%

Overall System Size = 411.50' x 30.00' x 4.00'

555 Chambers

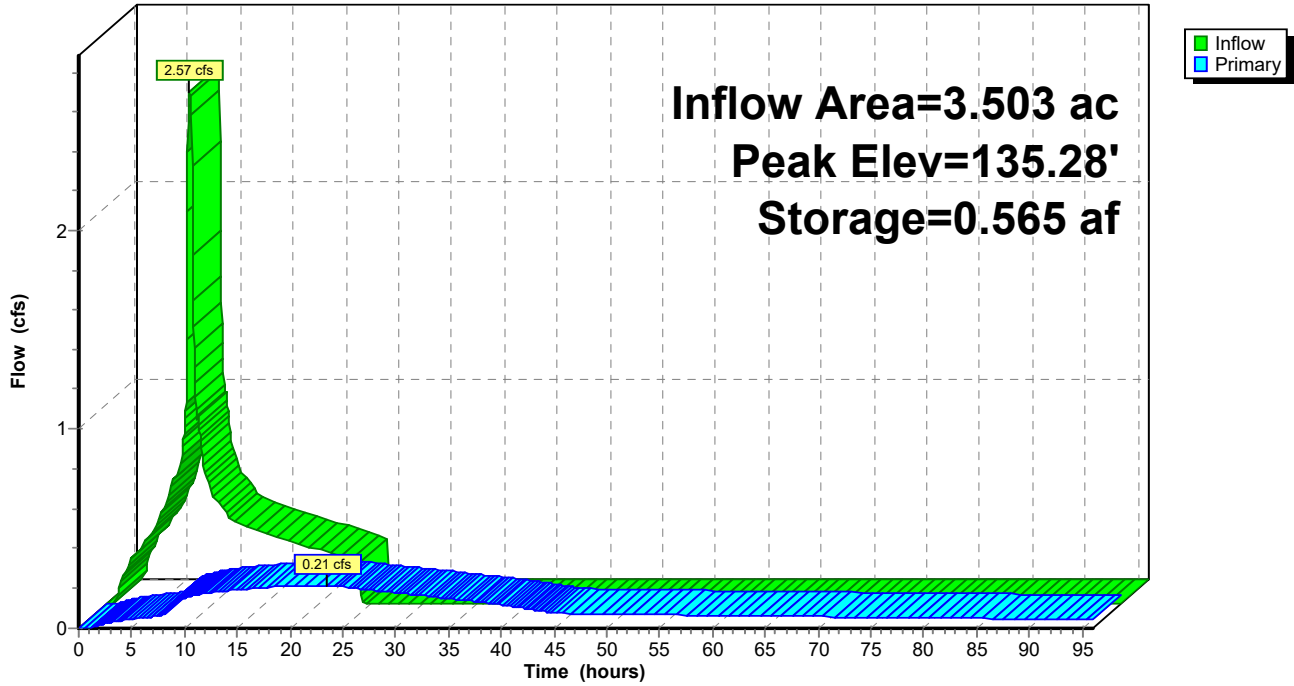
1,828.9 cy Field

1,073.2 cy Stone



Pond 20P: Stormwater System 4

Hydrograph



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Type IA 24-hr 5-YR Rainfall=3.10"

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Summary for Pond 23P: Stormwater System 2

Inflow Area = 4.533 ac, 100.00% Impervious, Inflow Depth = 2.87" for 5-YR event
Inflow = 3.33 cfs @ 7.86 hrs, Volume= 1.083 af
Outflow = 0.46 cfs @ 14.77 hrs, Volume= 0.805 af, Atten= 86%, Lag= 414.7 min
Primary = 0.46 cfs @ 14.77 hrs, Volume= 0.805 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 137.36' @ 14.77 hrs Surf.Area= 0.284 ac Storage= 0.723 af

Plug-Flow detention time= 1,771.9 min calculated for 0.804 af (74% of inflow)
Center-of-Mass det. time= 1,608.7 min (2,274.1 - 665.4)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.265 af	41.50"W x 297.83'L x 4.00'H Field A 1.135 af Overall - 0.473 af Embedded = 0.662 af x 40.0% Voids
#2A	134.00'	0.473 af	Cultec R-360HD x 560 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 560 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		0.738 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.50'	1.5" Vert. Orifice/Grate C= 0.600
#3	Primary	137.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.45 cfs @ 14.77 hrs HW=137.36' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.47 fps)
- 2=Orifice/Grate (Orifice Controls 0.10 cfs @ 8.06 fps)
- 3=Orifice/Grate (Weir Controls 0.34 cfs @ 0.83 fps)

Pond 23P: Stormwater System 2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

80 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 295.83' Row Length +12.0" End Stone x 2 = 297.83' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

560 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 20,611.5 cf Chamber Storage

49,440.3 cf Field - 20,611.5 cf Chambers = 28,828.9 cf Stone x 40.0% Voids = 11,531.6 cf Stone Storage

Chamber Storage + Stone Storage = 32,143.0 cf = 0.738 af

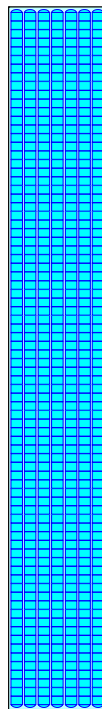
Overall Storage Efficiency = 65.0%

Overall System Size = 297.83' x 41.50' x 4.00'

560 Chambers

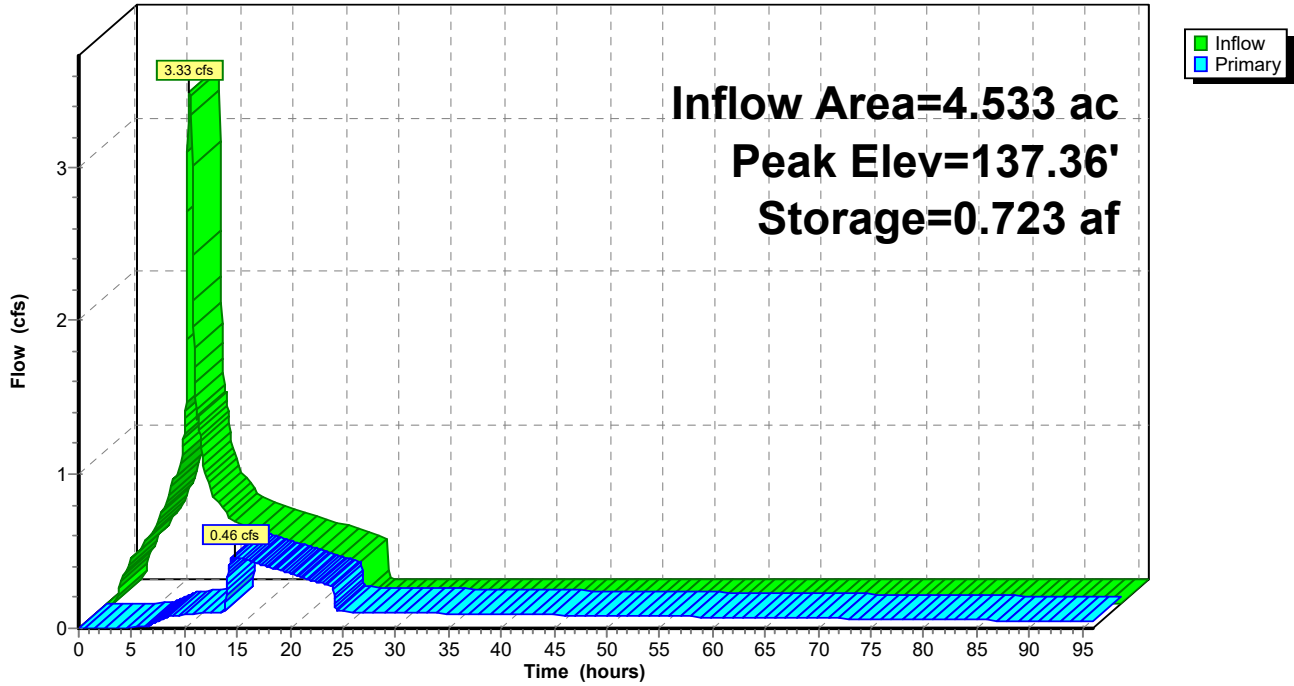
1,831.1 cy Field

1,067.7 cy Stone



Pond 23P: Stormwater System 2

Hydrograph



Walgraves

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Type IA 24-hr 10-YR Rainfall=3.45"

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8S: Basin 1	Runoff Area=125,547 sf 100.00% Impervious Runoff Depth=3.22" Tc=5.0 min CN=98 Runoff=2.36 cfs 0.773 af
Subcatchment13S: Basin 3	Runoff Area=224,462 sf 100.00% Impervious Runoff Depth=3.22" Tc=5.0 min CN=98 Runoff=4.23 cfs 1.381 af
Subcatchment15S: Filter Strip Basins	Runoff Area=40,551 sf 100.00% Impervious Runoff Depth=3.22" Tc=10.0 min CN=98 Runoff=0.76 cfs 0.250 af
Subcatchment17S: Pre Total	Runoff Area=740,599 sf 0.00% Impervious Runoff Depth=1.60" Tc=30.0 min CN=80 Runoff=5.20 cfs 2.262 af
Subcatchment18S: Basin 4	Runoff Area=152,599 sf 100.00% Impervious Runoff Depth=3.22" Tc=5.0 min CN=98 Runoff=2.87 cfs 0.939 af
Subcatchment19S: Basin 2	Runoff Area=197,440 sf 100.00% Impervious Runoff Depth=3.22" Tc=5.0 min CN=98 Runoff=3.72 cfs 1.215 af
Reach 22R: Offsite Discharge	Avg. Flow Depth=0.15' Max Vel=0.30 fps Inflow=3.60 cfs 4.140 af n=0.035 L=300.0' S=0.0008 '/' Capacity=29.46 cfs Outflow=2.99 cfs 4.130 af
Pond 11P: Stormwater System 1	Peak Elev=135.63' Storage=0.278 af Inflow=2.36 cfs 0.773 af Outflow=1.17 cfs 0.752 af
Pond 14P: Stormwater System 3	Peak Elev=134.44' Storage=0.470 af Inflow=4.23 cfs 1.381 af Outflow=1.83 cfs 1.338 af
Pond 20P: Stormwater System 4	Peak Elev=135.67' Storage=0.634 af Inflow=2.87 cfs 0.939 af Outflow=0.24 cfs 0.865 af
Pond 23P: Stormwater System 2	Peak Elev=137.38' Storage=0.725 af Inflow=3.72 cfs 1.215 af Outflow=0.60 cfs 0.936 af

Total Runoff Area = 34.004 ac Runoff Volume = 6.820 af Average Runoff Depth = 2.41"
50.00% Pervious = 17.002 ac 50.00% Impervious = 17.002 ac

Summary for Subcatchment 8S: Basin 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.36 cfs @ 7.86 hrs, Volume= 0.773 af, Depth= 3.22"

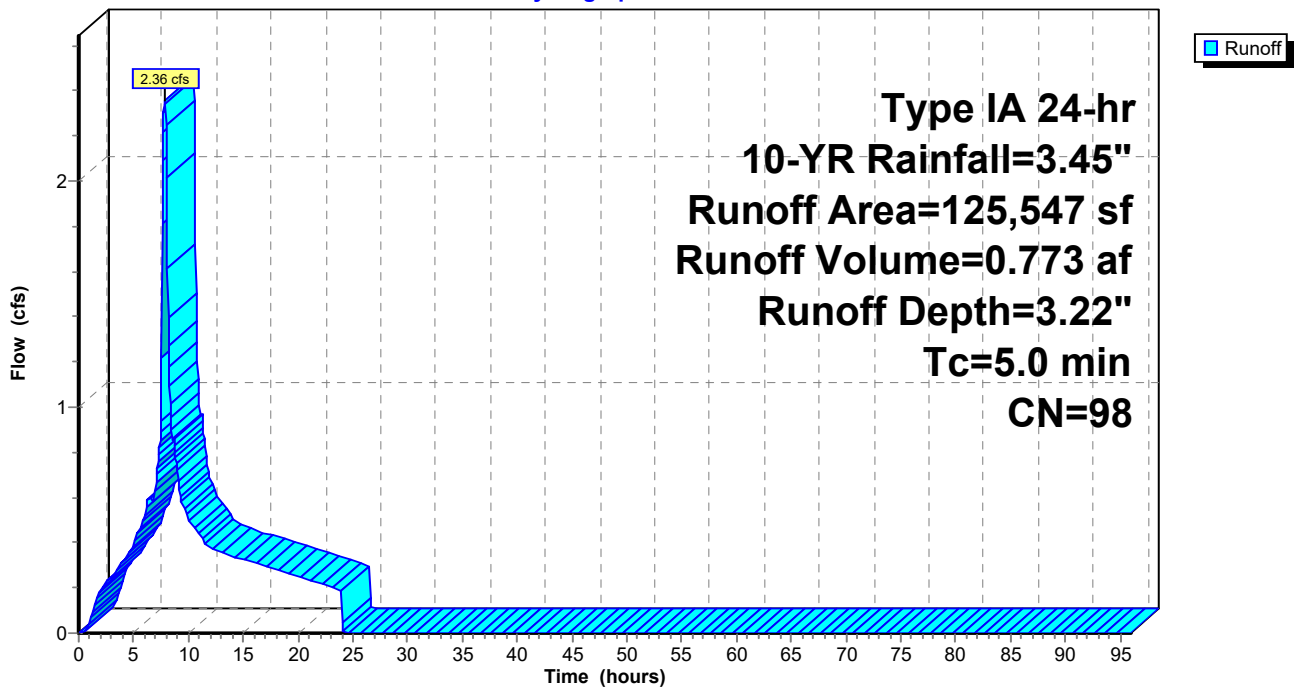
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
* 125,547	98	
125,547		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Basin 1

Hydrograph



Summary for Subcatchment 13S: Basin 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 4.23 cfs @ 7.86 hrs, Volume= 1.381 af, Depth= 3.22"

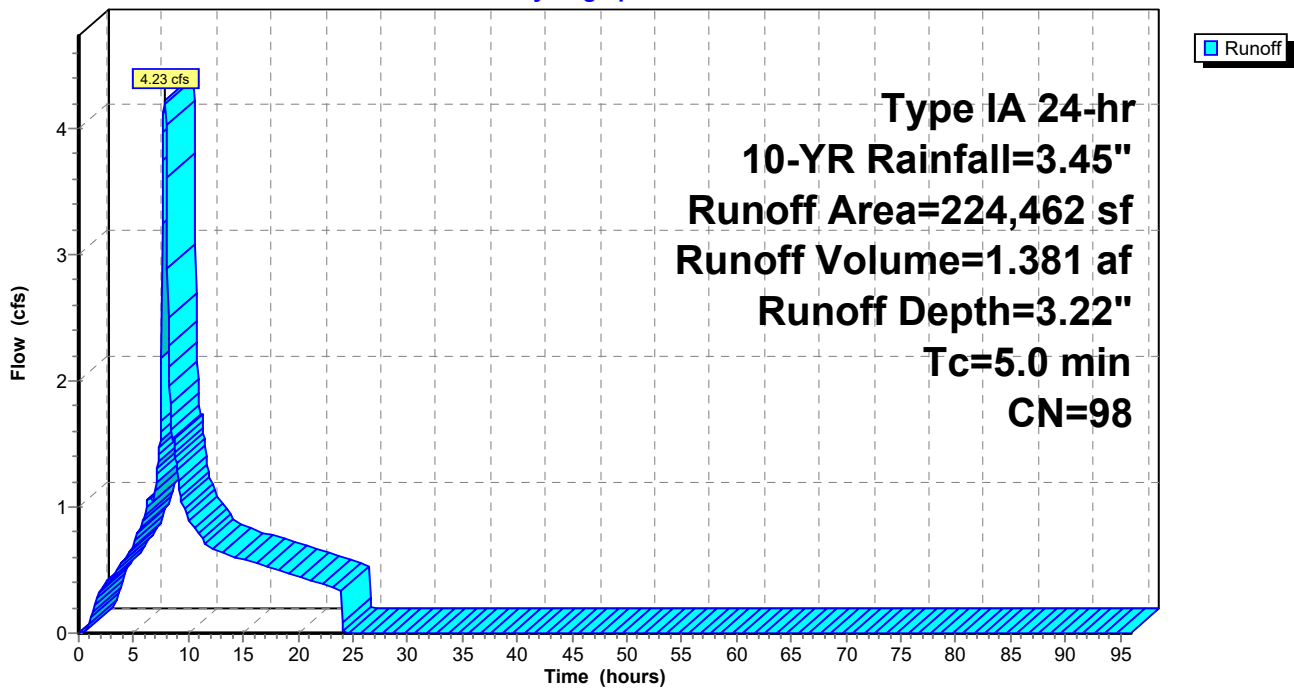
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
* 224,462	98	
224,462		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 13S: Basin 3

Hydrograph



Summary for Subcatchment 15S: Filter Strip Basins

Runoff = 0.76 cfs @ 7.94 hrs, Volume= 0.250 af, Depth= 3.22"

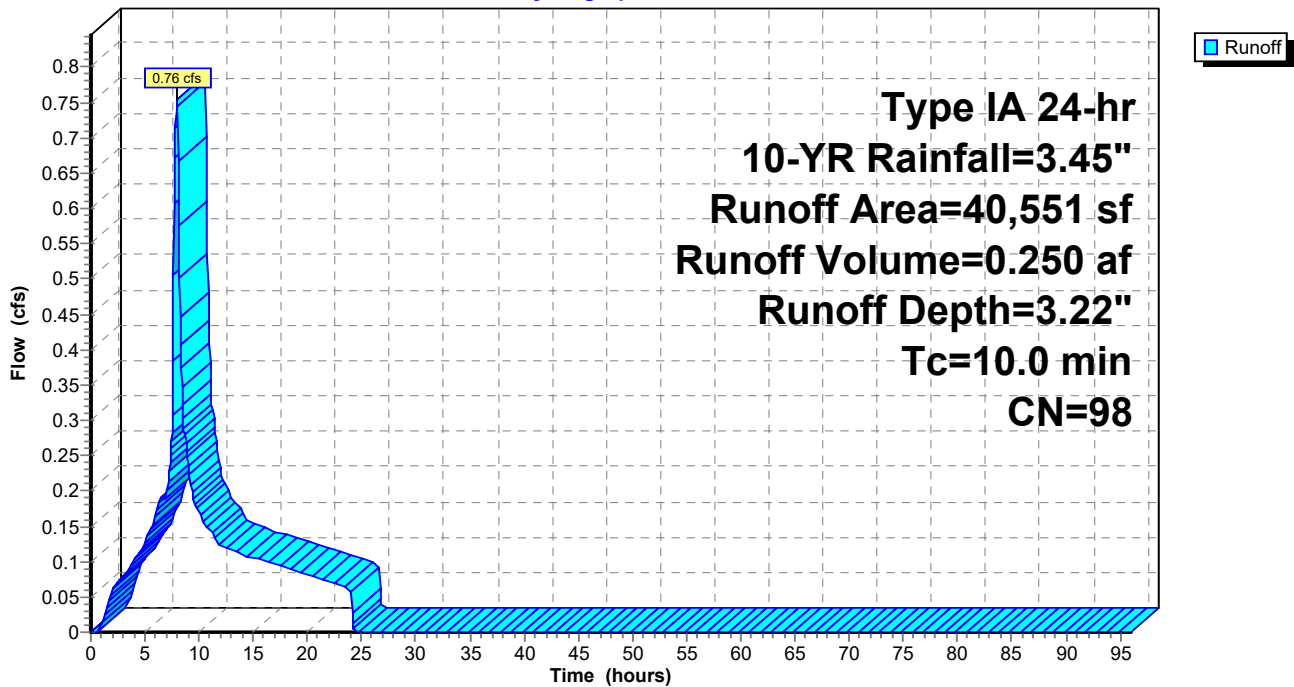
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
* 40,551	98	
40,551		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, 20

Subcatchment 15S: Filter Strip Basins

Hydrograph



Summary for Subcatchment 17S: Pre Total

Runoff = 5.20 cfs @ 8.25 hrs, Volume= 2.262 af, Depth= 1.60"

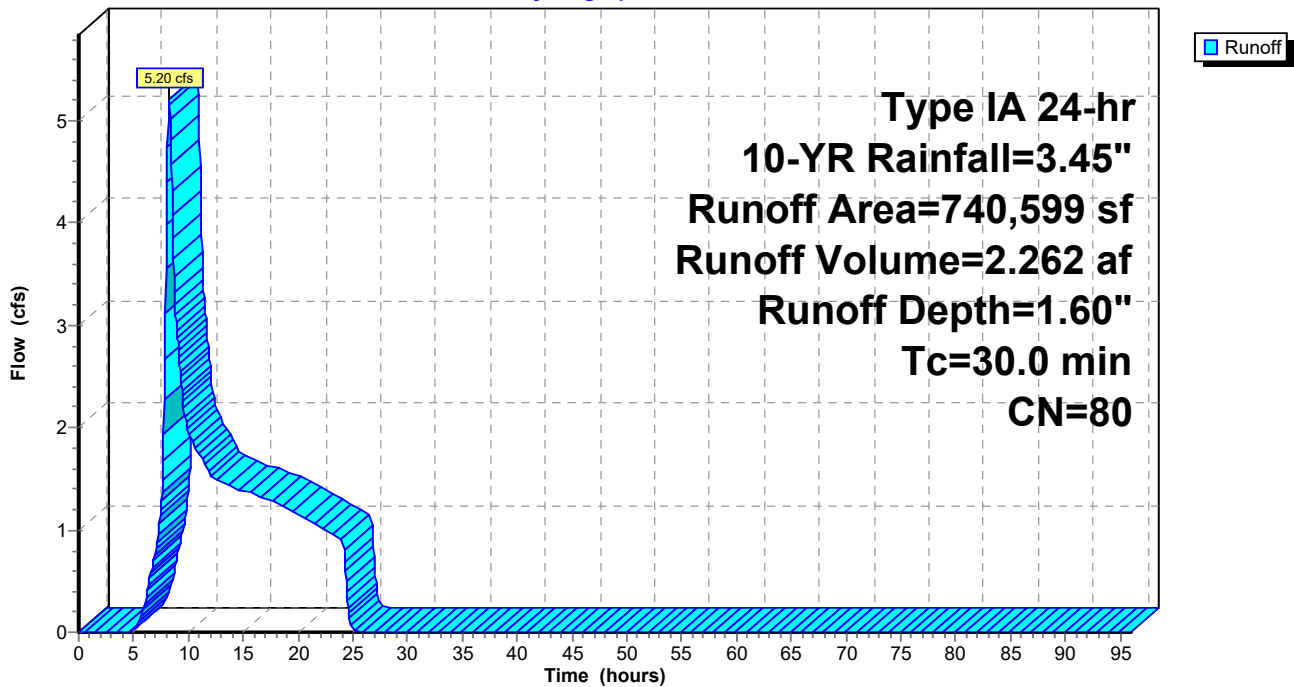
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
740,599	80	>75% Grass cover, Good, HSG D
740,599		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 17S: Pre Total

Hydrograph



Summary for Subcatchment 18S: Basin 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.87 cfs @ 7.86 hrs, Volume= 0.939 af, Depth= 3.22"

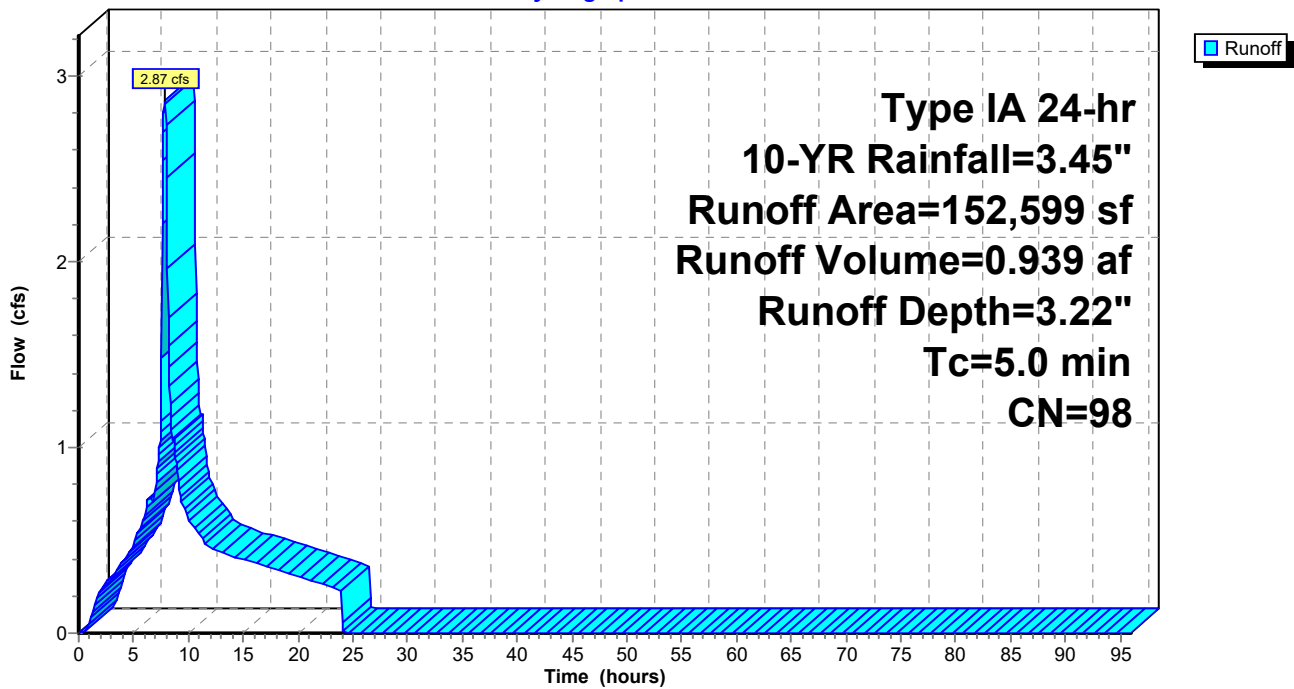
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
* 152,599	98	
152,599		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 18S: Basin 4

Hydrograph



Summary for Subcatchment 19S: Basin 2

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.72 cfs @ 7.86 hrs, Volume= 1.215 af, Depth= 3.22"

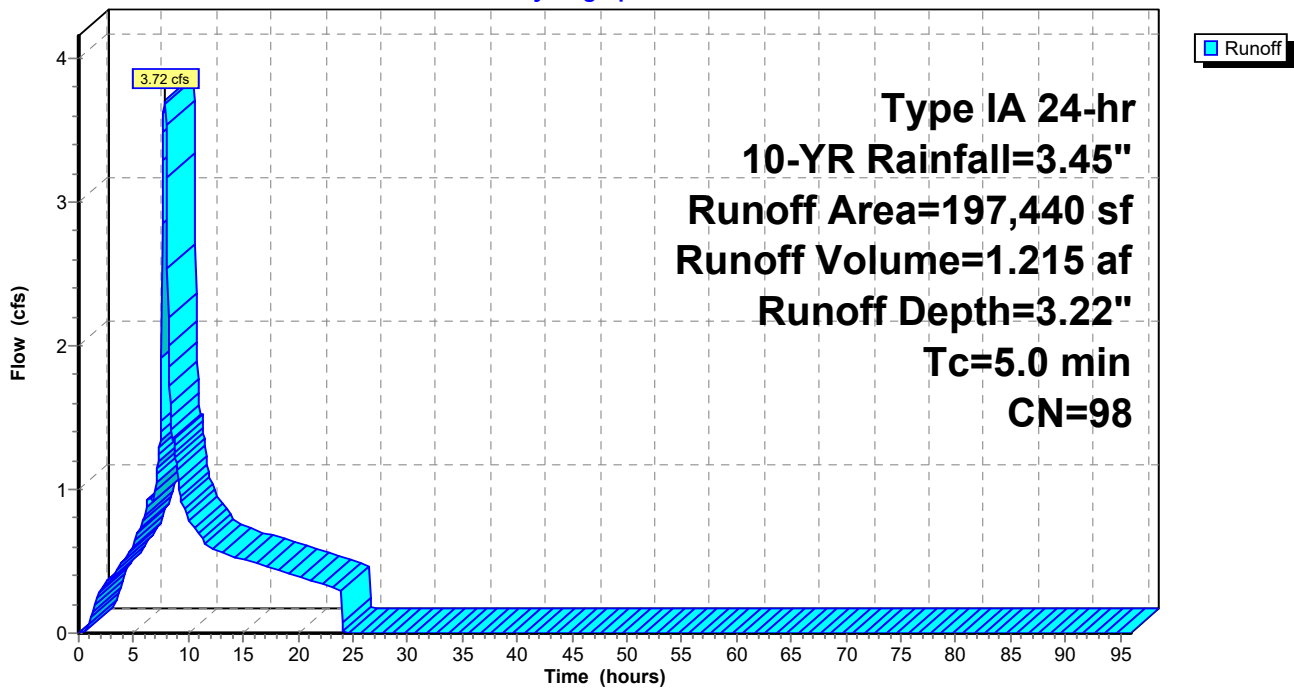
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 10-YR Rainfall=3.45"

Area (sf)	CN	Description
* 197,440	98	
197,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 19S: Basin 2

Hydrograph



Walgraves

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Type IA 24-hr 10-YR Rainfall=3.45"

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Summary for Reach 22R: Offsite Discharge

Reach modeled with shallow side slopes to best mimic the overland flow created at the discharge points.

[81] Warning: Exceeded Pond 14P by 0.50' @ 0.00 hrs

[81] Warning: Exceeded Pond 20P by 0.50' @ 0.00 hrs

Inflow Area =	17.002 ac, 100.00% Impervious, Inflow Depth > 2.92"	for 10-YR event
Inflow =	3.60 cfs @ 8.32 hrs, Volume=	4.140 af
Outflow =	2.99 cfs @ 8.96 hrs, Volume=	4.130 af, Atten= 17%, Lag= 38.1 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs

Max. Velocity= 0.30 fps, Min. Travel Time= 16.5 min

Avg. Velocity = 0.15 fps, Avg. Travel Time= 34.3 min

Peak Storage= 2,960 cf @ 8.68 hrs

Average Depth at Peak Storage= 0.15'

Bank-Full Depth= 0.50' Flow Area= 50.0 sf, Capacity= 29.46 cfs

50.00' x 0.50' deep channel, n= 0.035 High grass

Side Slope Z-value= 100.0 ' / ' Top Width= 150.00'

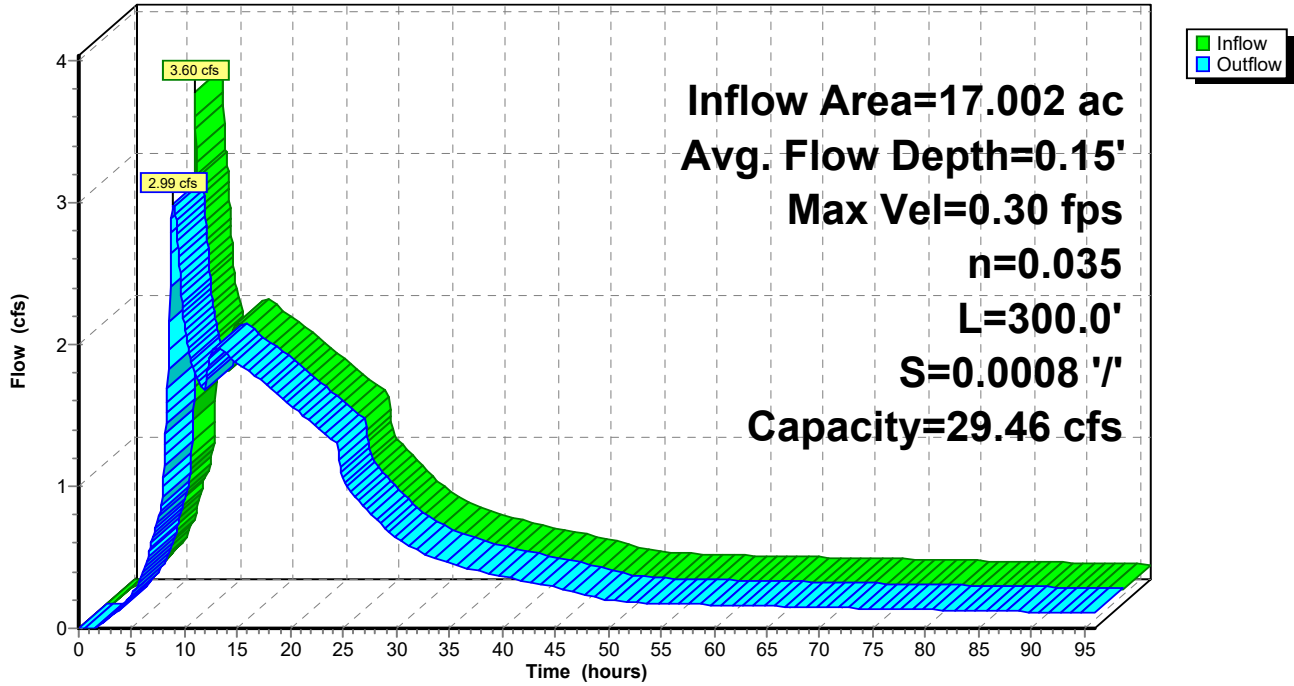
Length= 300.0' Slope= 0.0008 ' / '

Inlet Invert= 133.00', Outlet Invert= 132.75'



Reach 22R: Offsite Discharge

Hydrograph



Summary for Pond 11P: Stormwater System 1

[93] Warning: Storage range exceeded by 0.09'

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=14)

Inflow Area = 2.882 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10-YR event
 Inflow = 2.36 cfs @ 7.86 hrs, Volume= 0.773 af
 Outflow = 1.17 cfs @ 8.32 hrs, Volume= 0.752 af, Atten= 50%, Lag= 27.8 min
 Primary = 1.17 cfs @ 8.32 hrs, Volume= 0.752 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 135.63' @ 8.32 hrs Surf.Area= 0.246 ac Storage= 0.278 af

Plug-Flow detention time= 625.5 min calculated for 0.751 af (97% of inflow)
 Center-of-Mass det. time= 606.8 min (1,269.3 - 662.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.149 af	28.33'W x 377.50'L x 2.04'H Field A 0.501 af Overall - 0.128 af Embedded = 0.373 af x 40.0% Voids
#2A	134.00'	0.128 af	Cultec C-100HD x 400 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 8 rows
		0.278 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.80'	2.5" Vert. Orifice/Grate C= 0.600
#3	Primary	135.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.06 cfs @ 8.32 hrs HW=135.62' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.01 fps)
- 2=Orifice/Grate (Orifice Controls 0.21 cfs @ 6.30 fps)
- 3=Orifice/Grate (Weir Controls 0.84 cfs @ 1.13 fps)

Pond 11P: Stormwater System 1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 8 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

50 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 375.50' Row Length +12.0" End Stone x 2 = 377.50' Base Length

8 Rows x 36.0" Wide + 4.0" Spacing x 7 + 12.0" Side Stone x 2 = 28.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

400 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 8 Rows = 5,591.9 cf Chamber Storage

21,837.3 cf Field - 5,591.9 cf Chambers = 16,245.4 cf Stone x 40.0% Voids = 6,498.2 cf Stone Storage

Chamber Storage + Stone Storage = 12,090.1 cf = 0.278 af

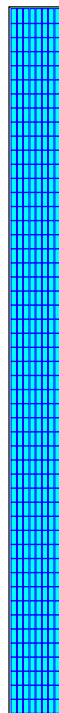
Overall Storage Efficiency = 55.4%

Overall System Size = 377.50' x 28.33' x 2.04'

400 Chambers

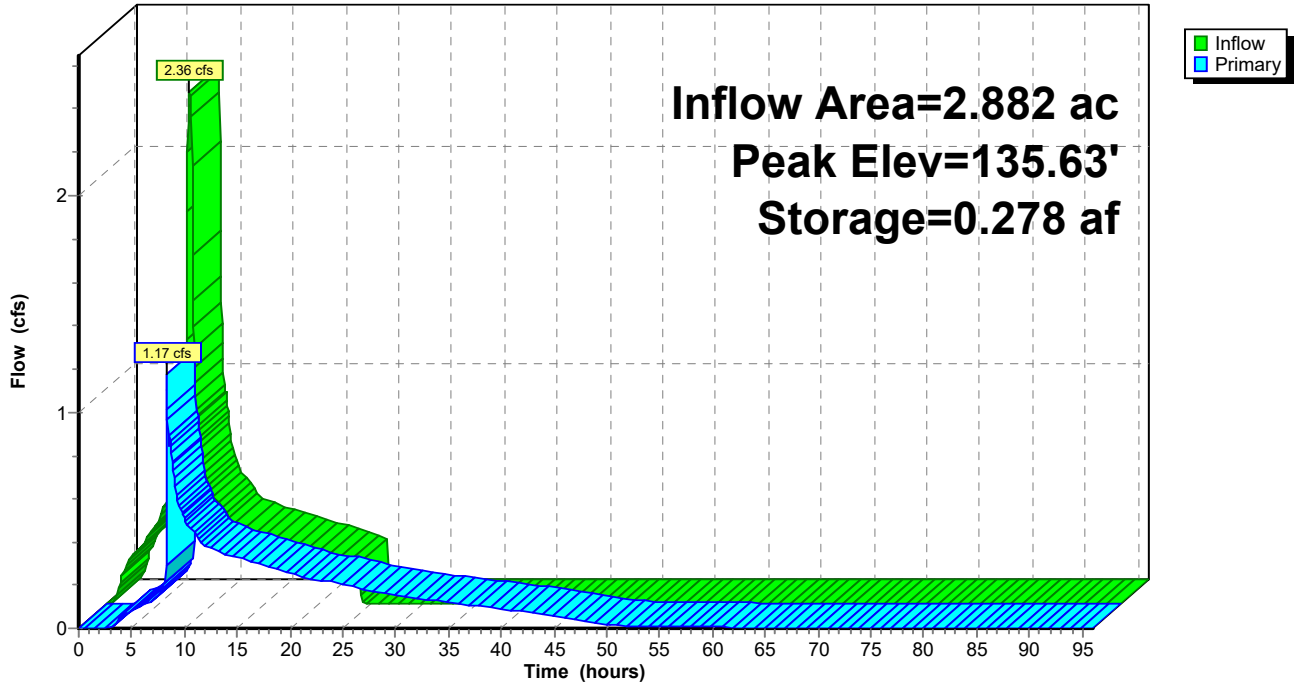
808.8 cy Field

601.7 cy Stone



Pond 11P: Stormwater System 1

Hydrograph



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Type IA 24-hr 10-YR Rainfall=3.45"

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Summary for Pond 14P: Stormwater Sytem 3

Inflow Area = 5.153 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10-YR event
 Inflow = 4.23 cfs @ 7.86 hrs, Volume= 1.381 af
 Outflow = 1.83 cfs @ 8.35 hrs, Volume= 1.338 af, Atten= 57%, Lag= 29.8 min
 Primary = 1.83 cfs @ 8.35 hrs, Volume= 1.338 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 134.44' @ 8.35 hrs Surf.Area= 0.427 ac Storage= 0.470 af

Plug-Flow detention time= 535.6 min calculated for 1.337 af (97% of inflow)
 Center-of-Mass det. time= 513.5 min (1,176.1 - 662.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.257 af	68.33"W x 272.50'L x 2.04'H Field A 0.873 af Overall - 0.231 af Embedded = 0.642 af x 40.0% Voids
#2A	133.00'	0.231 af	Cultec C-100HD x 720 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 20 rows
		0.488 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.05'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	134.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.83 cfs @ 8.35 hrs HW=134.44' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.71 fps)
- 2=Orifice/Grate (Orifice Controls 0.71 cfs @ 5.23 fps)
- 3=Orifice/Grate (Weir Controls 1.08 cfs @ 1.22 fps)

Pond 14P: Stormwater Sytem 3 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 20 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

36 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 270.50' Row Length +12.0" End Stone x 2 = 272.50' Base Length

20 Rows x 36.0" Wide + 4.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

720 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 20 Rows = 10,070.7 cf Chamber Storage

38,017.5 cf Field - 10,070.7 cf Chambers = 27,946.8 cf Stone x 40.0% Voids = 11,178.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,249.4 cf = 0.488 af

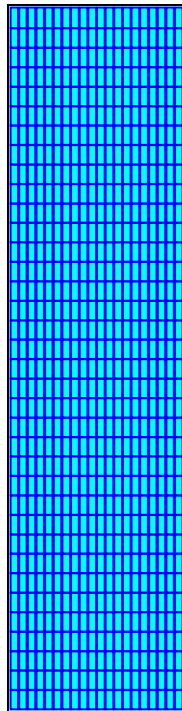
Overall Storage Efficiency = 55.9%

Overall System Size = 272.50' x 68.33' x 2.04'

720 Chambers

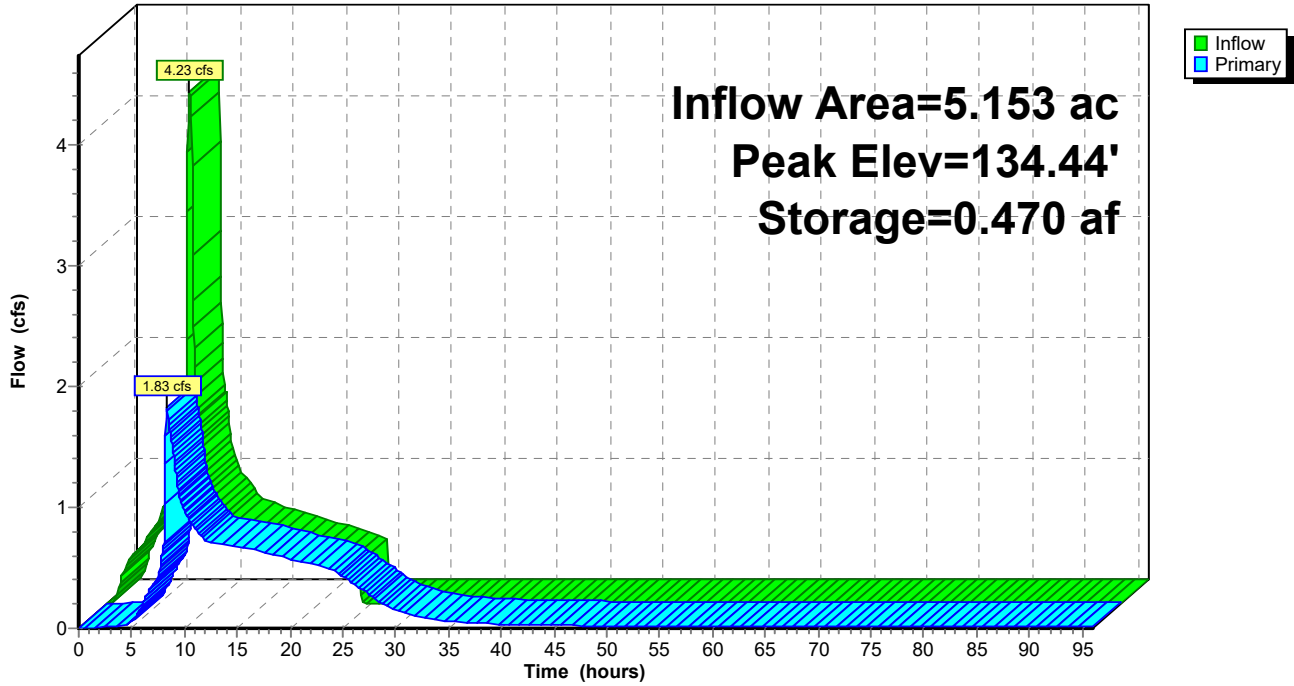
1,408.1 cy Field

1,035.1 cy Stone



Pond 14P: Stormwater Sytem 3

Hydrograph



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Type IA 24-hr 10-YR Rainfall=3.45"

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Summary for Pond 20P: Stormwater System 4

Inflow Area = 3.503 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10-YR event
 Inflow = 2.87 cfs @ 7.86 hrs, Volume= 0.939 af
 Outflow = 0.24 cfs @ 23.57 hrs, Volume= 0.865 af, Atten= 92%, Lag= 942.5 min
 Primary = 0.24 cfs @ 23.57 hrs, Volume= 0.865 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 135.67' @ 23.57 hrs Surf.Area= 0.283 ac Storage= 0.634 af

Plug-Flow detention time= 1,642.1 min calculated for 0.865 af (92% of inflow)
 Center-of-Mass det. time= 1,584.2 min (2,246.8 - 662.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.266 af	30.00'W x 411.50'L x 4.00'H Field A 1.134 af Overall - 0.468 af Embedded = 0.665 af x 40.0% Voids
#2A	133.00'	0.468 af	Cultec R-360HD x 555 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 555 Chambers in 5 Rows Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf
		0.734 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.00'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	136.25'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.24 cfs @ 23.57 hrs HW=135.67' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.11 cfs @ 8.58 fps)
- 2=Orifice/Grate (Orifice Controls 0.13 cfs @ 6.07 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 20P: Stormwater System 4 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length

5 Rows x 60.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 30.00' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

555 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 5 Rows = 20,402.4 cf Chamber Storage

49,380.0 cf Field - 20,402.4 cf Chambers = 28,977.6 cf Stone x 40.0% Voids = 11,591.0 cf Stone Storage

Chamber Storage + Stone Storage = 31,993.4 cf = 0.734 af

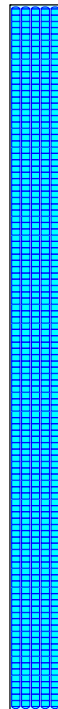
Overall Storage Efficiency = 64.8%

Overall System Size = 411.50' x 30.00' x 4.00'

555 Chambers

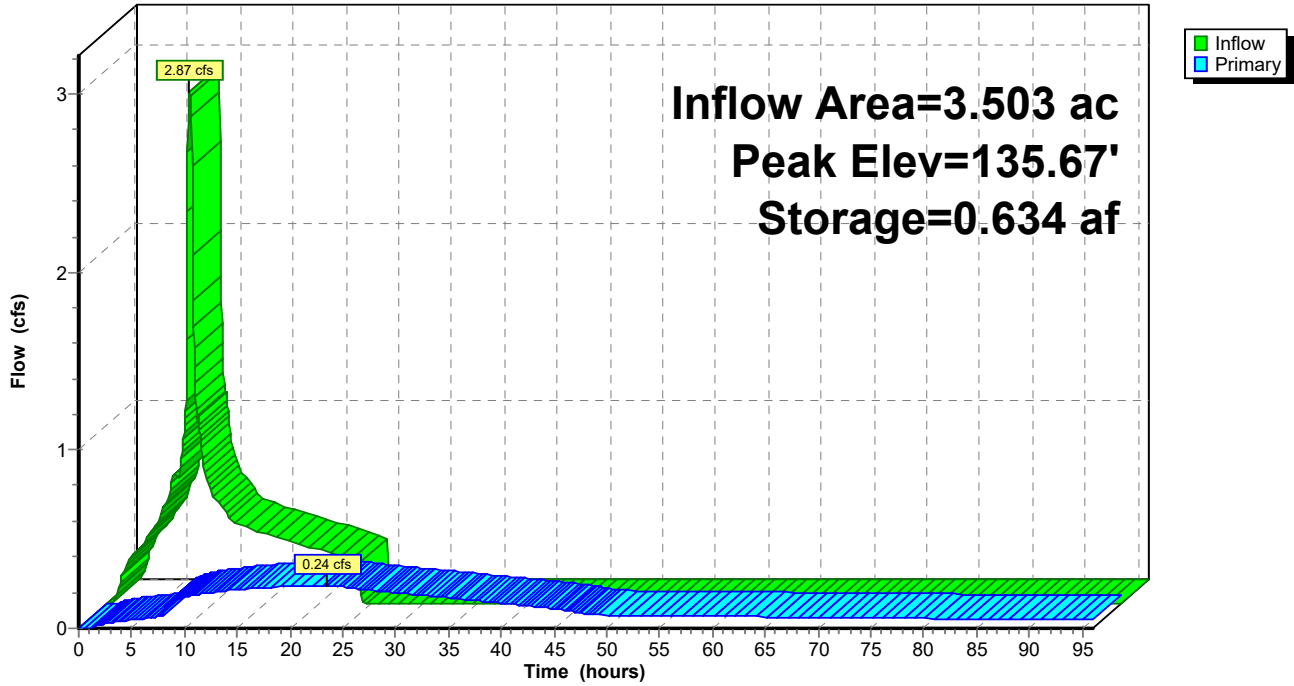
1,828.9 cy Field

1,073.2 cy Stone



Pond 20P: Stormwater System 4

Hydrograph



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Type IA 24-hr 10-YR Rainfall=3.45"

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Summary for Pond 23P: Stormwater System 2

Inflow Area = 4.533 ac, 100.00% Impervious, Inflow Depth = 3.22" for 10-YR event
 Inflow = 3.72 cfs @ 7.86 hrs, Volume= 1.215 af
 Outflow = 0.60 cfs @ 12.56 hrs, Volume= 0.936 af, Atten= 84%, Lag= 282.0 min
 Primary = 0.60 cfs @ 12.56 hrs, Volume= 0.936 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 137.38' @ 12.56 hrs Surf.Area= 0.284 ac Storage= 0.725 af

Plug-Flow detention time= 1,563.1 min calculated for 0.936 af (77% of inflow)
 Center-of-Mass det. time= 1,412.8 min (2,075.3 - 662.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.265 af	41.50"W x 297.83'L x 4.00'H Field A 1.135 af Overall - 0.473 af Embedded = 0.662 af x 40.0% Voids
#2A	134.00'	0.473 af	Cultec R-360HD x 560 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 560 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		0.738 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.50'	1.5" Vert. Orifice/Grate C= 0.600
#3	Primary	137.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.60 cfs @ 12.56 hrs HW=137.38' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.49 fps)
- 2=Orifice/Grate (Orifice Controls 0.10 cfs @ 8.09 fps)
- 3=Orifice/Grate (Weir Controls 0.48 cfs @ 0.94 fps)

Pond 23P: Stormwater System 2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

80 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 295.83' Row Length +12.0" End Stone x 2 = 297.83' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

560 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 20,611.5 cf Chamber Storage

49,440.3 cf Field - 20,611.5 cf Chambers = 28,828.9 cf Stone x 40.0% Voids = 11,531.6 cf Stone Storage

Chamber Storage + Stone Storage = 32,143.0 cf = 0.738 af

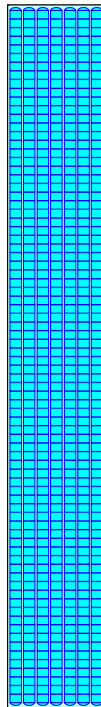
Overall Storage Efficiency = 65.0%

Overall System Size = 297.83' x 41.50' x 4.00'

560 Chambers

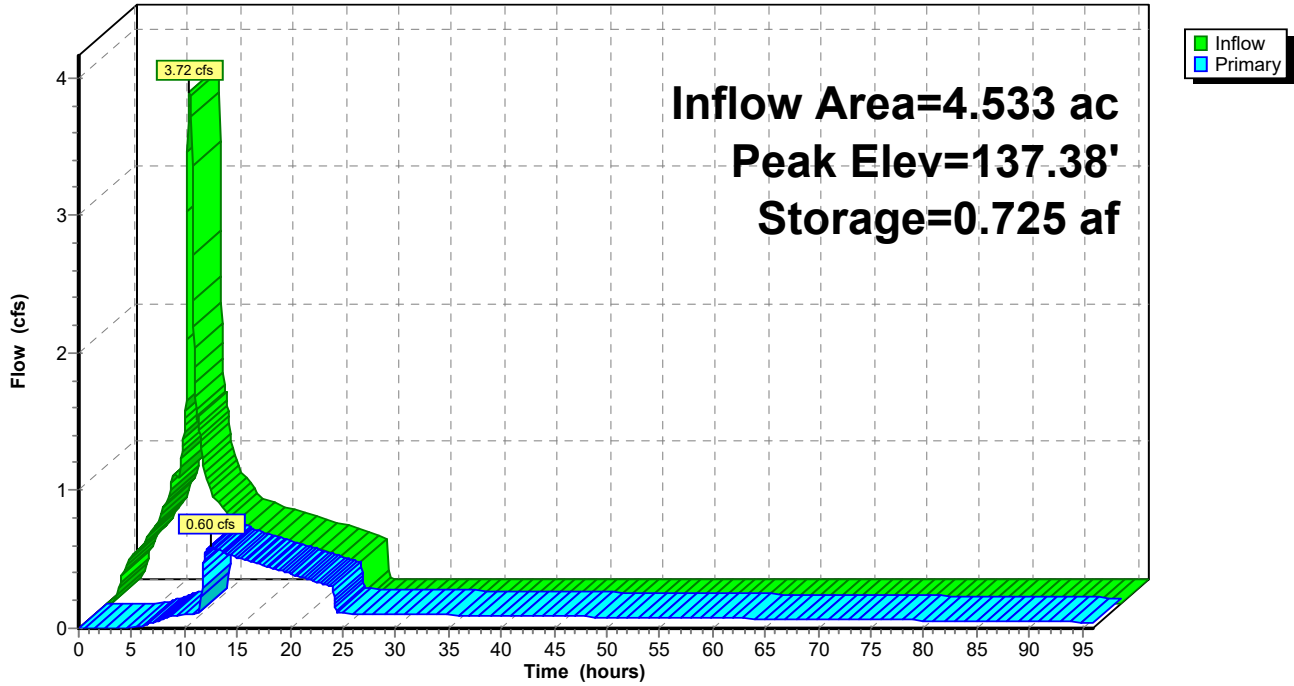
1,831.1 cy Field

1,067.7 cy Stone



Pond 23P: Stormwater System 2

Hydrograph



Walgraves

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Type IA 24-hr 25-YR Rainfall=3.90"

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8S: Basin 1	Runoff Area=125,547 sf 100.00% Impervious Runoff Depth=3.67" Tc=5.0 min CN=98 Runoff=2.68 cfs 0.880 af
Subcatchment13S: Basin 3	Runoff Area=224,462 sf 100.00% Impervious Runoff Depth=3.67" Tc=5.0 min CN=98 Runoff=4.80 cfs 1.574 af
Subcatchment15S: Filter Strip Basins	Runoff Area=40,551 sf 100.00% Impervious Runoff Depth=3.67" Tc=10.0 min CN=98 Runoff=0.86 cfs 0.284 af
Subcatchment17S: Pre Total	Runoff Area=740,599 sf 0.00% Impervious Runoff Depth=1.96" Tc=30.0 min CN=80 Runoff=6.63 cfs 2.776 af
Subcatchment18S: Basin 4	Runoff Area=152,599 sf 100.00% Impervious Runoff Depth=3.67" Tc=5.0 min CN=98 Runoff=3.26 cfs 1.070 af
Subcatchment19S: Basin 2	Runoff Area=197,440 sf 100.00% Impervious Runoff Depth=3.67" Tc=5.0 min CN=98 Runoff=4.22 cfs 1.384 af
Reach 22R: Offsite Discharge	Avg. Flow Depth=0.20' Max Vel=0.35 fps Inflow=7.59 cfs 4.762 af n=0.035 L=300.0' S=0.0008 '/' Capacity=29.46 cfs Outflow=4.93 cfs 4.752 af
Pond 11P: Stormwater System 1	Peak Elev=135.80' Storage=0.278 af Inflow=2.68 cfs 0.880 af Outflow=3.51 cfs 0.859 af
Pond 14P: Stormwater System 3	Peak Elev=134.58' Storage=0.488 af Inflow=4.80 cfs 1.574 af Outflow=3.83 cfs 1.530 af
Pond 20P: Stormwater System 4	Peak Elev=136.27' Storage=0.708 af Inflow=3.26 cfs 1.070 af Outflow=0.34 cfs 0.983 af
Pond 23P: Stormwater System 2	Peak Elev=137.41' Storage=0.727 af Inflow=4.22 cfs 1.384 af Outflow=0.85 cfs 1.106 af

Total Runoff Area = 34.004 ac Runoff Volume = 7.969 af Average Runoff Depth = 2.81"
50.00% Pervious = 17.002 ac 50.00% Impervious = 17.002 ac

Summary for Subcatchment 8S: Basin 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 2.68 cfs @ 7.86 hrs, Volume= 0.880 af, Depth= 3.67"

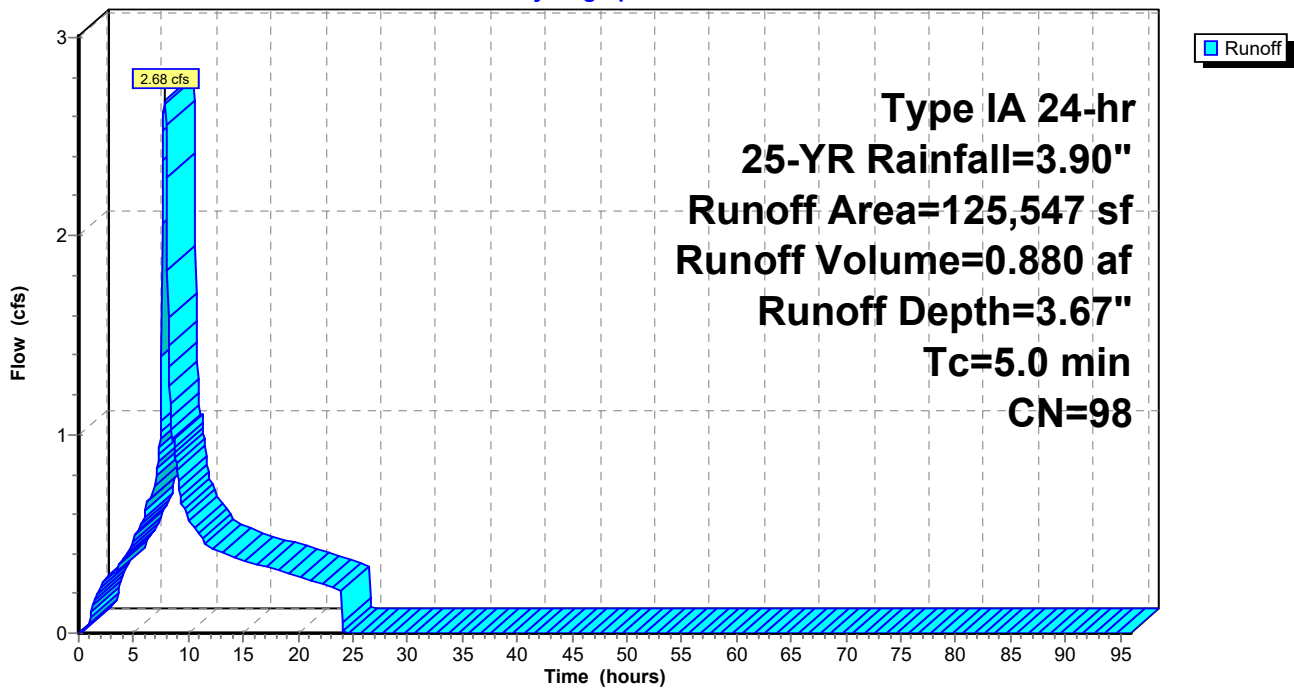
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
* 125,547	98	
125,547		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Basin 1

Hydrograph



Summary for Subcatchment 13S: Basin 3

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.80 cfs @ 7.86 hrs, Volume= 1.574 af, Depth= 3.67"

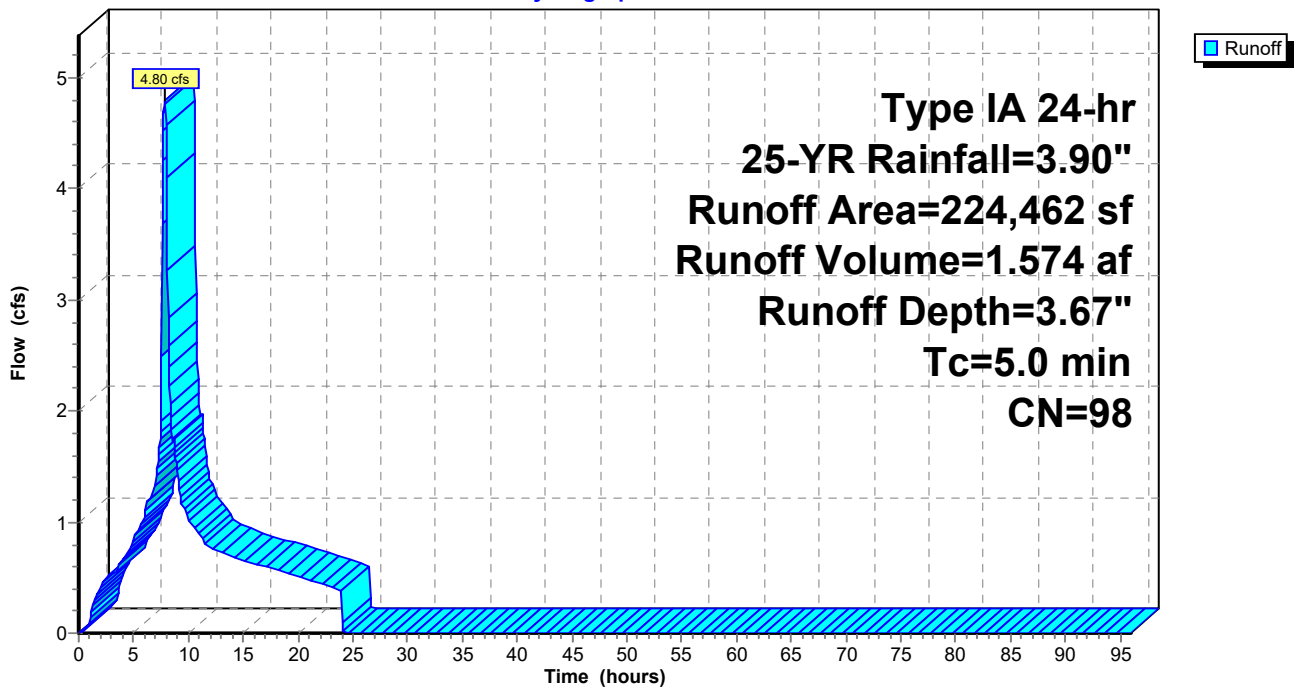
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
* 224,462	98	
224,462		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 13S: Basin 3

Hydrograph



Summary for Subcatchment 15S: Filter Strip Basins

Runoff = 0.86 cfs @ 7.94 hrs, Volume= 0.284 af, Depth= 3.67"

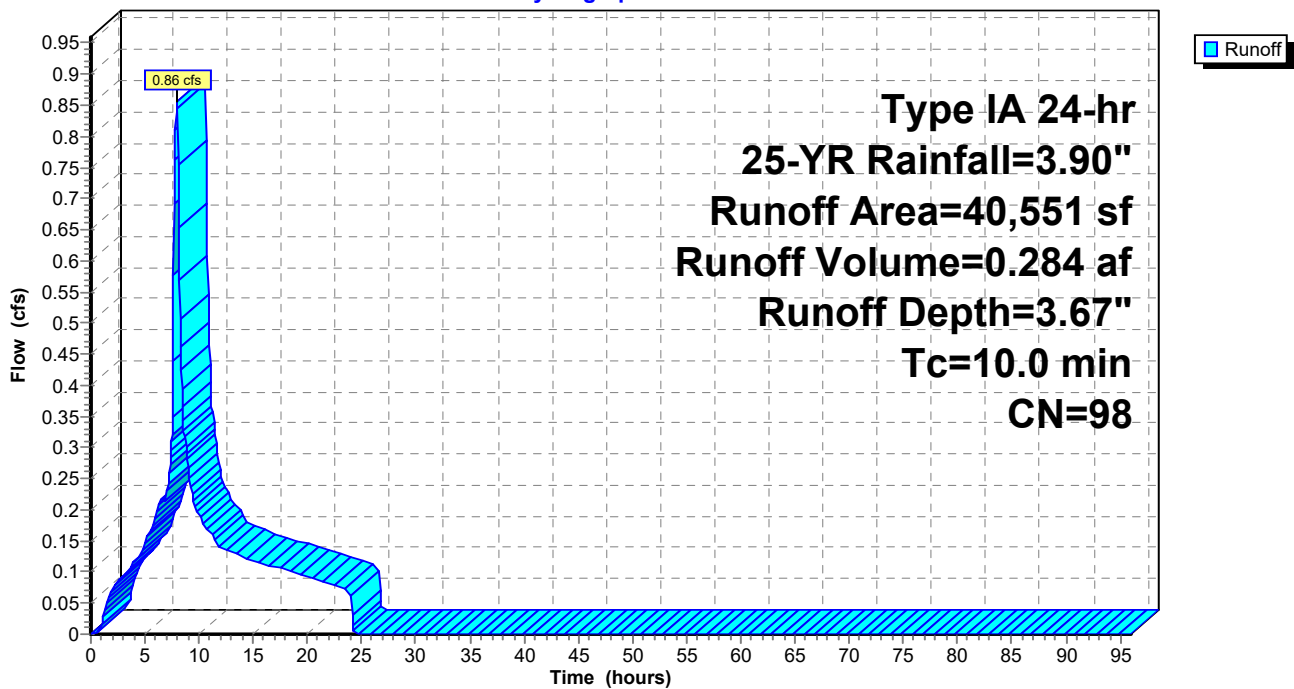
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
* 40,551	98	
40,551		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, 20

Subcatchment 15S: Filter Strip Basins

Hydrograph



Summary for Subcatchment 17S: Pre Total

Runoff = 6.63 cfs @ 8.24 hrs, Volume= 2.776 af, Depth= 1.96"

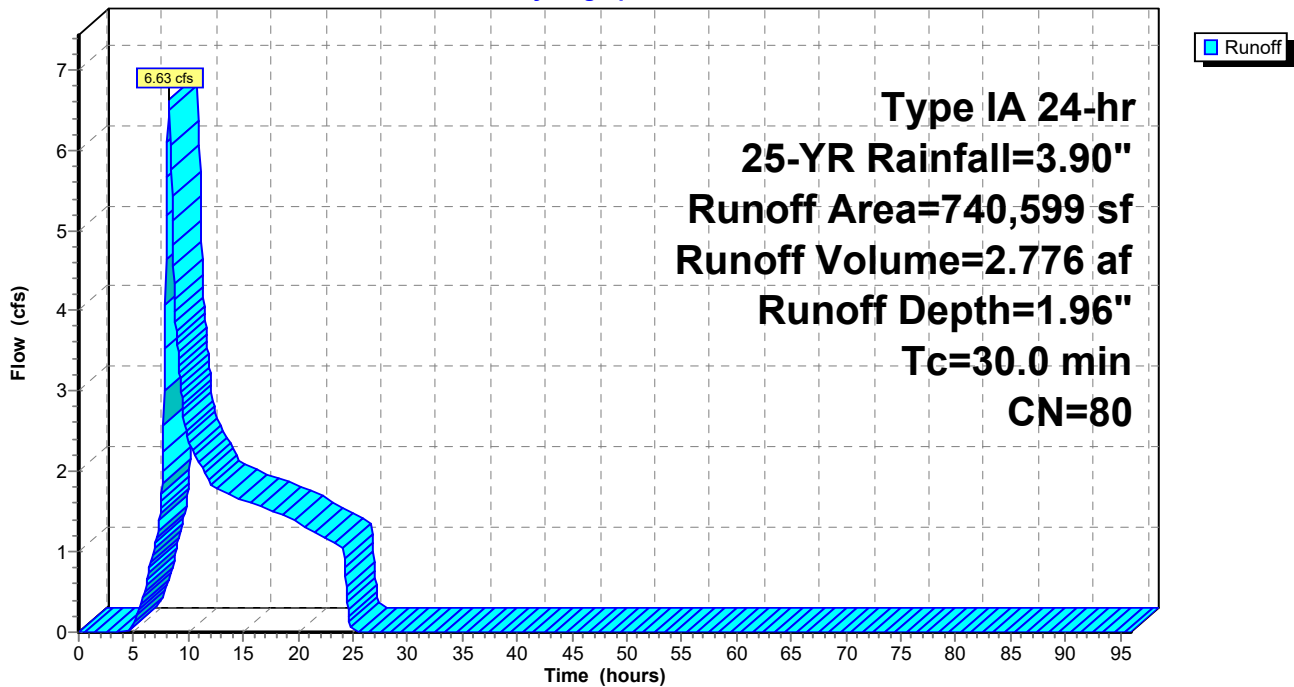
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
740,599	80	>75% Grass cover, Good, HSG D
740,599		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 17S: Pre Total

Hydrograph



Summary for Subcatchment 18S: Basin 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.26 cfs @ 7.86 hrs, Volume= 1.070 af, Depth= 3.67"

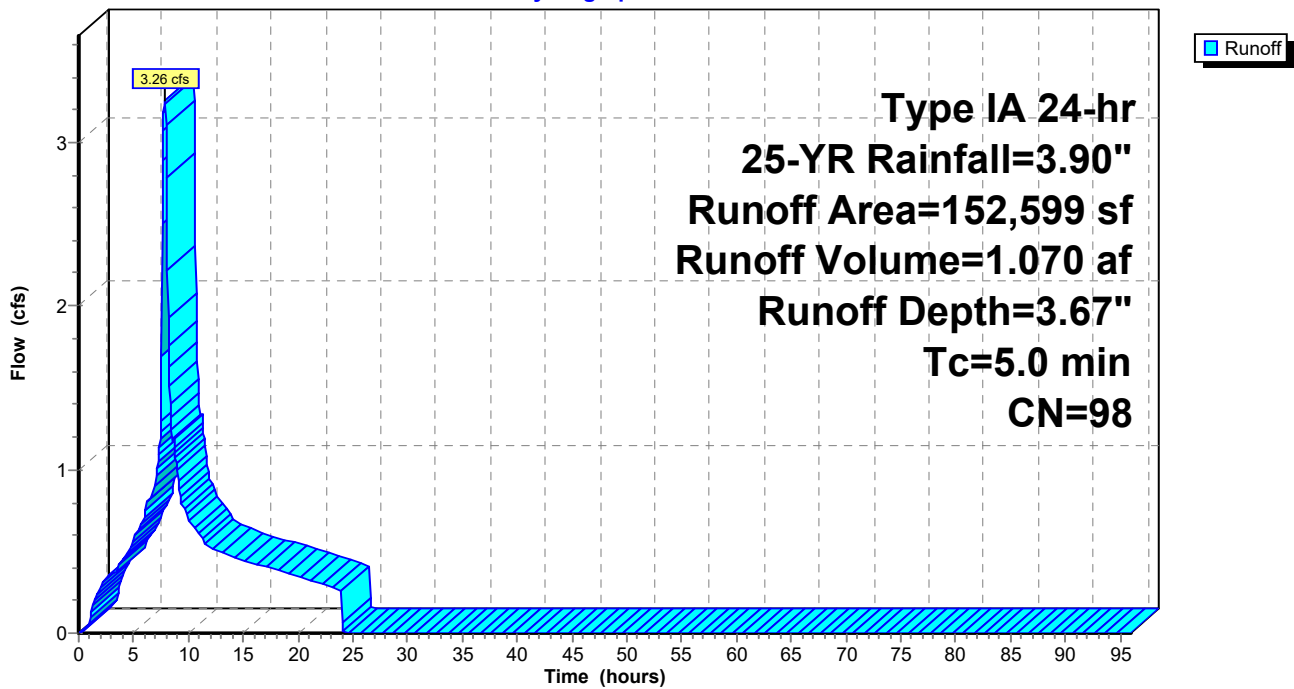
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
* 152,599	98	
152,599		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 18S: Basin 4

Hydrograph



Summary for Subcatchment 19S: Basin 2

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.22 cfs @ 7.86 hrs, Volume= 1.384 af, Depth= 3.67"

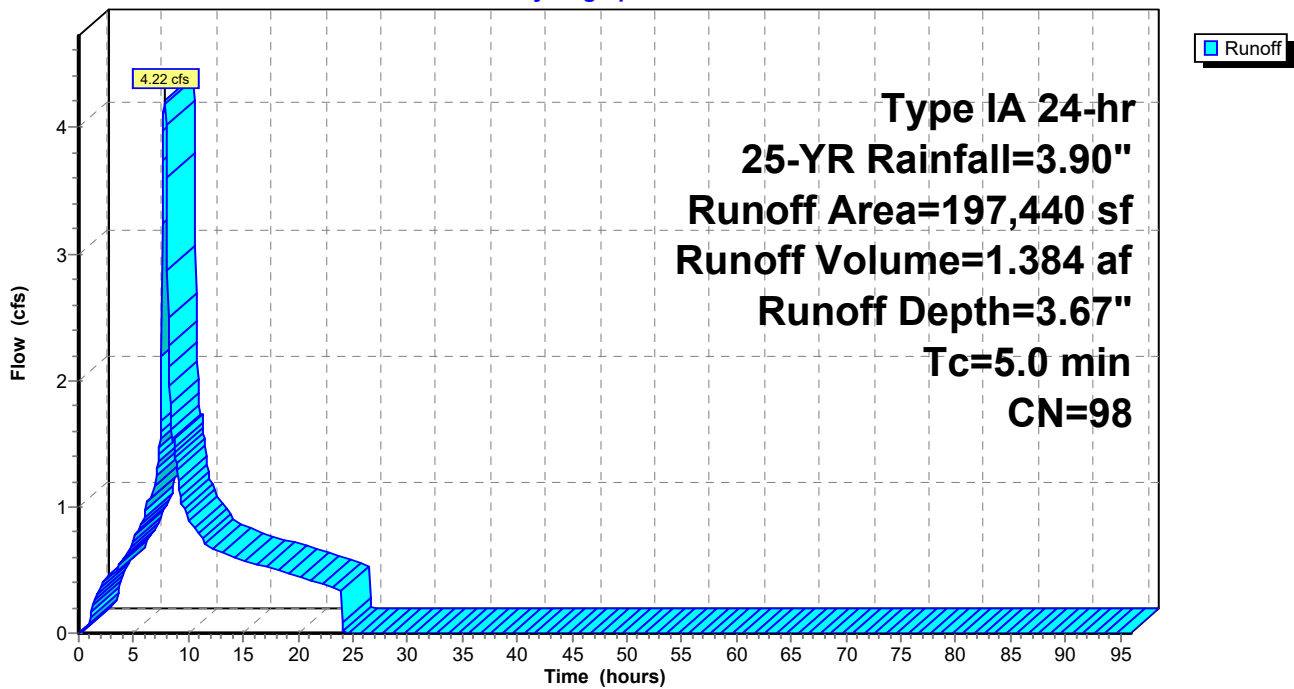
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 25-YR Rainfall=3.90"

Area (sf)	CN	Description
* 197,440	98	
197,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 19S: Basin 2

Hydrograph



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 25-YR Rainfall=3.90"

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Summary for Reach 22R: Offsite Discharge

Reach modeled with shallow side slopes to best mimic the overland flow created at the discharge points.

[81] Warning: Exceeded Pond 14P by 0.50' @ 0.00 hrs

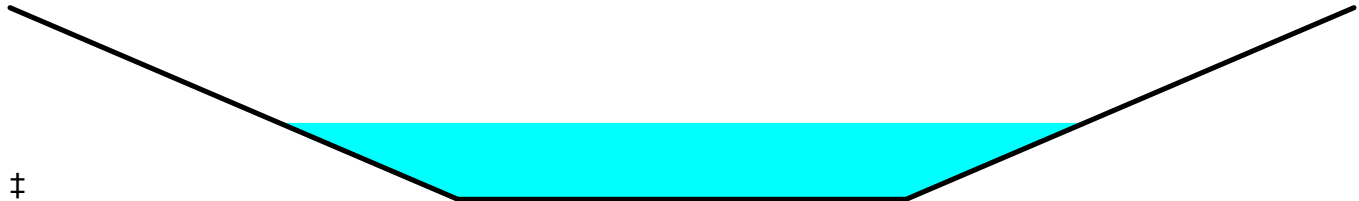
[81] Warning: Exceeded Pond 20P by 0.50' @ 0.00 hrs

Inflow Area = 17.002 ac, 100.00% Impervious, Inflow Depth > 3.36" for 25-YR event
Inflow = 7.59 cfs @ 8.10 hrs, Volume= 4.762 af
Outflow = 4.93 cfs @ 8.49 hrs, Volume= 4.752 af, Atten= 35%, Lag= 23.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.35 fps, Min. Travel Time= 14.1 min
Avg. Velocity = 0.15 fps, Avg. Travel Time= 33.2 min

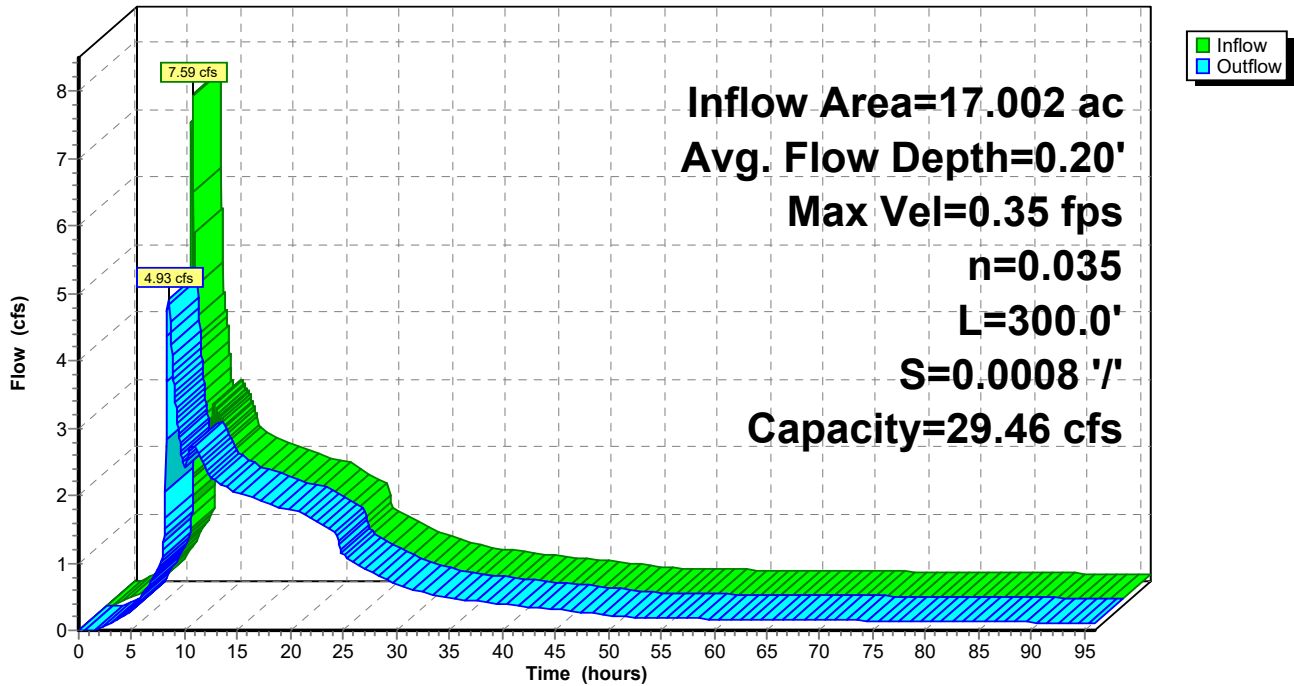
Peak Storage= 4,185 cf @ 8.25 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 0.50' Flow Area= 50.0 sf, Capacity= 29.46 cfs

50.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 100.0 ' / ' Top Width= 150.00'
Length= 300.0' Slope= 0.0008 ' / '
Inlet Invert= 133.00', Outlet Invert= 132.75'



Reach 22R: Offsite Discharge

Hydrograph



Summary for Pond 11P: Stormwater System 1

[93] Warning: Storage range exceeded by 0.26'

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=44)

Inflow Area = 2.882 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25-YR event
 Inflow = 2.68 cfs @ 7.86 hrs, Volume= 0.880 af
 Outflow = 3.51 cfs @ 8.01 hrs, Volume= 0.859 af, Atten= 0%, Lag= 9.0 min
 Primary = 3.51 cfs @ 8.01 hrs, Volume= 0.859 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 135.80' @ 8.01 hrs Surf.Area= 0.246 ac Storage= 0.278 af

Plug-Flow detention time= 556.0 min calculated for 0.859 af (98% of inflow)
 Center-of-Mass det. time= 539.7 min (1,199.1 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.149 af	28.33"W x 377.50'L x 2.04'H Field A 0.501 af Overall - 0.128 af Embedded = 0.373 af x 40.0% Voids
#2A	134.00'	0.128 af	Cultec C-100HD x 400 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 8 rows
		0.278 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.80'	2.5" Vert. Orifice/Grate C= 0.600
#3	Primary	135.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.23 cfs @ 8.01 hrs HW=135.78' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.27 fps)
- 2=Orifice/Grate (Orifice Controls 0.22 cfs @ 6.59 fps)
- 3=Orifice/Grate (Weir Controls 2.99 cfs @ 1.72 fps)

Pond 11P: Stormwater System 1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 8 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

50 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 375.50' Row Length +12.0" End Stone x 2 = 377.50' Base Length

8 Rows x 36.0" Wide + 4.0" Spacing x 7 + 12.0" Side Stone x 2 = 28.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

400 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 8 Rows = 5,591.9 cf Chamber Storage

21,837.3 cf Field - 5,591.9 cf Chambers = 16,245.4 cf Stone x 40.0% Voids = 6,498.2 cf Stone Storage

Chamber Storage + Stone Storage = 12,090.1 cf = 0.278 af

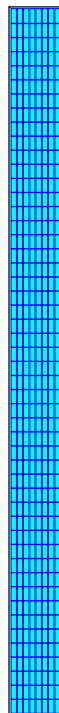
Overall Storage Efficiency = 55.4%

Overall System Size = 377.50' x 28.33' x 2.04'

400 Chambers

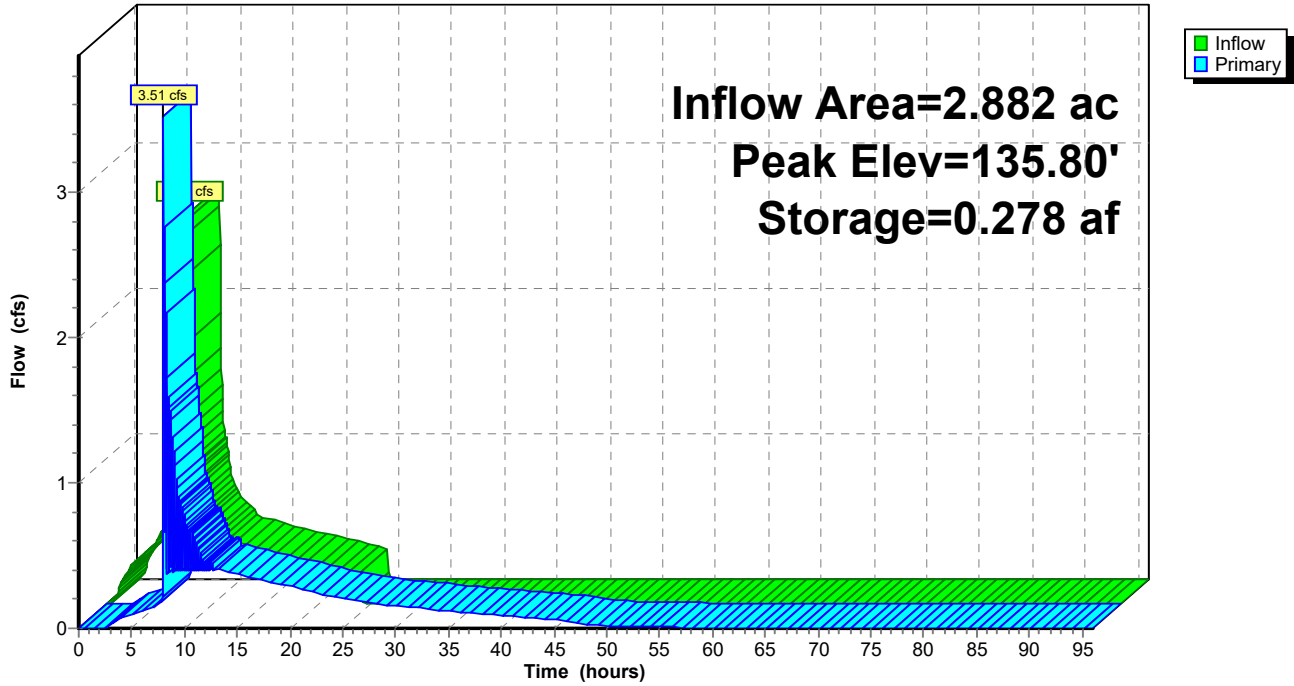
808.8 cy Field

601.7 cy Stone



Pond 11P: Stormwater System 1

Hydrograph



Summary for Pond 14P: Stormwater Sytem 3

[93] Warning: Storage range exceeded by 0.04'

Inflow Area = 5.153 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25-YR event
 Inflow = 4.80 cfs @ 7.86 hrs, Volume= 1.574 af
 Outflow = 3.83 cfs @ 8.10 hrs, Volume= 1.530 af, Atten= 20%, Lag= 14.6 min
 Primary = 3.83 cfs @ 8.10 hrs, Volume= 1.530 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 134.58' @ 8.10 hrs Surf.Area= 0.427 ac Storage= 0.488 af

Plug-Flow detention time= 488.8 min calculated for 1.529 af (97% of inflow)
 Center-of-Mass det. time= 469.3 min (1,128.7 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.257 af	68.33"W x 272.50'L x 2.04'H Field A 0.873 af Overall - 0.231 af Embedded = 0.642 af x 40.0% Voids
#2A	133.00'	0.231 af	Cultec C-100HD x 720 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 20 rows
		0.488 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.05'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	134.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=3.81 cfs @ 8.10 hrs HW=134.58' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.04 cfs @ 6.94 fps)
- 2=Orifice/Grate (Orifice Controls 0.75 cfs @ 5.53 fps)
- 3=Orifice/Grate (Weir Controls 3.02 cfs @ 1.73 fps)

Pond 14P: Stormwater Sytem 3 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 20 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

36 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 270.50' Row Length +12.0" End Stone x 2 = 272.50' Base Length

20 Rows x 36.0" Wide + 4.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

720 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 20 Rows = 10,070.7 cf Chamber Storage

38,017.5 cf Field - 10,070.7 cf Chambers = 27,946.8 cf Stone x 40.0% Voids = 11,178.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,249.4 cf = 0.488 af

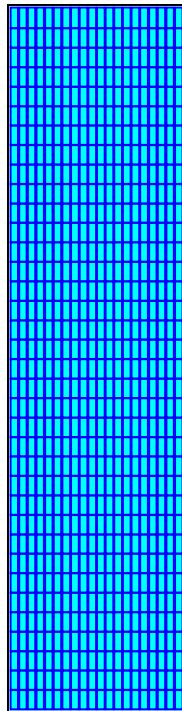
Overall Storage Efficiency = 55.9%

Overall System Size = 272.50' x 68.33' x 2.04'

720 Chambers

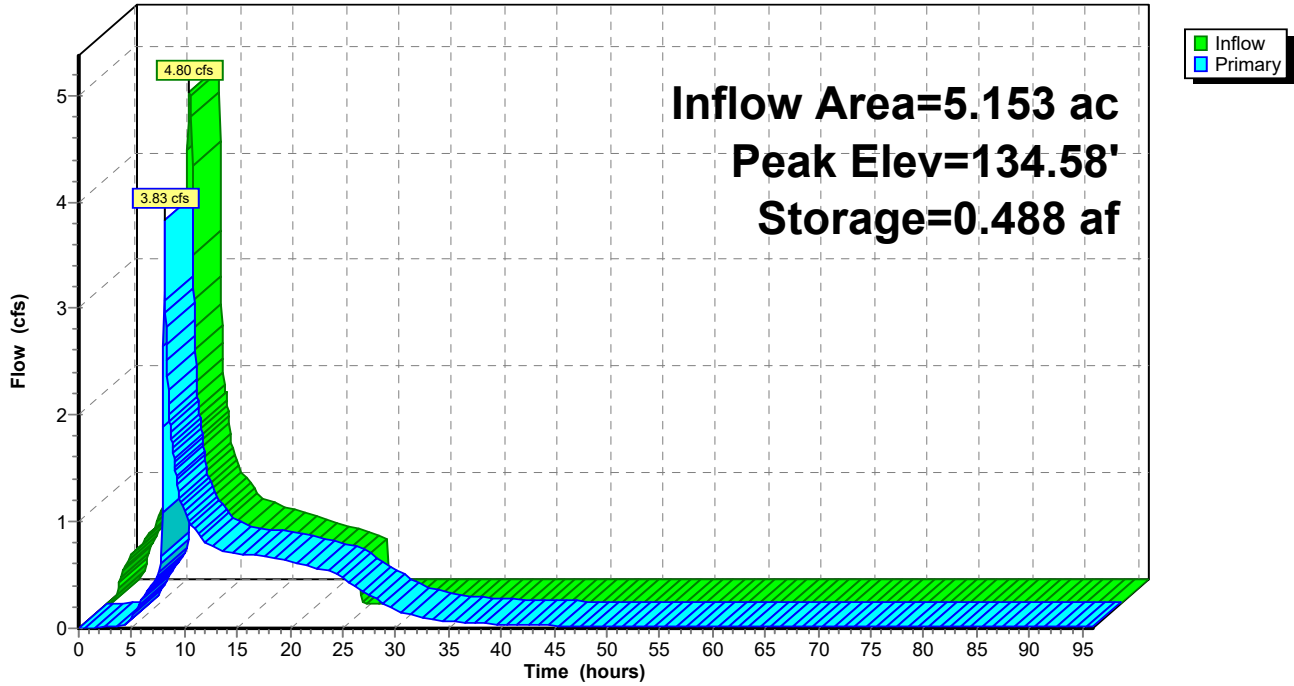
1,408.1 cy Field

1,035.1 cy Stone



Pond 14P: Stormwater Sytem 3

Hydrograph



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 25-YR Rainfall=3.90"

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Summary for Pond 20P: Stormwater System 4

Inflow Area = 3.503 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25-YR event
Inflow = 3.26 cfs @ 7.86 hrs, Volume= 1.070 af
Outflow = 0.34 cfs @ 20.10 hrs, Volume= 0.983 af, Atten= 90%, Lag= 734.6 min
Primary = 0.34 cfs @ 20.10 hrs, Volume= 0.983 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 136.27' @ 20.10 hrs Surf.Area= 0.283 ac Storage= 0.708 af

Plug-Flow detention time= 1,593.3 min calculated for 0.983 af (92% of inflow)
Center-of-Mass det. time= 1,533.5 min (2,193.0 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.266 af	30.00'W x 411.50'L x 4.00'H Field A 1.134 af Overall - 0.468 af Embedded = 0.665 af x 40.0% Voids
#2A	133.00'	0.468 af	Cultec R-360HD x 555 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 555 Chambers in 5 Rows Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf
		0.734 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.00'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	136.25'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.33 cfs @ 20.10 hrs HW=136.27' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.11 cfs @ 9.35 fps)
- 2=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.12 fps)
- 3=Orifice/Grate (Weir Controls 0.06 cfs @ 0.46 fps)

Pond 20P: Stormwater System 4 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length

5 Rows x 60.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 30.00' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

555 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 5 Rows = 20,402.4 cf Chamber Storage

49,380.0 cf Field - 20,402.4 cf Chambers = 28,977.6 cf Stone x 40.0% Voids = 11,591.0 cf Stone Storage

Chamber Storage + Stone Storage = 31,993.4 cf = 0.734 af

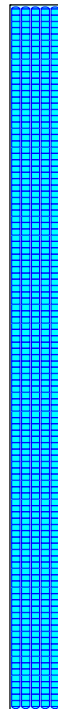
Overall Storage Efficiency = 64.8%

Overall System Size = 411.50' x 30.00' x 4.00'

555 Chambers

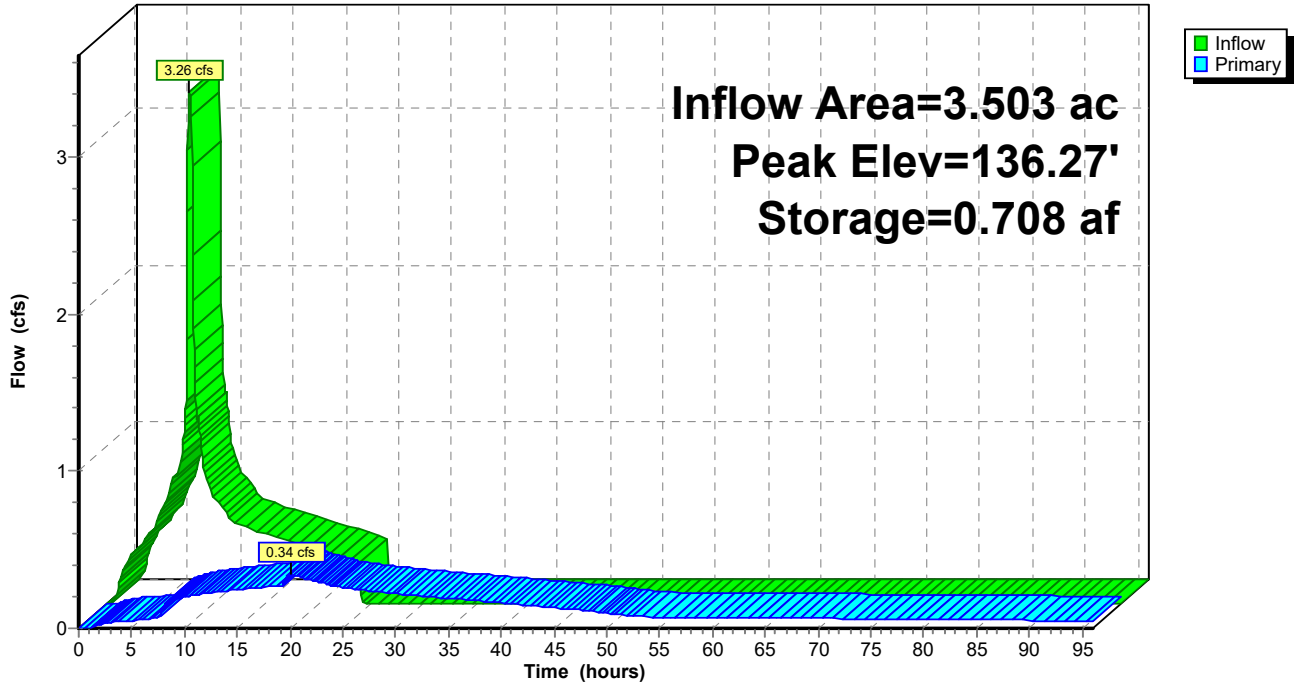
1,828.9 cy Field

1,073.2 cy Stone



Pond 20P: Stormwater System 4

Hydrograph



Walgraves

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Type IA 24-hr 25-YR Rainfall=3.90"

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Summary for Pond 23P: Stormwater System 2

Inflow Area = 4.533 ac, 100.00% Impervious, Inflow Depth = 3.67" for 25-YR event
Inflow = 4.22 cfs @ 7.86 hrs, Volume= 1.384 af
Outflow = 0.85 cfs @ 10.32 hrs, Volume= 1.106 af, Atten= 80%, Lag= 148.1 min
Primary = 0.85 cfs @ 10.32 hrs, Volume= 1.106 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 137.41' @ 10.32 hrs Surf.Area= 0.284 ac Storage= 0.727 af

Plug-Flow detention time= 1,351.2 min calculated for 1.105 af (80% of inflow)
Center-of-Mass det. time= 1,217.9 min (1,877.4 - 659.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.265 af	41.50'W x 297.83'L x 4.00'H Field A 1.135 af Overall - 0.473 af Embedded = 0.662 af x 40.0% Voids
#2A	134.00'	0.473 af	Cultec R-360HD x 560 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 560 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		0.738 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.50'	1.5" Vert. Orifice/Grate C= 0.600
#3	Primary	137.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.84 cfs @ 10.32 hrs HW=137.41' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.52 fps)

2=Orifice/Grate (Orifice Controls 0.10 cfs @ 8.12 fps)

3=Orifice/Grate (Weir Controls 0.73 cfs @ 1.07 fps)

Pond 23P: Stormwater System 2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

80 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 295.83' Row Length +12.0" End Stone x 2 = 297.83' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

560 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 20,611.5 cf Chamber Storage

49,440.3 cf Field - 20,611.5 cf Chambers = 28,828.9 cf Stone x 40.0% Voids = 11,531.6 cf Stone Storage

Chamber Storage + Stone Storage = 32,143.0 cf = 0.738 af

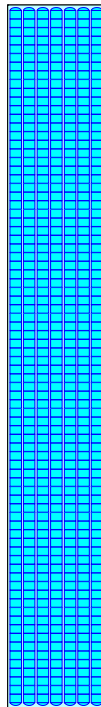
Overall Storage Efficiency = 65.0%

Overall System Size = 297.83' x 41.50' x 4.00'

560 Chambers

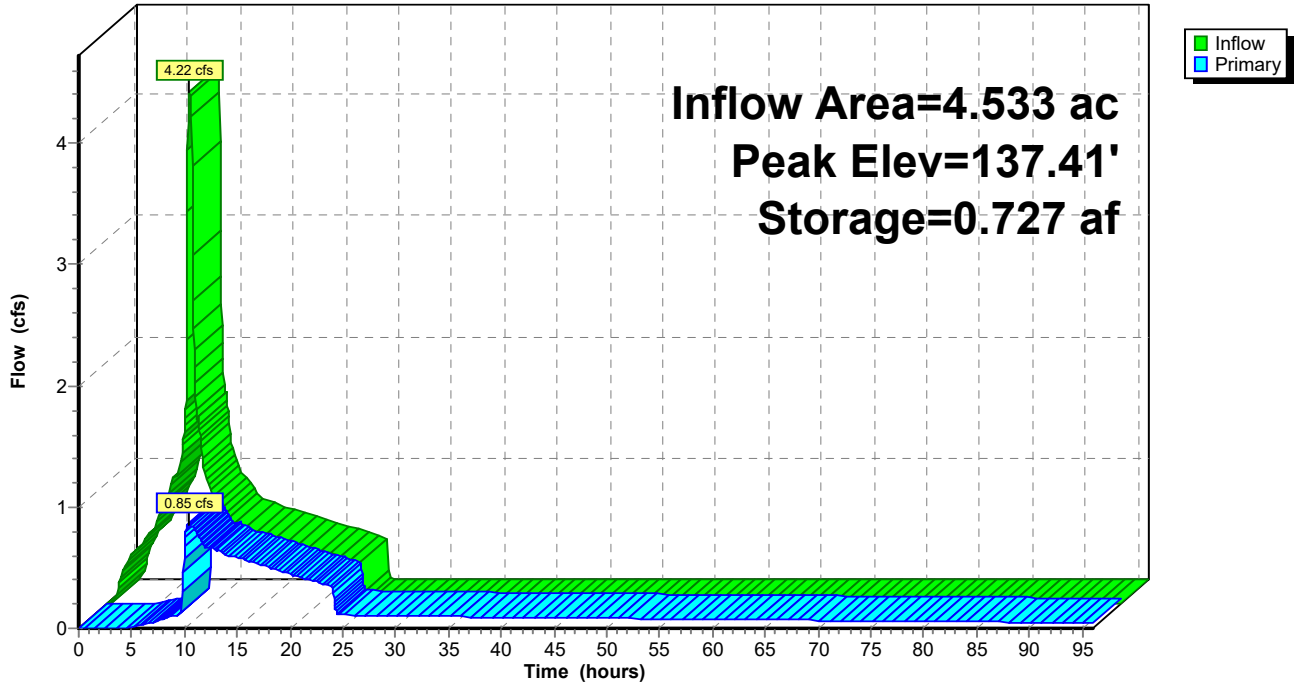
1,831.1 cy Field

1,067.7 cy Stone



Pond 23P: Stormwater System 2

Hydrograph



Walgraves

Prepared by AAI Engineering

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Type IA 24-hr 100-YR Rainfall=4.50"

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8S: Basin 1	Runoff Area=125,547 sf 100.00% Impervious Runoff Depth=4.26" Tc=5.0 min CN=98 Runoff=3.11 cfs 1.024 af
Subcatchment13S: Basin 3	Runoff Area=224,462 sf 100.00% Impervious Runoff Depth=4.26" Tc=5.0 min CN=98 Runoff=5.56 cfs 1.831 af
Subcatchment15S: Filter Strip Basins	Runoff Area=40,551 sf 100.00% Impervious Runoff Depth=4.26" Tc=10.0 min CN=98 Runoff=0.99 cfs 0.331 af
Subcatchment17S: Pre Total	Runoff Area=740,599 sf 0.00% Impervious Runoff Depth=2.46" Tc=30.0 min CN=80 Runoff=8.63 cfs 3.488 af
Subcatchment18S: Basin 4	Runoff Area=152,599 sf 100.00% Impervious Runoff Depth=4.26" Tc=5.0 min CN=98 Runoff=3.78 cfs 1.245 af
Subcatchment19S: Basin 2	Runoff Area=197,440 sf 100.00% Impervious Runoff Depth=4.26" Tc=5.0 min CN=98 Runoff=4.89 cfs 1.611 af
Reach 22R: Offsite Discharge	Avg. Flow Depth=0.26' Max Vel=0.41 fps Inflow=11.91 cfs 5.609 af n=0.035 L=300.0' S=0.0008 '/' Capacity=29.46 cfs Outflow=8.01 cfs 5.599 af
Pond 11P: Stormwater System 1	Peak Elev=135.88' Storage=0.278 af Inflow=3.11 cfs 1.024 af Outflow=5.08 cfs 1.003 af
Pond 14P: Stormwater System 3	Peak Elev=134.68' Storage=0.488 af Inflow=5.56 cfs 1.831 af Outflow=5.61 cfs 1.786 af
Pond 20P: Stormwater System 4	Peak Elev=136.31' Storage=0.713 af Inflow=3.78 cfs 1.245 af Outflow=0.57 cfs 1.157 af
Pond 23P: Stormwater System 2	Peak Elev=137.46' Storage=0.734 af Inflow=4.89 cfs 1.611 af Outflow=1.49 cfs 1.332 af

Total Runoff Area = 34.004 ac Runoff Volume = 9.529 af Average Runoff Depth = 3.36"
50.00% Pervious = 17.002 ac 50.00% Impervious = 17.002 ac

Summary for Subcatchment 8S: Basin 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.11 cfs @ 7.85 hrs, Volume= 1.024 af, Depth= 4.26"

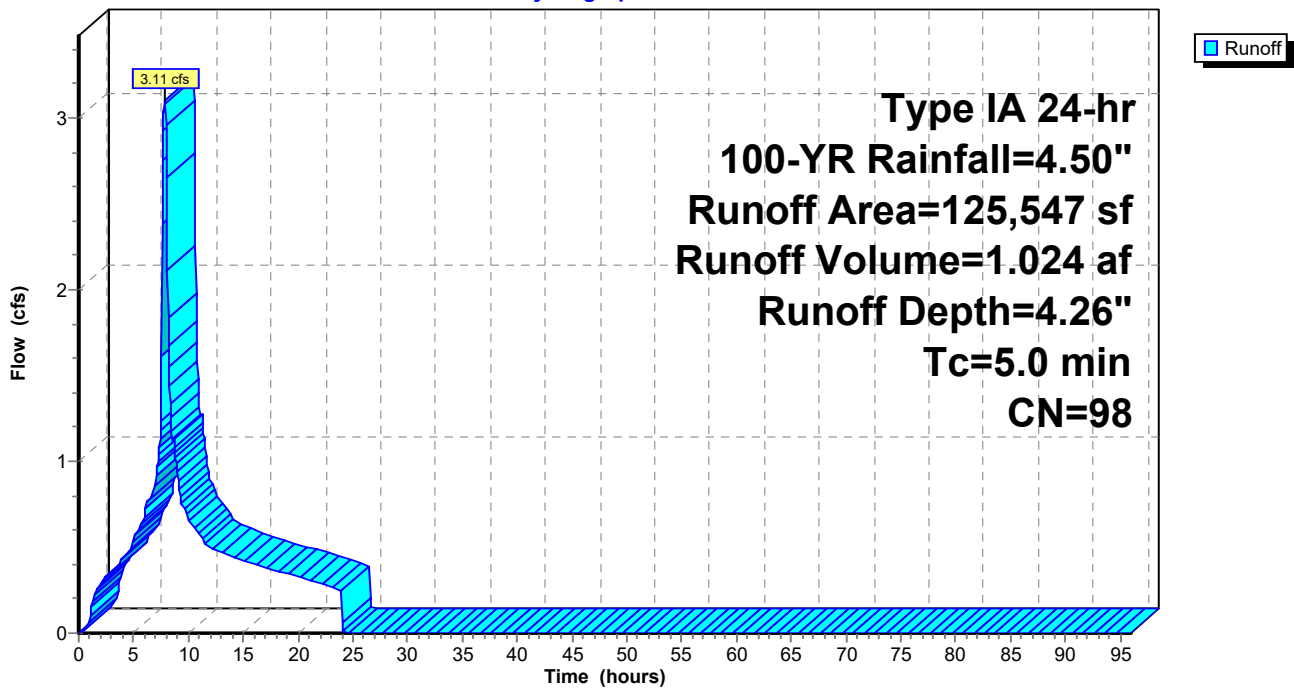
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
* 125,547	98	
125,547		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Basin 1

Hydrograph



Summary for Subcatchment 13S: Basin 3

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 5.56 cfs @ 7.85 hrs, Volume= 1.831 af, Depth= 4.26"

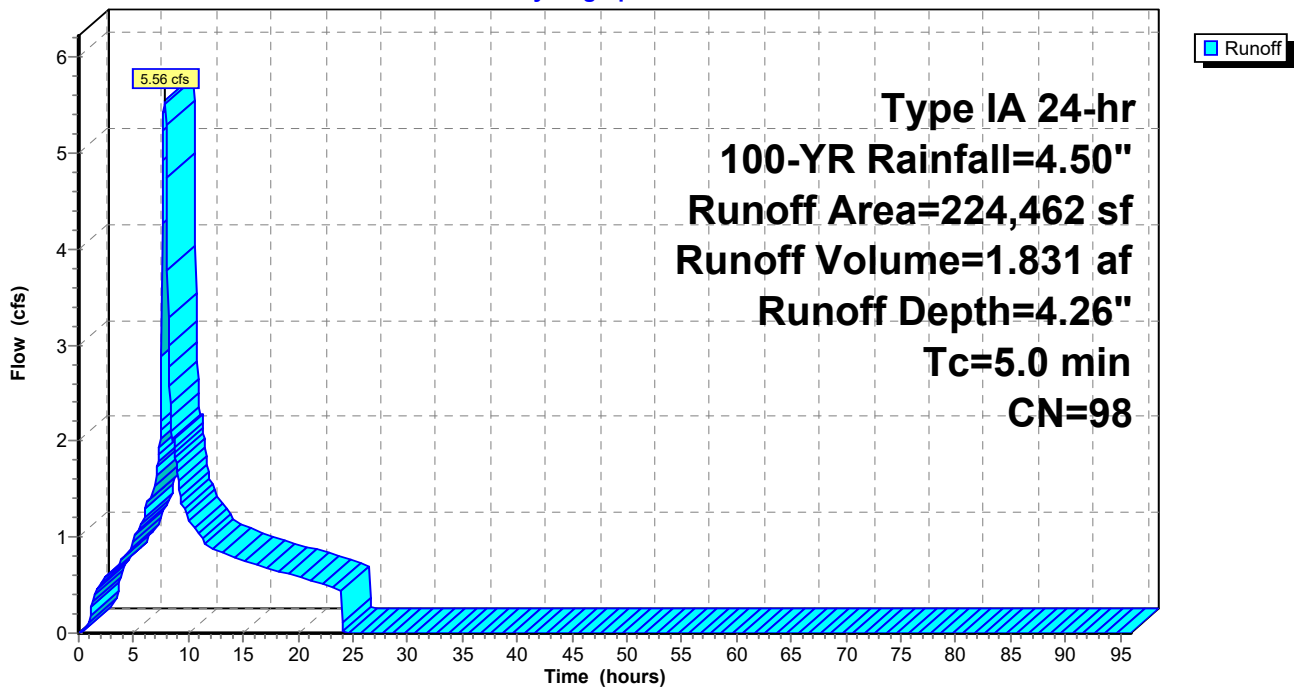
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
* 224,462	98	
224,462		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 13S: Basin 3

Hydrograph



Summary for Subcatchment 15S: Filter Strip Basins

Runoff = 0.99 cfs @ 7.94 hrs, Volume= 0.331 af, Depth= 4.26"

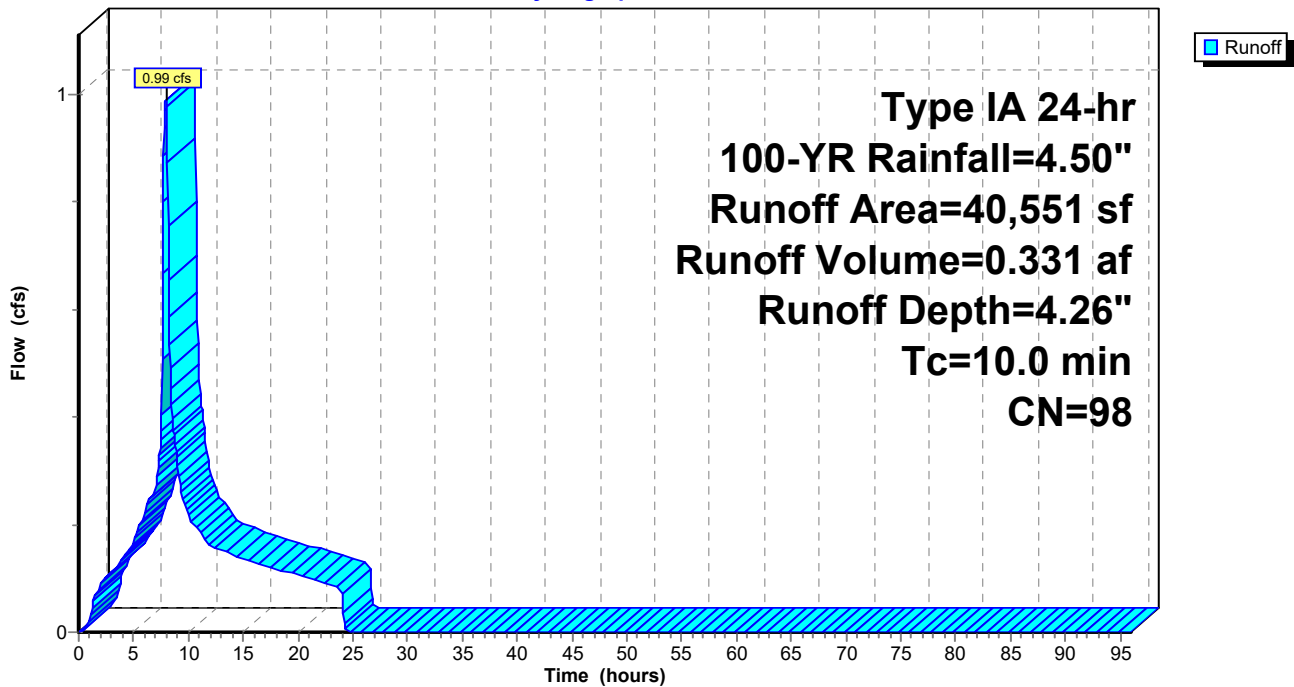
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
* 40,551	98	
40,551		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, 20

Subcatchment 15S: Filter Strip Basins

Hydrograph



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Type IA 24-hr 100-YR Rainfall=4.50"

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Summary for Subcatchment 17S: Pre Total

Runoff = 8.63 cfs @ 8.23 hrs, Volume= 3.488 af, Depth= 2.46"

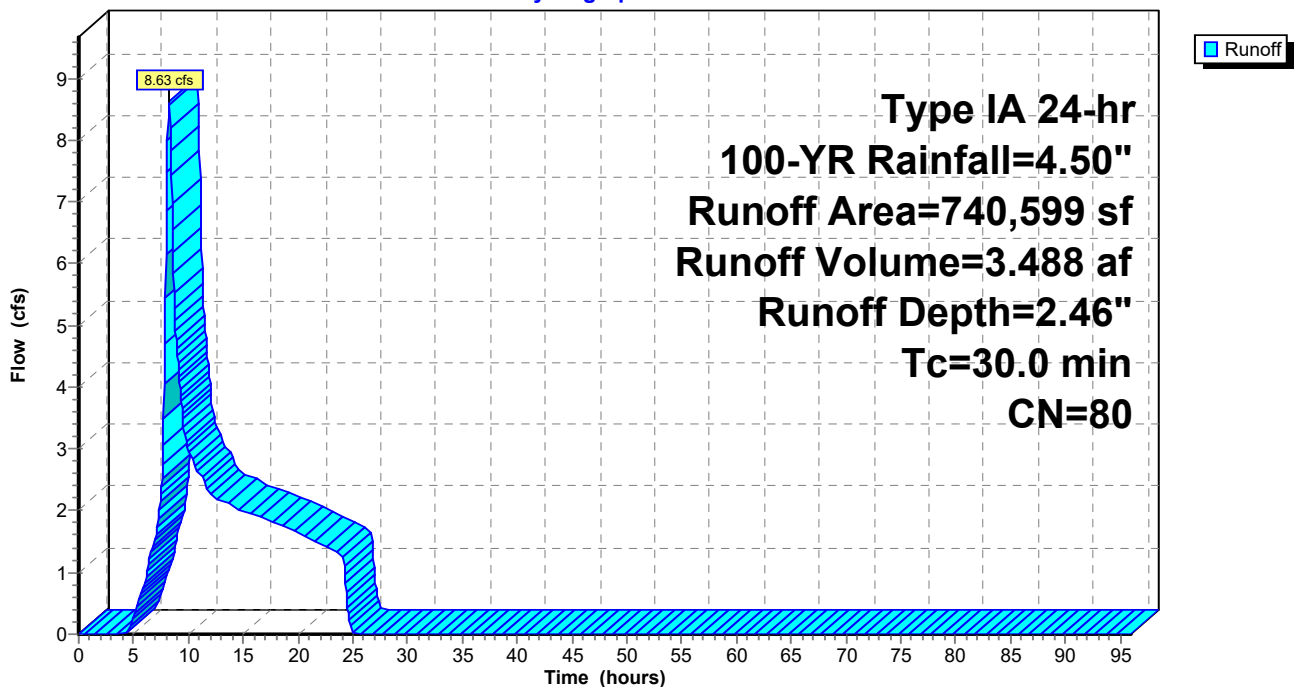
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
740,599	80	>75% Grass cover, Good, HSG D
740,599		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 17S: Pre Total

Hydrograph



Summary for Subcatchment 18S: Basin 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 3.78 cfs @ 7.85 hrs, Volume= 1.245 af, Depth= 4.26"

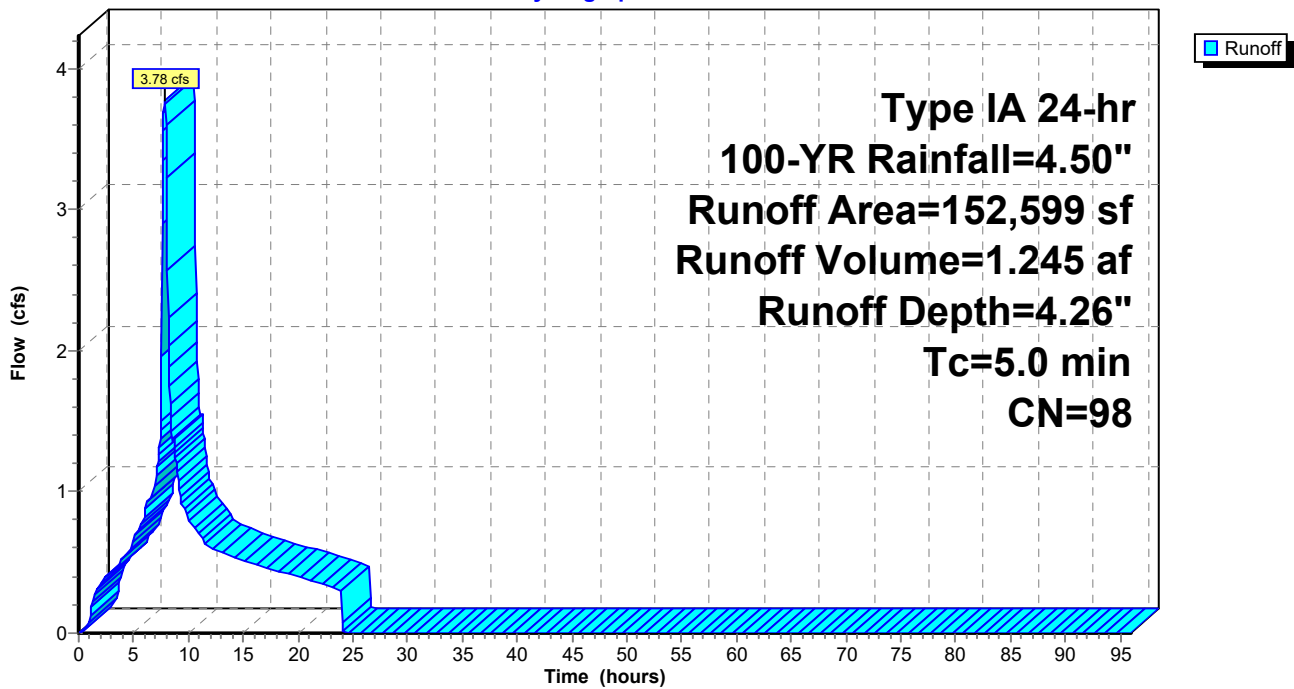
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
* 152,599	98	
152,599		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 18S: Basin 4

Hydrograph



Summary for Subcatchment 19S: Basin 2

[49] Hint: Tc<2dt may require smaller dt

Runoff = 4.89 cfs @ 7.85 hrs, Volume= 1.611 af, Depth= 4.26"

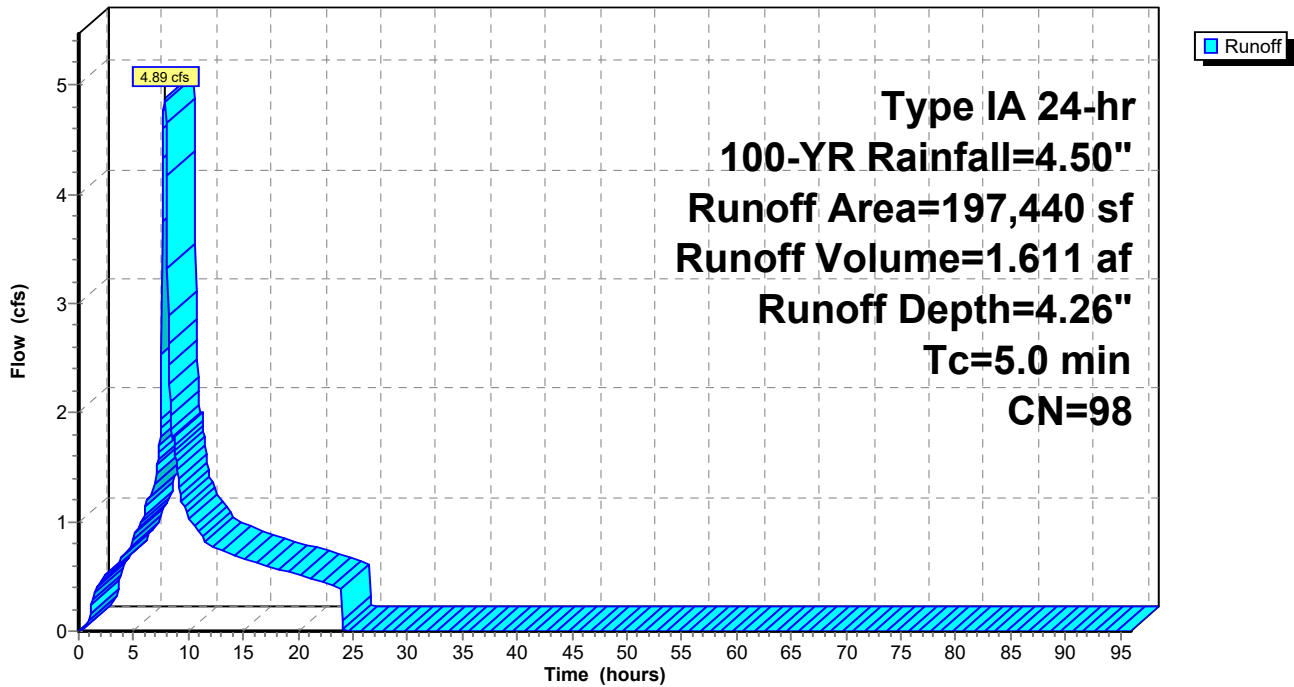
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr 100-YR Rainfall=4.50"

Area (sf)	CN	Description
* 197,440	98	
197,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 19S: Basin 2

Hydrograph



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Type IA 24-hr 100-YR Rainfall=4.50"

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Summary for Reach 22R: Offsite Discharge

Reach modeled with shallow side slopes to best mimic the overland flow created at the discharge points.

[81] Warning: Exceeded Pond 14P by 0.50' @ 0.00 hrs

[81] Warning: Exceeded Pond 20P by 0.50' @ 0.00 hrs

Inflow Area = 17.002 ac, 100.00% Impervious, Inflow Depth > 3.96" for 100-YR event
Inflow = 11.91 cfs @ 7.90 hrs, Volume= 5.609 af
Outflow = 8.01 cfs @ 8.27 hrs, Volume= 5.599 af, Atten= 33%, Lag= 22.5 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.41 fps, Min. Travel Time= 12.2 min
Avg. Velocity = 0.16 fps, Avg. Travel Time= 32.3 min

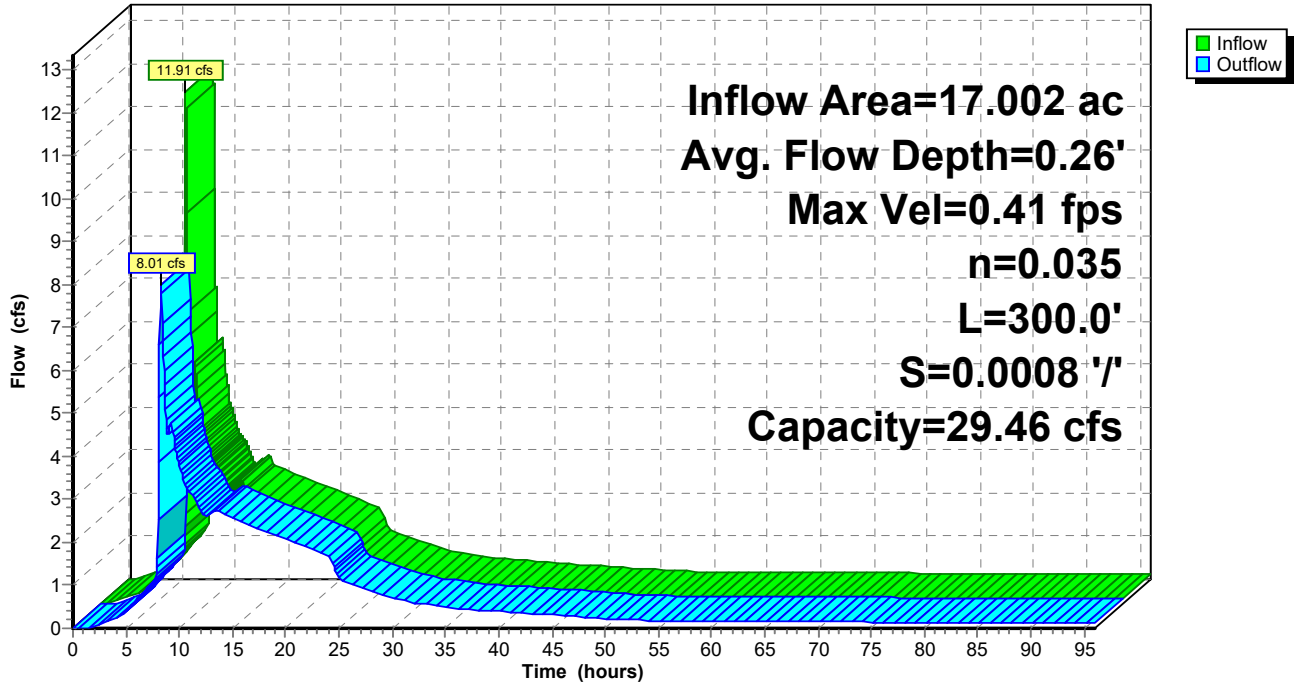
Peak Storage= 5,886 cf @ 8.07 hrs
Average Depth at Peak Storage= 0.26'
Bank-Full Depth= 0.50' Flow Area= 50.0 sf, Capacity= 29.46 cfs

50.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 100.0 '/' Top Width= 150.00'
Length= 300.0' Slope= 0.0008 '/'
Inlet Invert= 133.00', Outlet Invert= 132.75'



Reach 22R: Offsite Discharge

Hydrograph



Summary for Pond 11P: Stormwater System 1

[93] Warning: Storage range exceeded by 0.34'

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

[85] Warning: Oscillations may require smaller dt or Finer Routing (severity=75)

Inflow Area = 2.882 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100-YR event
 Inflow = 3.11 cfs @ 7.85 hrs, Volume= 1.024 af
 Outflow = 5.08 cfs @ 7.90 hrs, Volume= 1.003 af, Atten= 0%, Lag= 2.7 min
 Primary = 5.08 cfs @ 7.90 hrs, Volume= 1.003 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 135.88' @ 7.90 hrs Surf.Area= 0.246 ac Storage= 0.278 af

Plug-Flow detention time= 484.2 min calculated for 1.003 af (98% of inflow)
 Center-of-Mass det. time= 470.3 min (1,126.5 - 656.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.149 af	28.33'W x 377.50'L x 2.04'H Field A 0.501 af Overall - 0.128 af Embedded = 0.373 af x 40.0% Voids
#2A	134.00'	0.128 af	Cultec C-100HD x 400 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 8 rows
		0.278 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.80'	2.5" Vert. Orifice/Grate C= 0.600
#3	Primary	135.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.06 cfs @ 7.90 hrs HW=135.88' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 7.43 fps)
- 2=Orifice/Grate (Orifice Controls 0.23 cfs @ 6.77 fps)
- 3=Orifice/Grate (Weir Controls 4.82 cfs @ 2.02 fps)

Pond 11P: Stormwater System 1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 8 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

50 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 375.50' Row Length +12.0" End Stone x 2 = 377.50' Base Length

8 Rows x 36.0" Wide + 4.0" Spacing x 7 + 12.0" Side Stone x 2 = 28.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

400 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 8 Rows = 5,591.9 cf Chamber Storage

21,837.3 cf Field - 5,591.9 cf Chambers = 16,245.4 cf Stone x 40.0% Voids = 6,498.2 cf Stone Storage

Chamber Storage + Stone Storage = 12,090.1 cf = 0.278 af

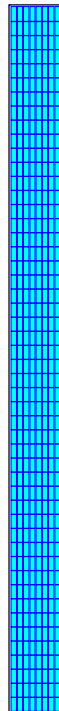
Overall Storage Efficiency = 55.4%

Overall System Size = 377.50' x 28.33' x 2.04'

400 Chambers

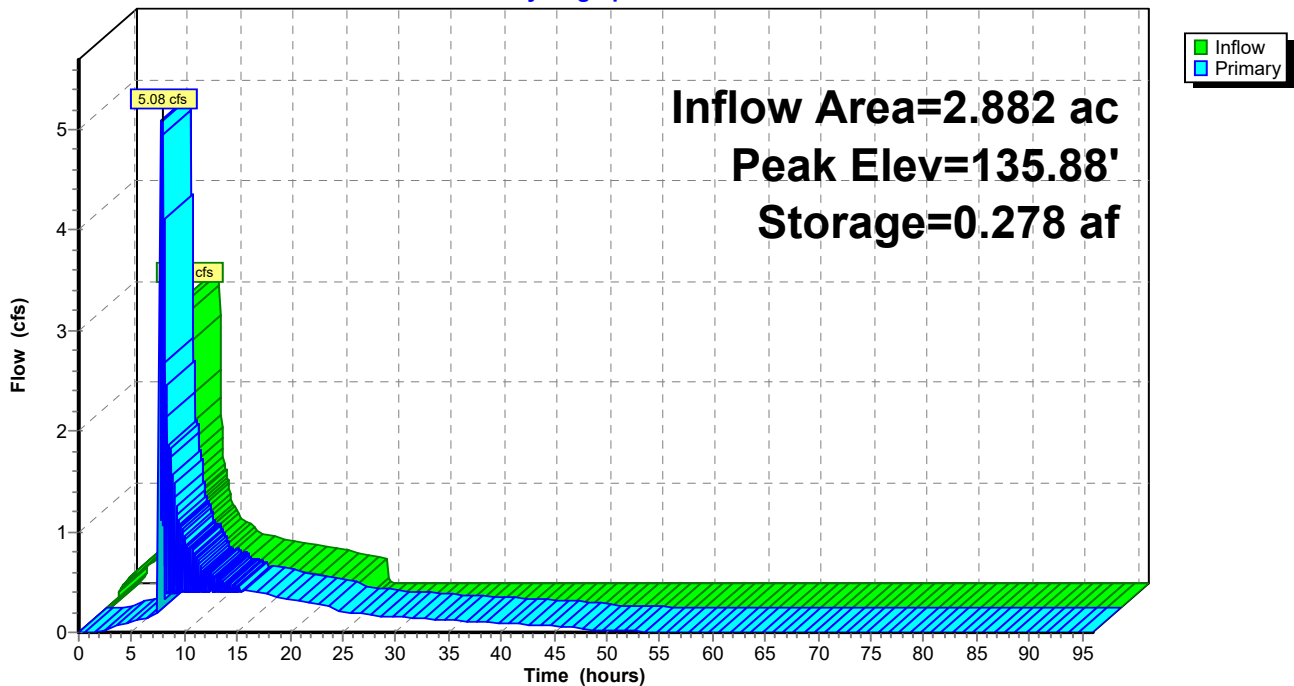
808.8 cy Field

601.7 cy Stone



Pond 11P: Stormwater System 1

Hydrograph



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Type IA 24-hr 100-YR Rainfall=4.50"

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Summary for Pond 14P: Stormwater Sytem 3

[93] Warning: Storage range exceeded by 0.14'

[88] Warning: Qout>Qin may require smaller dt or Finer Routing

Inflow Area = 5.153 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100-YR event
Inflow = 5.56 cfs @ 7.85 hrs, Volume= 1.831 af
Outflow = 5.61 cfs @ 7.89 hrs, Volume= 1.786 af, Atten= 0%, Lag= 2.2 min
Primary = 5.61 cfs @ 7.89 hrs, Volume= 1.786 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 134.68' @ 7.89 hrs Surf.Area= 0.427 ac Storage= 0.488 af

Plug-Flow detention time= 439.1 min calculated for 1.786 af (98% of inflow)
Center-of-Mass det. time= 420.2 min (1,076.4 - 656.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.257 af	68.33"W x 272.50'L x 2.04'H Field A 0.873 af Overall - 0.231 af Embedded = 0.642 af x 40.0% Voids
#2A	133.00'	0.231 af	Cultec C-100HD x 720 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 20 rows
		0.488 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.05'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	134.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=5.58 cfs @ 7.89 hrs HW=134.68' (Free Discharge)

1=Orifice/Grate (Orifice Controls 0.04 cfs @ 7.10 fps)

2=Orifice/Grate (Orifice Controls 0.78 cfs @ 5.74 fps)

3=Orifice/Grate (Weir Controls 4.76 cfs @ 2.01 fps)

Pond 14P: Stormwater Sytem 3 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 20 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

36 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 270.50' Row Length +12.0" End Stone x 2 = 272.50' Base Length

20 Rows x 36.0" Wide + 4.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

720 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 20 Rows = 10,070.7 cf Chamber Storage

38,017.5 cf Field - 10,070.7 cf Chambers = 27,946.8 cf Stone x 40.0% Voids = 11,178.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,249.4 cf = 0.488 af

Overall Storage Efficiency = 55.9%

Overall System Size = 272.50' x 68.33' x 2.04'

720 Chambers

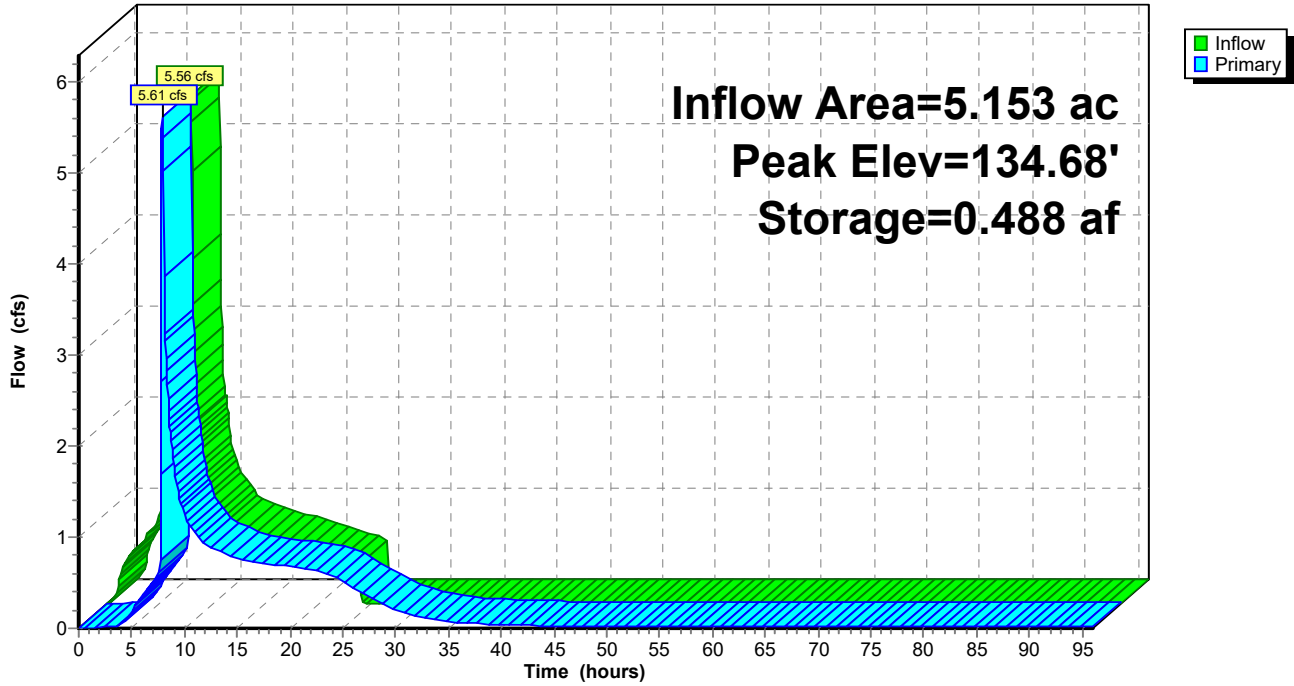
1,408.1 cy Field

1,035.1 cy Stone



Pond 14P: Stormwater Sytem 3

Hydrograph



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Type IA 24-hr 100-YR Rainfall=4.50"

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Summary for Pond 20P: Stormwater System 4

Inflow Area = 3.503 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100-YR event
Inflow = 3.78 cfs @ 7.85 hrs, Volume= 1.245 af
Outflow = 0.57 cfs @ 13.28 hrs, Volume= 1.157 af, Atten= 85%, Lag= 325.7 min
Primary = 0.57 cfs @ 13.28 hrs, Volume= 1.157 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 136.31' @ 13.28 hrs Surf.Area= 0.283 ac Storage= 0.713 af

Plug-Flow detention time= 1,401.3 min calculated for 1.157 af (93% of inflow)
Center-of-Mass det. time= 1,349.1 min (2,005.4 - 656.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.266 af	30.00'W x 411.50'L x 4.00'H Field A 1.134 af Overall - 0.468 af Embedded = 0.665 af x 40.0% Voids
#2A	133.00'	0.468 af	Cultec R-360HD x 555 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 555 Chambers in 5 Rows Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf
		0.734 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.00'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	136.25'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.57 cfs @ 13.28 hrs HW=136.31' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.12 cfs @ 9.40 fps)
- 2=Orifice/Grate (Orifice Controls 0.16 cfs @ 7.18 fps)
- 3=Orifice/Grate (Weir Controls 0.29 cfs @ 0.79 fps)

Pond 20P: Stormwater System 4 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length

5 Rows x 60.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 30.00' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

555 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 5 Rows = 20,402.4 cf Chamber Storage

49,380.0 cf Field - 20,402.4 cf Chambers = 28,977.6 cf Stone x 40.0% Voids = 11,591.0 cf Stone Storage

Chamber Storage + Stone Storage = 31,993.4 cf = 0.734 af

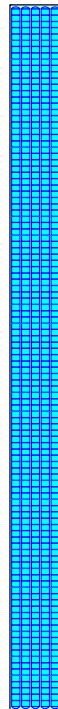
Overall Storage Efficiency = 64.8%

Overall System Size = 411.50' x 30.00' x 4.00'

555 Chambers

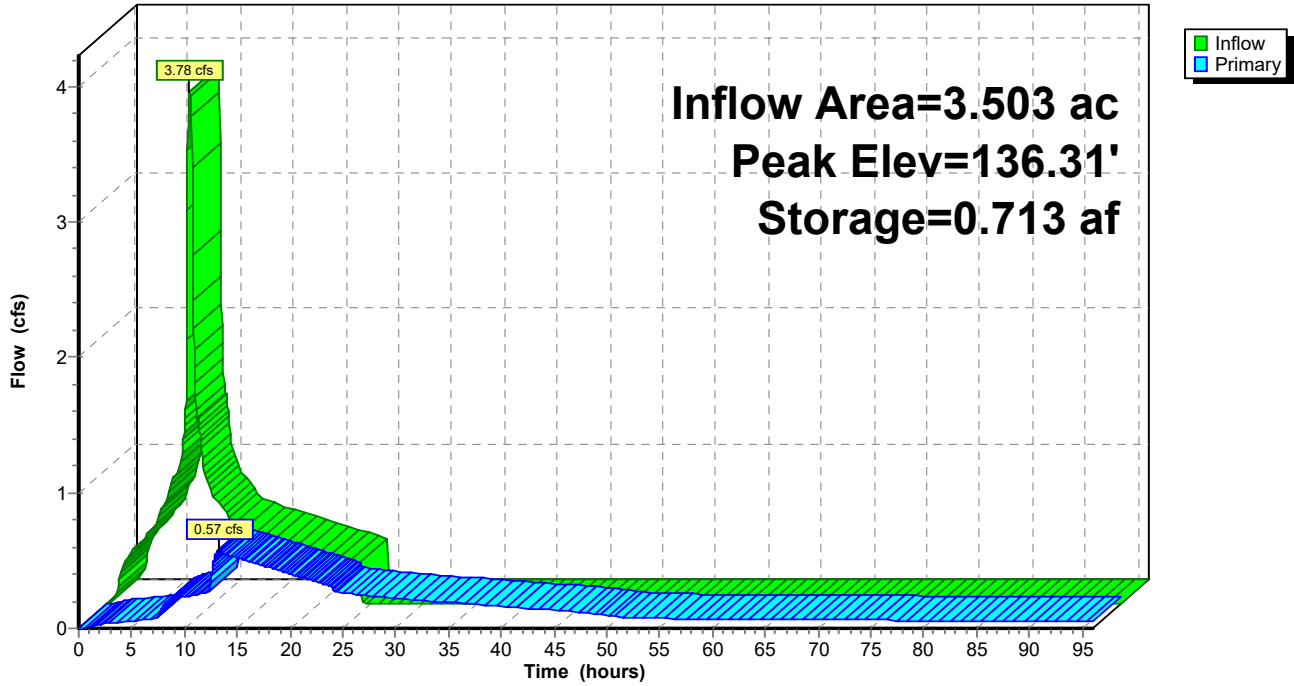
1,828.9 cy Field

1,073.2 cy Stone



Pond 20P: Stormwater System 4

Hydrograph



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Type IA 24-hr 100-YR Rainfall=4.50"

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Summary for Pond 23P: Stormwater System 2

Inflow Area = 4.533 ac, 100.00% Impervious, Inflow Depth = 4.26" for 100-YR event
 Inflow = 4.89 cfs @ 7.85 hrs, Volume= 1.611 af
 Outflow = 1.49 cfs @ 8.97 hrs, Volume= 1.332 af, Atten= 69%, Lag= 66.9 min
 Primary = 1.49 cfs @ 8.97 hrs, Volume= 1.332 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 137.46' @ 8.97 hrs Surf.Area= 0.284 ac Storage= 0.734 af

Plug-Flow detention time= 1,144.2 min calculated for 1.331 af (83% of inflow)
 Center-of-Mass det. time= 1,027.2 min (1,683.4 - 656.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.265 af	41.50'W x 297.83'L x 4.00'H Field A 1.135 af Overall - 0.473 af Embedded = 0.662 af x 40.0% Voids
#2A	134.00'	0.473 af	Cultec R-360HD x 560 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 560 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		0.738 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.50'	1.5" Vert. Orifice/Grate C= 0.600
#3	Primary	137.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.49 cfs @ 8.97 hrs HW=137.46' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.01 cfs @ 9.59 fps)
- 2=Orifice/Grate (Orifice Controls 0.10 cfs @ 8.20 fps)
- 3=Orifice/Grate (Weir Controls 1.37 cfs @ 1.33 fps)

Pond 23P: Stormwater System 2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

80 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 295.83' Row Length +12.0" End Stone x 2 = 297.83' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

560 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 20,611.5 cf Chamber Storage

49,440.3 cf Field - 20,611.5 cf Chambers = 28,828.9 cf Stone x 40.0% Voids = 11,531.6 cf Stone Storage

Chamber Storage + Stone Storage = 32,143.0 cf = 0.738 af

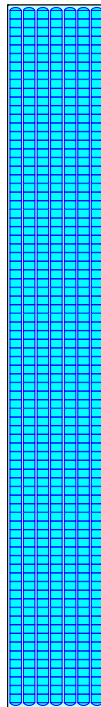
Overall Storage Efficiency = 65.0%

Overall System Size = 297.83' x 41.50' x 4.00'

560 Chambers

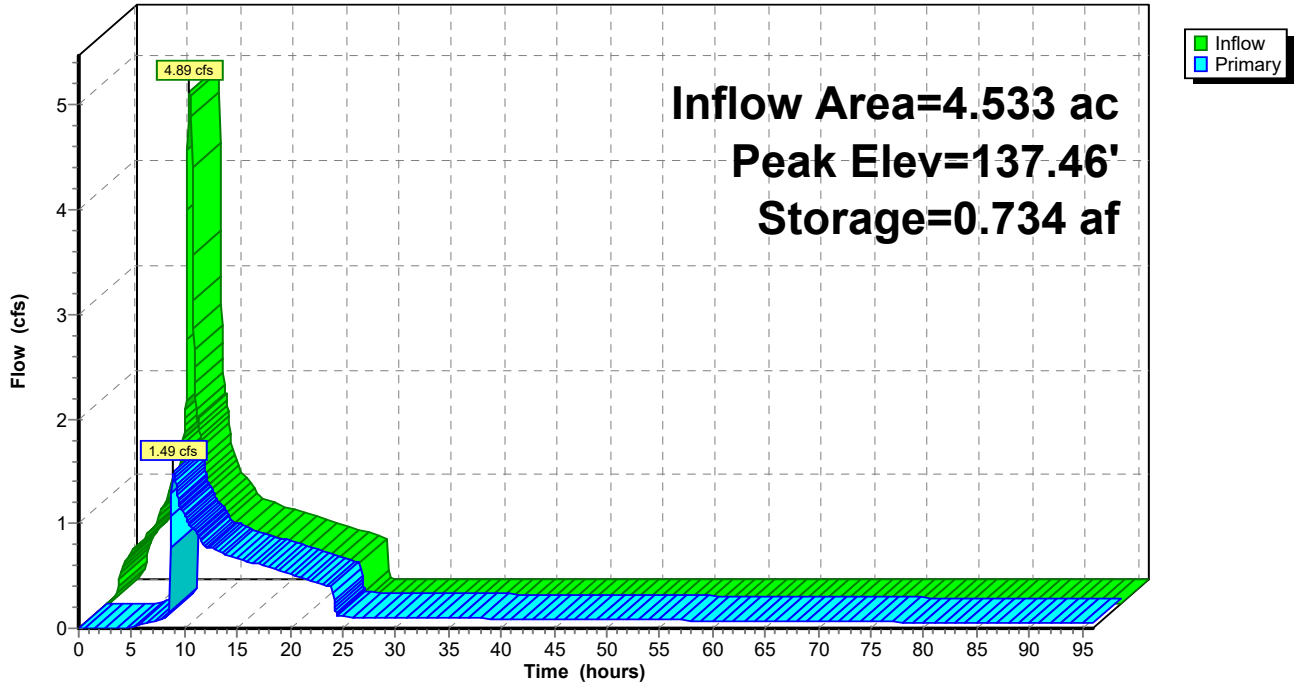
1,831.1 cy Field

1,067.7 cy Stone



Pond 23P: Stormwater System 2

Hydrograph



Walgraves

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Type IA 24-hr WQ Rainfall=0.36"

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Time span=0.00-96.00 hrs, dt=0.05 hrs, 1921 points
 Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
 Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment8S: Basin 1	Runoff Area=125,547 sf 100.00% Impervious Runoff Depth=0.19" Tc=5.0 min CN=98 Runoff=0.14 cfs 0.047 af
Subcatchment13S: Basin 3	Runoff Area=224,462 sf 100.00% Impervious Runoff Depth=0.19" Tc=5.0 min CN=98 Runoff=0.24 cfs 0.084 af
Subcatchment15S: Filter Strip Basins	Runoff Area=40,551 sf 100.00% Impervious Runoff Depth=0.19" Tc=10.0 min CN=98 Runoff=0.04 cfs 0.015 af
Subcatchment17S: Pre Total	Runoff Area=740,599 sf 0.00% Impervious Runoff Depth=0.00" Tc=30.0 min CN=80 Runoff=0.00 cfs 0.000 af
Subcatchment18S: Basin 4	Runoff Area=152,599 sf 100.00% Impervious Runoff Depth=0.19" Tc=5.0 min CN=98 Runoff=0.17 cfs 0.057 af
Subcatchment19S: Basin 2	Runoff Area=197,440 sf 100.00% Impervious Runoff Depth=0.19" Tc=5.0 min CN=98 Runoff=0.21 cfs 0.074 af
Reach 22R: Offsite Discharge	Avg. Flow Depth=0.02' Max Vel=0.08 fps Inflow=0.07 cfs 0.215 af n=0.035 L=300.0' S=0.0008 '/' Capacity=29.46 cfs Outflow=0.07 cfs 0.212 af
Pond 11P: Stormwater System 1	Peak Elev=133.88' Storage=0.037 af Inflow=0.14 cfs 0.047 af Outflow=0.02 cfs 0.032 af
Pond 14P: Stormwater System 3	Peak Elev=132.88' Storage=0.065 af Inflow=0.24 cfs 0.084 af Outflow=0.02 cfs 0.079 af
Pond 20P: Stormwater System 4	Peak Elev=132.70' Storage=0.023 af Inflow=0.17 cfs 0.057 af Outflow=0.03 cfs 0.057 af
Pond 23P: Stormwater System 2	Peak Elev=134.05' Storage=0.068 af Inflow=0.21 cfs 0.074 af Outflow=0.00 cfs 0.032 af

Total Runoff Area = 34.004 ac Runoff Volume = 0.276 af Average Runoff Depth = 0.10"
50.00% Pervious = 17.002 ac 50.00% Impervious = 17.002 ac

Summary for Subcatchment 8S: Basin 1

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.14 cfs @ 7.95 hrs, Volume= 0.047 af, Depth= 0.19"

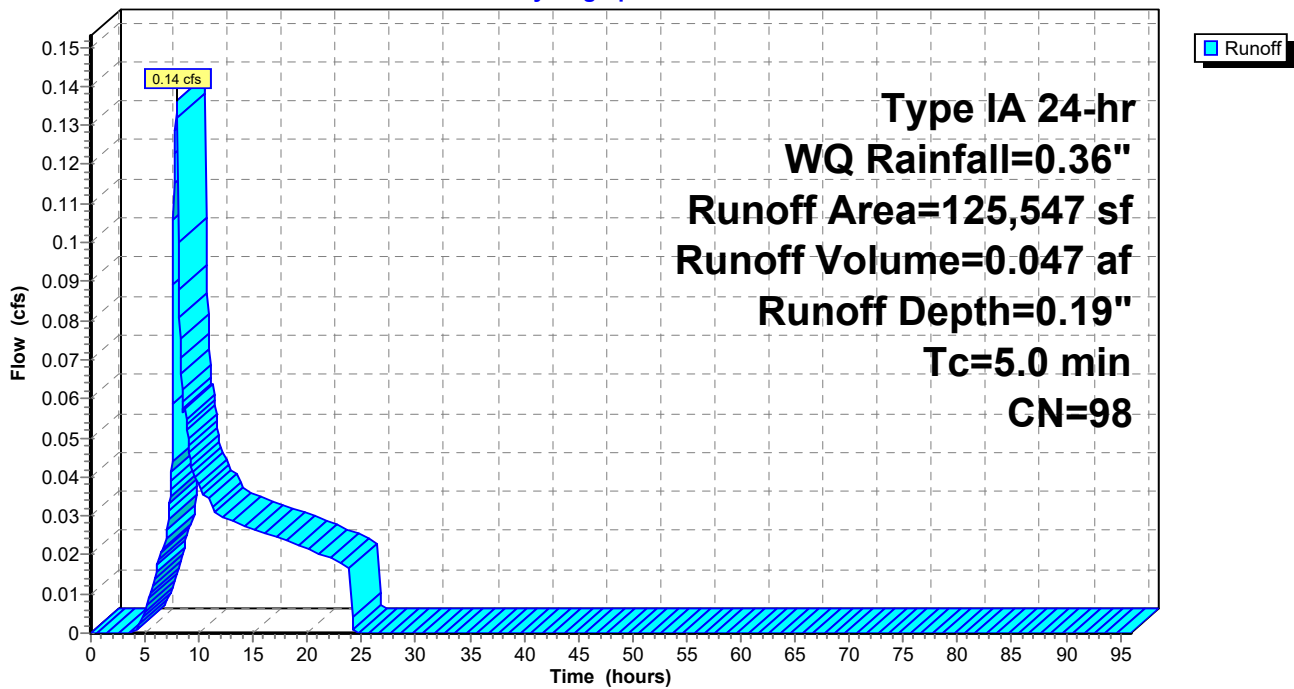
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
* 125,547	98	
125,547		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 8S: Basin 1

Hydrograph



Summary for Subcatchment 13S: Basin 3

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.24 cfs @ 7.95 hrs, Volume= 0.084 af, Depth= 0.19"

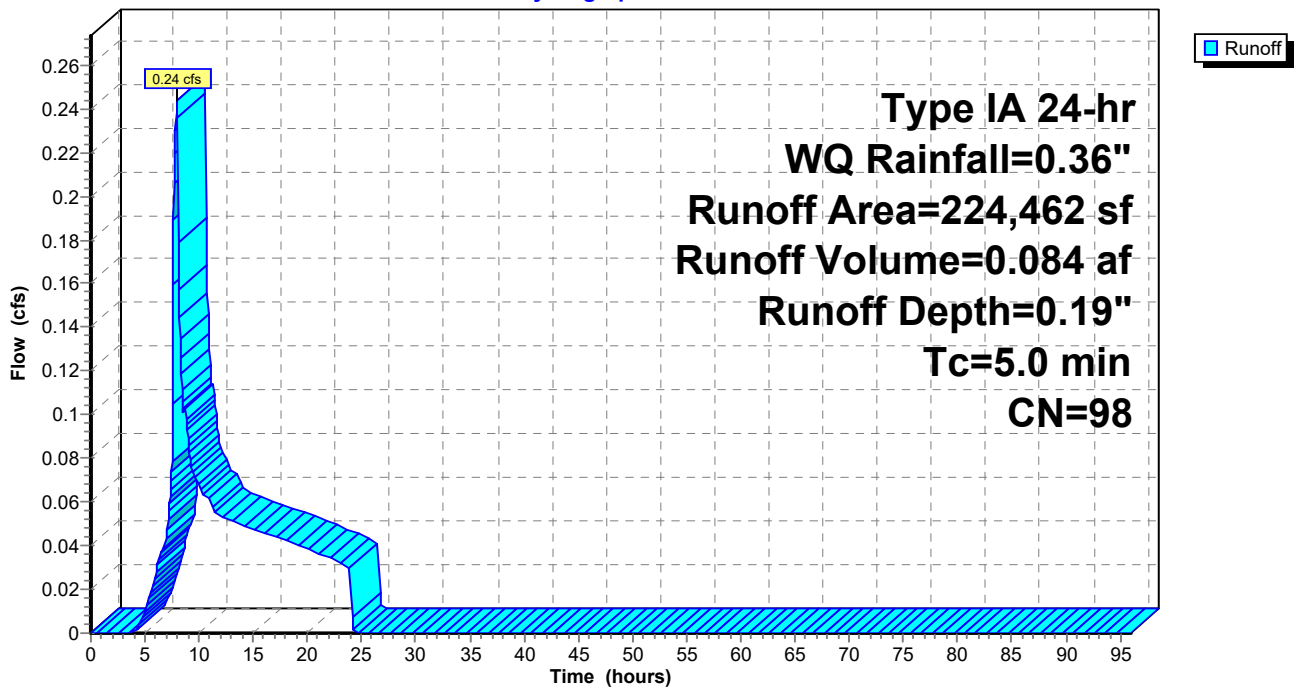
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
* 224,462	98	
224,462		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 13S: Basin 3

Hydrograph



Summary for Subcatchment 15S: Filter Strip Basins

Runoff = 0.04 cfs @ 8.01 hrs, Volume= 0.015 af, Depth= 0.19"

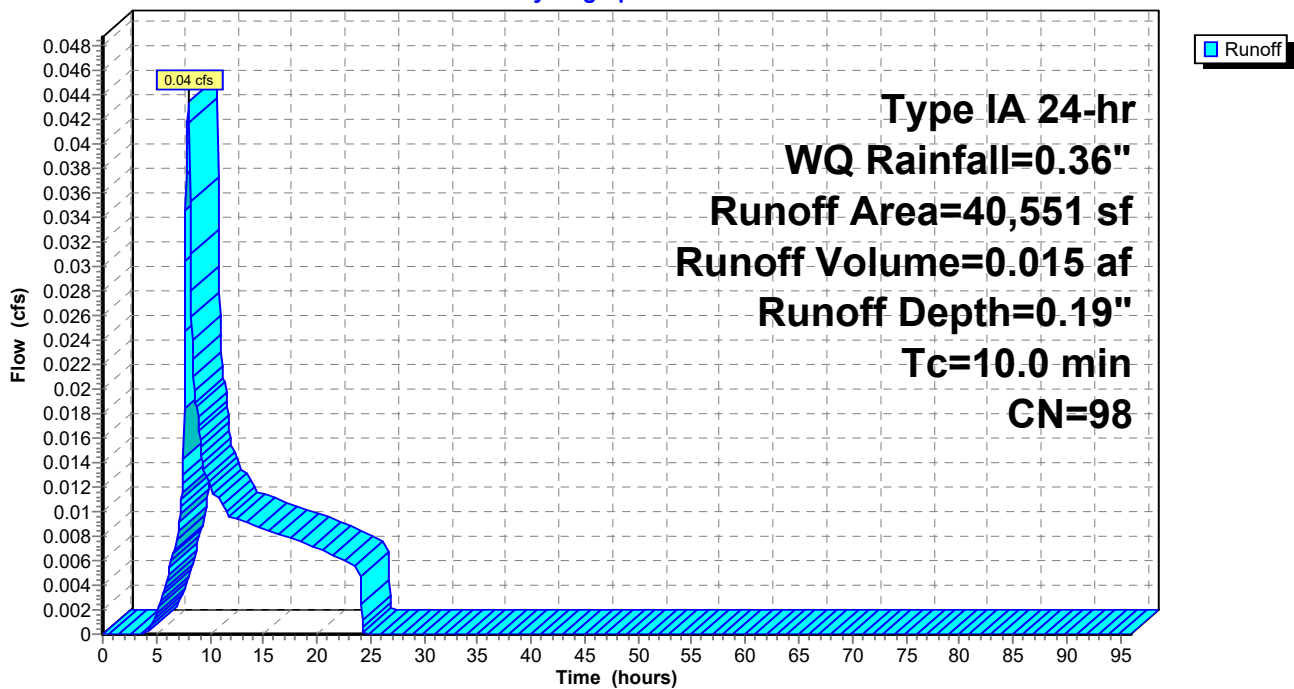
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
* 40,551	98	
40,551		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.0					Direct Entry, 20

Subcatchment 15S: Filter Strip Basins

Hydrograph



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Type IA 24-hr WQ Rainfall=0.36"

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Summary for Subcatchment 17S: Pre Total

[45] Hint: Runoff=Zero

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0.000 af, Depth= 0.00"

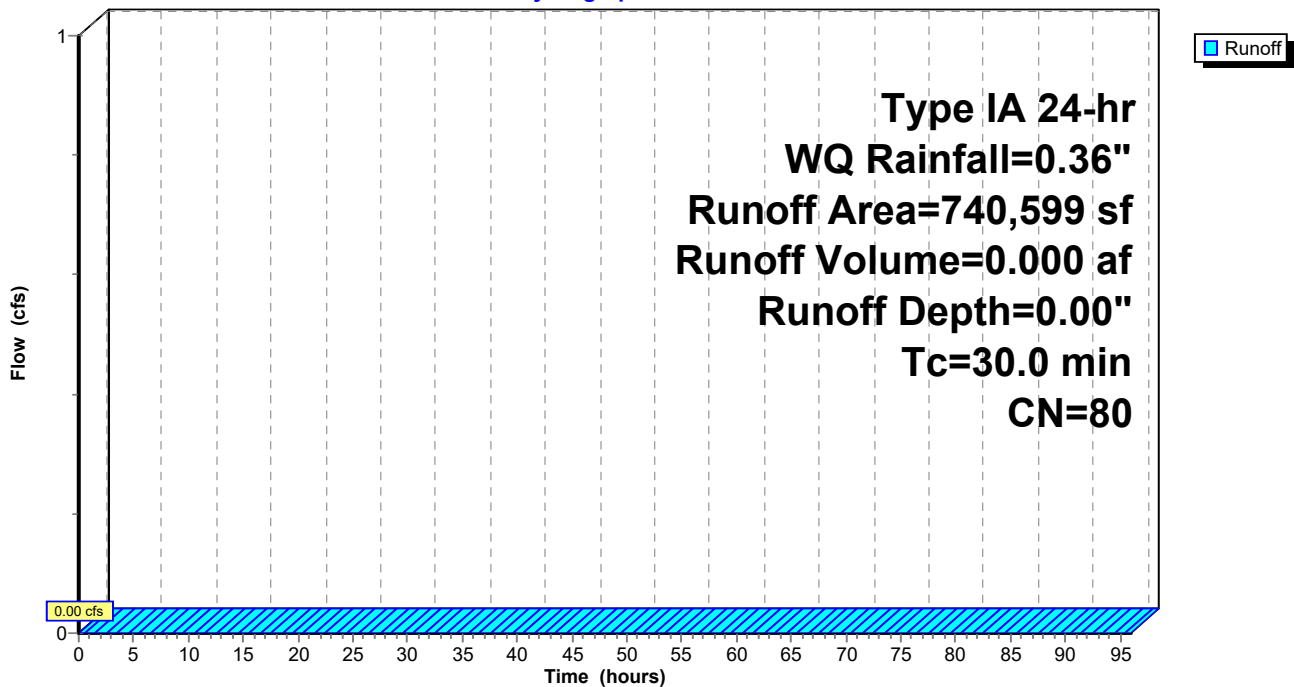
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
740,599	80	>75% Grass cover, Good, HSG D
740,599		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0					Direct Entry,

Subcatchment 17S: Pre Total

Hydrograph



Summary for Subcatchment 18S: Basin 4

[49] Hint: $T_c < 2dt$ may require smaller dt

Runoff = 0.17 cfs @ 7.95 hrs, Volume= 0.057 af, Depth= 0.19"

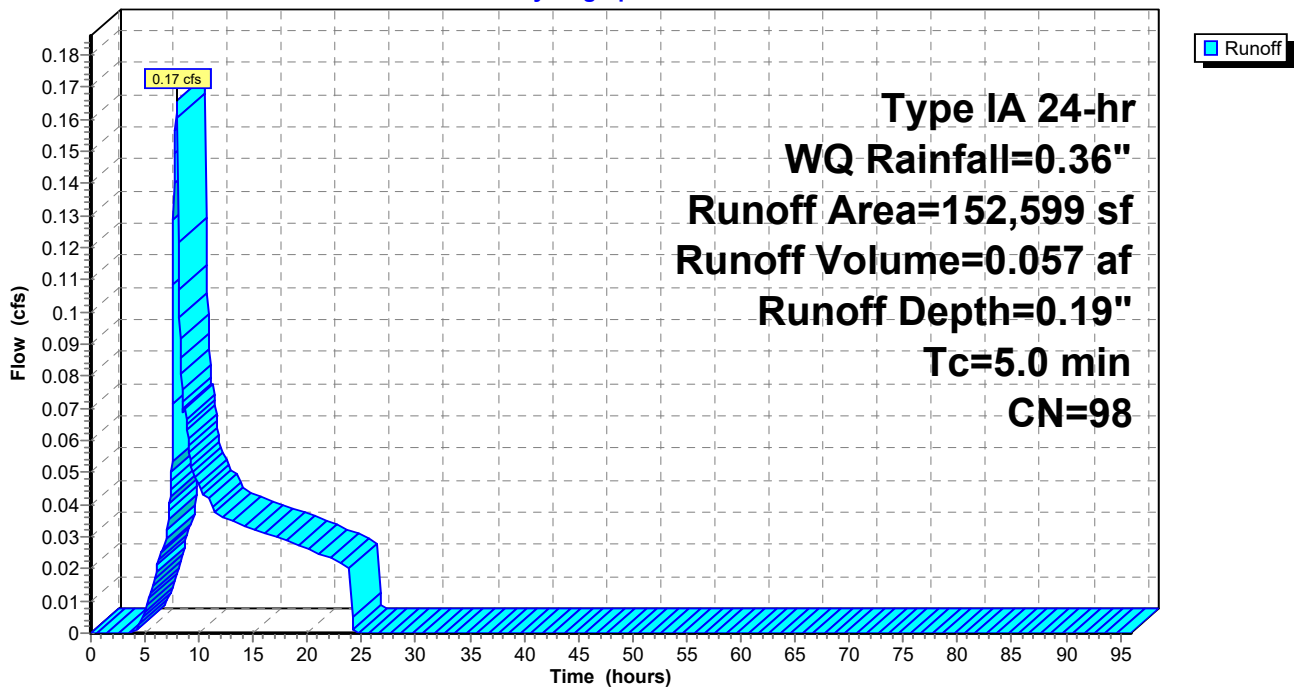
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
* 152,599	98	
152,599		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 18S: Basin 4

Hydrograph



Summary for Subcatchment 19S: Basin 2

[49] Hint: Tc<2dt may require smaller dt

Runoff = 0.21 cfs @ 7.95 hrs, Volume= 0.074 af, Depth= 0.19"

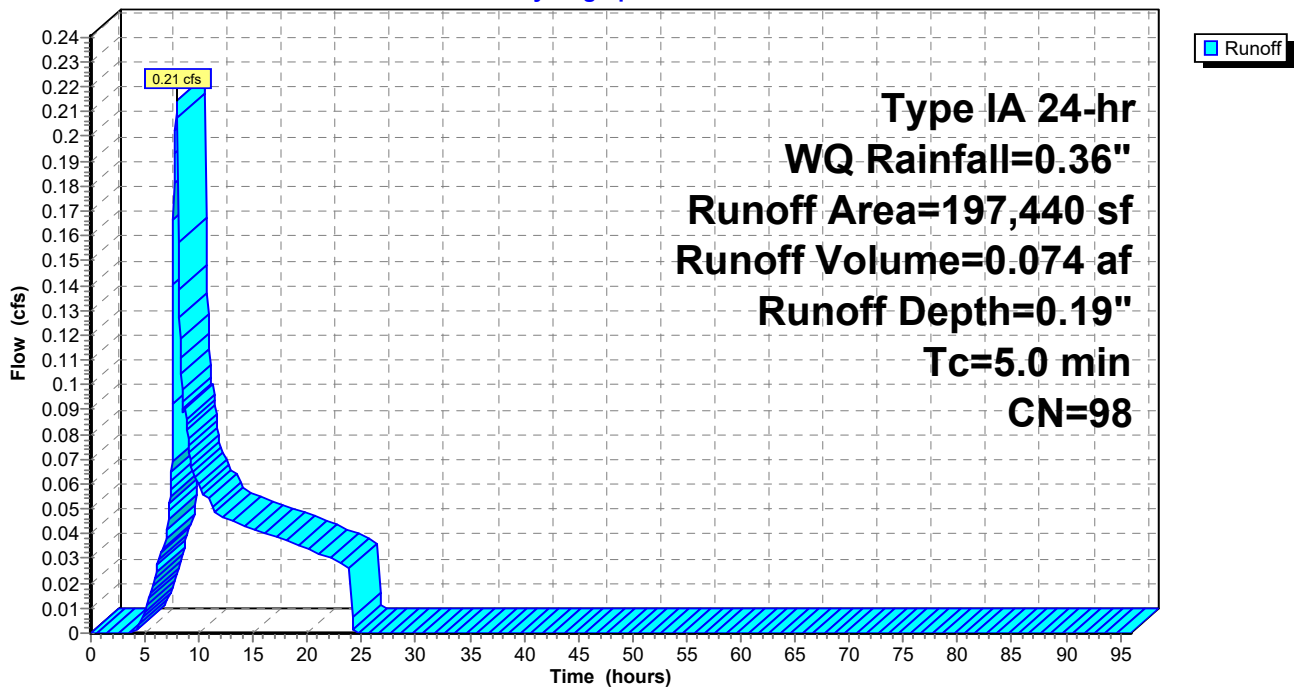
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Type IA 24-hr WQ Rainfall=0.36"

Area (sf)	CN	Description
* 197,440	98	
197,440		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					Direct Entry,

Subcatchment 19S: Basin 2

Hydrograph



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Type IA 24-hr WQ Rainfall=0.36"

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Summary for Reach 22R: Offsite Discharge

Reach modeled with shallow side slopes to best mimic the overland flow created at the discharge points.

[81] Warning: Exceeded Pond 14P by 0.50' @ 0.00 hrs

[81] Warning: Exceeded Pond 20P by 0.51' @ 61.80 hrs

Inflow Area = 17.002 ac, 100.00% Impervious, Inflow Depth > 0.15" for WQ event
Inflow = 0.07 cfs @ 8.03 hrs, Volume= 0.215 af
Outflow = 0.07 cfs @ 25.03 hrs, Volume= 0.212 af, Atten= 6%, Lag= 1,019.9 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Max. Velocity= 0.08 fps, Min. Travel Time= 63.2 min
Avg. Velocity = 0.05 fps, Avg. Travel Time= 91.8 min

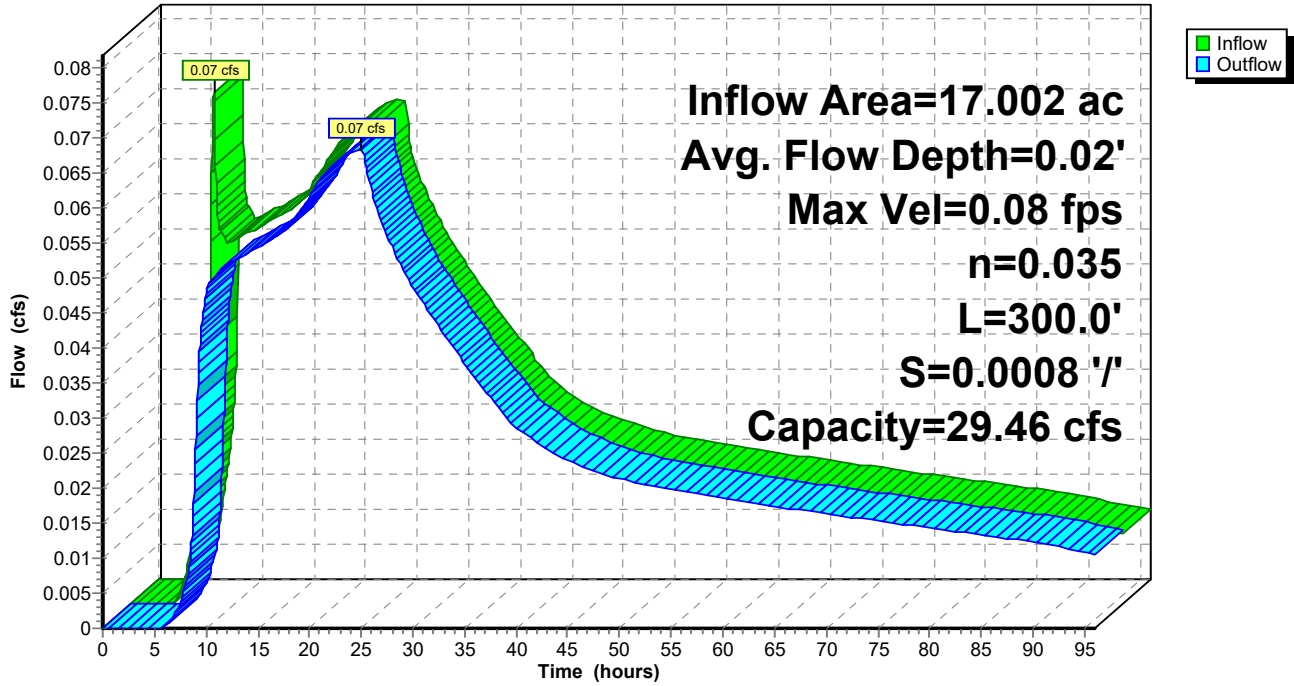
Peak Storage= 259 cf @ 23.98 hrs
Average Depth at Peak Storage= 0.02'
Bank-Full Depth= 0.50' Flow Area= 50.0 sf, Capacity= 29.46 cfs

50.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 100.0 ' ' Top Width= 150.00'
Length= 300.0' Slope= 0.0008 ' '
Inlet Invert= 133.00', Outlet Invert= 132.75'



Reach 22R: Offsite Discharge

Hydrograph



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Type IA 24-hr WQ Rainfall=0.36"

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Summary for Pond 11P: Stormwater System 1

Inflow Area = 2.882 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ event
Inflow = 0.14 cfs @ 7.95 hrs, Volume= 0.047 af
Outflow = 0.02 cfs @ 24.00 hrs, Volume= 0.032 af, Atten= 88%, Lag= 963.1 min
Primary = 0.02 cfs @ 24.00 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 133.88' @ 24.00 hrs Surf.Area= 0.246 ac Storage= 0.037 af

Plug-Flow detention time= 1,970.0 min calculated for 0.032 af (68% of inflow)
Center-of-Mass det. time= 1,788.0 min (2,575.3 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.149 af	28.33"W x 377.50'L x 2.04'H Field A 0.501 af Overall - 0.128 af Embedded = 0.373 af x 40.0% Voids
#2A	134.00'	0.128 af	Cultec C-100HD x 400 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 8 rows
		0.278 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.80'	2.5" Vert. Orifice/Grate C= 0.600
#3	Primary	135.50'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 24.00 hrs HW=133.88' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.00 cfs @ 2.97 fps)
- 2=Orifice/Grate (Orifice Controls 0.01 cfs @ 0.96 fps)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 11P: Stormwater System 1 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 8 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

50 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 375.50' Row Length +12.0" End Stone x 2 = 377.50' Base Length

8 Rows x 36.0" Wide + 4.0" Spacing x 7 + 12.0" Side Stone x 2 = 28.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

400 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 8 Rows = 5,591.9 cf Chamber Storage

21,837.3 cf Field - 5,591.9 cf Chambers = 16,245.4 cf Stone x 40.0% Voids = 6,498.2 cf Stone Storage

Chamber Storage + Stone Storage = 12,090.1 cf = 0.278 af

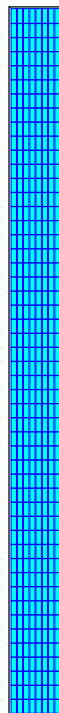
Overall Storage Efficiency = 55.4%

Overall System Size = 377.50' x 28.33' x 2.04'

400 Chambers

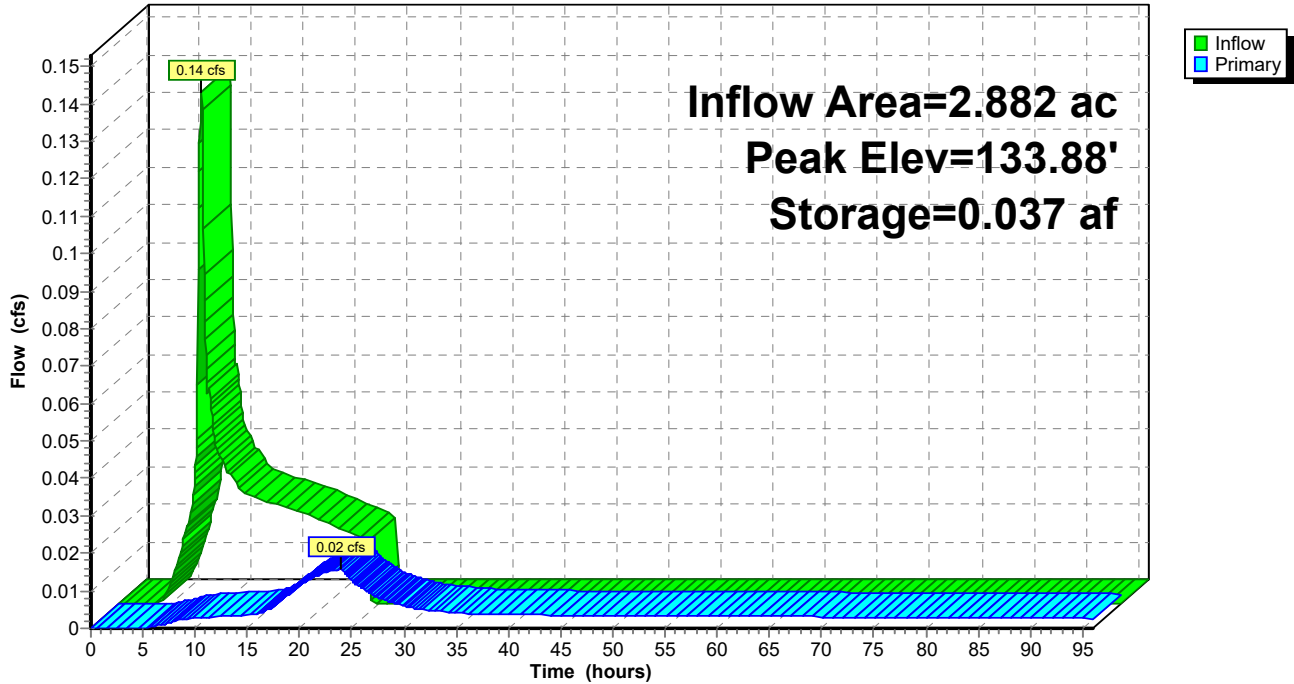
808.8 cy Field

601.7 cy Stone



Pond 11P: Stormwater System 1

Hydrograph



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Type IA 24-hr WQ Rainfall=0.36"

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Summary for Pond 14P: Stormwater Sytem 3

Inflow Area = 5.153 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ event
 Inflow = 0.24 cfs @ 7.95 hrs, Volume= 0.084 af
 Outflow = 0.02 cfs @ 24.07 hrs, Volume= 0.079 af, Atten= 93%, Lag= 967.2 min
 Primary = 0.02 cfs @ 24.07 hrs, Volume= 0.079 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 132.88' @ 24.07 hrs Surf.Area= 0.427 ac Storage= 0.065 af

Plug-Flow detention time= 1,893.9 min calculated for 0.079 af (94% of inflow)
 Center-of-Mass det. time= 1,860.1 min (2,647.4 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.257 af	68.33"W x 272.50"L x 2.04'H Field A 0.873 af Overall - 0.231 af Embedded = 0.642 af x 40.0% Voids
#2A	133.00'	0.231 af	Cultec C-100HD x 720 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 20 rows
		0.488 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	133.05'	5.0" Vert. Orifice/Grate C= 0.600
#3	Primary	134.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.02 cfs @ 24.07 hrs HW=132.88' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.02 cfs @ 2.96 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 14P: Stormwater Sytem 3 - Chamber Wizard Field A

Chamber Model = Cultec C-100HD (Cultec Contactor® 100HD)

Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf

Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap

Row Length Adjustment= +0.50' x 1.86 sf x 20 rows

36.0" Wide + 4.0" Spacing = 40.0" C-C Row Spacing

36 Chambers/Row x 7.50' Long +0.50' Row Adjustment = 270.50' Row Length +12.0" End Stone x 2 = 272.50' Base Length

20 Rows x 36.0" Wide + 4.0" Spacing x 19 + 12.0" Side Stone x 2 = 68.33' Base Width

6.0" Base + 12.5" Chamber Height + 6.0" Cover = 2.04' Field Height

720 Chambers x 14.0 cf +0.50' Row Adjustment x 1.86 sf x 20 Rows = 10,070.7 cf Chamber Storage

38,017.5 cf Field - 10,070.7 cf Chambers = 27,946.8 cf Stone x 40.0% Voids = 11,178.7 cf Stone Storage

Chamber Storage + Stone Storage = 21,249.4 cf = 0.488 af

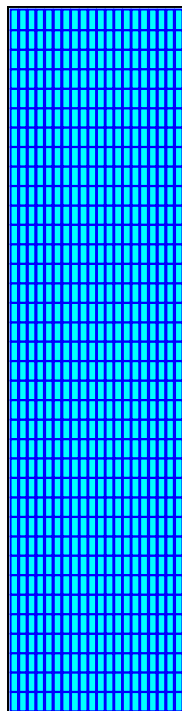
Overall Storage Efficiency = 55.9%

Overall System Size = 272.50' x 68.33' x 2.04'

720 Chambers

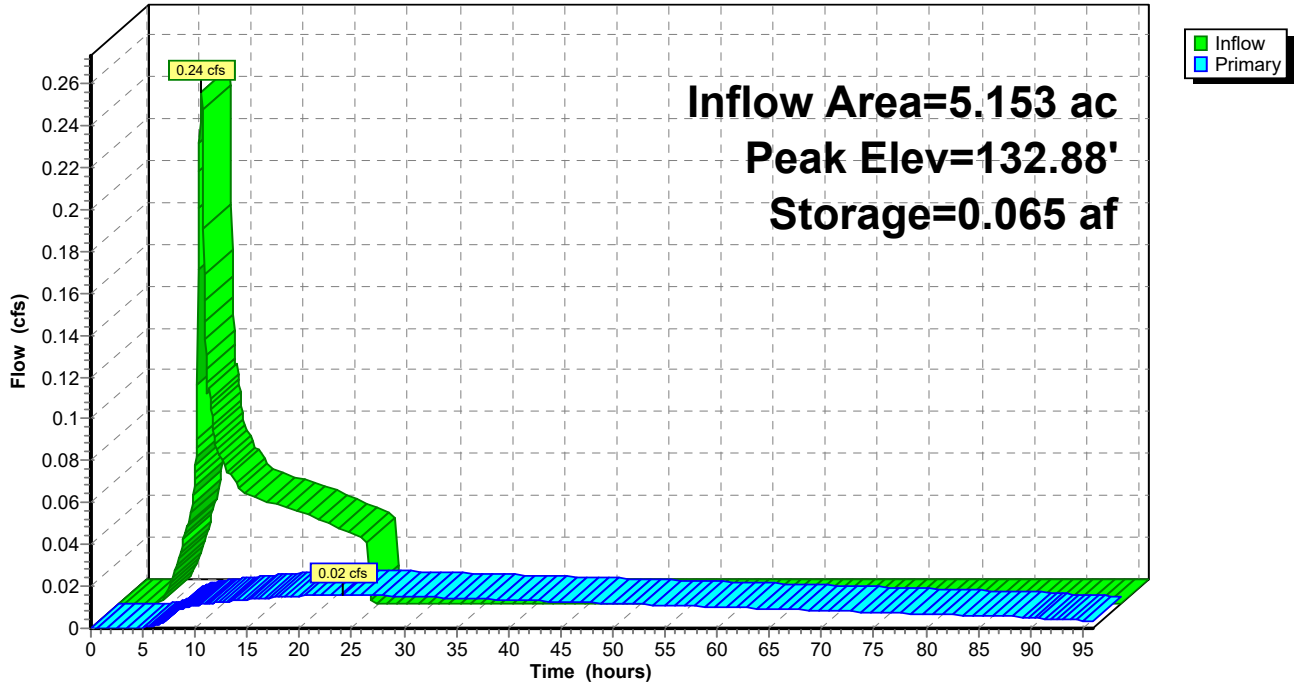
1,408.1 cy Field

1,035.1 cy Stone



Pond 14P: Stormwater Sytem 3

Hydrograph



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Type IA 24-hr WQ Rainfall=0.36"

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Summary for Pond 20P: Stormwater System 4

Inflow Area = 3.503 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ event
 Inflow = 0.17 cfs @ 7.95 hrs, Volume= 0.057 af
 Outflow = 0.03 cfs @ 19.74 hrs, Volume= 0.057 af, Atten= 84%, Lag= 707.5 min
 Primary = 0.03 cfs @ 19.74 hrs, Volume= 0.057 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
 Peak Elev= 132.70' @ 19.74 hrs Surf.Area= 0.283 ac Storage= 0.023 af

Plug-Flow detention time= 532.0 min calculated for 0.057 af (100% of inflow)
 Center-of-Mass det. time= 531.6 min (1,318.9 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	132.50'	0.266 af	30.00'W x 411.50'L x 4.00'H Field A 1.134 af Overall - 0.468 af Embedded = 0.665 af x 40.0% Voids
#2A	133.00'	0.468 af	Cultec R-360HD x 555 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 555 Chambers in 5 Rows Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf
		0.734 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	132.50'	1.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.00'	2.0" Vert. Orifice/Grate C= 0.600
#3	Primary	136.25'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.03 cfs @ 19.74 hrs HW=132.70' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.03 cfs @ 2.17 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 20P: Stormwater System 4 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 5 rows = 64.6 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

111 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 409.50' Row Length +12.0" End Stone x 2 = 411.50' Base Length

5 Rows x 60.0" Wide + 9.0" Spacing x 4 + 12.0" Side Stone x 2 = 30.00' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

555 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 5 Rows = 20,402.4 cf Chamber Storage

49,380.0 cf Field - 20,402.4 cf Chambers = 28,977.6 cf Stone x 40.0% Voids = 11,591.0 cf Stone Storage

Chamber Storage + Stone Storage = 31,993.4 cf = 0.734 af

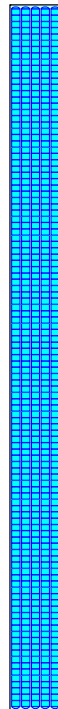
Overall Storage Efficiency = 64.8%

Overall System Size = 411.50' x 30.00' x 4.00'

555 Chambers

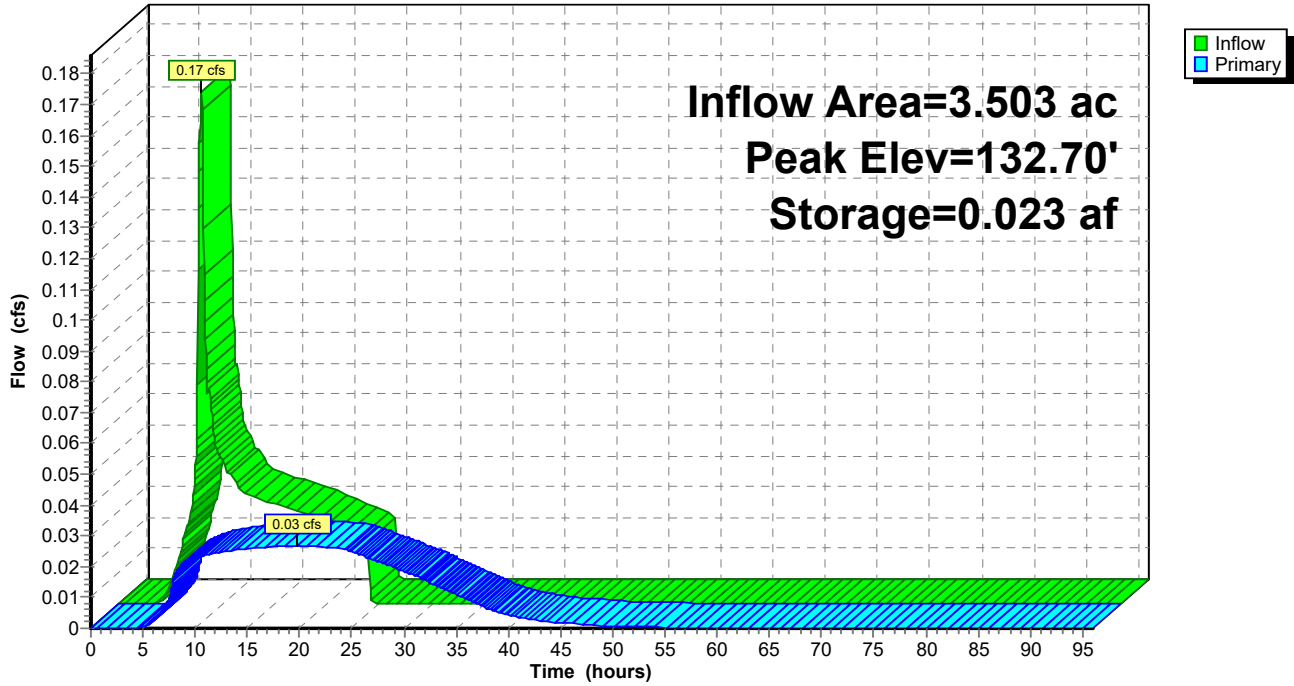
1,828.9 cy Field

1,073.2 cy Stone



Pond 20P: Stormwater System 4

Hydrograph



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Type IA 24-hr WQ Rainfall=0.36"

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Summary for Pond 23P: Stormwater System 2

Inflow Area = 4.533 ac, 100.00% Impervious, Inflow Depth = 0.19" for WQ event
Inflow = 0.21 cfs @ 7.95 hrs, Volume= 0.074 af
Outflow = 0.00 cfs @ 24.12 hrs, Volume= 0.032 af, Atten= 98%, Lag= 970.2 min
Primary = 0.00 cfs @ 24.12 hrs, Volume= 0.032 af

Routing by Stor-Ind method, Time Span= 0.00-96.00 hrs, dt= 0.05 hrs
Peak Elev= 134.05' @ 24.12 hrs Surf.Area= 0.284 ac Storage= 0.068 af

Plug-Flow detention time= 2,578.1 min calculated for 0.032 af (44% of inflow)
Center-of-Mass det. time= 2,292.9 min (3,080.2 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	133.50'	0.265 af	41.50'W x 297.83'L x 4.00'H Field A 1.135 af Overall - 0.473 af Embedded = 0.662 af x 40.0% Voids
#2A	134.00'	0.473 af	Cultec R-360HD x 560 Inside #1 Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap 560 Chambers in 7 Rows Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf
		0.738 af	Total Available Storage

Storage Group A created with Chamber Wizard

Device	Routing	Invert	Outlet Devices
#1	Primary	133.50'	0.5" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads
#2	Primary	134.50'	1.5" Vert. Orifice/Grate C= 0.600
#3	Primary	137.30'	24.0" Horiz. Orifice/Grate C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.00 cfs @ 24.12 hrs HW=134.05' (Free Discharge)

- 1=Orifice/Grate (Orifice Controls 0.00 cfs @ 3.56 fps)
- 2=Orifice/Grate (Controls 0.00 cfs)
- 3=Orifice/Grate (Controls 0.00 cfs)

Pond 23P: Stormwater System 2 - Chamber Wizard Field A

Chamber Model = Cultec R-360HD (Cultec Recharger® 360HD)

Effective Size= 54.9"W x 36.0"H => 9.99 sf x 3.67'L = 36.6 cf

Overall Size= 60.0"W x 36.0"H x 4.17'L with 0.50' Overlap

Cap Storage= +6.5 cf x 2 x 7 rows = 90.4 cf

60.0" Wide + 9.0" Spacing = 69.0" C-C Row Spacing

80 Chambers/Row x 3.67' Long +1.25' Cap Length x 2 = 295.83' Row Length +12.0" End Stone x 2 = 297.83' Base Length

7 Rows x 60.0" Wide + 9.0" Spacing x 6 + 12.0" Side Stone x 2 = 41.50' Base Width

6.0" Base + 36.0" Chamber Height + 6.0" Cover = 4.00' Field Height

560 Chambers x 36.6 cf + 6.5 cf Cap Volume x 2 x 7 Rows = 20,611.5 cf Chamber Storage

49,440.3 cf Field - 20,611.5 cf Chambers = 28,828.9 cf Stone x 40.0% Voids = 11,531.6 cf Stone Storage

Chamber Storage + Stone Storage = 32,143.0 cf = 0.738 af

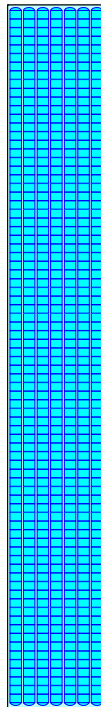
Overall Storage Efficiency = 65.0%

Overall System Size = 297.83' x 41.50' x 4.00'

560 Chambers

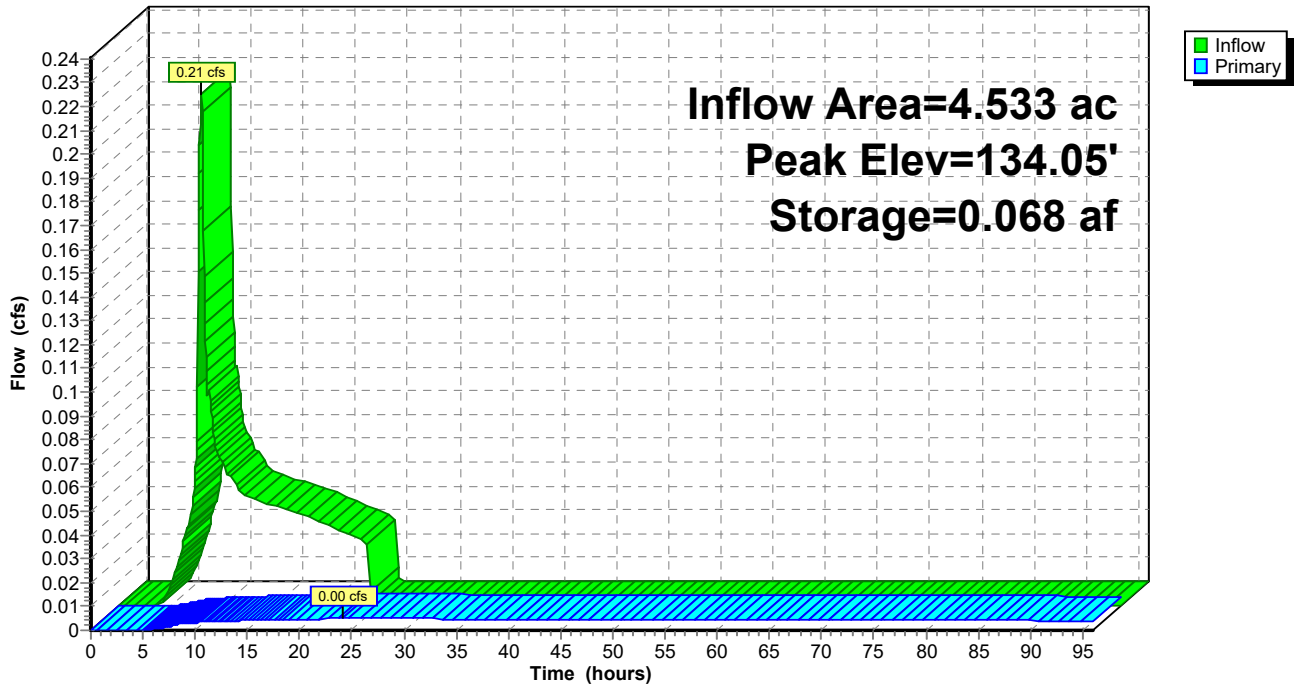
1,831.1 cy Field

1,067.7 cy Stone



Pond 23P: Stormwater System 2

Hydrograph



Appendix H

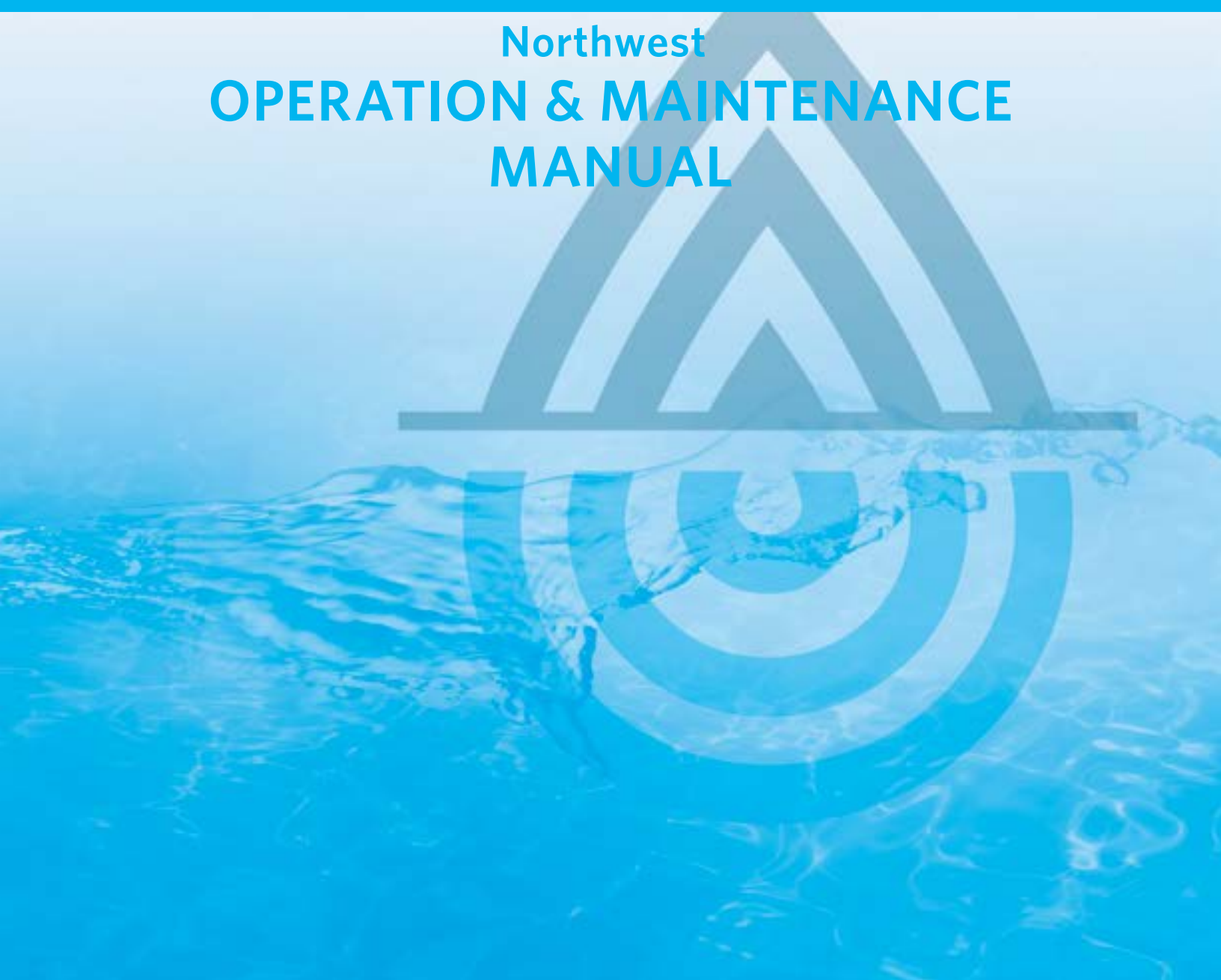
Operations and Maintenance Manual



Modular Wetlands[®] Linear

A Stormwater Biofiltration Solution

Northwest OPERATION & MAINTENANCE MANUAL



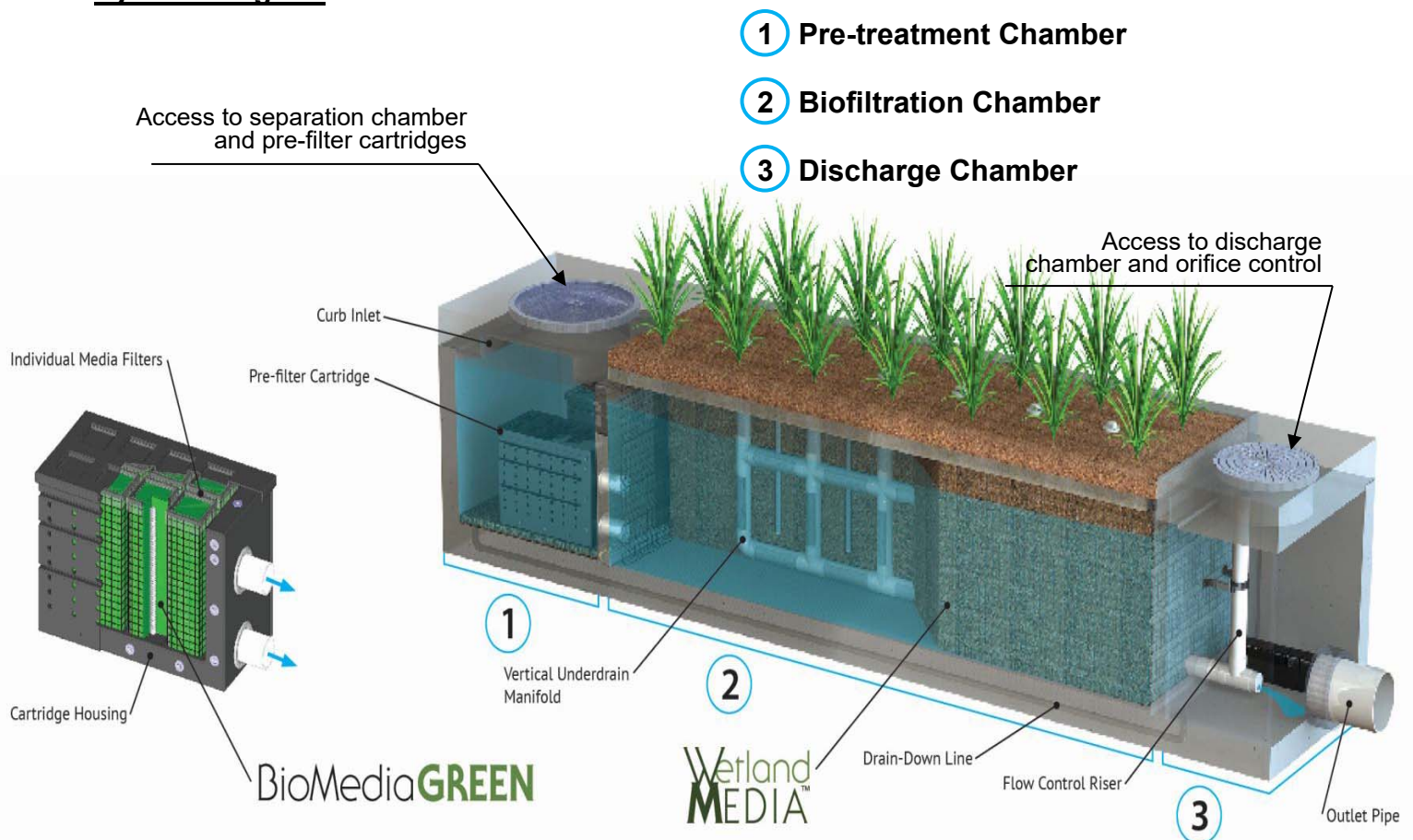


Inspection Guidelines for Modular Wetland System - Linear

Inspection Summary

- Inspect Pre-Treatment, Biofiltration and Discharge Chambers – average inspection interval is 6 to 12 months.
 - *(15 minute average inspection time).*
- NOTE: Pollutant loading varies greatly from site to site and no two sites are the same. Therefore, the first year requires inspection monthly during the wet season and every other month during the dry season in order to observe and record the amount of pollutant loading the system is receiving.

System Diagram



Inspection Overview

As with all stormwater BMPs inspection and maintenance on the MWS Linear is necessary. Stormwater regulations require that all BMPs be inspected and maintained to ensure they are operating as designed to allow for effective pollutant removal and provide protection to receiving water bodies. It is recommended that inspections be performed multiple times during the first year to assess the site specific loading conditions. This is recommended because pollutant loading and pollutant characteristics can vary greatly from site to site. Variables such as nearby soil erosion or construction sites, winter sanding on roads, amount of daily traffic and land use can increase pollutant loading on the system. The first year of inspections can be used to set inspection and maintenance intervals for subsequent years to ensure appropriate maintenance is provided. Without appropriate maintenance a BMP will exceed its storage capacity which can negatively affect its continued performance in removing and retaining captured pollutants.

Inspection Equipment

Following is a list of equipment to allow for simple and effective inspection of the MWS Linear:

- Modular Wetland Inspection Form
- Flashlight
- Manhole hook or appropriate tools to remove access hatches and covers
- Appropriate traffic control signage and procedures
- Measuring pole and/or tape measure.
- Protective clothing and eye protection.
- 7/16" open or closed ended wrench.
- **Large permanent black marker (initial inspections only – first year)**
- Note: entering a confined space requires appropriate safety and certification. It is generally not required for routine inspections of the system.





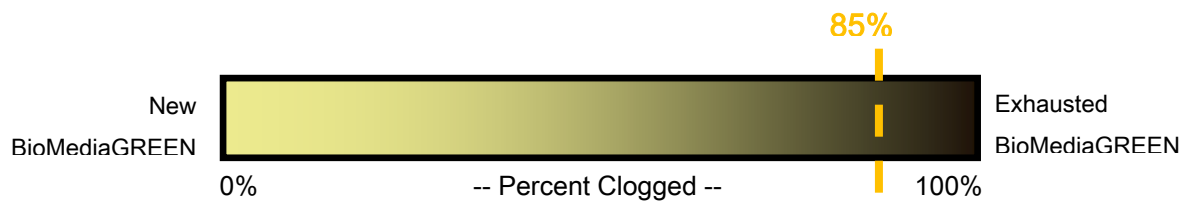
Inspection Steps

The core to any successful stormwater BMP maintenance program is routine inspections. The inspection steps required on the MWS Linear are quick and easy. As mentioned above the first year should be seen as the maintenance interval establishment phase. During the first year more frequent inspections should occur in order to gather loading data and maintenance requirements for that specific site. This information can be used to establish a base for long term inspection and maintenance interval requirements.

The MWS Linear can be inspected through visual observation without entry into the system. All necessary pre-inspection steps must be carried out before inspection occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once these access covers have been safely opened the inspection process can proceed:

- Prepare the inspection form by writing in the necessary information including project name, location, date & time, unit number and other info (see inspection form).
- Observe the inside of the system through the access hatches. If minimal light is available and vision into the unit is impaired utilize a flashlight to see inside the system and all of its chambers.
- Look for any out of the ordinary obstructions in the inflow pipe, pre-treatment chamber, biofiltration chamber, discharge chamber or outflow pipe. Write down any observations on the inspection form.
- Through observation and/or digital photographs estimate the amount of trash, debris and sediment accumulated in the pre-treatment chamber. Utilizing a tape measure or measuring stick estimate the amount of trash, debris and sediment in this chamber. Record this depth on the inspection form.

- Through visual observation inspect the condition of the pre-filter cartridges. Look for excessive build-up of sediments on the cartridges, any build-up on the top of the cartridges, or clogging of the holes. Record this information on the inspection form. The pre-filter cartridges can further be inspected by removing the cartridge tops and assessing the color of the BioMediaGREEN filter cubes (requires entry into pre-treatment chamber – see notes above regarding confined space entry). Record the color of the material. New material is a light green in color. As the media becomes clogged it will turn darker in color, eventually becoming dark brown or black. Using the below color indicator record the percentage of media exhausted.



- The biofiltration chamber is generally maintenance free due to the system's advanced pre-treatment chamber. For units which have open planters with vegetation it is recommended that the vegetation be inspected. Look for any plants that are dead or showing signs of disease or other negative stressors. Record the general health of the plants on the inspection and indicate through visual observation or digital photographs if trimming of the vegetation is needed.
- The discharge chamber houses the orifice control structure and is connected to the outflow pipe. It is important to check to ensure the orifice is in proper operating conditions and free of any obstructions. Generally, the discharge chamber will be clean and free of debris. Inspect the water marks on the side walls. If possible, inspect the discharge chamber during a rain event to assess the amount of flow leaving the system while it is at 100% capacity (pre-treatment chamber water level at peak HGL). The water level of the flowing water should be compared to the watermark level on the side walls which is an indicator of the highest discharge rate the system achieved when initially installed. Record on the form is there is any difference in level from watermark in inches.

- NOTE: During the first few storms the water level in the outflow chamber should be observed and a 6" long horizontal watermark line drawn (using a large permanent marker) at the water level in the discharge chamber while the system is operating at 100% capacity. The diagram below illustrates where a line should be drawn. This line is a reference point for future inspections of the system:



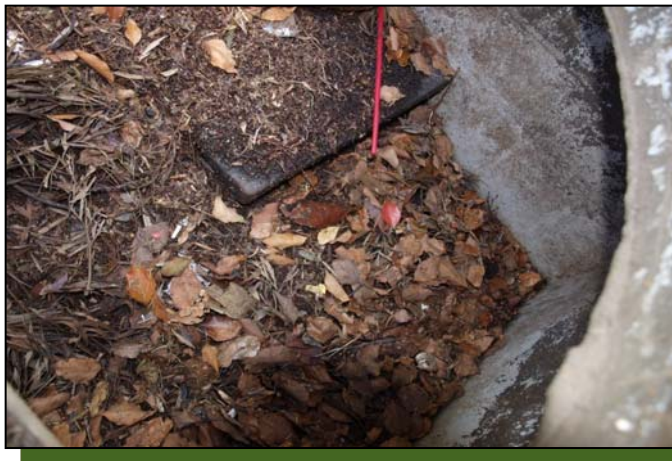
Using a permanent marker draw a 6 inch long horizontal line, as shown, at the higher water level in the MWS Linear discharge chamber.

- Water level in the discharge chamber is a function of flow rate and pipe size. Observation of water level during the first few months of operation can be used as a benchmark level for future inspections. The initial mark and all future observations shall be made when system is at 100% capacity (water level at maximum level in pre-treatment chamber). If future water levels are below this mark when system is at 100% capacity this is an indicator that maintenance to the pre-filter cartridges may be needed.
- Finalize inspection report for analysis by the maintenance manager to determine if maintenance is required.

Maintenance Indicators

Based upon observations made during inspection, maintenance of the system may be required based on the following indicators:

- Missing or damaged internal components or cartridges.
- Obstructions in the system or its inlet or outlet.
- Excessive accumulation of floatables in the pre-treatment chamber in which the length and width of the chamber is fully impacted more than 18”.



- Excessive accumulation of sediment in the pre-treatment chamber of more than 6” in depth.



- Excessive accumulation of sediment on the BioMediaGREEN media housed within the pre-filter cartridges. The following chart shows photos of the condition of the BioMediaGREEN contained within the pre-filter cartridges. When media is more than 85% clogged replacement is required.



- Overgrown vegetation.



- Water level in discharge chamber during 100% operating capacity (pre-treatment chamber water level at max height) is lower than the watermark by 20%.



Inspection Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the Biofiltration Chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.

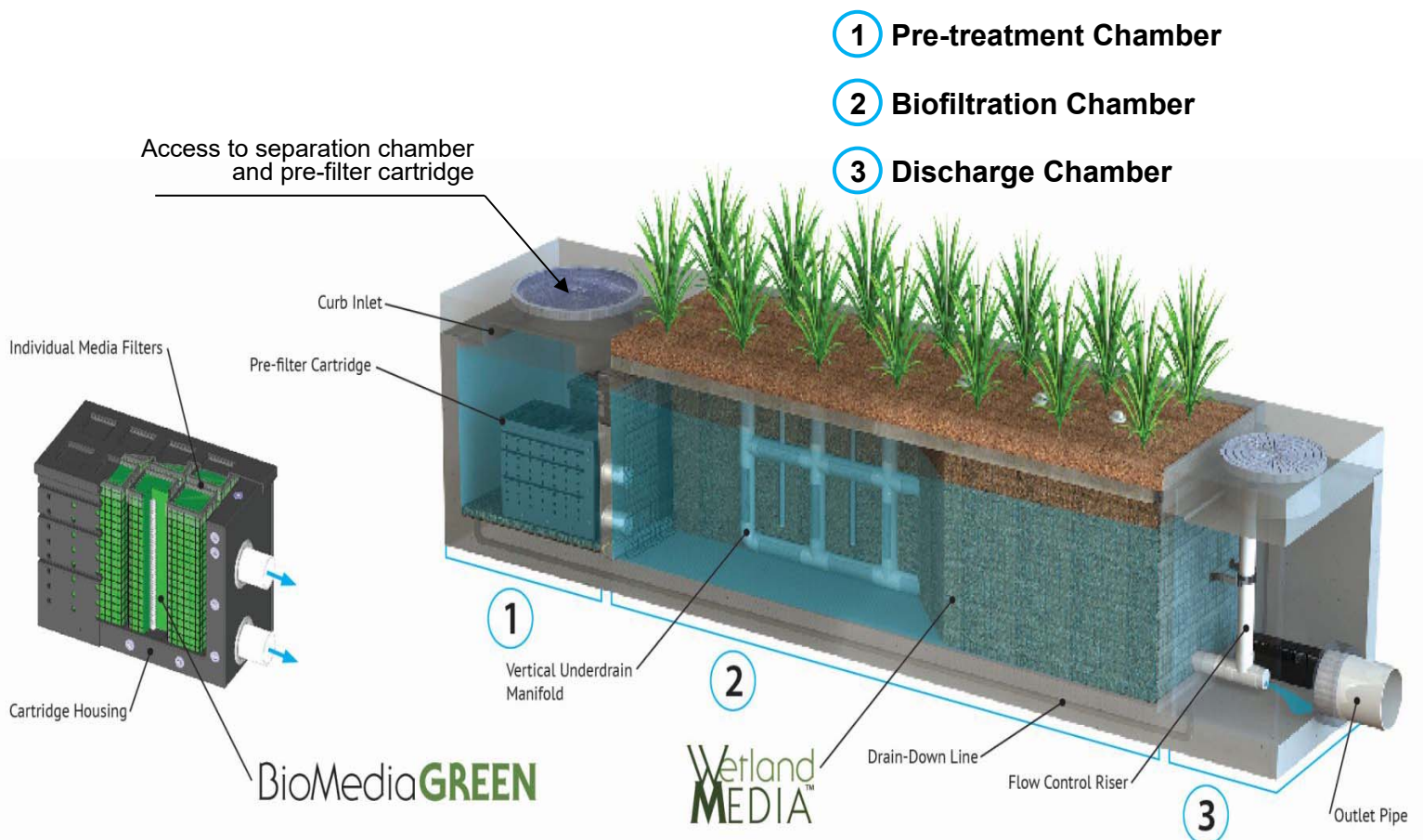


Maintenance Guidelines for Modular Wetland System - Linear

Maintenance Summary

- Remove Sediment from Pre-Treatment Chamber – average maintenance interval is 12 to 24 months.
 - (10 minute average service time).
- Replace Pre-Filter Cartridge Media – average maintenance interval 12 to 24 months.
 - (10-15 minute per cartridge average service time).
- Trim Vegetation – average maintenance interval is 6 to 12 months.
 - (Service time varies).

System Diagram



Maintenance Overview

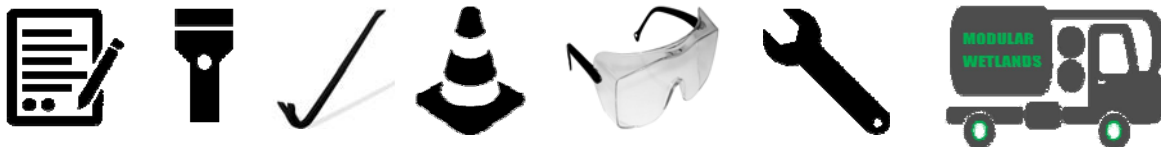
The time has come to maintain your Modular Wetland System Linear (MWS Linear). To ensure successful and efficient maintenance on the system we recommend the following. The MWS Linear can be maintained by removing the access hatches over the systems various chambers. All necessary pre-maintenance steps must be carried out before maintenance occurs, especially traffic control and other safety measures to protect the inspector and near-by pedestrians from any dangers associated with an open access hatch or manhole. Once traffic control has been set up per local and state regulations and access covers have been safely opened the maintenance process can begin. It should be noted that some maintenance activities require confined space entry. All confined space requirements must be strictly followed before entry into the system. In addition the following is recommended:

- Prepare the maintenance form by writing in the necessary information including project name, location, date & time, unit number and other info (see maintenance form).
- Set up all appropriate safety and cleaning equipment.
- Ensure traffic control is set up and properly positioned.
- Prepare a pre-checks (OSHA, safety, confined space entry) are performed.

Maintenance Equipment

Following is a list of equipment required for maintenance of the MWS Linear:

- Modular Wetland Maintenance Form
- Manhole hook or appropriate tools to access hatches and covers
- Protective clothing, flashlight and eye protection.
- 7/16" open or closed ended wrench.
- Vacuum assisted truck with pressure washer.
- Replacement BioMediaGREEN for Pre-Filter Cartridges if required (order from manufacturer).



Maintenance Steps

1. Pre-treatment Chamber (bottom of chamber)
 - A. Remove access hatch or manhole cover over pre-treatment chamber and position vacuum truck accordingly.
 - B. With a pressure washer spray down pollutants accumulated on walls and pre-filter cartridges.
 - C. Vacuum out Pre-Treatment Chamber and remove all accumulated pollutants including trash, debris and sediments. Be sure to vacuum the floor until pervious pavers are visible and clean.
 - D. If Pre-Filter Cartridges require media replacement move onto step 2. If not, replace access hatch or manhole cover.



Removal of access hatch to gain access below.



Insertion of vacuum hose into separation chamber.



Removal of trash, sediment and debris.



Fully cleaned separation chamber.

2. Pre-Filter Cartridges (attached to wall of pre-treatment chamber)

- A. After finishing step 1 enter pre-treatment chamber.
- B. Unscrew the two bolts holding the lid on each cartridge filter and remove lid.



Pre-filter cartridges with tops on.



Inside cartridges showing media filters ready for replacement.

- C. Place the vacuum hose over each individual media filter to suck out filter media.



Vacuuming out of media filters.

- D. Once filter media has been sucked use a pressure washer to spray down inside of the cartridge and it's containing media cages. Remove cleaned media cages and place to the side. Once removed the vacuum hose can be inserted into the cartridge to vacuum out any remaining material near the bottom of the cartridge.

- E. Reinstall media cages and fill with new media from manufacturer or outside supplier. Manufacturer will provide specification of media and sources to purchase. Utilize the manufacture provided refilling tray and place on top of cartridge. Fill tray with new bulk media and shake down into place. Using your hands slightly compact media into each filter cage. Once cages are full removed refilling tray and replace cartridge top ensuring bolts are properly tightened.



Refilling tray for media replacement.



Refilling tray on cartridge with bulk media.



- F. Exit pre-treatment chamber. Replace access hatch or manhole cover.

3. Biofiltration Chamber (middle vegetated chamber)

- A. In general, the biofiltration chamber is maintenance free with the exception of maintaining the vegetation. Using standard gardening tools properly trim back the vegetation to healthy levels. The MWS Linear utilizes vegetation similar to surrounding landscape areas therefore trim vegetation to match surrounding vegetation. If any plants have died replace plants with new ones:





Inspection Notes

1. Following maintenance and/or inspection, it is recommended the maintenance operator prepare a maintenance/inspection record. The record should include any maintenance activities performed, amount and description of debris collected, and condition of the system and its various filter mechanisms.
2. The owner should keep maintenance/inspection record(s) for a minimum of five years from the date of maintenance. These records should be made available to the governing municipality for inspection upon request at any time.
3. Transport all debris, trash, organics and sediments to approved facility for disposal in accordance with local and state requirements.
4. Entry into chambers may require confined space training based on state and local regulations.
5. No fertilizer shall be used in the Biofiltration Chamber.
6. Irrigation should be provided as recommended by manufacturer and/or landscape architect. Amount of irrigation required is dependent on plant species. Some plants may not require irrigation after initial establishment.



Inspection Form



Modular Wetland System, Inc.

P. 760.433-7640

F. 760-433-3176

E. Info@modularwetlands.com

www.modularwetlands.com



Maintenance Report



Modular Wetland System, Inc.

P. 760.433-7640

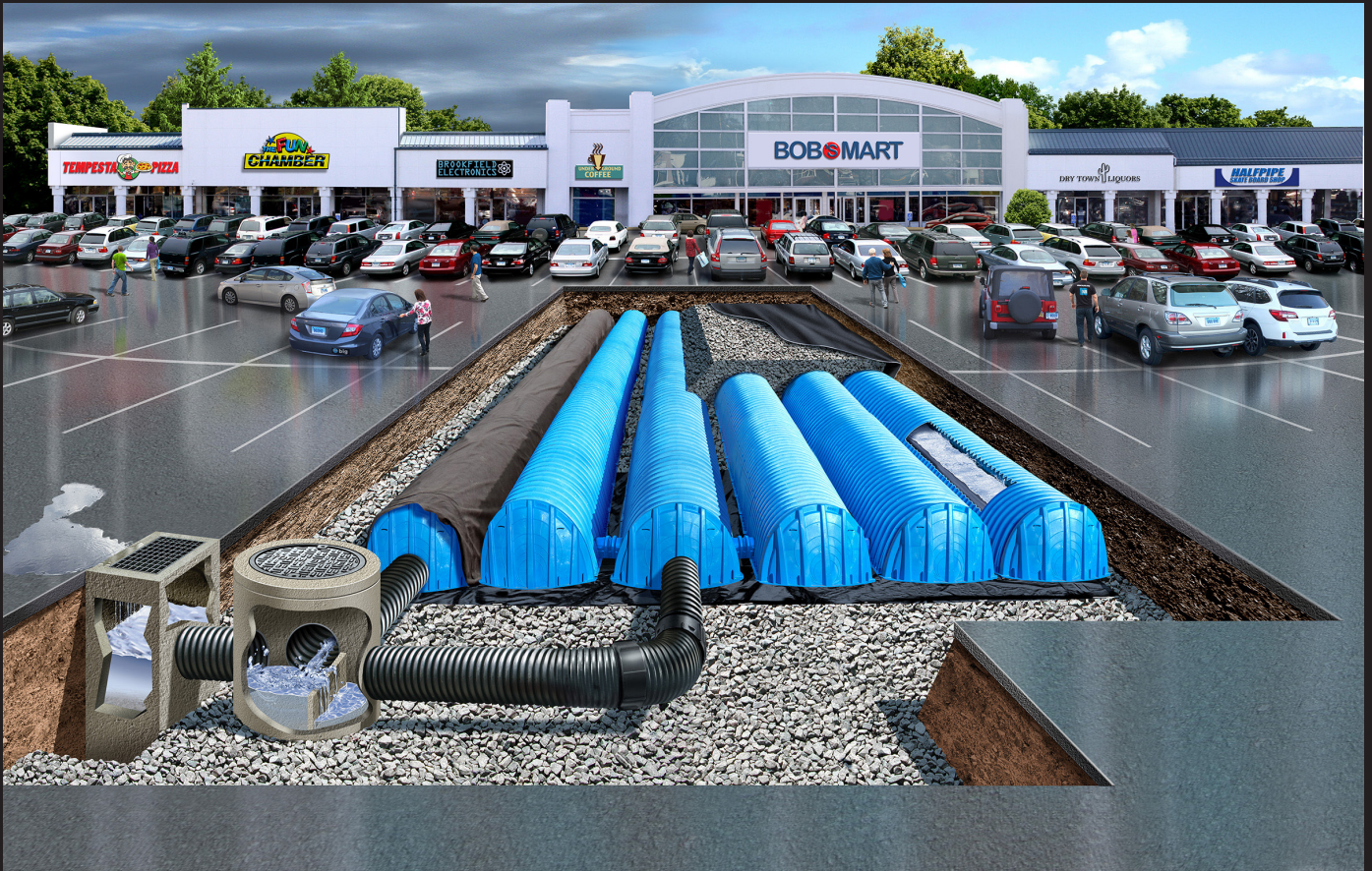
F. 760-433-3176

E. Info@modularwetlands.com

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CONTACTOR® & RECHARGER®

STORMWATER MANAGEMENT SOLUTIONS



OPERATION & MAINTENANCE GUIDELINES FOR CULTEC STORMWATER MANAGEMENT SYSTEMS



OPERATIONS AND MAINTENANCE GUIDELINES

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Contact Information:

For general information on our other products and services, please contact our offices within the United States at (800)428-5832, (203)775-4416 ext. 202, or e-mail us at custservice@cultec.com.

For technical support, please call (203)775-4416 ext. 203 or e-mail tech@cultec.com.

Visit www.cultec.com/downloads.html for Product Downloads and CAD details.

Doc ID: CLT057 01-20

January 2020

These instructions are for single-layer traffic applications only. For multi-layer applications, contact CULTEC. All illustrations and photos shown herein are examples of typical situations. Be sure to follow the engineer's drawings. Actual designs may vary.

This manual contains guidelines recommended by CULTEC, Inc. and may be used in conjunction with, but not to supersede, local regulations or regulatory authorities. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Introduction

The CULTEC Subsurface Stormwater Management System is a high-density polyethylene (HDPE) chamber system arranged in parallel rows surrounded by washed stone. The CULTEC chambers create arch-shaped voids within the washed stone to provide stormwater detention, retention, infiltration, and reclamation. Filter fabric is placed between the native soil and stone interface to prevent the intrusion of fines into the system. In order to minimize the amount of sediment which may enter the CULTEC system, a sediment collection device (stormwater pretreatment device) is recommended upstream from the CULTEC chamber system. Examples of pretreatment devices include, but are not limited to, an appropriately sized catch basin with sump, pretreatment catchment device, oil grit separator, or baffled distribution box. Manufactured pretreatment devices may also be used in accordance with CULTEC chambers. Installation, operation, and maintenance of these devices shall be in accordance with manufacturer's recommendations. Almost all of the sediment entering the stormwater management system will be collected within the pretreatment device.

Best Management Practices allow for the maintenance of the preliminary collection systems prior to feeding the CULTEC chambers. The pretreatment structures shall be inspected for any debris that will restrict inlet flow rates. Outfall structures, if any, such as outlet control must also be inspected for any obstructions that would restrict outlet flow rates. OSHA Guidelines must be followed when inspecting or cleaning any structure.

Operation and Maintenance Requirements

I. Operation

CULTEC stormwater management systems shall be operated to receive only stormwater run-off in accordance with applicable local regulations. CULTEC subsurface stormwater management chambers operate at peak performance when installed in series with pretreatment. Pretreatment of suspended solids is superior to treatment of solids once they have been introduced into the system. The use of pretreatment is adequate as long as the structure is maintained and the site remains stable with finished impervious surfaces such as parking lots, walkways, and pervious areas are properly maintained. If there is to be an unstable condition, such as improvements to buildings or parking areas, all proper silt control measures shall be implemented according to local regulations.

II. Inspection and Maintenance Options

- A. The CULTEC system may be equipped with an inspection port located on the inlet row. The inspection port is a circular cast box placed in a rectangular concrete collar. When the lid is removed, a 6-inch (150 mm) pipe with a screw-in plug will be exposed. Remove the plug. This will provide access to the CULTEC Chamber row below. From the surface, through this access, the sediment may be measured at this location. A stadia rod may be used to measure the depth of sediment if any in this row. If the depth of sediment is in excess of 3 inches (76 mm), then this row should be cleaned with high pressure water through a culvert cleaning nozzle. This would be carried out through an upstream manhole or through the CULTEC StormFilter Unit (or other pretreatment device). CCTV inspection of this row can be deployed through this access port to determine if any sediment has accumulated in the inlet row.
- B. If the CULTEC bed is not equipped with an inspection port, then access to the inlet row will be through an upstream manhole or the CULTEC StormFilter.
 1. **Manhole Access**
This inspection should only be carried out by persons trained in confined space entry and sewer inspection services. After the manhole cover has been removed a gas detector must be lowered into the manhole to ensure that there are not high concentrations of toxic gases present. The inspector should be lowered into the manhole with the proper safety equipment as per OSHA requirements. The inspector may be able to observe sediment from this location. If this is not possible, the inspector will need to deploy a CCTV robot to permit viewing of the sediment.

2. StormFilter Access

Remove the manhole cover to allow access to the unit. Typically a 30-inch (750 mm) pipe is used as a riser from the StormFilter to the surface. As in the case with manhole access, this access point requires a technician trained in confined space entry with proper gas detection equipment. This individual must be equipped with the proper safety equipment for entry into the StormFilter. The technician will be lowered onto the StormFilter unit. The hatch on the unit must be removed. Inside the unit are two filters which may be removed according to StormFilter maintenance guidelines. Once these filters are removed the inspector can enter the StormFilter unit to launch the CCTV camera robot.

- C. The inlet row of the CULTEC system is placed on a polyethylene liner to prevent scouring of the washed stone beneath this row. This also facilitates the flushing of this row with high pressure water through a culvert cleaning nozzle. The nozzle is deployed through a manhole or the StormFilter and extended to the end of the row. The water is turned on and the inlet row is back-flushed into the manhole or StormFilter. This water is to be removed from the manhole or StormFilter using a vacuum truck.

III. Maintenance Guidelines

The following guidelines shall be adhered to for the operation and maintenance of the CULTEC stormwater management system:

- A. The owner shall keep a maintenance log which shall include details of any events which would have an effect on the system's operational capacity.
- B. The operation and maintenance procedure shall be reviewed periodically and changed to meet site conditions.
- C. Maintenance of the stormwater management system shall be performed by qualified workers and shall follow applicable occupational health and safety requirements.
- D. Debris removed from the stormwater management system shall be disposed of in accordance with applicable laws and regulations.

IV. Suggested Maintenance Schedules

A. Minor Maintenance

The following suggested schedule shall be followed for routine maintenance during the regular operation of the stormwater system:

Frequency	Action
Monthly in first year	Check inlets and outlets for clogging and remove any debris, as required.
Spring and Fall	Check inlets and outlets for clogging and remove any debris, as required.
One year after commissioning and every third year following	Check inlets and outlets for clogging and remove any debris, as required.

B. Major Maintenance

The following suggested maintenance schedule shall be followed to maintain the performance of the CULTEC stormwater management chambers. Additional work may be necessary due to insufficient performance and other issues that might be found during the inspection of the stormwater management chambers. (See table on next page)

	Frequency	Action
Inlets and Outlets	Every 3 years	<ul style="list-style-type: none"> Obtain documentation that the inlets, outlets and vents have been cleaned and will function as intended.
	Spring and Fall	<ul style="list-style-type: none"> Check inlet and outlets for clogging and remove any debris as required.
CULTEC Stormwater Chambers	2 years after commissioning	<ul style="list-style-type: none"> Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.
	9 years after commissioning every 9 years following	<ul style="list-style-type: none"> Clean stormwater management chambers and feed connectors of any debris. Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended.
	45 years after commissioning	<ul style="list-style-type: none"> Clean stormwater management chambers and feed connectors of any debris. Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. Attain the appropriate approvals as required. Establish a new operation and maintenance schedule.
Surrounding Site	Monthly in 1 st year	<ul style="list-style-type: none"> Check for depressions in areas over and surrounding the stormwater management system.
	Spring and Fall	<ul style="list-style-type: none"> Check for depressions in areas over and surrounding the stormwater management system.
	Yearly	<ul style="list-style-type: none"> Confirm that no unauthorized modifications have been performed to the site.

For additional information concerning the maintenance of CULTEC Subsurface Stormwater Management Chambers, please contact CULTEC, Inc. at 1-800-428-5832.



WQMP Operation & Maintenance (O&M) Plan

Project Name: _____

Prepared for:

Project Name: _____

Address: _____

City, State Zip: _____

Prepared on:

Date: _____

This O&M Plan describes the designated responsible party for implementation of this WQMP, including: operation and maintenance of all the structural BMP(s), conducting the training/educational program and duties, and any other necessary activities. The O&M Plan includes detailed inspection and maintenance requirements for all structural BMPs, including copies of any maintenance contract agreements, manufacturer’s maintenance requirements, permits, etc.

8.1.1 Project Information

Project name	
Address	
City, State Zip	
Site size	
List of structural BMPs, number of each	
Other notes	

8.1.2 Responsible Party

The responsible party for implementation of this WQMP is:

Name of Person or HOA Property Manager	
Address	
City, State Zip	
Phone number	
24-Hour Emergency Contact number	
Email	

8.1.3 Record Keeping

Parties responsible for the O&M plan shall retain records for at least 5 years.

All training and educational activities and BMP operation and maintenance shall be documented to verify compliance with this O&M Plan. A sample Training Log and Inspection and Maintenance Log are included in this document.

8.1.4 Electronic Data Submittal

This document along with the Site Plan and Attachments shall be provided in PDF format. AutoCAD files and/or GIS coordinates of BMPs shall also be submitted to the City.

Appendix ____

BMP SITE PLAN

Site plan is preferred on minimum 11" by 17" colored sheets, as long as legible.

Minor Maintenance

Frequency		Action
Monthly in first year		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
<input type="checkbox"/> Month 1	Date:	
<input type="checkbox"/> Month 2	Date:	
<input type="checkbox"/> Month 3	Date:	
<input type="checkbox"/> Month 4	Date:	
<input type="checkbox"/> Month 5	Date:	
<input type="checkbox"/> Month 6	Date:	
<input type="checkbox"/> Month 7	Date:	
<input type="checkbox"/> Month 8	Date:	
<input type="checkbox"/> Month 9	Date:	
<input type="checkbox"/> Month 10	Date:	
<input type="checkbox"/> Month 11	Date:	
<input type="checkbox"/> Month 12	Date:	
Spring and Fall		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
<input type="checkbox"/> Spring	Date:	
<input type="checkbox"/> Fall	Date:	
<input type="checkbox"/> Spring	Date:	
<input type="checkbox"/> Fall	Date:	
<input type="checkbox"/> Spring	Date:	
<input type="checkbox"/> Fall	Date:	
<input type="checkbox"/> Spring	Date:	
<input type="checkbox"/> Fall	Date:	
<input type="checkbox"/> Spring	Date:	
<input type="checkbox"/> Fall	Date:	
<input type="checkbox"/> Spring	Date:	
<input type="checkbox"/> Fall	Date:	
One year after commissioning and every third year following		Check inlets and outlets for clogging and remove any debris, as required.
		Notes
<input type="checkbox"/> Year 1	Date:	
<input type="checkbox"/> Year 4	Date:	
<input type="checkbox"/> Year 7	Date:	
<input type="checkbox"/> Year 10	Date:	
<input type="checkbox"/> Year 13	Date:	
<input type="checkbox"/> Year 16	Date:	
<input type="checkbox"/> Year 19	Date:	
<input type="checkbox"/> Year 22	Date:	

Major Maintenance

Frequency		Action
Inlets and Outlets	Every 3 years	
	<input type="checkbox"/> Year 1	Date:
	<input type="checkbox"/> Year 4	Date:
	<input type="checkbox"/> Year 7	Date:
	<input type="checkbox"/> Year 10	Date:
	<input type="checkbox"/> Year 13	Date:
	<input type="checkbox"/> Year 16	Date:
	<input type="checkbox"/> Year 19	Date:
	<input type="checkbox"/> Year 22	Date:
	Spring and Fall	
	<input type="checkbox"/> Spring	Date:
	<input type="checkbox"/> Fall	Date:
	<input type="checkbox"/> Spring	Date:
	<input type="checkbox"/> Fall	Date:
	<input type="checkbox"/> Spring	Date:
	<input type="checkbox"/> Fall	Date:
<input type="checkbox"/> Spring	Date:	
<input type="checkbox"/> Fall	Date:	
CULTEC Stormwater Chambers	2 years after commissioning	
	<input type="checkbox"/> Inspect the interior of the stormwater management chambers through inspection port for deficiencies using CCTV or comparable technique. <input type="checkbox"/> Obtain documentation that the stormwater management chambers and feed connectors will function as anticipated.	
	Notes	
<input type="checkbox"/> Year 2	Date:	

Major Maintenance

Frequency		Action
CULTEC Stormwater Chambers	9 years after commissioning every 9 years following	
	<ul style="list-style-type: none"> <input type="checkbox"/> Clean stormwater management chambers and feed connectors of any debris. <input type="checkbox"/> Inspect the interior of the stormwater management structures for deficiencies using CCTV or comparable technique. <input type="checkbox"/> Obtain documentation that the stormwater management chambers and feed connectors have been cleaned and will function as intended. 	
	Notes	
	<input type="checkbox"/> Year 9	Date:
	<input type="checkbox"/> Year 18	Date:
	<input type="checkbox"/> Year 27	Date:
	<input type="checkbox"/> Year 36	Date:
45 years after commissioning		
<ul style="list-style-type: none"> <input type="checkbox"/> Clean stormwater management chambers and feed connectors of any debris. <input type="checkbox"/> Determine the remaining life expectancy of the stormwater management chambers and recommended schedule and actions to rehabilitate the stormwater management chambers as required. <input type="checkbox"/> Inspect the interior of the stormwater management chambers for deficiencies using CCTV or comparable technique. <input type="checkbox"/> Replace or restore the stormwater management chambers in accordance with the schedule determined at the 45-year inspection. <input type="checkbox"/> Attain the appropriate approvals as required. <input type="checkbox"/> Establish a new operation and maintenance schedule. 		
Notes		
<input type="checkbox"/> Year 45	Date:	

Major Maintenance

Frequency		Action	
Surrounding Site	Monthly in 1st year		
	<input type="checkbox"/> Check for depressions in areas over and surrounding the stormwater management system.		
	Notes		
	<input type="checkbox"/> Month 1	Date:	
	<input type="checkbox"/> Month 2	Date:	
	<input type="checkbox"/> Month 3	Date:	
	<input type="checkbox"/> Month 4	Date:	
	<input type="checkbox"/> Month 5	Date:	
	<input type="checkbox"/> Month 6	Date:	
	<input type="checkbox"/> Month 7	Date:	
	<input type="checkbox"/> Month 8	Date:	
	<input type="checkbox"/> Month 9	Date:	
	<input type="checkbox"/> Month 10	Date:	
	<input type="checkbox"/> Month 11	Date:	
	<input type="checkbox"/> Month 12	Date:	
	Spring and Fall		
	<input type="checkbox"/> Check for depressions in areas over and surrounding the stormwater management system.		
	Notes		
	<input type="checkbox"/> Spring	Date:	
	<input type="checkbox"/> Fall	Date:	
	<input type="checkbox"/> Spring	Date:	
	<input type="checkbox"/> Fall	Date:	
	<input type="checkbox"/> Spring	Date:	
	<input type="checkbox"/> Fall	Date:	
	<input type="checkbox"/> Spring	Date:	
	<input type="checkbox"/> Fall	Date:	
	<input type="checkbox"/> Spring	Date:	
	<input type="checkbox"/> Fall	Date:	
	<input type="checkbox"/> Spring	Date:	
	<input type="checkbox"/> Fall	Date:	
	Yearly		
	<input type="checkbox"/> Confirm that no unauthorized modifications have been performed to the site.		
Notes			
<input type="checkbox"/> Year 1	Date:		
<input type="checkbox"/> Year 2	Date:		
<input type="checkbox"/> Year 3	Date:		
<input type="checkbox"/> Year 4	Date:		
<input type="checkbox"/> Year 5	Date:		
<input type="checkbox"/> Year 6	Date:		
<input type="checkbox"/> Year 7	Date:		



CULTEC, Inc.

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RETENTION • DETENTION • INFILTRATION • WATER QUALITY



CITY OF TUALATIN
Planning Division

Land Use Application

Project Information		
Project Title: Walgraeves Industrial Park		
Brief Description: Annexation of a portion of property that will have access via SW Myslony Street.		
Property Information		
Address: 11345 SW Herman Road, Tualatin OR		
Assessor's Map Number and Tax Lots: 2S122D000550		
Applicant/Primary Contact		
Name: Beth Zauner	Company Name: AAI Engineering	
Address: 4875 SW Griffith Dr. #300		
City: Beaverton	State: Oregon	ZIP: 97005
Phone: 503-620-3030	Email: bethz@aaieng.com	
Property Owner		
Name: GARY A. WALGRAEVE, Ricky A Walgraev e		
Address: 11345 SW HERMAN RD.		
City: TUALATIN	State: OR.	ZIP: 97062
Phone: 503-692-0766	Email: farmerboys@comcast.net	
Property Owner's Signature: Gary A. Walgraev e, Ricky A Walgraev e		Date: Sept 1 '21
<i>(Note: Letter of authorization is required if not signed by owner)</i>		
AS THE PERSON RESPONSIBLE FOR THIS APPLICATION, I HEREBY ACKNOWLEDGE THAT I HAVE READ THIS APPLICATION AND STATE THAT THE INFORMATION IN AND INCLUDED WITH THIS APPLICATION IN ITS ENTIRETY IS CORRECT. I AGREE TO COMPLY WITH ALL APPLICABLE CITY AND COUNTY ORDINANCES AND STATE LAWS REGARDING BUILDING CONSTRUCTION AND LAND USE.		
Applicant's Signature:		Date:

Land Use Application Type:

- | | | |
|--|---|---|
| <input checked="" type="checkbox"/> Annexation (ANN) | <input type="checkbox"/> Historic Landmark (HIST) | <input type="checkbox"/> Minor Architectural Review (MAR) |
| <input checked="" type="checkbox"/> Architectural Review (AR) | <input type="checkbox"/> Industrial Master Plan (IMP) | <input type="checkbox"/> Minor Variance (MVAR) |
| <input type="checkbox"/> Architectural Review—Single Family (ARSF) | <input type="checkbox"/> Plan Map Amendment (PMA) | <input type="checkbox"/> Sign Variance (SVAR) |
| <input type="checkbox"/> Architectural Review—ADU (ARADU) | <input type="checkbox"/> Plan Text Amendment (PTA) | <input type="checkbox"/> Variance (VAR) |
| <input type="checkbox"/> Conditional Use (CUP) | <input type="checkbox"/> Tree Removal/Review (TCP) | |

Office Use		
Case No:	Date Received:	Received by:
Fee:	Receipt No:	

Walgraeves submittal materials for AR

GENERAL:

- Land Use Application form
- Narrative addressing all applicable approval criteria and standards
- Title Report
- Hydraulic Modeling Worksheet
- Service Provider Letter from Clean Water Services
- Service Provider Letter/Agreement from Republic Services

PLANS:

- Existing Conditions
- Site Plan
- Tree Preservation Plan
- Grading Plan
- Utility Plan
- Landscape Plan
- Lighting Plan
- Color Elevations
- Materials Board

PUBLIC NOTICE:

- Documentation for Neighborhood Developer Meeting
- Certification of Sign Posting

TYPICAL REPORTS:

- Tree Assessment Report
- Transportation Impact Study
- Stormwater Management Report



25 NW 23rd Place Suite 1 / Commercial Dept
Portland, OR 97210
Phone (503) 219-9088 Fax (503) 477-6476

WFG National Title Insurance Company
Attn: Trevor Cheyne
25 NW 23rd Place Suite 1 / Commercial Dept
Portland, OR 97210

Date Prepared: June 12, 2020

PRELIMINARY TITLE REPORT

Order Number: **20-207334**
Escrow Officer: Trevor Cheyne
Phone: (503) 444-7047
Fax: (503) 296-5869
Email: tcheyne@wfgnationaltitle.com

Seller(s): Gary Walgraeve and Ricky Walgraeve
Buyer(s): Phelan Development Company, LLC

Property: 11345 SW Herman Road, Tualatin, OR 97062

WFG National Title Insurance Company, is prepared to issue a title insurance policy, as of the effective date and in the form and amount shown on Schedule A, subject to the conditions, stipulations and exclusions from coverage appearing in the policy form and subject to the exceptions shown on Schedule B. This Report (and any Amendments) is preliminary to and issued solely for the purpose of facilitating the issuance of a policy of title insurance at the time the real estate transaction in question is closed and no liability is assumed in the Report. The Report shall become null and void unless a policy is issued and the full premium paid.

This report is for the exclusive use of the person to whom it is addressed. Title insurance is conditioned on recordation of satisfactory instruments that establish the interests of the parties to be insured; until such recordation, the Company may cancel or revise this report for any reason.

SCHEDULE A

1. The effective date of this preliminary title report is **8:00 A.M. on 9th day of June, 2020**
2. The policies and endorsements to be insured and the related charges are:

<u>Policy/Endorsement Description</u>	<u>Liability</u>	<u>Charge</u>
ALTA 2006 Owners Policy	\$9,016,920.00	\$14,126.00
Basic Owner's Rate		\$14,126.00

Proposed Insured: Phelan Development Company, LLC

Government Service Fee: \$25.00

This is a preliminary billing only, a consolidated statement of charges, credits and advances, if any, in connection with this order will be provided at closing.

3. Title to the land described herein is vested in:

Ricky Walgraeve and Gary Walgraeve, as tenants in common

4. The estate or interest in land is:

Fee Simple

5. The land referred to in this report is described as follows:

SEE ATTACHED EXHIBIT "A" ATTACHED HERETO AND MADE A PART HEREOF

EXHIBIT "A"
LEGAL DESCRIPTION

A tract of land being a portion of that certain tract of land described in Deed to Gary Walgraeve and Ricky Walgraeve recorded November 12, 1993, as Fee No. 930943118, Washington County Deed Records, in the Southeast 1/4 of Section 22, Township 2 South, Range 1 West of the Willamette Meridian, County of Washington and State of Oregon, being more particularly described as follows:

Commencing at a 3-1/4" aluminum disk marking the South 1/4 corner of said Section 22; thence along the South line of said Southeast 1/4 of Section 22, North 89°37'22" East 69.55 feet to the Southwest corner of said Walgraeve tract; thence along the West line thereof, North 00°27'50" West 970.99 feet to the True Point of Beginning of the herein described tract of land; thence continuing along said West line, North 00°27'50" West 1220.09 feet to the Southeasterly right of way line of the Southern Pacific Railroad (60.00 feet wide); thence along said right of way line North 67°04'40" East 1179.33 feet to the North line of said Southeast 1/4 of Section 22; thence leaving said right of way line and along said North line North 89°40'09" East 167.37 feet; thence South 00°20'09" East 444.41 feet to the North line of Tract B, Partition Plat No. 2003-082, a duly recorded plat in said County; thence along said North line North 88°39'51" West 5.00 feet to the Northwest corner of said Tract B, also being the Northwest corner of that certain tract of land described in Deed to Swanpor Corporation recorded September 24, 1986, as Fee No. 86043361, said Deed Records; thence along the West line of said Swanpor tract South 00°20'09" East 1227.71 feet; thence leaving said West line South 89°37'22" West 1248.52 feet to the True Point of Beginning.

ALSO a tract of land being a portion of that certain tract of land described in Deed to Gary Walgraeve and Ricky Walgraeve, as tenants in common, recorded July 28, 2006 as Instrument No. 2006-090121, Washington County Records, situated in the Southeast quarter of Section 22, Township 2 South, Range 1 West of the Willamette Meridian, County of Washington, State of Oregon, being more particularly described as follows:

Commencing at a 3-1/4" aluminum disk marking the South quarter corner of said Section 22; thence along the South line of said Southeast quarter of Section 22, North 89°37'22" East 69.55 feet to the Southwest corner of said Walgraeve tract; thence along the West line thereof North 00°27'50" West 507.64 feet to the True Point of Beginning of the herein described tract of land; thence continuing along said West line North 00°27'50" West 463.34 feet; thence leaving said West line North 89°37'22" East 1248.52 feet to the West line of Parcel 1, Partition Plat 2003-082, a duly recorded Plat in Washington County; thence along said West line South 00°20'09" East 430.00 feet to the North line of that certain tract of land conveyed to Pascuzzi Investment LLC by Quitclaim Deed recorded June 2, 1995 as Instrument No. 95-037906, said Deed Records; thence along said North line South 89°37'22" West 495.00 feet to the Northwest corner of said Pascuzzi tract of land; thence North 00°22'38" West 30.00 feet to the beginning of a 2553.81 foot radius non-tangent curve to the left, a radial line bears North 00°22'38" West to said point; thence along the arc of said curve 438.46 feet through a central angle of 9°50'14" (the long chord bears South 84°42'15" West 437.93 feet); thence along a radial line North 10°12'52" West 7.00 feet to the beginning of a 2560.81 foot radius curve to the left, said curve being concentric with the aforementioned curve; thence along the arc of said curve 37.74 feet through a central angle of 0°50'40" (the long chord bears South 79°21'49" West 37.74 feet) to the beginning of a 1497.92 foot radius reverse curve to the right; thence along the arc of said curve 272.61 feet through a central angle of 10°25'38" (the long chord bears South 84°09'18" West 272.23 feet); thence South 89°22'07" West 6.87 feet to the true point of beginning. The bearings contained in this description are based on Survey No. 30526, Washington County Survey Records.

EXCEPTING THEREFROM a tract of land located in the Southeast One-Quarter of Section 22, Township 2 South, Range 1 West, Willamette Meridian, City of Tualatin, Washington County, Oregon and being more particularly described as follows: Beginning at the southwest corner of Parcel 1 of Partition Plat Number 2003-082, being a 3 inch brass disk inscribed "DE HAAS AND ASSOC. INC.", thence along the west line of said Parcel 1 North 00°20'09" West 395.59 feet to a 5/8 inch iron rod with a yellow plastic cap inscribed "DE HAAS & ASSOC. INC."; thence South 89°37'22" West 5.00 feet to the True Point of Beginning, being a 5/8 inch iron rod with a yellow plastic cap inscribed "DE HAAS & ASSOC. INC."; thence South 89°37'22" West 495.00 feet to a 5/8 inch iron rod with a yellow plastic cap inscribed "RYAN LS 58833"; thence North 00°22'38" West 140.00 feet to a point; thence North 89°37'22" East 495.10 feet to a point on the west line of said Parcel I; thence along said west line South 00°20'09" East 140.00 feet to the True Point of Beginning. The Basis of Bearings is per Washington County Survey Number 30837.

SCHEDULE B

GENERAL EXCEPTIONS

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the public records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto the subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.
5. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.

SPECIAL EXCEPTIONS

6. As disclosed by the tax roll the premises herein described have been zoned or classified for farm use. At any time that said land is disqualified for such use, the property may be subject to additional taxes or penalties and interest.
7. Unpaid Taxes for 2019 -2020:

Levied Amount	:	\$66.94
Balance Owing	:	\$66.94, plus interest
Property ID No.	:	R2159788
Levy Code	:	023.76
Map Tax Lot No.	:	2S122D000550
8. Unpaid Taxes for 2019 -2020:

Levied Amount	:	\$2,028.91
Balance Owing	:	\$2,028.91, plus interest
Property ID No.	:	R530624
Levy Code	:	023.78
Map Tax Lot No.	:	2S122D000550
9. City liens, if any, of the City of Tualatin. We find none as of June 12, 2020.
10. Rights of governmental bodies in and to any portion of the premises lying within an unnamed creek or tributary of [Hedges Creek](#), for flood control and protection of anadromous fish and for wetlands protection.
11. Ordinance No. 685-86 of the City of Tualatin, including the terms and provisions thereof:

Regarding	:	Local Improvement District for sewer system improvements
Recorded	:	January 27, 1986
Recording No.	:	86003933
12. Ordinance No. 684-86 of the City of Tualatin, including the terms and provisions thereof:

Regarding	:	Local Improvement District for water system improvements
Recorded	:	January 27, 1986
Recording No.	:	86003934

13. Easement, including the terms and provisions thereof:
 - For : Sanitary sewer line
 - Granted to : City of Tualatin
 - Recorded : May 12, 1987
 - Recording No. : [87024140](#)
 - Affects : see [Public Survey 31560](#) for location

14. Easement, including the terms and provisions thereof:
 - For : Storm water line to benefit property [south of Myslony Street](#)
 - Granted to : Pacific N.W. Properties Limited Partnership, and [assigns](#)
 - Recorded : December 24, 2007
 - Recording No. : [2007-130682](#)
 - Affects : Location to be determined

15. State Tax Warrant:
 - In favor of : State of Oregon Department of Revenue
 - Against : Rick A Walgraeve
 - Warrant No. : L0748665344
 - Recorded : August 19, 2016
 - Recording No. : [2016-066433](#)
 - Amount : \$7,907.84

16. State Tax Warrant:
 - In favor of : State of Oregon Department of Revenue
 - Against : Rick A Walgraeve
 - Warrant No. : L0115917568
 - Recorded : April 7, 2017
 - Recording No. : [2017-028179](#)
 - Amount : \$2,721.65
 - and
 - Notice of Renewal of Distraint Warrant:
 - Recorded : April 27, 2017
 - Recording No. : [2017-033784](#)

17. This Commitment is subject to approval by personnel of WFG National Title Insurance Company and any additional limitations, requirements or exceptions made by WFG National Title Insurance Company.

18. The legal description herein covers more property than is intended for the transaction. We require that a surveyor's legal description for the intended parcel be provided prior to closing.

END OF EXCEPTIONS

NOTE: Please be advised that we have searched the records and do not find any open Deeds of Trust or Mortgages. If you should have knowledge of an outstanding obligation, please contact the Title Department for further review.

NOTE: In no event shall WFG National Title Insurance Company have any liability for the tax assessor's imposition of any additional assessments for omitted taxes unless such taxes have been added to the tax roll and constitute liens on the property as of the date of closing. Otherwise, such omitted taxes shall be the sole, joint and several responsibility of seller(s) and buyer(s), as they may determine between themselves.

NOTE: LINKS FOR ADDITIONAL SUPPORTING DOCUMENTS:

- [Vesting Deed 93094118](#)
- [Vesting Deed 2006-090121 PLA](#)
- [Vesting Deed 2007-117930 PLA](#)
- [Vesting Deed 2010-102922 PLA](#)
- [PS 30526 - 2006 PLA survey](#)
- [PS 30837 - 2007 PLA survey](#)
- [PS 31560 - 2010 PLA survey](#)
- [PS 33560 - 2019 Myslony Street & 118th Ave survey](#)
- [Partition Plat 2012-002 south of Myslony St](#)
- [Partition Plat 2003-082 - adjacent east](#)
- [Plat Map 3-11 Tualatin Valley Acres - adjacent west](#)
- [86043361 deed to Swanpor](#)- legal description reference
- [2010-102923 deed to Pascuzzi](#) - legal description reference
- [map - WCO - Hedges Creek Greenway](#)
- [map - NWN gas lines](#)
- [map - WCO zoning](#)
- [Photos - GoogleEarth-rTM](#)

NOTE: Due to current conflicts or potential conflicts between state and federal law, which conflicts may extend to local law, regarding marijuana, if the transaction to be insured involves property which is currently used or is to be used in connection with a marijuana enterprise, including but not limited to the cultivation, storage, distribution, transport, manufacture, or sale of marijuana and/or products containing marijuana, the Company declines to close or insure the transaction, and this Preliminary Title Report shall automatically be considered null and void and of no force and effect.

NOTE: The following applicable recording fees will be charged by the county:

Washington County-First Page	\$81.00
Each Additional Page	\$ 5.00
Non-standard Document Fee	\$20.00
E-recording Fee	\$ 3.00

Washington County Ordinance No. 193, recorded May 13, 1977 in Washington County, Oregon imposes a tax of \$1.00 per \$1,000.00 or fraction thereof on the transfer of real property located within Washington County.

NOTE: IMPORTANT INFORMATION REGARDING PROPERTY TAX PAYMENTS

Fiscal Year:	July 1 st through June 30 th
Taxes become a lien on real property, but are not yet payable.	July 1 st
Taxes become certified and payable (approximately on this date)	October 15 th
First one third payment of taxes are due	November 15 th
Second one third payment of taxes are due	February 15 th
Final payment of taxes are due	May 15 th

Discounts: If two thirds are paid by November 15th, a 2% discount will apply.

If the full amount of the taxes are paid by November 15th, a 3% discount will apply.

Interest: Interest accrues as of the 15th of each month based on any amount that is unpaid by the due date. No interest is charged if the minimum amount is paid according to the above mentioned payment schedule.

NOTE: THE FOLLOWING NOTICE IS REQUIRED BY STATE LAW: YOU WILL BE REVIEWING, APPROVING AND SIGNING IMPORTANT DOCUMENTS AT CLOSING. LEGAL CONSEQUENCES FOLLOW FROM THE SELECTION AND USE OF THESE DOCUMENTS. YOU MAY CONSULT AN ATTORNEY ABOUT THESE DOCUMENTS. YOU SHOULD CONSULT AN ATTORNEY IF YOU HAVE QUESTIONS OR CONCERNS ABOUT THE TRANSACTION OR ABOUT THESE DOCUMENTS. IF YOU WISH TO REVIEW TRANSACTION DOCUMENTS THAT YOU HAVE NOT SEEN, CONTACT THE ESCROW AGENT.

End of Report

Your Escrow Officer

Trevor Cheyne
WFG National Title Insurance Company
25 NW 23rd Place Suite 1 / Commercial Dept
Portland, OR 97210
Phone: **(503) 444-7047**
Fax: **(503) 296-5869**
Email: **TeamTrevor@wfgnationaltitle.com**

Your Title Officer

Rosa Stombaugh
WFG National Title Insurance Company
12909 SW 68th Pkwy., Suite 350
Portland, OR 97223
Phone: **(503) 431-8526**
Fax: **(503) 684-2978**
Email: **rstombaugh@wfgnationaltitle.com**



WFG National Title Insurance Company is prepared to issue, as of the date specified in the attached Preliminary Title Report (the Report), a policy or policies of title insurance as listed in the Report and describing the land and the estate or interest set forth, insuring against loss which may be sustained by reason of any defect, lien or encumbrance not shown or referred to as a General or Specific Exception or not excluded from coverage pursuant to the printed Exclusions and Conditions of the policy form(s).

The printed General Exceptions and Exclusions from the coverage of the policy or policies are listed in Exhibit One to the Report. In addition, the forms of the policy or policies to be issued may contain certain contract clauses, including an arbitration clause, which could affect the party's rights. Copies of the policy forms should be read. They are available from the office which issued the Report.

The Report (and any amendments) is preliminary to and issued solely for the purpose of facilitating the issuance of a policy of title insurance at the time the real estate transaction in question is closed and no liability is assumed in the Report.

The policy(s) of title insurance to be issued will be policy(s) of WFG National Title Insurance Company.

Please read the Specific Exceptions shown in the Report and the General Exceptions and Exclusions listed in Exhibit One carefully. The list of Specific and General Exceptions and Exclusions are meant to provide you with notice of matters which are not covered under the terms of the title insurance policy to be issued and should be read and carefully considered.

It is important to note that the Report is not an abstract of title, a written representation as to the complete condition of the title of the property in question, and may not list all liens, defects and encumbrances affecting title to the land.

The Report is for the exclusive use of the parties to this transaction, and the Company does not have any liability to any third parties or any liability under the terms of the policy(s) to be issued until the full premium is paid. Until all necessary documents are recorded in the public record, the Company reserves the right to amend the Report.

Countersigned

A handwritten signature in black ink, appearing to be 'J. B. G.', written in a cursive style.

Exhibit One
2006 American Land Title Association Loan Policy 6-17-06
EXCLUSIONS FROM COVERAGE

The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
 - (i) the occupancy, use, or enjoyment of the Land;
 - (ii) the character, dimensions, or location of any improvement erected on the Land;
 - (iii) the subdivision of land; or
 - (iv) environmental protection;or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
- (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
 - (a) created, suffered, assumed, or agreed to by the Insured Claimant;
 - (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
 - (c) resulting in no loss or damage to the Insured Claimant;
 - (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 11, 13, or 14); or
 - (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Insured Mortgage.
4. Unenforceability of the lien of the Insured Mortgage because of the inability or failure of an Insured to comply with applicable doing-business laws of the state where the Land is situated.
5. Invalidity or unenforceability in whole or in part of the lien of the Insured Mortgage that arises out of the transaction evidenced by the Insured Mortgage and is based upon usury or any consumer credit protection or truth-in-lending law.
6. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction creating the lien of the Insured Mortgage, is
 - (a) a fraudulent conveyance or fraudulent transfer, or
 - (b) a preferential transfer for any reason not stated in Covered Risk 13(b) of this policy.
7. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the Insured Mortgage in the Public Records. This Exclusion does not modify or limit the coverage provided under Covered Risk 11(b).

THE ABOVE POLICY FORM MAY BE ISSUED TO AFFORD EITHER Standard Coverage or Extended Coverage. In addition to the above Exclusions from Coverage, the Exceptions from Coverage in a Standard Coverage policy will also include the following Exceptions from Coverage:

SCHEDULE B - GENERAL EXCEPTIONS FROM COVERAGE

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the public records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto the subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.
5. Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.

2006 AMERICAN LAND TITLE ASSOCIATION OWNER'S POLICY 6-17-06
EXCLUSIONS FROM COVERAGE

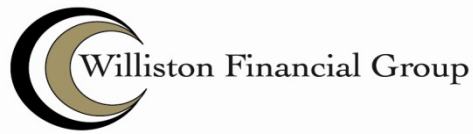
The following matters are expressly excluded from the coverage of this policy, and the Company will not pay loss or damage, costs, attorneys' fees, or expenses that arise by reason of:

1. (a) Any law, ordinance, permit, or governmental regulation (including those relating to building and zoning) restricting, regulating, prohibiting, or relating to
 - (i) the occupancy, use, or enjoyment of the Land;
 - (ii) the character, dimensions, or location of any improvement erected on the Land;
 - (iii) the subdivision of land; or
 - (iv) environmental protection;or the effect of any violation of these laws, ordinances, or governmental regulations. This Exclusion 1(a) does not modify or limit the coverage provided under Covered Risk 5.
- (b) Any governmental police power. This Exclusion 1(b) does not modify or limit the coverage provided under Covered Risk 6.
2. Rights of eminent domain. This Exclusion does not modify or limit the coverage provided under Covered Risk 7 or 8.
3. Defects, liens, encumbrances, adverse claims, or other matters
 - (a) created, suffered, assumed, or agreed to by the Insured Claimant;
 - (b) not Known to the Company, not recorded in the Public Records at Date of Policy, but Known to the Insured Claimant and not disclosed in writing to the Company by the Insured Claimant prior to the date the Insured Claimant became an Insured under this policy;
 - (c) resulting in no loss or damage to the Insured Claimant;
 - (d) attaching or created subsequent to Date of Policy (however, this does not modify or limit the coverage provided under Covered Risk 9 and 10); or
 - (e) resulting in loss or damage that would not have been sustained if the Insured Claimant had paid value for the Title.
4. Any claim, by reason of the operation of federal bankruptcy, state insolvency, or similar creditors' rights laws, that the transaction vesting the Title as shown in Schedule A, is
 - (a) a fraudulent conveyance or fraudulent transfer; or
 - (b) a preferential transfer for any reason not stated in Covered Risk 9 of this policy.
5. Any lien on the Title for real estate taxes or assessments imposed by governmental authority and created or attaching between Date of Policy and the date of recording of the deed or other instrument of transfer in the Public Records that vests Title as shown in Schedule A.

SCHEDULE B - GENERAL EXCEPTIONS FROM COVERAGE

1. Taxes or assessments which are not shown as existing liens by the records of any taxing authority that levies taxes or assessments on real property or by the public records; proceedings by a public agency which may result in taxes or assessments, or notices of such proceedings, whether or not shown by the records of such agency or by the public records.
2. Facts, rights, interests or claims which are not shown by the public records but which could be ascertained by an inspection of the land or by making inquiry of persons in possession thereof.
3. Easements, or claims of easement, not shown by the public records; reservations or exceptions in patents or in Acts authorizing the issuance thereof; water rights, claims or title to water.
4. Any encroachment (of existing improvements located on the subject land onto adjoining land or of existing improvements located on adjoining land onto the subject land), encumbrance, violation, variation, or adverse circumstance affecting the title that would be disclosed by an accurate and complete land survey of the subject land.

Any lien, or right to a lien, for services, labor, material, equipment rental or workers compensation heretofore or hereafter furnished, imposed by law and not shown by the public records.



Plain English Privacy Statement for Appraisal, Title & Escrow Customers

WFG believes it is important to protect your privacy and confidences. We recognize and respect the privacy expectations of our customers. We believe that making you aware of how we collect information about you, how we use that information, and who we share that information will form the basis for a relationship of trust between us. This Privacy Policy provides that explanation. We reserve the right to change this Privacy Policy from time to time.

Williston Financial Group, LLC, WFG National Title Insurance Co. and each of the affiliates listed below (collectively "WFG" or the "WFG Family") are obligated to comply with Federal and state privacy laws. While there are some common requirements to those laws, the definitions and duties differ significantly from law-to-law and state-to-state. A privacy statement drafted to comply with all of the applicable privacy laws and their differing definitions would likely be confusing. Therefore, in an attempt to better communicate our privacy policies, WFG designed this "Plain English" explanation, followed by the Gramm-Leach-Bliley Act model form and State-Specific Privacy Notices in order to provide you with the complete, legal privacy notices and disclosures required under Federal and applicable State Laws.

WFG's primary business is providing appraisal, title insurance and, escrow services for the sale or refinance of real property. This can be a complicated process, involving multiple parties, many of whom have been selected by our customers, each filling a specialized role. In part, you have hired WFG to coordinate and smooth the passage of the information necessary for an efficient settlement or closing.

In the course of this process, WFG collects a significant amount of personal and identifying information about the parties to a transaction, including sensitive items that include but are not limited to: your contact information including email addresses, Social Security numbers, driver's license and, other identification numbers and information; financial, bank and insurance information; information about past and proposed mortgages and loans; about properties you currently or previously owned; your mortgage application package; and the cookie, IP address, and other information captured automatically by computer systems.

Much of this information is gathered from searches of public land records, tax, court and credit records to make certain that any liens, challenges, or title defects are addressed properly. Some of the information that is collected is provided by you, or the computer systems you use. We also may receive information from real estate brokers and agents, mortgage brokers and, others working to facilitate your transaction. We also may receive information from public, private or governmental databases including credit bureaus, 'no-fly' lists, and terrorist 'watch lists', as well as from your lenders and credit bureaus.

What Information is Shared?

WFG DOES NOT SELL any of your information to non-affiliated companies for marketing or any other purpose.

However, some of the same information does get shared with persons inside and outside the WFG Family in order to facilitate and complete your transaction.

For example:

- Information, draft documents, and closing costs will pass back and forth between WFG and your mortgage broker and lender to facilitate your transaction.
- Information, including purchase agreements and amendments, will pass back and forth between WFG and the real estate agents and brokers, the mortgage brokers and lenders, your lawyers and accountants, and others involved in facilitating the transaction.
- WFG may order property searches and examinations from title searchers, abstractors and title plants.
- WFG may use third parties to obtain tax information, lien information, payoff information, condominium and, homeowners' association information and payoff information.
- Third parties may be engaged to prepare documents in connection with your transaction.
- Surveys, appraisals and, inspections may be ordered.
- Within the WFG Family of companies, we may divide up the work to handle each closing in the most efficient and compliant manner possible and to meet specific legal and licensing requirements. Certain parts of your closing (for example a search or disbursement) may be handled by another division or company within the WFG family.

- When it is time for signatures, your complete closing package may be sent to a notary, remote online notary, or notary service company who will arrange to meet with you to sign documents. The notary will, in turn, send signed copies back to us along with copies of your driver's license or other identity documents usually by mail, UPS, Federal Express or another courier service.
- Your deed, mortgage and other documents required to perfect title will be recorded with the local recorder of deeds.
- In some cases, we use an outside service to coordinate the recording or electronic-recording of those instruments, and they will receive copies of your deeds, mortgages and other recordable documents to process, scan and send on to the recording office.
- Various government agencies get involved. The law requires us to provide certain information to the IRS, the US Treasury, local and state tax authorities and other governmental agencies.

You have a choice in the selection of a mortgage broker, lender, real estate broker or agent and others that make up your 'transaction team.' Information flows to and from the members of the transaction team you have selected to facilitate an efficient transaction for you.

When WFG selects and engages a third-party provider, we limit the scope of the information shared with that third party to the information reasonably necessary for that service provider to provide the requested services. With most, we have entered into express agreements in which they expressly commit to maintain a WFG customer's information in strict confidence and use the information only for purposes of providing the requested services, clearing title, preventing fraud and addressing claims under our title insurance policies.

How does WFG use your Information?

We may use your personal information in a variety of ways, including but not limited to:

- Provide the products, services and title insurance you have requested and to close and facilitate your transaction.
- Coordinate and manage the appraisal process.
- Handle a claim or provide other services relating to your title insurance policies.
- Create and manage your account.
- Operate and improve WFG's applications and websites, including WFG MyHome WFG's secure communication and transaction portal. Your information is used for access management, payment processing, site administration, internal operations, troubleshooting, data analysis, testing, research, and for statistical purposes.
- Respond to your requests, feedback, or inquiries.
- Comply with laws, regulations, and other legal requirements.
- Comply with relevant industry standards and our policies, including managing WFG's risk profile through reinsurance.
- Protect and enforce your rights and the rights of other users against unlawful activity, including identity theft and fraud.
- Protect and enforce our collective rights arising under any agreements entered into between WFG and you or any other third party;
- Protect the integrity and maintain security of our applications, websites, and products;
- Operate, evaluate, and improve our business; and
- Provide you with information about products, services, and promotions, from WFG or third parties that may interest you.

How Do We Store and Protect Your Personal Information?

Although no system can guarantee the complete security of your personal information, we will use our best efforts to maintain commercially reasonable technical, organizational, and physical safeguards, consistent with applicable law, to protect your personal information and our systems and sites from malicious intrusions or hacking.

How Long Do We Keep Your Personal Information?

We keep your personal information for as long as necessary to comply with the purpose for which it was collected, our business needs, and our legal and regulatory obligations. We may store some personal information indefinitely. If we dispose of your personal information, we will do so in a way that is secure and appropriate to the nature of the information subject to disposal.

Computer Information

When you access a WFG website, or communicate with us by e-mail, we may automatically collect and store more information than you are expressly providing when you fill out a survey or send an email. This may include:

- Your IP Address.
- Your email address, your alias and, social media handles.
- (Internet Protocol Address) and domain name.
- The type of browser and operating system you use.
- The time of your visit.
- The pages of our site you visit.
- Cookies.

In order to provide you with customized service, we make use of Web browser cookies. Cookies are files that help us identify your computer and personalize your online experience. You may disable cookies on your computer, but you may not be able to download online documents or access certain sites unless cookies are enabled.

The technical information we collect is used for administrative and technical purposes and to prevent fraud and provide identity verification. For instance, we may use it to count the number of visitors to our site and determine the most popular pages. We may also use it to review types of technology you are using, determine which link brought you to our Web site, assess how our advertisements on other sites are working, help with maintenance, and improve our customers' experience.

We may compare information gathered on previous visits to verify that we are interacting with the same parties and not a potential imposter.

If we ask you to fill out any forms or surveys, we will use the information we receive only for the specific purposes indicated in those forms or surveys.

The information you and your transaction team send us in emails or attached to an email, or provide through any of our online tools, is used for purposes of providing title, escrow and appraisal management services and used for the purposes described above.

Links to Third Party Sites

Our Applications and Websites may contain links to third-party websites and services. Please note that these links are provided for your convenience and information, and the websites and services may operate independently from us and have their own privacy policies or notices, which we strongly suggest you review. This Privacy Notice applies to WFG's applications and websites only.

Do Not Track

Because there is not an industry-standard process or defined criteria to permit a user to opt-out of tracking their online activities (Do Not Track or DNT), our websites do not currently change the way they operate based upon detection of a "Do Not Track" or similar signal. Likewise, we cannot assure that third parties are not able to collect information about your online activities on WFG websites or applications.

Social Media Integration

Our applications, websites, and products contain links to and from social media platforms. You may choose to connect to us through a social media platform, such as Facebook, Twitter, Google, etc. When you do, we may collect additional information from or about you, such as your screen names, profile picture, contact information, contact list, and the profile pictures of your contacts, through the social media platform. The social media platforms may also collect information from you.

When you click on a social plug-in, such as Facebook's "Like" button, Twitter's "tweet" button or the Google+, that particular social network's plugin will be activated and your browser will directly connect to that provider's servers. Your action in clicking on the social plug-in causes information to be passed to the social media platform.

We do not have control over the collection, use and sharing practices of social media platforms. We, therefore, encourage you to review their usage and disclosure policies and practices, including their data security practices, before using social media platforms.

How Can You “Opt-Out?”

We do not sell your information; therefore there is no need to opt-out of such reselling. Under various laws, you can opt-out of the sharing of your information for more narrow purposes. For additional detail, consult the Links under the “Legal” Notices attached below.

The “Legal” Notices

To comply with various federal and state laws, we are required to provide more complete legal notices and disclosures. In reviewing these, you will find that these notices incorporate the definitions and terminology used in the respective privacy laws which can often be somewhat convoluted and may even seem inconsistent with the descriptions above. The state-specific statutes may also give residents of those states additional rights and remedies.

How to Contact Us

If you have any questions about WFG’s privacy policy or how we protect your information, please contact WFG:

- By email: Consumerprivacy@willistonfinancial.com
- By telephone: 833-451-5718
- By fax: 503-974-9596
- By mail: 12909 SW 68th Pkwy, Suite 350, Portland, OR 97223
- In-person: 12909 SW 68th Pkwy, Suite 350, Portland, OR 97223

WFG FAMILY

WILLISTON FINANCIAL GROUP LLC
WFG NATIONAL TITLE INSURANCE COMPANY
WFG LENDER SERVICES, LLC
WFGLS TITLE AGENCY OF UTAH, LLC
WFG NATIONAL TITLE COMPANY OF WASHINGTON, LLC
WFG NATIONAL TITLE COMPANY OF CALIFORNIA
WFG NATIONAL TITLE COMPANY OF TEXAS, LLC D/B/A WFG NATIONAL TITLE COMPANY
UNIVERSAL TITLE PARTNERS, LLC
VALUTRUST SOLUTIONS, LLC
WILLISTON ENTERPRISE SOLUTIONS & TECHNOLOGY, LLC
WFG NATIONAL TITLE COMPANY OF CLARK COUNTY, WA, LLC D/B/A WFG NATIONAL TITLE

FACTS	WHAT DOES WILLISTON FINANCIAL GROUP DO WITH YOUR PERSONAL INFORMATION?
Why?	Financial companies choose how they share your personal information. Federal law gives consumers the right to limit some but not all sharing. Federal law also requires us to tell you how we collect, share, and protect your personal information. Please read this notice carefully to understand what we do.
What?	The types of personal information we collect and share depend on the product or service you have with us. This information can include: <ul style="list-style-type: none"> • Social Security number and other government identification information • Your name, address, phone, and email • Information about the property, any liens and restrictions • Financial Information including credit history and other debt • Financial account information, including wire transfer instructions.
How?	All financial companies need to share customers' personal information to run their everyday business. In the section below, we list the reasons financial companies can share their customers' personal information; the reasons Williston Financial Group chooses to share; and whether you can limit this sharing.

Reasons we can share your personal information	Does Williston Financial Group share?	Can you limit this sharing?
For our everyday business purposes—such as to process your transactions, maintain your account(s), respond to court orders and legal investigations, or report to credit bureaus	Yes	No
For our marketing purposes—to offer our products and services to you	Yes	No
For joint marketing with other financial companies	No	We don't share
For our affiliates' everyday business purposes—information about your transactions and experiences	Yes	No
For our affiliates' everyday business purposes—information about your creditworthiness	No	We don't share
For our affiliates to market to you	No	We don't share
For nonaffiliates to market to you	No	We don't share

To limit our sharing	<ul style="list-style-type: none"> • Call 833-451-5718—our menu will prompt you through your choice(s) • Visit us online: http://bit.ly/WFGsConsumerPrivacyInformationRequestPage or e-mailing us at consumerprivacy@willistonfinancial.com <p>Mail the form below</p> <p>Please note:</p> <p>If you are a new customer, we can begin sharing your information [30] days from the date we sent this notice. When you are no longer our customer, we continue to share your information as described in this notice.</p> <p>However, you can contact us at any time to limit our sharing.</p>
Questions?	Call 833-451-5718 or Email consumerprivacy@willistonfinancial.com

Mail-In Form	
If you have a joint policy, your choices will apply to everyone on your account.	<p>Mark any/all you want to limit:</p> <p><input type="checkbox"/> Do not share information about my creditworthiness with your affiliates for their everyday business purposes.</p> <p><input type="checkbox"/> Do not allow your affiliates to use my personal information to market to me.</p> <p><input type="checkbox"/> Do not share my personal information with nonaffiliates to market their products and services to me.</p>
Name	<input type="text"/>
Address	<input type="text"/>
City, State, Zip	<input type="text"/>
File Number	<input type="text"/>
<p>Mail to:</p> <p>Williston Financial Group PRIVACY DEPT 12909 SW 68th Pkwy, #350 Portland, OR 97223</p>	

Who we are	
Who is providing this notice	Williston Financial Group, LLC and its affiliates and subsidiaries as listed below:
What we do	
How does Williston Financial Group protect my personal information?	To protect your personal information from unauthorized access and use, we use security measures that comply with federal law. These measures include computer safeguards and secured files and buildings. We limit access to your information to employees that need to use the information to process or protect transaction. We take industry standard (IPSEC) measures to protect against malicious intrusions or hacking
How does Williston Financial Group collect my personal information?	<p>We collect your personal information, for example, when you</p> <ul style="list-style-type: none"> • Apply for insurance • Engage us to provide appraisal, title and escrow services • Give us your contact information • Provide your mortgage information • Show your driver's license <p>We also collect your personal information from others, such as real estate agents and brokers, mortgage brokers, lenders, credit bureaus, affiliates, and others</p>
Why can't I limit all sharing?	<p>Federal law gives you the right to limit only</p> <ul style="list-style-type: none"> • sharing for affiliates' everyday business purposes—information about your creditworthiness • affiliates from using your information to market to you • sharing for nonaffiliates to market to you <p>State laws and individual companies may give you additional rights to limit sharing. See below for more on your rights under state law.</p>
What happens when I limit sharing for an account I hold jointly with someone else?	Your choices will apply to everyone on your policy.
Definitions	
Affiliates	<p>Companies related by common ownership or control. They can be financial and nonfinancial companies.</p> <p>Our affiliates include companies with a common corporate identity, including those listed below.</p>
Nonaffiliates	<p>Companies not related by common ownership or control. They can be financial and nonfinancial companies.</p> <p>Nonaffiliates we share with can include real estate agents and brokers, mortgage brokers, lenders, appraisers, abstractors and title searchers and others as appropriate to facilitate your transaction.</p>
Joint marketing	<p>A formal agreement between nonaffiliated financial companies that together market financial products or services to you.</p> <p>Williston Financial Group does not jointly market.</p>
Other important information	
As a resident or citizen of certain states, we may have to provide additional state-specific privacy notices and you may have rights other than as set forth above. The privacy notices below will provide state-specific information:	

PRIVACY NOTICE FOR CALIFORNIA RESIDENTS

This PRIVACY NOTICE FOR CALIFORNIA RESIDENTS supplements the information contained in the Privacy Statement of WFG NATIONAL TITLE INSURANCE COMPANY and its parent, subsidiaries and affiliates (collectively, "WFG" "we," "us," or "our") and applies solely to customers, parties to real estate transactions, visitors, users, and others who reside in the State of California ("consumer" or "you"). We have adopted this notice to comply with the California Consumer Privacy Act of 2018 ("CCPA") and other California privacy laws. Any terms defined in the CCPA have the same meaning when used in this notice.

Your Rights as a California Consumer

Under California Law, you have the right to request that WFG disclose what personal information we collect, use, disclose, and sell. You have the right to opt-out of a sale of your personal information, and you may request the deletion of your personal information. You will not receive discriminatory treatment by WFG if you exercise any of your privacy rights under CCPA.

You may also designate an authorized agent to make a request under the CCPA on your behalf.

These are not absolute rights, they are subject to exceptions and limitations which we are happy to discuss as they may apply to your particular circumstances and the services you have engaged WFG to supply.

If you would like to exercise any of these rights or to designate an authorized agent, you may start the process by:

- Emailing us at consumerprivacy@willistonfinancial.com
- Going to <http://bit.ly/WFGsConsumerPrivacyInformationRequestPage>
- Calling us at: 833-451-5718; or
- Going into any WFG office and making the request in person.

In exercising any of these rights, we must make absolutely certain we are dealing with you or your authorized agent. So depending on how you submit your request, we will be asking you to confirm your identity, which may include providing additional documentation or information to verify it is really you, and we may send a notary or other person to meet with you in person or require you to come into a WFG office to verify your identity. Some of the identification process may be handled through an online portal and may include knowledge-based identification questions.

Information We Collect

WFG's primary business is providing appraisal, title and escrow services for the sale or refinance of real estate. This can be a complicated and legalistic process. In part, you have hired WFG to centralize and smooth the passage of all the information necessary for your real estate transaction and to have us coordinate a smooth and efficient closing. In the course of providing those services to you, we collect a significant amount of personal information.

We do not knowingly collect, maintain or use personal information from children under the age of 18 and no part of our Services are directed or targeted to children. If you become aware that a child under the age of 18 has provided WFG with personal information in violation of this Privacy Policy, please alert us at Consumerprivacy@willistonfinancial.com.

The CCPA requires us to list the statutory categories of consumers' personal information that we have collected about any consumers in the preceding 12 months. Much of this information is gathered from our searches of the land, tax, court and credit records to make certain that any liens, challenges, or title defects are addressed properly. Some of it is provided by you, or your computer systems. Some come from real estate agents and brokers, mortgage brokers and others working to facilitate your transaction, and some are provided by your lenders and credit bureaus. Here's how it breaks down:

Category and Examples	From where do we get this Information?	Purpose Collected	3 rd Parties with whom shared
Identifiers. Such as your name, spouse's name, maiden names, family member's names, aliases, postal address, unique personal identifier, online identifiers, Internet Protocol address, email address, account name, Social Security number, driver's license number, passport number, or other similar identifiers	You, your family and agents Your computer, tablet and cell phone Real estate agents and brokers involved in the transaction Mortgage brokers, lenders and credit bureaus Surveyors, appraisers, abstractors, title plants, title searchers Lien searchers and clearance companies	Each Category of information will be used in various combinations for the following purposes: <ul style="list-style-type: none">To provide the services and products requested, including title and settlement services, evaluating the state of title of a property and identifying the liens and encumbrances affecting that property, to close loans, to record your deeds, mortgages and other instruments affecting title, make filings with government agencies, clearing title defects, to provide customer support to you and others involved in your transaction.To prevent fraud in transactions, to find, prevent and respond to online and offline security issues, and for purposes of Identity verification	See Below "Disclosure of Personal Information for a Business Purpose"
Personal information categories listed in Cal. Civ. Code § 1798.80(e) such as your name, signature, Social Security number, physical characteristics or description, address, telephone number, passport number, driver's license or state identification card number, insurance policy number, education, employment, employment history, bank account number, credit card number, debit card number, or any other financial information..	You, your family and agents Your computer, tablet and cell phone Real estate agents and brokers involved in the transaction Mortgage brokers, lenders and credit bureaus Surveyors, appraisers, abstractors, title plants, title searchers Lien searchers and clearance companies	<ul style="list-style-type: none">To prevent fraud in transactions, to find, prevent and respond to online and offline security issues, and for purposes of Identity verificationFor Government and regulatory compliance and reporting, to comply with relevant industry standards and best practices and WFG policies.To maintain and supplement title plants, databases of prior policies, subdivision master searches and other resources which may expedite future transactions affecting your property.To use and optimize our computer systems, understand how you use our online an web resources and improve our websites and apps and present their contents to you; while maintaining the	See Below "Disclosure of Personal Information for a Business Purpose"
Protected classification characteristics under California or federal law including your age, race, color, marital status, sex, physical disability, and veteran or military status as such information appears in driver license and other identity documents and in loan application materials.	You, your family and agents Real estate agents and brokers involved in the transaction Mortgage brokers, lenders and credit bureaus	<ul style="list-style-type: none">For Government and regulatory compliance and reporting, to comply with relevant industry standards and best practices and WFG policies.	See Below "Disclosure of Personal Information for a Business Purpose"
Commercial information mostly in the form of real property records, mortgage records and lien records.	You, your family and agents Your computer, tablet and cell phone Real estate agents and brokers involved in the transaction Mortgage brokers, lenders and credit bureaus Surveyors, appraisers, abstractors, title plants, title searchers Lien searchers and clearance companies	<ul style="list-style-type: none">To maintain and supplement title plants, databases of prior policies, subdivision master searches and other resources which may expedite future transactions affecting your property.To use and optimize our computer systems, understand how you use our online an web resources and improve our websites and apps and present their contents to you; while maintaining the	See Below "Disclosure of Personal Information for a Business Purpose"
Biometric information as contained in drivers licenses and identity documents; captured on security cameras in our offices; and as	You, your family and agents Notaries and others handling	<ul style="list-style-type: none">To use and optimize our computer systems, understand how you use our online an web resources and improve our websites and apps and present their contents to you; while maintaining the	See Below "Disclosure of Personal Information for a Business Purpose"

required for notarization and e-notarization in some states.	closing and signing functions Your computer, tablet and cell phone	<p>integrity and security of our applications, websites and products.</p> <ul style="list-style-type: none"> To provide you with email, text and video alerts, event registrations and other notices concerning our products or services, or events or news, that may be of interest to you. To carry out our obligations and enforce our rights arising from the contracts entered into between you and us, and with others, including for billing and collections and handling of claims under a title policy. For testing, research, analysis and product development. As necessary or appropriate to protect the rights, property or safety of us, insureds, our customers, and others. To respond to law enforcement, regulatory, and lender requests and as required by applicable law, court order, or governmental regulations. As described to you when collecting your personal information or as otherwise set forth in the CCPA and the Gramm-Leach-Bliley Act. To evaluate or conduct a merger, divestiture, restructuring, reorganization, dissolution, or other sale or transfer of some or all of our assets, whether as a going concern or as part of bankruptcy, liquidation, or similar proceeding, in which personal information held by us is among the assets transferred. 	Business Purpose”
Internet or other similar network activity such as information on how you interact with and use our websites, applications, emails, texts and other electronic resources	You, your family and agents Your computer, tablet and cell phone		See Below “Disclosure of Personal Information for a Business Purpose”
Geolocation data, primarily in the form of the location of your property and when and where someone may be meeting you for signatures, etc.	You, your family and agents Real estate agents and brokers involved in the transaction Mortgage brokers, lenders and credit bureaus Surveyors, appraisers, abstractors, title plants, title searchers Lien searchers and clearance companies Notaries and those handling closing and signing Your computer, tablet and cell phone		See Below “Disclosure of Personal Information for a Business Purpose”
Audio, electronic, visual, thermal, olfactory, or similar information. Should you choose to interact with us by phone, video link or come into our offices your voice or images may be recorded	You, your family and agents Your computer, tablet and cell phone		See Below “Disclosure of Personal Information for a Business Purpose”
Professional or employment-related information. Current or past job history is often a part of loan applications and statements of information.	You, your family and agents Mortgage brokers, lenders and credit bureaus		See Below “Disclosure of Personal Information for a Business Purpose”
Inferences drawn from other personal information.	You, your family and agents Your computer, tablet and cell phone Real estate agents and brokers involved in the transaction Mortgage brokers, lenders and credit bureaus Surveyors, appraisers, abstractors, title plants, title searchers Lien searchers and clearance companies		See Below “Disclosure of Personal Information for a Business Purpose”

Disclosure of Personal Information for a Business Purpose

WFG DOES NOT SELL your information for monetary or other valuable consideration for marketing or any other purpose.

However, some of your information **does get shared**, and within the last 12 months has been shared with persons outside of the WFG family of companies in order to better facilitate and complete your transactions and for other business and commercial purposes.

For example:

- WFG may order property searches and examinations from title searchers, abstractors and title plants.
- WFG may use third parties to obtain tax information, lien information, mortgage payoff information, condominium, and homeowners' association information and payoff information.
- WFG may engage third parties to prepare documents in connection with your transaction.
- WFG may order surveys, appraisals, and inspections and/or communicate with those service providers.

Those services can't be ordered without providing basic information about the property involved, the parties, and/or the liens to those service providers.

- Within the WFG family of companies, we divide up the work to handle each closing most efficiently and to meet specific legal and licensing requirements. So certain parts of your closing (for example a search or disbursement) may be handled by another division or company within the WFG family.
- When it is time for signatures, your complete closing package may be sent to a mobile notary, remote online notary, or notary service company who will arrange to meet with you to sign documents. The notary will, in turn, send signed copies back to us along with copies of your driver's license or other identity documents usually by mail, UPS, Federal Express or other courier service and sometimes by email or another electronic transmission.
- Your deed, mortgage and other documents required to perfect or clarify title will be recorded with the local recorder of deeds.
- We may use an outside service to coordinate the recording or e-recording of those instruments, and they will receive copies of deeds, mortgages and other recordable documents to process, scan and send on to the recording office.
- Information and draft documents will pass back and forth between WFG and the lenders and mortgage brokers to facilitate your transaction.
- Information, including purchase agreements and amendments, will pass back and forth between WFG and the Real estate agents and brokers, lenders, the mortgage brokers and others facilitating the transaction; and
- Various government agencies get involved. The law requires us to provide certain information to the IRS, the US Treasury, local and state tax authorities, recorders of deeds and other governmental agencies.
- In resolving claims and mitigating losses, we may engage outside counsel and other service providers (such as surveyors and appraisers) to assist in resolving the claim.
- From time to time, we are required to respond to law enforcement, regulatory, and lender requests and as required by applicable law, court order, or governmental regulations.

Contact for More Information

If you have any questions or comments about this notice, our Privacy Statement, the ways in which we collect and use your personal information, your choices and rights regarding such use, or wish to exercise your rights under California law, please do not hesitate to contact us at:

- Emailing us at consumerprivacy@willistonfinancial.com
- Going to <http://bit.ly/WFGsConsumerPrivacyInformationRequestPage>
- Calling us at: 833-451-5718; or
- Going into any WFG office and making the request in person.

The business is not subject to requirements set forth section 999.317(g) of the California Consumer Privacy Act Regulations

Changes to Our Privacy Notice

We reserve the right to amend this privacy notice at our discretion and at any time. When we make changes to this privacy notice, we will notify you by email or through a notice on our website homepage.

Privacy Notice for Oregon Residents

We may not disclose personal or privileged information about you unless we provide you with a disclosure authorization form that is executed by you or your representative and otherwise complies with certain statutory requirements. Any such authorization is not valid for more than 24 months and may be revoked by you at any time, subject to the rights of anyone who relied on the authorization prior to your notice of revocation.

In addition, if your personal or privileged information was collected or received by us in connection with a title insurance transaction, we cannot disclose such information if the disclosure authorization form that you executed is more than one year old or if the requested disclosure is for a purpose other than a purpose expressly permitted by statute.

You have the right at any time to request in writing access to recorded personal information about you that is reasonably described by you and reasonably available to us. Within 30 days of the date of our receipt of any such written request from you, we will inform you of the nature and substance of any such information, permit you to see and copy that information or obtain a copy by mail, disclose the identity, if recorded, of the persons to whom we have disclosed such information during the previous two years, and provide you with a summary of the procedures by which you may request that such information be corrected, amended or deleted.

- Emailing us at consumerprivacy@willistonfinancial.com
- Calling us at: 833-451-5718; or
- Going into any WFG office and making the request in person.

Revised 12/31/19



PO Box 398
Camas, WA 98607
360.834.2519
www.kcdevelopment.net

PROVIDING SURVEYING AND PLANNING SERVICES WITH A PERSONAL COMMITMENT TO EXCELLENCE.

Walgraeves Annexation Legal Description

October 1, 2021

A Portion of the Southeast 1/4 of Section 22, Township 2 South, Range 1 West, W.M., Washington County, Oregon, being more particularly described as follows:

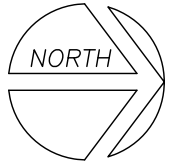
Beginning at a point on the West line of Parcel 2, Partition Plat No. 2003-082, at a point which bears N01°33'00"E, 52.03 feet from the 5/8" Rebar with a Yellow Plastic cap marking the Southwest Corner thereof; thence along the West line of said Parcel 2, and continuing along the West line of Parcel 1 of said Partition Plat, S01°33'00"W, 449.13 feet to the 5/8" Rebar with a Red Plastic Cap inscribed "Ryan LS 58833" as set in Survey Number 30,526 at the Southeast Corner of Tract 2 of that Property Line Adjustment recorded in Document Number 2006-090121, Washington County Records, being also the City Limits Line; thence along the South line of said Tract 2 and said City Limits Line, N88°30'34"W, 1248.54 feet to the 5/8" Rebar with a Red Plastic Cap inscribed "Ryan LS 58833" as set in Survey Number 30,526 at the Southwest Corner of said Tract 2; thence along the West line of said Tract 2, N01°23'38"E, 305.55 feet; thence leaving said line, N88°06'57"E, 558.38 feet; thence N85°36'07"E, 187.62 feet; thence N57°45'52"E, 161.78 feet; thence S88°29'13"E, 340.99 feet to the Point of Beginning.

Containing 462,318 Square Feet (10.613 Acres).

REGISTERED
PROFESSIONAL
LAND SURVEYOR

OREGON
JULY 11, 2000
CINDY A. HALCUMB
58928 LS

EXPIRATION 06/30/23



1"=200'

ANNEXATION

SITUATED IN THE SOUTHEAST 1/4 OF SECTION 22,
TOWNSHIP 2 SOUTH, RANGE 1 WEST, W.M.,
WASHINGTON COUNTY, OREGON

OCTOBER 1, 2021

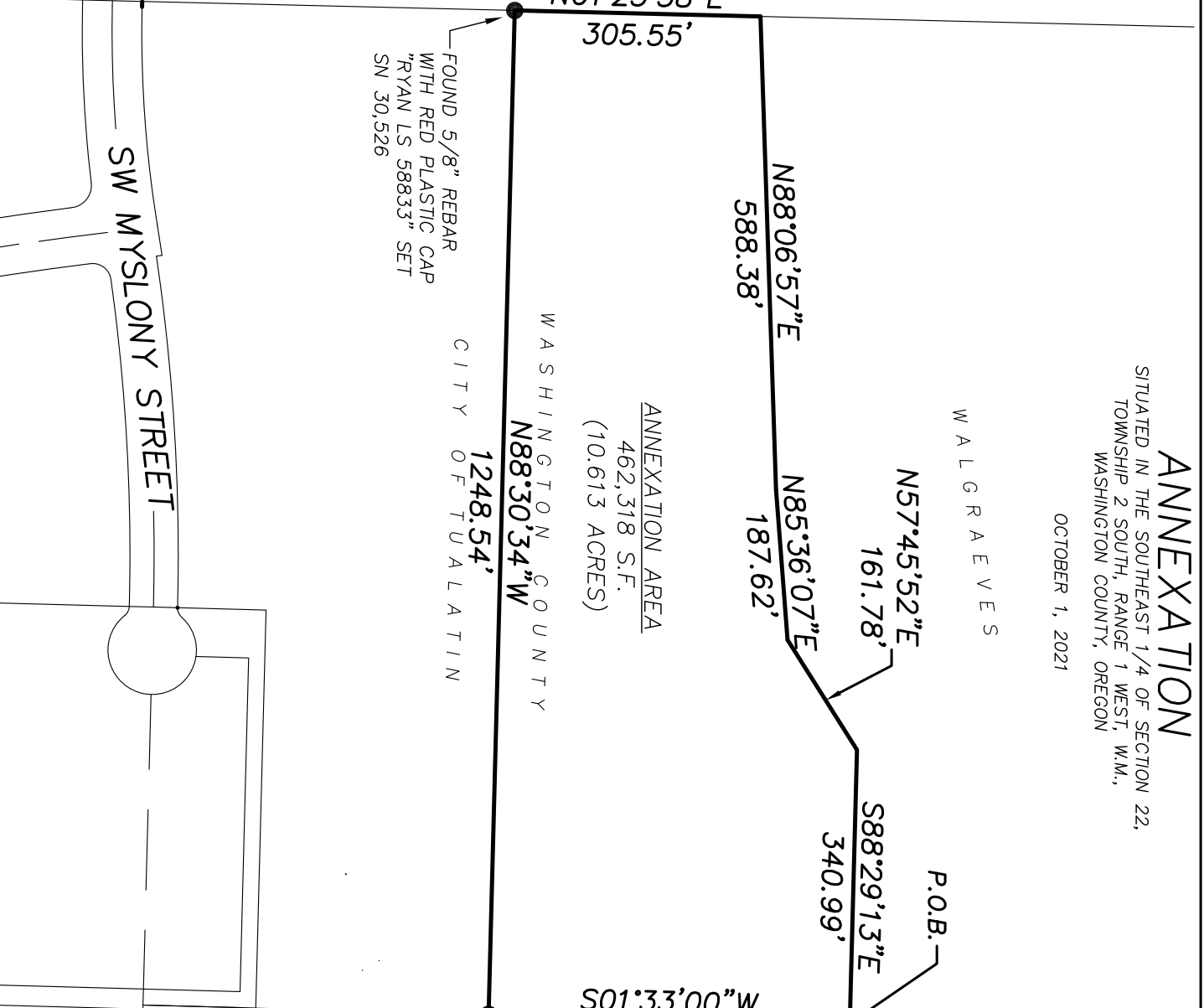
W A L G R A E V E S

ANNEXATION AREA
462,318 S.F.
(10.613 ACRES)

W A S H I N G T O N C O U N T Y
C I T Y O F T U A L A T I N

SW MYSLONY STREET

PREPARED FOR
PHELAN
DEVELOPMENT



FOUND 5/8" REBAR
WITH RED PLASTIC CAP
"RYAN LS 58833" SET
SN 30,526

N57°45'52"E
161.78'

N88°06'57"E
588.38'

N85°36'07"E
187.62'

S88°29'13"E
340.99'

P.O.B.

S01°33'00"W
449.13'

FOUND 5/8" REBAR WITH
YELLOW PLASTIC CAP
"TETSUKA ASSOC INC."
SET PP 2003-082

FOUND 5/8" REBAR
WITH RED PLASTIC CAP
"RYAN LS 58833" SET
SN 30,526

PARCEL 2

PARCEL 2
PARTITION PLAT
NO. 2003-082

PARCEL 1

PARCEL 1
PARTITION PLAT
NO. 2003-082

PREPARED BY
KC DEVELOPMENT
360.834.2519

REGISTERED
PROFESSIONAL
LAND SURVEYOR

OREGON
JULY 11, 2000
CINDY A. HALCUMB
58928 LS

EXPIRATION 06/30/23

Project No.: _____ Project: Walgraaves
Date: Sept. 16, 2021 Time: 6:00 Meeting Field Conversation
Subject: Walgraaves Neighborhood Mtg.
With: Public Contact Info: Zoom - meeting.

Cal Coatsworth cca
Craig Harris AAI
Beth Zouner AAI

-received emailed questions list:

1. Dave Kiersey (davek@kierseyandmcmillan.com)
2. Cozette Tran-caffee (TranCaffee@LanePowell.com)
3. Lisa McKillips (Lisa.Mckillips@nike.com)

No neighbors joined the Zoom meeting.
Meeting was ended at 6:30 pm.

ZAMPELL TUALATIN LLC
3 STANLEY TUCKER DR
NEWBURYPORT, MA 01950

WETLANDS CONSERVANCY INC
4640 SW MACADAM AVE #50
PORTLAND, OR 97239

TUALATIN CITY OF
18880 SW MARTINAZZI AVE
TUALATIN, OR 97062

WASHINGTON CO. FACILITIES MGMT.
169 N 1ST AVE #42
HILLSBORO, OR 97124

WALGRAEVE GARY & WALGRAEVE
RICKY
11345 SW HERMAN RD
TUALATIN, OR 97062

TUALATIN CITY OF
PO BOX 723597
ATLANTA, GA 31139

PHIGHT LLC
ONE BOWERMAN DR
BEAVERTON, OR 97005

TUALATIN YARDS LLC
19100 SW 51ST AVE
TUALATIN, OR 97062

TUALATIN INDUSTRIAL VENTURES LLC
1101 SE TECH CENTER DR #160
VANCOUVER, WA 98683

TAMARISK TUALATIN LLC
1099 18TH STE 2900
DENVER, CO 80202

SIDIEL LLC
PO BOX 1696
BEAVERTON, OR 97075

SEASONAL PRODUCTS LLC
4112 NW SANDPIPER DR
WOODLAND, WA 98674

S BENNER HEATHERBRAE LLC & M
BENNER HEATHERBRAE LLC
3329 WINTERCREEK CT
EUGENE, OR 97405

PASCUZZI INVESTMENT LLC
10250 SW NORTH DAKOTA
TIGARD, OR 97223

PNWP LLC #5
6600 SW 105TH AVE STE 175
BEAVERTON, OR 97008

PACIFIC METAL COMPANY
10700 SW MANHASSET DR
TUALATIN, OR 97062

OFIFLEX OR LLC
5348 VEGAS DR
LAS VEGAS, NV 89108

NORSTAR BUSINESS CENTER WEST #2
LLC
PO BOX 1696
BEAVERTON, OR 97075

NDH LLC & HOLMES THOMAS L
PO BOX 111
CANBY, OR 97013

MYSLONY LLC
11555 SW MYSLONY ST
TUALATIN, OR 97062

MORGAN WILLIAM RAY & JANICE ELLEN
REV LIV TRUST
4500 SW ADVANCE RD
WILSONVILLE, OR 97070

MARSHALL ASSOCIATED LLC
PO BOX 278
TUALATIN, OR 97062

MARINE LUMBER COMPANY
11800 SW MYSLONY ST
TUALATIN, OR 97062

METRO
600 NE GRAND AVE
PORTLAND, OR 97232

MAJNARICH FAMILY LP
8338 SW 11TH AVE
PORTLAND, OR 97219

LUMBER FAMILY CO LLC
PO BOX 1427
TUALATIN, OR 97062

MANHASSET BUSINESS CENTER
OWNERS ASSOC
1498 SE TECH CENTER PL #150
VANCOUVER, WA 98683

LIGHTSPEED TECHNOLOGIES INC
11509 SW HERMAN RD
TUALATIN, OR 97062

LIC LLC
7650 SW VILLAGE GREEN CIR
WILSONVILLE, OR 97070

HEDGES A AN LLC
PO BOX 15523
SEATTLE, WA 98115

HEDGES B AN LLC
PO BOX 15523
SEATTLE, WA 98115

HEDGES C AN LLC
PO BOX 15523
SEATTLE, WA 98115

HEDGES D AN LLC
PO BOX 15523
SEATTLE, WA 98115

HEDGES D AN LLC
PO BOX 15523
SEATTLE, WA 98115

GARSKE TRAVIS W
PO BOX 729
COLBERT, WA 99005

FUJIMI CORPORATION
11200 SW LEVETON DR
TUALATIN, OR 97062

CJO PROPERTIES LLC
14859 SW 162ND TER
TIGARD, OR 97224

CEDAR LANDSCAPE MAINTENANCE LLC
6107 SW MURRAY BLVD #175
BEAVERTON, OR 97008

BT PROPERTY LLC
55 GLENLAKE PKWY NE
ATLANTA, GA 30328

BENNETT LIV TRUST
10550 S KELLAND CT
OREGON CITY, OR 97045

BC CALKIN LLC
PO BOX 3450
TUALATIN, OR 97062

AXIOM INDUSTRIES INC
PO BOX 1147
TUALATIN, OR 97062

AW & JS ENTERPRISES LLC
PO BOX 849
TUALATIN, OR 97062

AMU PROPERTIES LLC
20049 SW 112TH AVE
TUALATIN, OR 97062

ABBOTT TUALATIN LLC
3030 BRIDGEWAY, STE 100
SAUSALITO, CA 94965

112TH & MYSLONY JPMJD/USICV LLC
450 NEWPORT CENTER DR STE 405
NEWPORT BEACH, CA 92660

D&B PROPERTY LEASING LLC
8060 SW PFAFFLE ST STE 200
TIGARD, OR 97223

EVE LAND INVESTMENTS LLC
PO BOX 19856
PORTLAND, OR 97280

AFFIDAVIT OF MAILING NOTICE

STATE OF OREGON)
) SS
COUNTY OF WASHINGTON)

I, ALISON BAKER being first duly sworn, depose and say:

That on the 1 day of SEPTEMBER 21, I served upon the persons shown on Exhibit "A" (Mailing Area List), attached hereto and by this reference incorporated herein, a copy of the Notice of Neighborhood/Developer Meeting marked Exhibit "B," attached hereto and by this reference incorporated herein, by mailing to them a true and correct copy of the original hereof. I further certify that the addresses shown on said Exhibit "A" are their regular addresses as determined from the books and records of the Washington County and/or Clackamas County Departments of Assessment and Taxation Tax Rolls, and that said envelopes were placed in the United States Mail with postage fully prepared thereon.


Signature

SUBSCRIBED AND SWORN to before me this 13 day of September, 2021.




Notary Public for Oregon
My commission expires: 01/20/2024

RE: WALKER'S NEIGHBORHOOD MEETING

NOTICE OF NEIGHBOR/DEVELOPER MEETING

9/1/2021

AAI Engineering
4875 SW Griffith Dr, #100
Beaverton, Oregon 97005

RE: Walgraeves Industrial Park.

Dear Property Owner,

You are cordially invited to attend an online meeting on Sept. 16, 2021 at 6:00pm. This meeting shall be held to discuss an Annexation application and an Architecture Review application for the same property. It is important to note that the property under consideration is not the entire lot. Rather, the project site is a portion of the property to the south that will take access off of SW Myslony Street, NOT SW Herman Rd.

This will be a FREE online meeting.

Please join the meeting from a computer, tablet or smartphone.
<https://zoom.us/join>

Meeting ID: 823 5620 3004
Passcode: 611526

You can also dial in using your phone.
United States: (253) 215-8782

This is an informational meeting to share the development proposal with interested neighbors. You will have the opportunity to review preliminary plans and identify topics of interest or consideration. Feel free to contact me with any questions or commentary.

Regards,

Beth Zauner
AAI Engineering, Inc.
503-620-3030; bethz@aaieng.com

CERTIFICATION OF SIGN POSTING

<p>NOTICE</p> <p>NEIGHBORHOOD / DEVELOPER MEETING</p> <p>__/__/2010 __:__.m.</p> <p>SW _____</p> <p>503-__-__</p>

In addition to the requirements of TDC 32.150, the 18" x 24" sign must display the meeting date, time, and address as well as a contact phone number. The block around the word "NOTICE" must remain **orange** composed of the RGB color values Red 254, Green 127, and Blue 0. A PowerPoint template of this sign is available at: <https://www.tualatinoregon.gov/planning/land-use-application-sign-templates>.

As the applicant for the Walgraeves project, I hereby certify that on this day, 9/2/2021 sign(s) was/were posted on the subject property in accordance with the requirements of the Tualatin Development Code and the Community Development Division.

Applicant's Name: Beth Zauner
(Please Print)

Applicant's Signature: 

Date: 9/2/2021



WALGRAVES INDUSTRIAL PARK

11345 SW Herman Road

Pre-Application Meeting Summary

Thank you for discussing your proposed industrial development project. Below you will find a summary of our discussion points. If there is anything else from our meeting that you wish to document, please respond with your notes as well. Thank you.

Required Land Use Reviews

Submit electronically via eTrakit: <https://permits.ci.tualatin.or.us/eTrakit/>.

Neighborhood/Developer meeting

- Holding a Neighborhood/Developer meeting is required for both Annexation and Architectural Review applications. The same meeting may be used for both applications.
- Neighborhood/Developer meetings should generally be held no more than six months prior to application. More detailed information about this meeting, is online here: <https://www.tualatinoregon.gov/planning/neighborhood-developer-meetings>
- Applicants are responsible for mailing and posting notice of your Neighborhood Developer meeting. The City can provide a list of addresses for your notice letters. This mailing list includes neighboring property owners, but communicating with your current residents is also encouraged to proactively address concerns. Please email us at planning@tualatin.gov to request a Mailing List for a \$32 fee.

Property Line Adjustment (PLA) Application Considerations:

- A portion of the property is located within Tualatin city limits, though [Ordinance 1218-06](#).
- Minimum lot size in the Tualatin MG zoning district is 20,000 square feet – [Table 60-2](#)
- Washington County zoning is FD-10.

Annexation:

- An annexation application based on legal description may be submitted concurrent with the property line adjustment (PLA) application.
- Findings regarding proposed connection to public sanitary sewer, stormwater, and water systems should be described in your narrative. Further comments regarding the available systems are under Public Utilities below.
- Application packet: <https://www.tualatinoregon.gov/planning/annexation-ann-application>
- Work with Washington County Assessment and Taxation's Cartography staff to obtain a certified tax map and have your other application forms certified: <https://www.co.washington.or.us/AssessmentTaxation/GISCartography/index.cfm>

- Examples of recent annexation applications are found on our projects website:
https://www.tualatinoregon.gov/projects?term_node_tid_depth=All&field_project_status_value=All&field_project_type_tid=All&keys=ANN

Architectural Review Application:

Type III Land Use Decision – See [TDC 33.020\(3\)](#)

https://www.tualatinoregon.gov/sites/default/files/fileattachments/planning/page/5081/ar_instructions_2019_withforms.pdf

Type III AR applications and examples for industrial development found here:

<https://www.tualatinoregon.gov/planning/ar-19-0008-tualatin-industrial-park>

Criteria to address for your AR narrative includes:

- **Tualatin Municipal Code:**
 - [03-02: Sewer Regulations;](#)
 - [03-03: Water Service;](#)
 - [03-05: Soil Erosion, Surface Water Management, Water Quality Facilities, and Building & Sewers;](#)
- **Tualatin Development Code:**
 - [32: Procedures;](#)
 - [33.020: Architectural Review;](#)
 - [33.110: Tree Removal Permit/Review;](#)
 - [61: General Manufacturing Zone;](#)
 - [63: Industrial Uses – Environmental Regulations;](#)
 - [70: Floodplain District](#)
 - [72: Natural Resource Project Overlay District](#)
 - [73A, 73B, and 73C: Design Standards;](#)
 - [74: Public Improvements](#)
 - [75: Access Management](#)

Type III Timeline:

- AR application may be submitted while the Annexation application is being processed. Please note that the ARB hearing will only be scheduled once the annexation boundary change is recorded with Metro and the Department of Revenue and the PLA survey and deed are recorded with the County. Be advised that final action on a complete land use application may be extended at the applicant’s request. The total of all extensions must not exceed 245 days, per ORS 227.178.
- Decided by Architectural Review Board, meets as needed on Wednesdays:
<https://www.tualatinoregon.gov/arb>
 - 30 day Completeness Review
 - Hearing typically scheduled within 60 days of complete application. Decision typically issued with 7 days of hearing, unless hearing is continued or appealed. Final local decision must be within 120 days of complete application, unless extended by applicant.
 - Notice of Hearing:
 - 20 day prior to hearing
 - Those who comment gain standing for potential appeal

- Notice of Decision:
 - 14 day appeal period – opportunity to appeal decision to City Council

Highlighted Site Design Standards

Permitted and conditional uses are listed in [Table 61-1](#), and use categories are described in [Chapter 39](#). Manufacturing and warehousing are permitted within the MG zone; however a conditional use permit is required for the warehousing of building materials and supplies.

- [TDC 73A.500\(1\)](#): Walkways must be provided between the main building entrances and other on-site buildings, accessways, and sidewalks along the public right-of-way;
- [TDC 73B.020\(3\)](#): The MG zones requires a minimum of 15% landscaping of the total area to be developed.
- [TDC 73B.060\(1\)](#): Minimum 5-foot-wide landscaped area must be located along all building perimeters viewable by the general public from parking lots or the public right-of-way, but the following may be used instead of the 5-foot-wide landscaped area requirement
- [TDC 73C.20\(4\)](#) Landscape island required for every eight continuous parking stalls
- [TDC 73D.010\(1\)](#): The requirements of the waste and recyclables management standards apply to all new industrial developments.

Tree Removal:

Tree removal is reviewed under the Architectural Review application. A tree preservation plan and a tree assessment report prepared by a certified arborist are required to address the approval criteria for tree removal found in [TDC 33.110\(5\)](#).

Natural resources:

Clean Water Services will comment on additional natural resource, through their Review process. The Service Provider Letter from CWS is a requirement of a complete land use or Engineering permit submittal. For more information, see <http://www.cleanwaterservices.org/permits-development/step-by-step-process/environmental-review/>

- Wetland Conservation Natural Areas (NRPO-WCNA) and Open Space Preservation District (OSNA) overlays are located on or within the project vicinity, as shown on [Figure 72-1](#).
- With exceptions, listed in [TDC 72.060\(2\)](#), no building, structure, grading, excavation, placement of fill, vegetation removal, impervious surface, use, activity or other development shall occur within the Wetland and Open Space Natural Areas.
- Criteria for determining significant natural resources that are identified on [Figure 72-3](#) are listed in [TDC 72.011](#).



Natural Resources

Natural Resources Protection Overlay District

- Wetland Preservation District
- Wetland Conservation District
- Open Space Preservation District
- Greenway

Public Utilities and Other Site Development

- Request available public utility as-builts by emailing tdoran@tualatin.gov.
- Apply for Tualatin Erosion Control, Public Works, and Water Quality Permits electronically via eTrakit: <https://permits.ci.tualatin.or.us/eTrakit/>. The Flood Hazard Area Development Permit application may be available online.
- An Erosion Control permit is required from Tualatin for projects disturbing over 500 square feet.
 - Additionally if between one and five acres are disturbed, a 1200CN is needed from CWS.
 - If over five acres are disturbed, a 1200C is needed from DEQ.
- FEMA identified 100-year/1% annual-chance/Base Flood is shown varying through this vicinity with elevations from approximately 134.6 to 142.1 feet, NAVD 1988.
 - TMC 3-5-250 and TDC 70 requirements are for up to the 100-year/1% annual-chance/Base Flood.
 - A free floodplain permit will be needed. Elevation certificates for structures must be submitted for Construction Drawings and Final Construction.
 - Balanced cut-and fill within the floodplain must be reflected on permit plan sheets.



-
- A Water Quality Permit is needed for construction and modification of public and private impervious areas. The permit will include wetland mitigation/revegetation required by CWS SPL in addition to treatment, detention as required for conveyance, and hydromodification per CWS D&CS Ch 4.
 - Include all private stormwater treatment and conveyance within a maintenance agreement including existing facilities.
 - For water quality permit application completeness submit stormwater plans and calculations certified by an Oregon registered, professional engineer in accordance with TMC 3-5-390(1) proving proposed systems:
 - In accordance with TMC 3-5-200 through 3-5-430, TDC 74.630 and 74.650, Public Works Construction Code (PWCC), and Clean Water Services' (CWS) Design and Construction Standards (D&CS) Chapter 4.
 - Show onsite facilities for proposed new and modified impervious areas.
 - Address runoff from all new and modified private impervious areas.
 - Treat new and modified impervious areas in accordance with CWS D&CS 4.08.1.d meeting phosphorous removal in accordance with TMC 3-5-350 per the design storm in accordance with TMC 3-5-360 and CWS D&CS 4.08.2.
 - Detain up to the 25 year storm event in accordance with the Hedges Creek Subbasin, TMC 3-5-220, TMC 3-5-230, and CWS D&CS 4.08.
 - Accommodate hydromodification in accordance with CWS D&CS 4.03.5.

- Include conveyance calculations that accommodates up to a 25-year storm event with 100-year overland flow to the public stormwater system in accordance with TDC 74.640 and CWS D&CS 5.05.2.d.
 - Downstream evaluation with a maximum of 82% capacity within public lines per [TMC 3-5-210 - Review of Downstream System](#)
 - Demonstrate compliance with the Clean Water Services' Service Provider Letter CWS conditions sufficient to obtain a Stormwater Connection Permit Authorization Letter in accordance with TDC 74.650(2) and CWS D&CS 3.01.2(d).
 - If the proposed water quality facility includes infiltration in the design, a Geotech/soil/infiltration report will need to be submitted to Engineering for a complete land use application.
- A Public Works Permit is needed for any sanitary sewer, stormwater, or water line work within right-of-way or public easements.
 - Public sanitary sewer is within SW Myslony Street and a public easement meandering from SW 112th Avenue to the northeast.
 - Public stormwater and water lines exist within SW Myslony Street. Hedges Creek may be a location for direct private stormwater release.
 - Dedication and construction of SW Myslony Street to the west of SW 112th Avenue may be allowed to match the existing bridge crossing Hedges Creek pending Traffic Impact Analysis confirmation.
 - SW Myslony Street from the west side of SW 112th Avenue to the east would match a Connector cross-section with the addition of a 12-foot wide multi-use path on the north side instead of a 6-foot wide sidewalk. This path would need to connect to the southwest corner of the intersection of SW 112th Avenue and SW Myslony Street.
 - A public stormwater treatment and detention facility is needed to treat the right-of-way which could include a LIDA facility within a planter strip. The existing public facility at the southwest corner of SW 112th Avenue and SW Myslony Street is currently proposed to be modified to accommodate the eastern extension of SW Myslony Street. If there is consideration to modify it again for this project, there could be inclusion of requirements of this development to only modify once.
- SW Herman Road is expected to become access restricted by the Railroad in the future, therefore access of all developable areas must be enabled access to SW Myslony Street. A 24-foot wide access to SW Myslony Street must be extended to serve any remaining lots between the railroad tracks and SW Myslony Street. A public utility easement including sanitary sewer, stormwater, water, and franchises must be recorded. A conceptual plan for extension of the access and these utilities must be provided to prove acceptable easement locations.
- Driveways must be a minimum of 150 feet from the intersection of the local street and Collectors such as SW 112th Avenue and SW Myslony Street. A possibility of a fourth leg to this intersection may be discussed.
 - [TDC 75.040. - Driveway Approach Requirements](#)
- Record an 8-foot wide public utility easement adjacent to right-of-way. Underground utilities unless over 50kv (then associated existing utilities may remain above).
 - Work directly with PGE regarding any existing lines and poles vs what they will require to serve your site.
 - Your conversations with PGE may result in their request of special circumstances to the City. Please provide us PGE's response early so we can provide any needed input.

- Hydraulic Modeling is required for over 48,300 square footage of new building area, 870 gallons/acre/day use, and/or more than 49 residential units. Hydraulic Modeling may be requested in advance of application for a land use to confirm availability and requirements, but may need to be updated depending on changes due to conditions of approval. When submitting a modeling application include:
 - Requirements/alternatives allowed by Tom Mooney, TVF&R (503) 259-1419; thomas.mooney@tvfr.com
 - Hydrant flow test results. Request testing via <https://www.tualatinoregon.gov/publicworks/hydrant-flow-tests>. For questions contact Terrance Leahy, Water Division Manager, (503) 691-3095; [tleahy@tualatin.gov](mailto:t Leahy@tualatin.gov)
 - After submittal Staff will coordinate with you regarding payment of the fee per the current [fee schedule](#). (Currently \$300/building)

Transportation and Site Access

- Your transportation engineer must contact Mike McCarthy, Principal Traffic Engineer, mmccarthy@tualatin.gov (please also copy tdoran@tualatin.gov) to confirm proposed Traffic Impact Analysis scope. Mike will coordinate with any other applicable agencies and jurisdictions. Mike may also be reached at (503) 691-3674.

Fire

- Tom Mooney, TVF&R (503) 259-1419; thomas.mooney@tvfr.com)
- A TVF&R Service Provider Letter will be required as part of your Architectural Review submittal, apply here: <https://protect-us.mimecast.com/s/2I9QC1wPBylBNqETLlCJc?domain=tvfr.com>
- Flow testing: Terrance Leahy, Water Division Manager, (503) 691-3095; [tleahy@tualatin.gov](mailto:t Leahy@tualatin.gov))

Parks

- The regional Ice Age Tonquin Trail is proposed along this property.
- Rich Mueller, Parks Planning & Development Manager (503) 691-3064; rmueller@tualatin.gov

Fees

- Current fee schedule: <https://www.tualatinoregon.gov/finance/fee-schedule>
- For calculating SDC fees, please work with Lauren Gonzalez, lgonzalez@tualatin.gov

November 22, 2021

MIKE DEARMEY
PHELAN DEVELOPMENT COMPANY
450 NEWPORT CENTER DRIVE, SUITE 405
NEWPORT BEACH, CA 92660

RE: LOT LINE ADJUSTMENT | SW HERMAN ROAD | TUALATIN OR
CWS FILE NO. 20-002007 (Tax map 2S122D0 Tax lot 00550, 551, 552)

Clean Water Services has received your Sensitive Area Certification and assessment for the above referenced site. District staff has reviewed the submitted materials including site conditions and the description of your project. Staff concurs that the above referenced project will not significantly impact the existing Sensitive Areas found near the site. In light of this result, this document will serve as your Service Provider letter as required by Resolution and Order 19-5, Section 3.02.1, as amended by Resolution and Order 19-22. Per Section 3.09.2.c, requirements for easements, tracts and improvements to the Vegetated Corridor will apply to subsequent land use or development applications on the subject properties. All required permits and approvals must be obtained and completed under applicable local, state, and federal law.

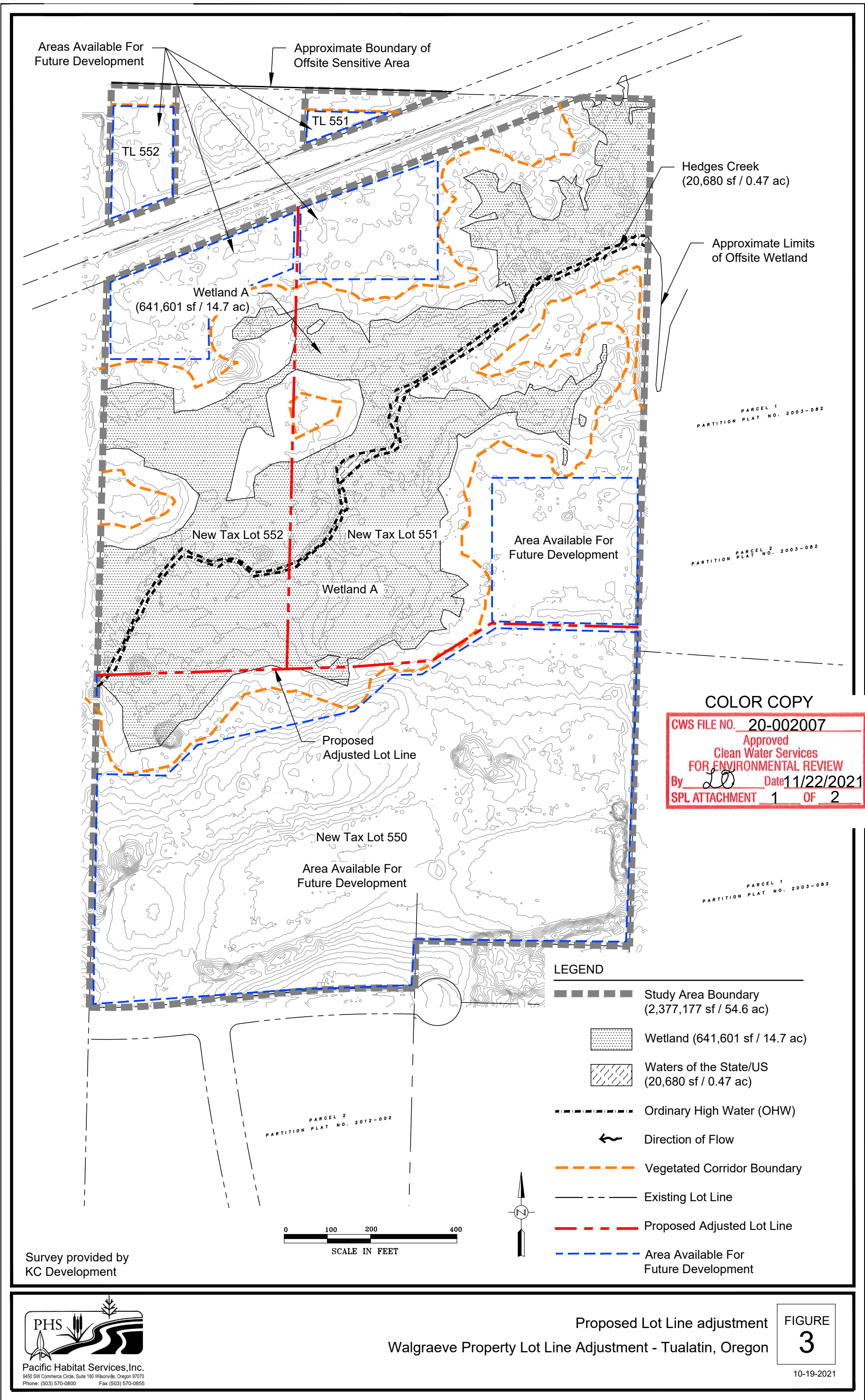
This letter does NOT eliminate the need to protect Sensitive Areas if they are subsequently identified on your site.

If you have any questions, please feel free to call me at (503) 681-3653.

Sincerely,

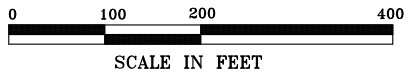


Lindsey Obermiller
Environmental Plan Review
Attachment (2)



COLOR COPY
CWS FILE NO. 20-002007
 Approved
 Clean Water Services
FOR ENVIRONMENTAL REVIEW
 By LD Date 11/22/2021
SPL ATTACHMENT 1 OF 2

- LEGEND**
- Study Area Boundary (2,377,177 sf / 54.6 ac)
 - Wetland (641,601 sf / 14.7 ac)
 - Waters of the State/US (20,680 sf / 0.47 ac)
 - Ordinary High Water (OHW)
 - Direction of Flow
 - Vegetated Corridor Boundary
 - Existing Lot Line
 - Proposed Adjusted Lot Line
 - Area Available For Future Development



Survey provided by
 KC Development



Proposed Lot Line adjustment
 Walgraeve Property Lot Line Adjustment - Tualatin, Oregon

FIGURE
3

10-19-2021

PROPERTY LINE ADJUSTMENT SITE PLAN

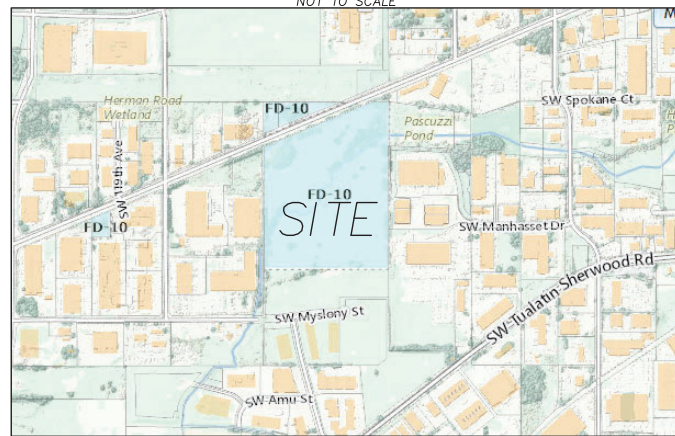
WALGRAEVES

SITUATED IN THE SOUTHEAST 1/4 OF SECTION 22,
TOWNSHIP 2 SOUTH, RANGE 1 WEST, W.M.,
CITY OF TUALATIN, WASHINGTON COUNTY, OREGON

TAX LOTS 550, 551 AND 552, MAP 2S122D

PREPARED FOR
PHELAN DEVELOPMENT
OCTOBER 1, 2021

VICINITY MAP
NOT TO SCALE



1"=80'

BASIS OF BEARINGS
STATE PLANE GRID COORDINATES
INTERNATIONAL FEET
3601 OREGON NORTH
NAD83(2011)(EPOCH2010.0000)
POINT SCALE 0.99990106
COMBINED FACTOR 0.99989672

VERTICAL DATUM
WASHINGTON COUNTY (NAVD29)
COMPUTED USING GEOID 18

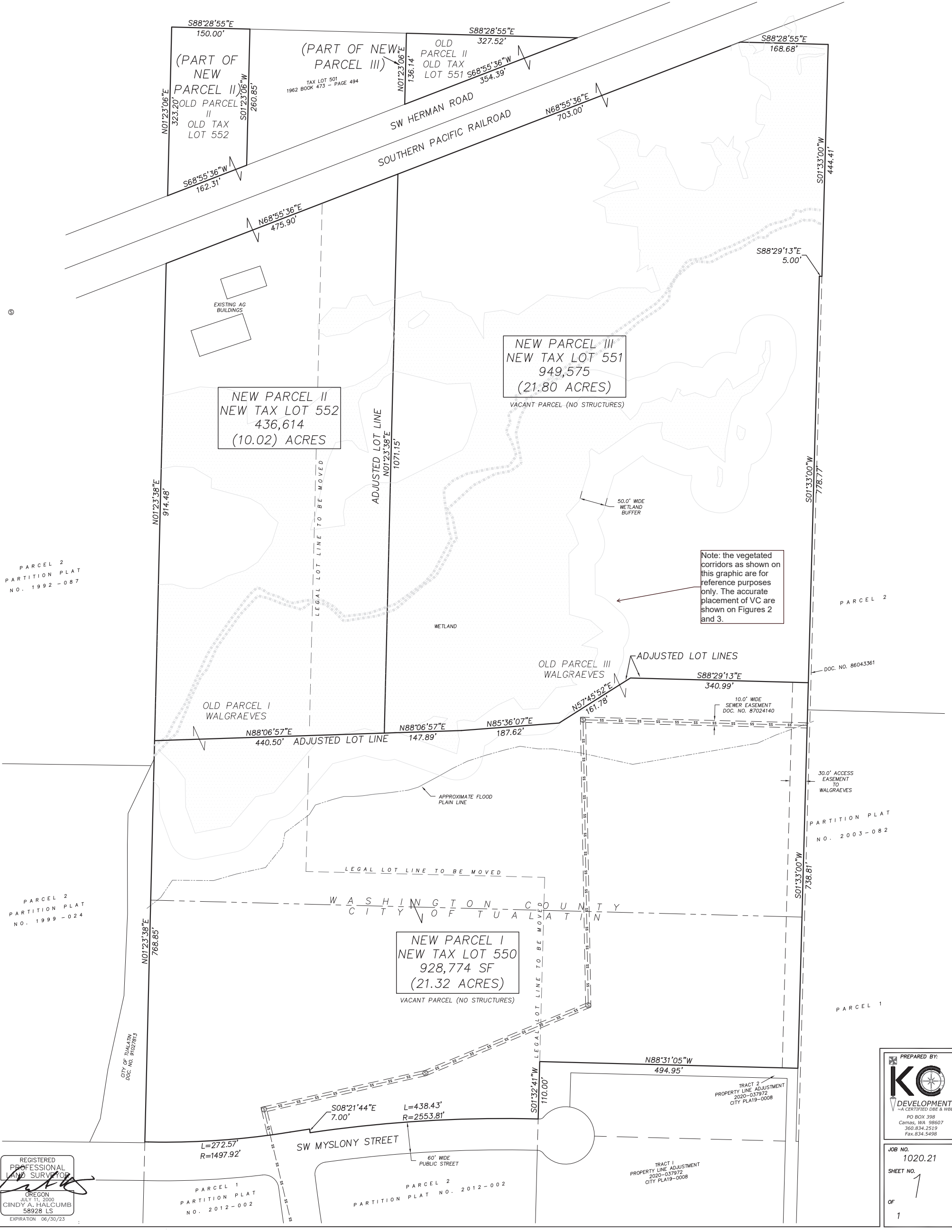
COLOR COPY

CWS FILE NO. 20-002007

Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW

By LO Date 11/22/2021

SPL ATTACHMENT 2 OF 2



PARCEL 2
PARTITION PLAT
NO. 1992-087

PARCEL 2
PARTITION PLAT
NO. 1999-024

PARCEL 2

PARCEL 1

REGISTERED
PROFESSIONAL
LAND SURVEYOR
CINDY A. HALCUMB
58928 LS
EXPIRATION 06/30/23

PREPARED BY:
KO
DEVELOPMENT
A CERTIFIED DBE & WBE
PO BOX 398
Camas, WA 98607
360.834.2519
Fax: 834.5498

JOB NO.
1020.21
SHEET NO.
1
OF
1

Service Provider Letter

This form and the attached conditions will serve as your Service Provider Letter in accordance with Clean Water Services Design and Construction Standards (R&O 19-5, as amended by R&O 19-22).

Jurisdiction:	<u>Washington County</u>	Review Type:	<u>Tier 2 Analysis</u>
Site Address / Location:	<u>SW Myslony St / SW 112th Ave</u> <u>Tualatin, OR 97062</u>	SPL Issue Date:	<u>March 29, 2022</u>
		SPL Expiration Date:	<u>March 28, 2024</u>

Applicant Information:

Name MIKE DEARMEY
 Company CV QOZP HEDGES CREEK LLC
450 NEWPORT CENTER DRIVE
 Address NEWPORT BEACH, CA 92660
SUITE 405
 Phone/Fax (714) 330-0759
 E-mail: mdearmey@phelandevco.com

Owner Information:

Name _____
 Company CV QOZP HEDGES CREEK LLC
450 NEWPORT CENTER DRIVE
 Address NEWPORT BEACH, CA 92660
SUITE 405
 Phone/Fax (714) 330-0759
 E-mail: mdearmey@phelandevco.com

Tax lot ID

2S122D000550

Development Activity

Light Industrial Development

Pre-Development Site Conditions:

Sensitive Area Present: On-Site Off-Site
 Vegetated Corridor Width: 50
 Vegetated Corridor Condition: Degraded

Post Development Site Conditions:

Sensitive Area Present: On-Site Off-Site
 Vegetated Corridor Width: Variable

Enhancement of Remaining Vegetated Corridor Required:

Square Footage to be enhanced:

23,696

Encroachments into Pre-Development Vegetated Corridor:

Type and location of Encroachment:	Square Footage:
<u>Buildings, Parking (Permanent Encroachment; Mitigation Required)</u>	<u>21,574</u>
<u>Construction Access (Temporary Encroachment; Restoration Planting In-place Required)</u>	<u>254</u>

Mitigation Requirements:

Type/Location	Sq. Ft./Ratio/Cost
<u>Per R&O 13-12 VC Mitigation Requirement Met Through Purchase of Wetland Mitigation Bank Credits</u>	<u>21,574</u>
<u>VC Expansion for Public Benefit to Water Quality</u>	<u>13,652</u>

Conditions Attached Development Figures Attached (3) Planting Plan Attached Geotech Report Required

This Service Provider Letter does NOT eliminate the need to evaluate and protect water quality sensitive areas if they are subsequently discovered on your property.

In order to comply with Clean Water Services water quality protection requirements the project must comply with the following conditions:

1. No structures, development, construction activities, gardens, lawns, application of chemicals, uncontained areas of hazardous materials as defined by Oregon Department of Environmental Quality, pet wastes, dumping of materials of any kind, or other activities shall be permitted within the sensitive area or Vegetated Corridor which may negatively impact water quality, except those allowed in R&O 19-5, Chapter 3, as amended by R&O 19-22.
2. Prior to any site clearing, grading or construction the Vegetated Corridor and water quality sensitive areas shall be surveyed, staked, and temporarily fenced per approved plan. During construction the Vegetated Corridor shall remain fenced and undisturbed except as allowed by R&O 19-5, Section 3.06.1, as amended by R&O 19-22 and per approved plans.
3. **Prior to any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.**
4. An approved Oregon Department of Forestry Notification is required for one or more trees harvested for sale, trade, or barter, on any non-federal lands within the State of Oregon.
5. Prior to any ground disturbing activities, an erosion control permit is required. Appropriate Best Management Practices (BMP's) for Erosion Control, in accordance with Clean Water Services' Erosion Prevention and Sediment Control Planning and Design Manual, shall be used prior to, during, and following earth disturbing activities.
6. Prior to construction, a Stormwater Connection Permit from Clean Water Services or its designee is required pursuant to Ordinance 27, Section 4.B.
7. Activities located within the 100-year floodplain shall comply with R&O 19-5, Section 5.10, as amended by R&O 19-22.
8. Removal of native, woody vegetation shall be limited to the greatest extent practicable.
9. The water quality swale and detention pond shall be planted with Clean Water Services approved native species, and designed to blend into the natural surroundings.
10. **Should final development plans differ significantly from those submitted for review by Clean Water Services, the applicant shall provide updated drawings, and if necessary, obtain a revised Service Provider Letter.**
11. The Vegetated Corridor width for sensitive areas within the project site shall be a minimum of 50 feet wide, as measured horizontally from the delineated boundary of the sensitive area.
12. **For Vegetated Corridors up to 50 feet wide, the applicant shall enhance the entire Vegetated Corridor to meet or exceed good corridor condition as defined in R&O 19-5, Section 3.14.2, Table 3-3, as amended by R&O 19-22.**
13. Removal of invasive non-native species by hand is required in all Vegetated Corridors rated ""good."" Replanting is required in any cleared areas larger than 25 square feet using low impact methods. The applicant shall calculate all cleared areas larger than 25 square feet prior to the preparation of the required Vegetated Corridor enhancement/restoration plan.
14. Prior to any site clearing, grading or construction, the applicant shall provide Clean Water Services with a Vegetated Corridor enhancement/restoration plan. Enhancement/restoration of the Vegetated Corridor shall be provided in accordance with R&O 19-5, Appendix A, as amended by R&O 19-22, and shall include planting specifications for all Vegetated Corridor, including any cleared areas larger than 25 square feet in Vegetated Corridor rated ""good.""
15. Prior to installation of plant materials, all invasive vegetation within the Vegetated Corridor shall be removed per methods described in Clean Water Services' Integrated Pest Management Plan, 2019. During removal of invasive vegetation care shall be taken to minimize impacts to existing native tree and shrub species.
16. Clean Water Services and/or City shall be notified 72 hours prior to the start and completion of enhancement/restoration activities. Enhancement/restoration activities shall comply with the

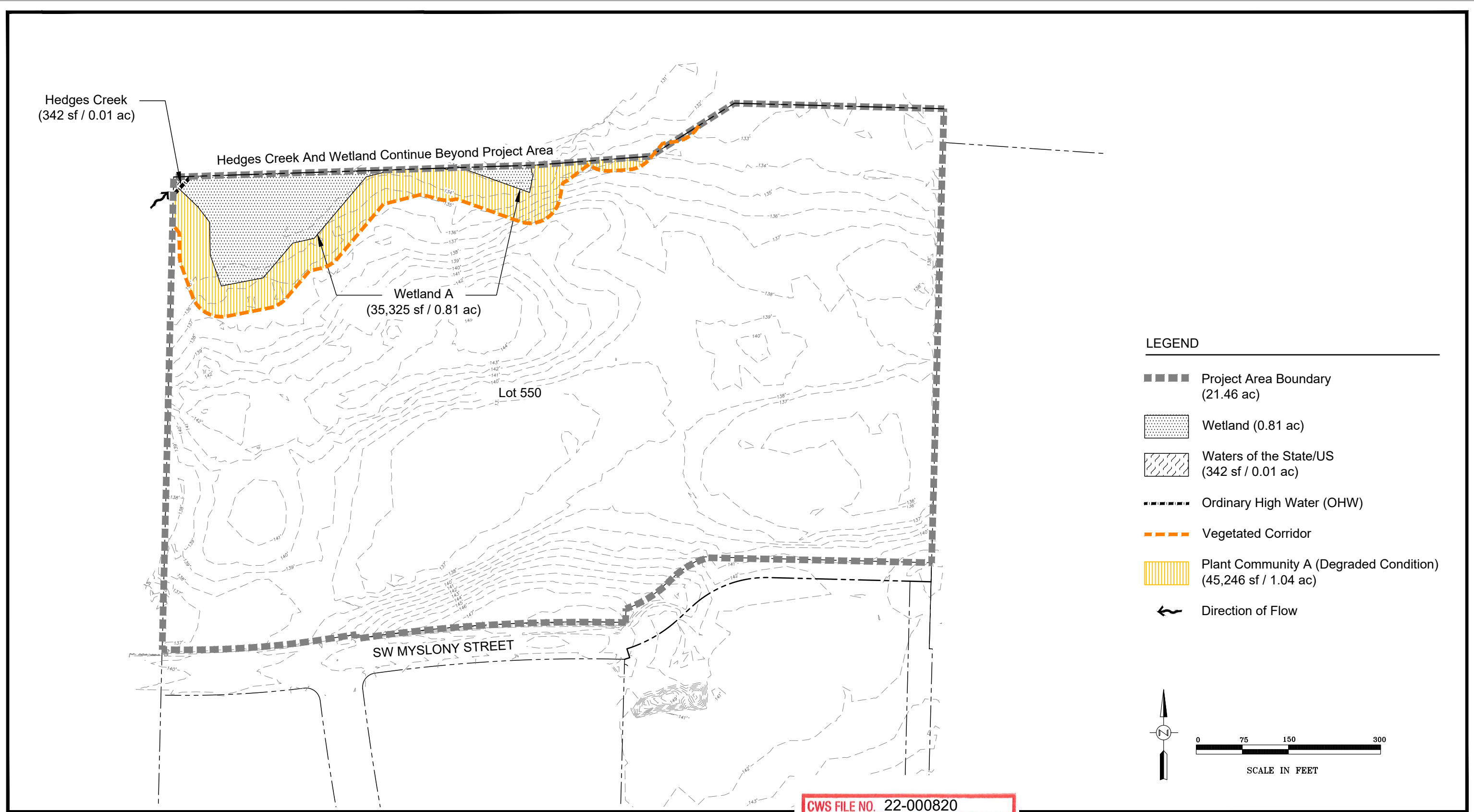
guidelines provided in Planting Requirements (R&O 19-5, Appendix A, as amended by R&O 19-22).

- 17. **Maintenance and monitoring requirements shall comply with R&O 19-5, Section 2.12.2, as amended by R&O 19-22. If at any time during the warranty period the landscaping falls below the 80% survival level, the owner shall reinstall all deficient planting at the next appropriate planting opportunity and the two year maintenance period shall begin again from the date of replanting.**
- 18. **Performance assurances for the Vegetated Corridor shall comply with R&O 19-5, Section 2.07.2, Table 2-1 and Section 2.11, Table 2-2, as amended by R&O 19-22.**
- 19. **Clean Water Services shall require an easement over the Sensitive Area and Vegetated Corridor conveying storm and surface water management to Clean Water Services or the City that would prevent the owner of the Vegetated Corridor from activities and uses inconsistent with the purpose of the corridor and any easements therein.**
- 20. **Final construction plans shall include landscape plans.** In the details section of the plans, a description of the methods for removal and control of exotic species, location, distribution, condition and size of plantings, existing plants and trees to be preserved, and installation methods for plant materials is required. Plantings shall be tagged for dormant season identification and shall remain on plant material after planting for monitoring purposes.
- 21. **A Maintenance Plan shall be included on final plans** including methods, responsible party contact information, and dates (minimum two times per year, by June 1 and September 30).
- 22. **Final construction plans shall clearly depict the location and dimensions of the sensitive area and the Vegetated Corridor** (indicating good, marginal, or degraded condition). Sensitive area boundaries shall be marked in the field.
- 23. Protection of the Vegetated Corridors and associated sensitive areas shall be provided by the installation of permanent fencing and signage between the development and the outer limits of the Vegetated Corridors. **Fencing and signage details to be included on final construction plans.**

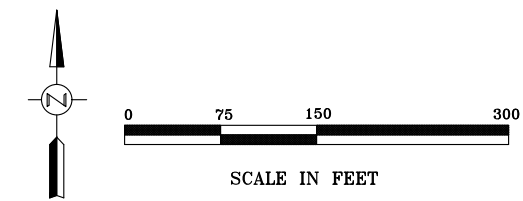
This Service Provider Letter is not valid unless CWS-approved site plan is attached.


Stacy Benjamin
Environmental Plan Review

Attachments (3)



- LEGEND**
- ■ ■ ■ Project Area Boundary (21.46 ac)
 - ▨ Wetland (0.81 ac)
 - ▧ Waters of the State/US (342 sf / 0.01 ac)
 - - - - Ordinary High Water (OHW)
 - - - - Vegetated Corridor
 - ▨ Plant Community A (Degraded Condition) (45,246 sf / 1.04 ac)
 - ← Direction of Flow

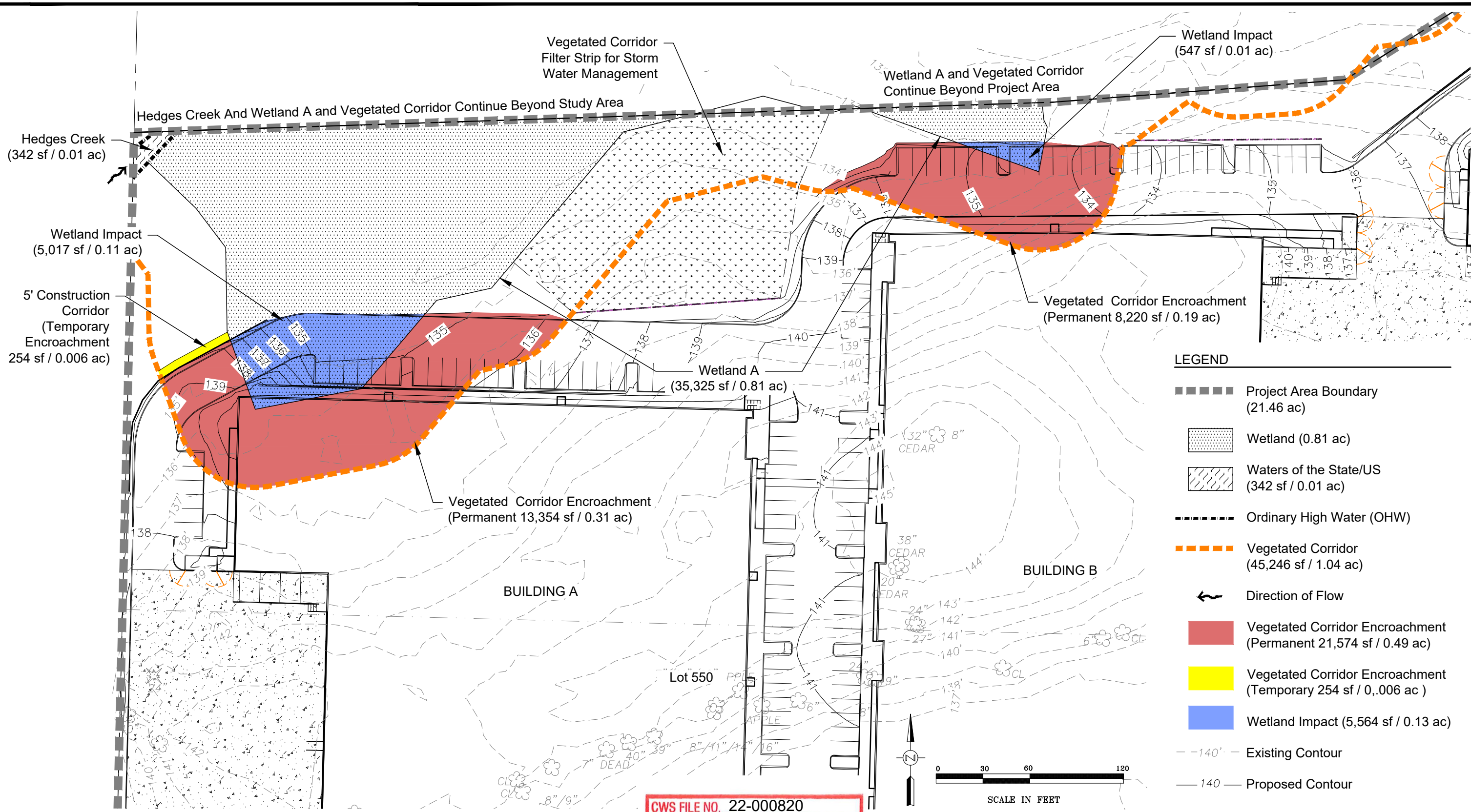


CWS FILE NO. 22-000820
 Approved
 Clean Water Services
 FOR ENVIRONMENTAL REVIEW
 By *SNB* Date 3/29/2022
 SPL ATTACHMENT 1 OF 3

Vegetated Corridor Plant Community Overview
 Hedges Creek Industrial - Tualatin, Oregon

FIGURE
2





CWS FILE NO. 22-000820
Approved
Clean Water Services
FOR ENVIRONMENTAL REVIEW
 By SNB Date 3/29/2022
SPL ATTACHMENT 2 OF 3

Proposed Site Development Plan
 Hedges Creek Industrial - Tualatin, Oregon

FIGURE 3A



Natural Resource Assessment for Lot Line Adjustment on the Walgraeve Parcels in Tualatin

Prepared for
Phelan Development Company LLC
Attn: Mike DeArmey
450 Newport Center Dr, Suite 405
Newport Beach, CA 92660

Prepared by
Shawn Eisner

Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, Oregon 97070
(503) 570-0800
(503) 570-0855 FAX
PHS Project Number: 6904

October 22, 2021



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2.0 EXISTING CONDITIONS	1
3.0 DISCUSSION OF WATER QUALITY SENSITIVE AREAS.....	1
4.0 VEGETATED CORRIDOR ASSESSMENT.....	2
4.1 Vegetated Corridor Width Determination.....	2
5.0 PROPOSED PROJECT	2
6.0 REFERENCES.....	3
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APPENDIX B: Wetland Delineation Data Forms	
APPENDIX C: Photo Documentation	

1.0 INTRODUCTION

Pacific Habitat Services, Inc. (PHS) conducted a Natural Resources Assessment (NRA) on three parcels located along Herman Road in Tualatin (Township 2 South, Range 1 West, Section 22D, tax lots 550, 551 & 552). The largest parcel is lot 550, which includes property south of Herman Road. Lots 551 and 552 are much smaller and are located north of Herman Road. These three parcels are proposed for lot line adjustments that will decrease the size of lot 550; extending lots 551 and 552 to include land south of Herman Road.

This report is submitted in compliance with requirements as established by Clean Water Services (CWS) for a Simplified Site Assessment. A Simplified Site Assessment is proposed in accordance with the proposed development action, which entails lot line adjustments of the three lots noted above. A Simplified Site assessment is satisfactory for this project because it does not result in additional impervious surface; does not include development that could encroach closer to existing sensitive areas; and no action is proposed on a slope greater than 25%. Figure 1 shows the project location; Figure 2 includes existing conditions, including slopes and the corresponding limits of vegetated corridor (VC), and Figure 3 includes a drawing of the proposed lot line adjustments. All figures are in Appendix A.

2.0 EXISTING CONDITIONS

The study area is split by Herman Road and the adjoining Southern Pacific Railroad, though the northern lots are just 1.0 and 0.5 acres in size; much smaller than lot 550 to the south, which is over 53 acres in size. All three parcels are actively utilized for agriculture. Lot 552 includes a cultivated northern portion with overgrown shrub and mowed grass lands across its southern extent. Lot 551 has been a cultivated field for decades. The northwest corner of lot 550 includes two agricultural buildings, with all but the southern extent of the lot being utilized for grazing of cattle. The southern extent includes fields planted in various agricultural crops from year to year.

Hedges Creek flows northeastward across the central portion of lot 550. Vegetation within the non-cultivated areas reflects disturbance associated with a history of grazing. Despite the grazing however much of the parcel remains forested and includes both evergreen and deciduous dominated habitats. The forested areas are dominated by a native tree canopy, with shrub cover in forested areas also largely native. The remaining areas include a mosaic of shrub dominated and herbaceous habitats. These areas by contrast are largely non-native, and including primarily pasture grasses and weedy forbs, with Himalayan blackberry the single most common shrub species.

3.0 DISCUSSION OF WATER QUALITY SENSITIVE AREAS

PHS delineated sensitive areas within the project area based on the presence of wetland hydrology, hydric soils, and hydrophytic vegetation; in accordance with the Routine On-site Determination, as described in the *Corps of Engineers Wetland Delineation Manual, Wetlands Research Program Technical Report Y-87-1* ("The 1987 Manual") and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region*, May 2010). The field work on this site began with a delineation of sensitive areas on lot 550 on July 1, 2020. The full site was returned to on September 15, 2021, at which time lots 551 and 552 were assessed and additional delineation and vegetated corridor data collected.

The results of the delineation are discussed below, with supporting wetland delineation data forms included in Appendix B.

Wetland A

Wetland A (14.73 acres) is a mosaic of forested, shrub and herbaceous habitat that dominates the Hedges Creek floodplain. The wetland roughly parallels the creek, extending several hundred feet to both sides. Though slopes generally decrease toward the creek, they are gentle and topography undulates a bit, resulting in variations in site hydrology, and even some areas of upland within the larger wetland area.

The swale's Cowardin class ranges from palustrine emergent through scrub-shrub and forested, with a hydrologic modifier of seasonally flooded in the areas adjoining Hedges Creek. The north and southern limits of wetland do not appear to be seasonally flooded, though would appear to be seasonally saturated, as evidenced by the abundance of oxidized rhizospheres. While the hydrogeomorphic (HGM) class is Slope, largely due to its moderate to shallow gradient and groundwater sources, seasonal overbank flooding along Hedges Creek would result in a limited area of Riverine flow-through as well.

Dominant vegetation is somewhat variable, but because of grazing, is generally dominated by mixed pasture grasses and weedy forbs. Shrubby areas are dominated by Himalayan blackberry, though there remain a few small, forested areas that are dominated by Oregon ash. Like the more open areas, the understory in forested areas has been grazed. Common shrubs include Himalayan blackberry, several species of rose, and snowberry. The herbaceous layer, where present, generally includes the same grass and forb species as the open areas.

4.0 VEGETATED CORRIDOR ASSESSMENT

The following assessment is limited to the determination of VC width as an assessment of VC condition is not required for a simplified assessment associated with a lot line adjustment because this development activity does not trigger enhancement requirements.

4.1 Vegetated Corridor Width Determination

The slopes adjacent to all sensitive areas were assessed to determine the regulated width of the VC. The location of the VC, adjacent slopes and corridor widths are shown on Figure 2. The regulated VC widths of identified sensitive areas were determined as follows:

Table 1. Summary of VC Widths

Sensitive Areas	VC Width	Justification
Onsite floodplain wetlands associated with Hedge Creek; offsite wetlands to the north and east	50 feet	<ul style="list-style-type: none"> • >0.5 acres • Slopes <25%
Small, isolated areas located south of the larger floodplain wetland	25 feet	<ul style="list-style-type: none"> • ≤0.5 acres and isolated • Slopes <25%

As slopes are generally quite gentle across all three existing lots and the main wetland is much larger than one-half acre in size, most VC widths across the site are 50 feet wide. There are two small areas of wetland separated from the larger wetland by about 20 feet. As these areas are not subject to inundation that would provide a connection between the wetlands and Hedge Creek (except during periods of extensive flooding), these isolated wetlands have a VC width of 25 feet.

The total area of regulated VC within the 3 lots is 384,379 square feet (8.82 acres). As the proposed action is a property line adjustment and no physical development will occur, this simplified site assessment does not include a determination of plant community boundaries or assessment of community condition.

5.0 PROPOSED PROJECT

The proposed project includes the adjustment of common lines between lots 550, 551 and 552 (see Figure 3). The result of adjustment will be an increase in the size of lots 551 and 552, which will extend south of Herman Road; the size of lot 550 will be decreased in proportion. Following line adjustment lot 550 will be annexed into the City of Tualatin, whereas lots 551 and 552 will remain in Washington County. To affirm that each of the proposed lots will be buildable under current CWS D&C standards Figure 3 roughly identifies the limits of potential development areas on each lot. Though no development is proposed on lot 550, a 30 foot wide access easement will be provided across the east side of lot 550, to provide legal access from the right of way of Myslonny Street north to the south end of proposed lot 551. Sheet 1 (following Figure 3) includes the details of the proposed property line adjustment.

6.0 REFERENCES

- Clean Water Services, 2019. Design and Construction Standards (R&O 19-5 as Amended by R&O 19-22).
- PortlandMaps.com, 2021. Air photo and tax lot boundary of project site. Website accessed September 21, 2021.

Appendix A

Figures





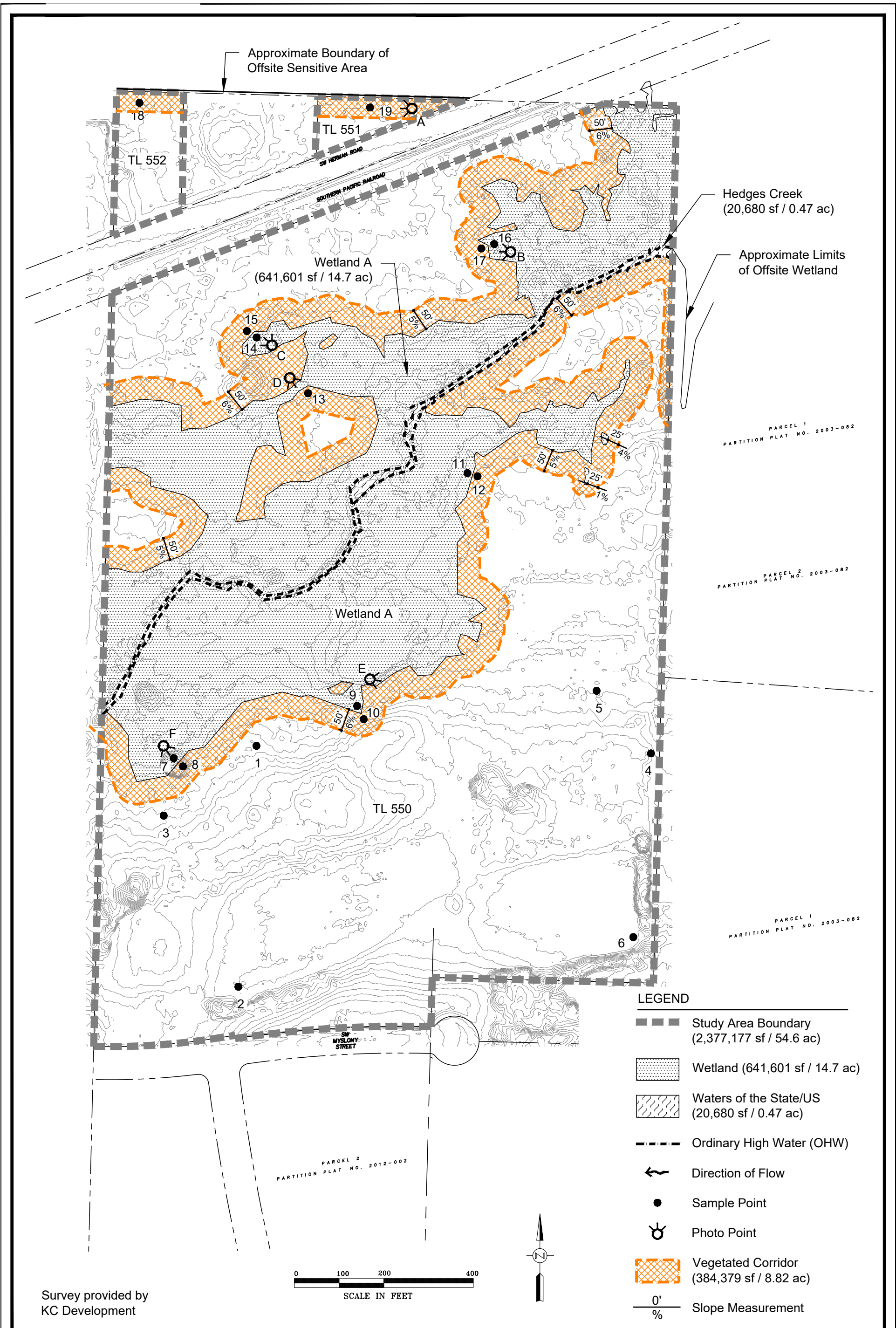
Project #6904
10/6/21



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Site location and approximate boundaries
Walgraeve property lot line adjustments
PortlandMaps.com 2021

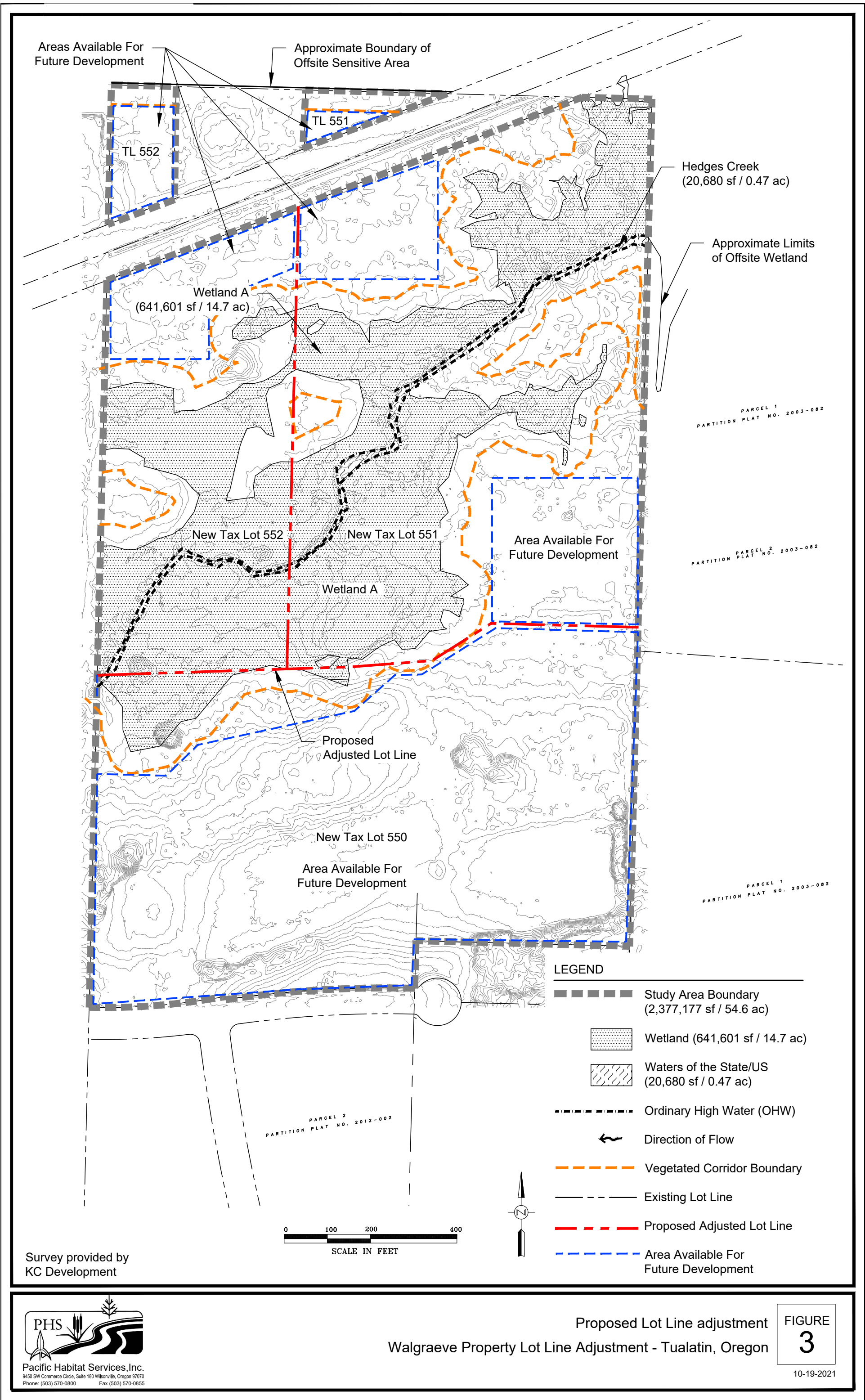
FIGURE
1



Existing Conditions
Walgraeve Property Lot Line Adjustment - Tualatin, Oregon

FIGURE
2

10-6-2021



Appendix B

Wetland Delineation Data Forms



WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 7/1/2020
 Applicant/Owner: Phelan Development State: OR Sampling Point: 1
 Investigator(s): JT Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 2
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Quatama loam NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>4</u> (A)	
2 _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>7</u> (B)	
3 _____	_____	_____	_____	Percent of Dominant Species	
4 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>57%</u> (A/B)	
5 _____	<u>0</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>15</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Rubus armeniacus</u>	<u>5</u>	<u>X</u>	<u>FAC</u>	OBL Species _____ x 1 = <u>0</u>	
2 <u>Sambucus nigra</u>	<u>5</u>	<u>X</u>	<u>FAC</u>	FACW species _____ x 2 = <u>0</u>	
3 _____	_____	_____	_____	FAC Species _____ x 3 = <u>0</u>	
4 _____	_____	_____	_____	FACU Species _____ x 4 = <u>0</u>	
5 _____	_____	_____	_____	UPL Species _____ x 5 = <u>0</u>	
	<u>10</u>	= Total Cover		Column Totals <u>0</u> (A)	<u>0</u> (B)
Herb Stratum (plot size: <u>5</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1 <u>Bromus tectorum</u>	<u>30</u>	<u>X</u>	<u>UPL</u>	Hydrophytic Vegetation Indicators:	
2 <u>Lolium perenne</u>	<u>20</u>	<u>X</u>	<u>FAC</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3 <u>Hordeum jubatum</u>	<u>10</u>	<u>X</u>	<u>FAC</u>	_____ <u>X</u> 2- Dominance Test is >50%	
4 <u>Anthemis cotula</u>	<u>10</u>	<u>X</u>	<u>FACU</u>	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5 <u>Vulpia myuros</u>	<u>10</u>	<u>X</u>	<u>FACU</u>	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 <u>Leucanthemum vulgare</u>	<u>5</u>	_____	<u>FACU</u>	_____ 5- Wetland Non-Vascular Plants ¹	
7 <u>Taraxacum officinale</u>	<u>5</u>	_____	<u>FACU</u>	_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8 <u>Tanacetum vulgare</u>	<u>5</u>	_____	<u>FACU</u>	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
	<u>95</u>	= Total Cover		Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
Woody Vine Stratum (plot size: _____)					
1 _____	_____	_____	_____		
2 _____	_____	_____	_____		
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:
Quercus garryana trees were cut down within 30 feet of sample area several years ago.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-2	10YR 3/2	100					Silt Loam	
2-4	7.5YR 3/2	100					Silt Loam	
4-14	7.5YR 3/3	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input checked="" type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No **X** Depth (inches): _____
 Water Table Present? Yes _____ No **X** Depth (inches): **>14**
 Saturation Present? Yes _____ No **X** Depth (inches): **>14**
 (includes capillary fringe)

Wetland Hydrology Present?
 Yes _____ No **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 7/1/2020
 Applicant/Owner: Phelan Development State: OR Sampling Point: 2
 Investigator(s): JT Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): none Local relief (concave, convex, none): none Slope (%): 2
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Quatama loam NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation X Soil X or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:
The sample area is part of a field that has been recently worked and vegetation has therefore been removed.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1	_____	_____	_____	That are OBL, FACW, or FAC: _____ (A)	
2	_____	_____	_____	Total Number of Dominant	
3	_____	_____	_____	Species Across All Strata: _____ (B)	
4	_____	_____	_____	Percent of Dominant Species	
	<u>0</u>	= Total Cover		That are OBL, FACW, or FAC: <u>#DIV/0!</u> (A/B)	
Sapling/Shrub Stratum (plot size: _____)				Prevalence Index Worksheet:	
1	_____	_____	_____	Total % Cover of	Multiply by:
2	_____	_____	_____	OBL Species	x 1 = <u>0</u>
3	_____	_____	_____	FACW species	x 2 = <u>0</u>
4	_____	_____	_____	FAC Species	x 3 = <u>0</u>
5	_____	_____	_____	FACU Species	x 4 = <u>0</u>
	<u>0</u>	= Total Cover		UPL Species	x 5 = <u>0</u>
Herb Stratum (plot size: _____)				Column Totals	<u>0</u> (A) <u>0</u> (B)
1	_____	_____	_____	Prevalence Index =B/A = <u>#DIV/0!</u>	
2	_____	_____	_____	Hydrophytic Vegetation Indicators:	
3	_____	_____	_____	_____ 1- Rapid Test for Hydrophytic Vegetation	
4	_____	_____	_____	_____ 2- Dominance Test is >50%	
5	_____	_____	_____	_____ 3-Prevalence Index is ≤ 3.0 ¹	
6	_____	_____	_____	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
7	_____	_____	_____	_____ 5- Wetland Non-Vascular Plants ¹	
8	_____	_____	_____	_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
	<u>0</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (plot size: _____)				Hydrophytic Vegetation Present?	
1	_____	_____	_____	Yes _____	No <u>X</u>
2	_____	_____	_____		
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum <u>100</u>					

Remarks:
Plowed. Few sprigs of Cirsium arvense <1%.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	10YR 2/1	100					Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) **Indicators for Problematic Hydric Soils³:**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:
Soils mucky clay

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____

Water Table Present? Yes _____ No X Depth (inches): >14

Saturation Present? Yes _____ No X Depth (inches): >14
(includes capillary fringe)

Wetland Hydrology Present?
Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 7/1/2020
 Applicant/Owner: Phelan Development State: OR Sampling Point: 3
 Investigator(s): JT Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 2
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Quatama loam NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No <u>X</u>	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:
Sample site is located in a low point in topography.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>2</u> (A)	
2 _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3 _____	_____	_____	_____	Percent of Dominant Species	
4 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>50%</u> (A/B)	
5 _____	<u>0</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>15</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Rubus armeniacus</u>	<u>5</u>	<u>X</u>	<u>FAC</u>	OBL Species _____ x 1 = <u>0</u>	
2 <u>Sambucus nigra</u>	<u>20</u>	<u>X</u>	<u>FAC</u>	FACW species _____ x 2 = <u>0</u>	
3 _____	_____	_____	_____	FAC Species _____ x 3 = <u>0</u>	
4 _____	_____	_____	_____	FACU Species _____ x 4 = <u>0</u>	
5 _____	<u>25</u>	= Total Cover		UPL Species _____ x 5 = <u>0</u>	
Herb Stratum (plot size: <u>5</u>)				Column Totals <u>0</u> (A) <u>0</u> (B)	
1 <u>Bromus tectorum</u>	<u>40</u>	<u>X</u>	<u>UPL</u>	Prevalence Index =B/A = <u>#DIV/0!</u>	
2 <u>Leucanthemum vulgare</u>	<u>30</u>	<u>X</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators:	
3 <u>Lolium perenne</u>	<u>10</u>	_____	<u>FAC</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
4 _____	_____	_____	_____	_____ 2- Dominance Test is >50%	
5 _____	_____	_____	_____	_____ 3-Prevalence Index is ≤ 3.0 ¹	
6 _____	_____	_____	_____	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
7 _____	_____	_____	_____	_____ 5- Wetland Non-Vascular Plants ¹	
8 _____	<u>80</u>	= Total Cover		_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
Woody Vine Stratum (plot size: _____)				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
1 _____	_____	_____	_____	Hydrophytic Vegetation Present?	
2 _____	_____	_____	_____	Yes _____ No <u>X</u>	
% Bare Ground in Herb Stratum <u>0</u>					

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	7.5YR 3/2	100					Silt Loam	
4-6	7.5YR 2/2	99	7.5YR 4/6	1	C	M	Silt Loam	Fine
6-14	7.5YR 3/2	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
 Water Table Present? Yes _____ No X Depth (inches): >14
 Saturation Present? Yes _____ No X Depth (inches): >14
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 7/1/2020
 Applicant/Owner: Phelan Development State: OR Sampling Point: 4
 Investigator(s): JT Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Ditch Local relief (concave, convex, none): concave Slope (%): 1
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Verboort silty clay loam NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	
Tree Stratum (plot size: <u>30</u>)				Dominance Test worksheet: Number of Dominant Species That are OBL, FACW, or FAC: <u>3</u> (A) Total Number of Dominant Species Across All Strata: <u>4</u> (B) Percent of Dominant Species That are OBL, FACW, or FAC: <u>75%</u> (A/B)
1	<u>100</u>	<u>X</u>	<u>FACW</u>	
2				
3				
4				
	<u>100</u>	= Total Cover		
Sapling/Shrub Stratum (plot size: <u>15</u>)				
1	<u>30</u>	<u>X</u>	<u>FAC</u>	
2	<u>10</u>	<u>X</u>	<u>FACU</u>	
3				
4				
5				
	<u>40</u>	= Total Cover		
Herb Stratum (plot size: <u>5</u>)				Prevalence Index Worksheet: Total % Cover of _____ Multiply by: OBL Species _____ x 1 = <u>0</u> FACW species _____ x 2 = <u>0</u> FAC Species _____ x 3 = <u>0</u> FACU Species _____ x 4 = <u>0</u> UPL Species _____ x 5 = <u>0</u> Column Totals <u>0</u> (A) <u>0</u> (B) Prevalence Index =B/A = <u>#DIV/0!</u>
1	<u>40</u>	<u>X</u>	<u>(FAC)</u>	
2				
3				
4				
5				
6				
7				
8				
	<u>40</u>	= Total Cover		
Woody Vine Stratum (plot size: _____)				
1				
2				
	<u>0</u>	= Total Cover		
% Bare Ground in Herb Stratum _____				

Hydrophytic Vegetation Indicators:

- _____ 1- Rapid Test for Hydrophytic Vegetation
- _____ 2- Dominance Test is >50%
- _____ 3-Prevalence Index is ≤ 3.0¹
- _____ 4-Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)
- _____ 5- Wetland Non-Vascular Plants¹
- _____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	10YR 3/2	100					Silt Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) **Indicators for Problematic Hydric Soils³:**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
 Water Table Present? Yes _____ No X Depth (inches): >14
 Saturation Present? Yes _____ No X Depth (inches): >14
 (includes capillary fringe)

Wetland Hydrology Present?
 Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 7/1/2020
 Applicant/Owner: Phelan Development State: OR Sampling Point: 5
 Investigator(s): JT Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Verboort silty clay loam NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation X Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

Remarks:
The sample area is grazed.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: <u>30</u>)				Number of Dominant Species	
1 <u>Fraxinus latifolia</u>	<u>40</u>	<u>X</u>	<u>FACW</u>	That are OBL, FACW, or FAC: <u>4</u> (A)	
2 _____				Total Number of Dominant Species Across All Strata: <u>5</u> (B)	
3 _____				Percent of Dominant Species	
4 _____				That are OBL, FACW, or FAC: <u>80%</u> (A/B)	
	<u>40</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>15</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Rubus armeniacus</u>	<u>20</u>	<u>X</u>	<u>FAC</u>	OBL Species _____ x 1 = <u>0</u>	
2 <u>Crataegus monogyna</u>	<u>10</u>	<u>X</u>	<u>FAC</u>	FACW species _____ x 2 = <u>0</u>	
3 <u>Rosa pisocarpa</u>	<u>5</u>		<u>FAC</u>	FAC Species _____ x 3 = <u>0</u>	
4 _____				FACU Species _____ x 4 = <u>0</u>	
5 _____				UPL Species _____ x 5 = <u>0</u>	
	<u>35</u>	= Total Cover		Column Totals <u>0</u> (A) <u>0</u> (B)	
Herb Stratum (plot size: <u>5</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1 <u>Leucanthemum vulgare</u>	<u>50</u>	<u>X</u>	<u>FACU</u>	Hydrophytic Vegetation Indicators:	
2 <u>Agrostis capillaris</u>	<u>30</u>	<u>X</u>	<u>FAC</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3 <u>Prunella vulgaris</u>	<u>20</u>		<u>FACU</u>	_____ <u>X</u> 2- Dominance Test is >50%	
4 <u>Parentucellia viscosa</u>	<u>5</u>		<u>FAC</u>	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5 _____				_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 _____				_____ 5- Wetland Non-Vascular Plants ¹	
7 _____				_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8 _____				_____	
	<u>105</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (plot size: _____)				Hydrophytic Vegetation Present?	
1 _____				Yes <u>X</u>	No _____
2 _____					
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum _____					

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 2/1	97	7.5YR 4/6	3	C	PL	Silty Clay Loam	
3-14	10YR 2/1	100					Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X**

Remarks:

The upper zone within which OR's are identified is not sufficiently thick (4 inches) to satisfy the criteria for F6.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No **X** Depth (inches): _____
 Water Table Present? Yes _____ No **X** Depth (inches): **>14**
 Saturation Present? Yes _____ No **X** Depth (inches): **>14**
 (includes capillary fringe)

Wetland Hydrology Present?

Yes _____ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

As the OR's are confined to the upper few inches of the soil profile it is strongly believed that they result from compaction of soils from grazing that has resulted in localized conditions of increased surface saturation. Soils in the same general area with less soils compaction do not include OR's.

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 7/1/2020
 Applicant/Owner: Phelan Development State: OR Sampling Point: 6
 Investigator(s): JT Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Labish mucky clay NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation X Soil X or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:
Sample point is located within a recently plowed field.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1	_____	_____	_____	That are OBL, FACW, or FAC: <u>1</u> (A)	
2	_____	_____	_____	Total Number of Dominant	
3	_____	_____	_____	Species Across All Strata: <u>1</u> (B)	
4	_____	_____	_____	Percent of Dominant Species	
	<u>0</u>	= Total Cover		That are OBL, FACW, or FAC: <u>100%</u> (A/B)	
Sapling/Shrub Stratum (plot size: _____)				Prevalence Index Worksheet:	
1	_____	_____	_____	Total % Cover of _____ Multiply by: _____	
2	_____	_____	_____	OBL Species _____ x 1 = <u>0</u>	
3	_____	_____	_____	FACW species _____ x 2 = <u>0</u>	
4	_____	_____	_____	FAC Species _____ x 3 = <u>0</u>	
5	_____	_____	_____	FACU Species _____ x 4 = <u>0</u>	
	<u>0</u>	= Total Cover		UPL Species _____ x 5 = <u>0</u>	
Herb Stratum (plot size: <u>5</u>)				Column Totals <u>0</u> (A) <u>0</u> (B)	
1	<u>20</u>	<u>X</u>	<u>FACW</u>	Prevalence Index =B/A = <u>#DIV/0!</u>	
2	_____	_____	_____	Hydrophytic Vegetation Indicators:	
3	_____	_____	_____	_____ 1- Rapid Test for Hydrophytic Vegetation	
4	_____	_____	_____	_____ <u>X</u> 2- Dominance Test is >50%	
5	_____	_____	_____	_____ 3-Prevalence Index is ≤ 3.0 ¹	
6	_____	_____	_____	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
7	_____	_____	_____	_____ 5- Wetland Non-Vascular Plants ¹	
8	<u>20</u>	= Total Cover		_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
Woody Vine Stratum (plot size: _____)				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
1	_____	_____	_____	Hydrophytic Vegetation Present?	
2	_____	_____	_____	Yes <u>X</u> No _____	
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum <u>80</u>					

Remarks:
Plowed. 80% of vegetation is removed.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-14	10YR 3/1	100					Silty Clay Loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No

Remarks:
Lowest spot in the field.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No Depth (inches): _____

Water Table Present? Yes _____ No Depth (inches): >14

Saturation Present? Yes _____ No Depth (inches): >14
(includes capillary fringe)

Wetland Hydrology Present? Yes _____ No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 7
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): none Slope (%): 5
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Quatama loam NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1	_____	_____	_____	That are OBL, FACW, or FAC: <u>3</u> (A)	
2	_____	_____	_____	Total Number of Dominant	
3	_____	_____	_____	Species Across All Strata: <u>3</u> (B)	
4	_____	_____	_____	Percent of Dominant Species	
	<u>0</u>	= Total Cover		That are OBL, FACW, or FAC: <u>100%</u> (A/B)	
Sapling/Shrub Stratum (plot size: <u>15</u>)				Prevalence Index Worksheet:	
1	<u>40</u>	<u>X</u>	<u>FAC</u>	Total % Cover of	Multiply by:
2	<u>20</u>	<u>X</u>	<u>FAC</u>	OBL Species	x 1 = <u>0</u>
3	<u>10</u>		<u>(FAC)</u>	FACW species	x 2 = <u>0</u>
4	_____	_____	_____	FAC Species	x 3 = <u>0</u>
5	_____	_____	_____	FACU Species	x 4 = <u>0</u>
	<u>70</u>	= Total Cover		UPL Species	x 5 = <u>0</u>
Herb Stratum (plot size: <u>5</u>)				Column Totals	<u>0</u> (A) <u>0</u> (B)
1	<u>70</u>	<u>X</u>	<u>(FAC)</u>	Prevalence Index =B/A = <u>#DIV/0!</u>	
2	<u>10</u>		<u>OBL</u>	Hydrophytic Vegetation Indicators:	
3	<u>5</u>		<u>FACU</u>	1- Rapid Test for Hydrophytic Vegetation	
4	<u>2</u>		<u>FACU</u>	<u>X</u> 2- Dominance Test is >50%	
5	_____	_____	_____	3-Prevalence Index is ≤ 3.0 ¹	
6	_____	_____	_____	4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
7	_____	_____	_____	5- Wetland Non-Vascular Plants ¹	
8	_____	_____	_____	Problematic Hydrophytic Vegetation ¹ (Explain)	
	<u>87</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (plot size: _____)				Hydrophytic Vegetation Present?	
1	_____	_____	_____	Yes <u>X</u>	No _____
2	_____	_____	_____		
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum <u>15</u>					

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR 2/2	90	10YR 3/6	5	C	PL	Sandy Loam	OR's
0-4			10YR 3/4	5	C	M	Sandy Loam	Medium
4-10	10YR 2/2	95	10YR 3/4	5	C	M	Sandy Loam	Medium

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)		Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): >10
 Saturation Present? Yes No Depth (inches): >10
 (includes capillary fringe)

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 8
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Hill/Mound Local relief (concave, convex, none): None Slope (%): 2
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Quatama loam NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1	_____	_____	_____	That are OBL, FACW, or FAC: <u>2</u> (A)	
2	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)	
3	_____	_____	_____	Percent of Dominant Species	
4	_____	_____	_____	That are OBL, FACW, or FAC: <u>67%</u> (A/B)	
5	<u>0</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>30</u>)				Total % Cover of _____ Multiply by: _____	
1	<u>80</u>	<u>X</u>	<u>FAC</u>	OBL Species _____ x 1 = <u>0</u>	
2	<u>30</u>	<u>X</u>	<u>FAC</u>	FACW species _____ x 2 = <u>0</u>	
3	_____	_____	_____	FAC Species _____ x 3 = <u>0</u>	
4	_____	_____	_____	FACU Species _____ x 4 = <u>0</u>	
5	_____	_____	_____	UPL Species _____ x 5 = <u>0</u>	
	<u>110</u>	= Total Cover		Column Totals <u>0</u> (A)	<u>0</u> (B)
Herb Stratum (plot size: <u>5</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1	<u>60</u>	<u>X</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators:	
2	<u>15</u>	_____	<u>FACU</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3	<u>10</u>	_____	<u>FACU</u>	_____ <u>X</u> 2- Dominance Test is >50%	
4	<u>5</u>	_____	<u>FACU</u>	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5	<u>5</u>	_____	<u>FACU</u>	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6	_____	_____	_____	_____ 5- Wetland Non-Vascular Plants ¹	
7	_____	_____	_____	_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8	<u>95</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (plot size: _____)				Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
1	_____	_____	_____		
2	_____	_____	_____		
	<u>0</u>	= Total Cover			

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR 3/3	100					Silt Loam	
4-12	10YR 3/3	95	10YR 3/0	5	C	M	Silt Loam	Nodules

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): _____
 Water Table Present? Yes _____ No _____ Depth (inches): _____
 Saturation Present? Yes _____ No _____ Depth (inches): _____
 (includes capillary fringe)

Wetland Hydrology Present?

Yes _____ No **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 9
 Investigator(s): MS/TF Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Quatama loam NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>5</u> (A)	
2 _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>5</u> (B)	
3 _____	_____	_____	_____	Percent of Dominant Species	
4 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>100%</u> (A/B)	
	<u>0</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>30</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Crataegus monogyna</u>	<u>30</u>	<u>X</u>	<u>FAC</u>	OBL Species _____	x 1 = <u>0</u>
2 <u>Rosa nutkana</u>	<u>20</u>	<u>X</u>	<u>FAC</u>	FACW species _____	x 2 = <u>0</u>
3 <u>Rosa pisocarpa</u>	<u>20</u>	<u>X</u>	<u>FAC</u>	FAC Species _____	x 3 = <u>0</u>
4 <u>Rubus armeniacus</u>	<u>15</u>	_____	<u>FAC</u>	FACU Species _____	x 4 = <u>0</u>
5 <u>Fraxinus latifolia</u>	<u>5</u>	_____	<u>FACW</u>	UPL Species _____	x 5 = <u>0</u>
	<u>90</u>	= Total Cover		Column Totals	<u>0</u> (A) <u>0</u> (B)
Herb Stratum (plot size: <u>10</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1 <u>Poa annua</u>	<u>60</u>	<u>X</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators:	
2 <u>Agrostis capillaris</u>	<u>60</u>	<u>X</u>	<u>FAC</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3 <u>Cynosurus cristatus</u>	<u>10</u>	_____	<u>FACU</u>	<u>X</u> 2- Dominance Test is >50%	
4 <u>Schedonorus arundinaceus</u>	<u>10</u>	_____	<u>FAC</u>	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5 <u>Jacobaea vulgaris</u>	<u>5</u>	_____	<u>FACU</u>	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 <u>Leontodon saxatilis</u>	<u>5</u>	_____	<u>FACU</u>	_____ 5- Wetland Non-Vascular Plants ¹	
7 <u>Mentha pulegium</u>	<u>5</u>	_____	<u>OBL</u>	_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8 _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
	<u>155</u>	= Total Cover		Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
Woody Vine Stratum (plot size: _____)					
1 _____	_____	_____	_____		
2 _____	_____	_____	_____		
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum _____					

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	7.5YR 3/2	95	5YR 3/8	5	C	PL	Silt Loam	OR's throughout

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)		Indicators for Problematic Hydric Soils³:	
<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)	
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)	
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)	
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)	
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)		
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)		
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)		
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)		

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

<p>Restrictive Layer (if present):</p> <p>Type: _____</p> <p>Depth (inches): _____</p>	<p>Hydric Soil Present? Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
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Remarks: _____

HYDROLOGY

Wetland Hydrology Indicators:	
Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Other (Explain in Remarks)
	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
	<input type="checkbox"/> Geomorphic Position (D2)
	<input type="checkbox"/> Shallow Aquitard (D3)
	<input type="checkbox"/> Fac-Neutral Test (D5)
	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
	<input type="checkbox"/> Frost-Heave Hummocks (D7)

<p>Field Observations:</p> <p>Surface Water Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): _____</p> <p>Water Table Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>>12</u></p> <p>Saturation Present? Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Depth (inches): <u>>12</u> (includes capillary fringe)</p>	<p>Wetland Hydrology Present?</p> <p>Yes <input checked="" type="checkbox"/> No <input type="checkbox"/></p>
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Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: _____

Remarks: _____

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 10
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): none Slope (%): 2
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Quatama loam NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: <u>30</u>)				Number of Dominant Species	
1 <u>Fraxinus latifolia</u>	<u>5</u>	<u>X</u>	<u>FACW</u>	That are OBL, FACW, or FAC: <u>4</u> (A)	
2 _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3 _____				Percent of Dominant Species	
4 _____	<u>5</u>			That are OBL, FACW, or FAC: <u>100%</u> (A/B)	
	<u>5</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>30</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Rosa sp</u>	<u>25</u>	<u>X</u>	<u>(FAC)</u>	OBL Species _____ x 1 = <u>0</u>	
2 <u>Rubus armeniacus</u>	<u>15</u>	<u>X</u>	<u>FAC</u>	FACW species _____ x 2 = <u>0</u>	
3 <u>Fraxinus latifolia</u>	<u>5</u>		<u>FACW</u>	FAC Species _____ x 3 = <u>0</u>	
4 <u>Crataegus douglasii</u>	<u>5</u>		<u>FAC</u>	FACU Species _____ x 4 = <u>0</u>	
5 <u>Crataegus monogyna</u>	<u>5</u>		<u>FAC</u>	UPL Species _____ x 5 = <u>0</u>	
	<u>55</u>	= Total Cover		Column Totals <u>0</u> (A) <u>0</u> (B)	
Herb Stratum (plot size: <u>10</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1 <u>Unidentified grass</u>	<u>90</u>	<u>X</u>	<u>(FAC)</u>	Hydrophytic Vegetation Indicators:	
2 <u>Hypochaeris radicata</u>	<u>5</u>		<u>FACU</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3 <u>Daucus carota</u>	<u>2</u>		<u>FACU</u>	_____ <u>X</u> 2- Dominance Test is >50%	
4 <u>Jacobaea vulgaris</u>	<u>1</u>		<u>FACU</u>	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5 _____				_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 _____				_____ 5- Wetland Non-Vascular Plants ¹	
7 _____				_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8 _____	<u>98</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (plot size: _____)				Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
1 _____					
2 _____					
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum _____					

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 2/2	99	10YR 3/4	1	C	PL	Sandy Loam	
3-10	10YR 3/2	99	10YR 3/4	1	C	M	Sandy Loam	Medium

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No **X** Depth (inches): _____
 Water Table Present? Yes _____ No **X** Depth (inches): **>10**
 Saturation Present? Yes _____ No **X** Depth (inches): **>10**
 (includes capillary fringe)

Wetland Hydrology Present?

Yes _____ No **X**

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 11
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Cove clay NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: <u>30</u>)				Number of Dominant Species	
1 <u>Fraxinus latifolia</u>	<u>30</u>	<u>X</u>	<u>FACW</u>	That are OBL, FACW, or FAC: <u>6</u> (A)	
2 _____				Total Number of Dominant Species Across All Strata: <u>6</u> (B)	
3 _____				Percent of Dominant Species	
4 _____				That are OBL, FACW, or FAC: <u>100%</u> (A/B)	
	<u>30</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>30</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Rosa pisocarpa</u>	<u>10</u>	<u>X</u>	<u>FAC</u>	OBL Species _____ x 1 = <u>0</u>	
2 <u>Crataegus monogyna</u>	<u>10</u>	<u>X</u>	<u>FAC</u>	FACW species _____ x 2 = <u>0</u>	
3 <u>Rosa nutkana</u>	<u>10</u>	<u>X</u>	<u>FAC</u>	FAC Species _____ x 3 = <u>0</u>	
4 _____				FACU Species _____ x 4 = <u>0</u>	
5 _____				UPL Species _____ x 5 = <u>0</u>	
	<u>30</u>	= Total Cover		Column Totals <u>0</u> (A) <u>0</u> (B)	
Herb Stratum (plot size: <u>10</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1 <u>Poa annua</u>	<u>50</u>	<u>X</u>	<u>FAC</u>	Hydrophytic Vegetation Indicators:	
2 <u>Agrostis capillaris</u>	<u>45</u>	<u>X</u>	<u>FAC</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3 <u>Lotus corniculatus</u>	<u>10</u>		<u>FAC</u>	_____ 2- Dominance Test is >50%	
4 <u>Holcus lanatus</u>	<u>10</u>		<u>FAC</u>	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5 <u>Schedonorus arundinaceus</u>	<u>5</u>		<u>FAC</u>	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 <u>Jacobaea vulgaris</u>	<u>5</u>		<u>FACU</u>	_____ 5- Wetland Non-Vascular Plants ¹	
7 _____				_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8 _____				_____	
	<u>125</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (plot size: _____)				Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
1 _____					
2 _____					
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum _____					

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-12	10YR 3/2	80	5YR 4/6	20	C	M,PL	Clay Loam	Coarse, Medium

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.) **Indicators for Problematic Hydric Soils³:**

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes No

Remarks: _____

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)	Secondary Indicators (2 or more required)
<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Salt Crust (B11)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Aquatic Invertebrates (B13)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Presence of Reduced Iron (C4)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)	<input checked="" type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)
	<input type="checkbox"/> Other (Explain in Remarks)
	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
	<input type="checkbox"/> Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes No Depth (inches): >12

Water Table Present? Yes No Depth (inches): >12

Saturation Present? (includes capillary fringe) Yes No Depth (inches): >12

Wetland Hydrology Present? Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: _____

Remarks: _____

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 12
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): none Slope (%): 2
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Cove clay NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: <u>30</u>)				Number of Dominant Species	
1 <u>Quercus garryana</u>	<u>5</u>	<u>X</u>	<u>FACU</u>	That are OBL, FACW, or FAC: <u>3</u> (A)	
2 _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3 _____				Percent of Dominant Species	
4 _____				That are OBL, FACW, or FAC: <u>75%</u> (A/B)	
	<u>5</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>30</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Crataegus monogyna</u>	<u>40</u>	<u>X</u>	<u>FAC</u>	OBL Species _____ x 1 = <u>0</u>	
2 <u>Rosa pisocarpa</u>	<u>20</u>	<u>X</u>	<u>FAC</u>	FACW species _____ x 2 = <u>0</u>	
3 <u>Rubus armeniacus</u>	<u>10</u>		<u>FAC</u>	FAC Species _____ x 3 = <u>0</u>	
4 <u>Crataegus douglasii</u>	<u>5</u>		<u>FAC</u>	FACU Species _____ x 4 = <u>0</u>	
5 _____				UPL Species _____ x 5 = <u>0</u>	
	<u>75</u>	= Total Cover		Column Totals <u>0</u> (A) <u>0</u> (B)	
Herb Stratum (plot size: <u>10</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1 <u>Unidentified grass</u>	<u>65</u>	<u>X</u>	<u>(FAC)</u>	Hydrophytic Vegetation Indicators:	
2 <u>Cynosurus cristatus</u>	<u>15</u>		<u>FACU</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3 <u>Poa sp</u>	<u>15</u>		<u>(FAC)</u>	_____ <u>X</u> 2- Dominance Test is >50%	
4 <u>Leontodon saxatilis</u>	<u>5</u>		<u>FACU</u>	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5 <u>Jacobaea vulgaris</u>	<u>2</u>		<u>FACU</u>	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 _____				_____ 5- Wetland Non-Vascular Plants ¹	
7 _____				_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8 _____				_____ ¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
	<u>102</u>	= Total Cover		Hydrophytic Vegetation Present? Yes _____ No _____	
Woody Vine Stratum (plot size: _____)					
1 _____					
2 _____					
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum _____					

Remarks:
Identification of grasses to species is complicated by the extent of grazing.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR 2/2	98	10YR 3/4	1	C	PL	Sandy Loam	Fine
0-4			7.5YR 3/4	1	C	M		
4-12	10YR 2/2	99	10YR 3/4	1	C	M	Sandy Loam	Fine

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
 Water Table Present? Yes _____ No X Depth (inches): >12
 Saturation Present? Yes _____ No X Depth (inches): >12
 (includes capillary fringe)

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 13
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): none Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Verboort silty clay loam NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

Remarks:
Sample point taken in the lowest spot.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>1</u> (A)	
2 _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>1</u> (B)	
3 _____	_____	_____	_____	Percent of Dominant Species	
4 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>100%</u> (A/B)	
5 _____	<u>0</u>	= Total Cover	_____	Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: _____)				Total % Cover of _____ Multiply by: _____	
1 _____	_____	_____	_____	OBL Species _____ x 1 = <u>0</u>	
2 _____	_____	_____	_____	FACW species _____ x 2 = <u>0</u>	
3 _____	_____	_____	_____	FAC Species _____ x 3 = <u>0</u>	
4 _____	_____	_____	_____	FACU Species _____ x 4 = <u>0</u>	
5 _____	_____	_____	_____	UPL Species _____ x 5 = <u>0</u>	
Herb Stratum (plot size: <u>10</u>)				Column Totals <u>0</u> (A) <u>0</u> (B)	
1 <u>Unidentified grass</u>	<u>70</u>	<u>X</u>	<u>(FAC)</u>	Prevalence Index =B/A = <u>#DIV/0!</u>	
2 <u>Jacobaea vulgaris</u>	<u>10</u>	_____	<u>FACU</u>		
3 <u>Cynosurus cristatus</u>	<u>10</u>	_____	<u>FACU</u>		
4 <u>Madia glomerata</u>	<u>5</u>	_____	<u>FACU</u>		
5 <u>Jacobaea vulgaris</u>	<u>2</u>	_____	<u>FACU</u>		
6 <u>Brassica nigra</u>	<u>2</u>	_____	<u>UPL</u>		
7 <u>Plantago lanceolata</u>	<u>1</u>	_____	<u>FACU</u>		
8 <u>Cichorium intybus</u>	<u>1</u>	_____	<u>FACU</u>		
	<u>101</u>	= Total Cover			
Woody Vine Stratum (plot size: _____)				Hydrophytic Vegetation Indicators:	
1 _____	_____	_____	_____	1- Rapid Test for Hydrophytic Vegetation	
2 _____	_____	_____	_____	<u>X</u> 2- Dominance Test is >50%	
				3-Prevalence Index is ≤ 3.0 ¹	
				4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
				5- Wetland Non-Vascular Plants ¹	
				Problematic Hydrophytic Vegetation ¹ (Explain)	
				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
				Hydrophytic Vegetation Present? Yes <u>X</u> No _____	

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	7.5YR 3/2	95	7.5YR 3/4	5	C	PL	silt loam	OR's
3-7	7.5YR 2.5/2	100					silt loam	
7-12+	7.5YR 2.5/3	100					silt loam	

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes _____ No **X**

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes _____ No **X** Depth (inches): _____
 Water Table Present? Yes _____ No **X** Depth (inches): **>12**
 Saturation Present? Yes _____ No **X** Depth (inches): **>12**
 (includes capillary fringe)

Wetland Hydrology Present?
 Yes **X** No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 14
 Investigator(s): TF//MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Flat Local relief (concave, convex, none): none Slope (%): 1-2
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Verboort silty clay loam NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation X Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

Remarks:
The sample area is grazed.

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: <u>30</u>)			
1 <u>Fraxinus latifolia</u>	<u>15</u>	<u>X</u>	<u>FACW</u>
2 _____			
3 _____			
4 _____			
	<u>15</u>	= Total Cover	
Sapling/Shrub Stratum (plot size: <u>30</u>)			
1 <u>Rosa rubiginosa</u>	<u>5</u>	<u>X</u>	<u>UPL</u>
2 _____			
3 _____			
4 _____			
5 _____			
	<u>5</u>	= Total Cover	
Herb Stratum (plot size: <u>10</u>)			
1 <u>Poa sp</u>	<u>60</u>	<u>X</u>	<u>(FAC)</u>
2 <u>Cynosurus cristatus</u>	<u>40</u>	<u>X</u>	<u>FACU</u>
3 <u>Jacobaea vulgaris</u>	<u>10</u>		<u>FACU</u>
4 <u>Schedonorus arundinaceus</u>	<u>5</u>		<u>FAC</u>
5 <u>Cirsium arvense</u>	<u>1</u>		<u>FAC</u>
6 _____			
7 _____			
8 _____			
	<u>116</u>	= Total Cover	
Woody Vine Stratum (plot size: _____)			
1 _____			
2 _____			
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum _____			

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 50% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by:	
OBL Species	x 1 =	<u>0</u>
FACW species	x 2 =	<u>30</u>
FAC Species	x 3 =	<u>198</u>
FACU Species	x 4 =	<u>200</u>
UPL Species	x 5 =	<u>25</u>
Column Totals		<u>136</u> (A) <u>453</u> (B)

Prevalence Index =B/A = 3.33

Hydrophytic Vegetation Indicators:

_____ 1- Rapid Test for Hydrophytic Vegetation

_____ 2- Dominance Test is >50%

_____ 3-Prevalence Index is ≤ 3.0¹

_____ 4-Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

_____ 5- Wetland Non-Vascular Plants¹

X Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:
Identification of grasses to species is complicated by the extent of grazing.

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-7	10YR 4/2	85	7.5YR 5/8	15	C	PL	Sandy Loam	Fine
7-9	7.5YR 3/2	95	7.5YR 5/8	5			Silt Loam	fine
9-14+	7.5YR 3/2	75	7.5YR 5/8	25	C	PL	Silt Loam	fine

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input checked="" type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input checked="" type="checkbox"/> Depleted Below Dark Surface (A11)	<input checked="" type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input checked="" type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes No Depth (inches): >14
 Water Table Present? Yes No Depth (inches): >14
 Saturation Present? (includes capillary fringe) Yes No Depth (inches): >14

Wetland Hydrology Present?

Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 15
 Investigator(s): TF//MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): none Local relief (concave, convex, none): none Slope (%): 1-Jan
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Verboort silty clay loam NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
<u>Tree Stratum</u> (plot size: <u>30</u>)				Number of Dominant Species	
1 <u>Quercus garryana</u>	<u>80</u>	<u>X</u>	<u>FACU</u>	That are OBL, FACW, or FAC: <u>3</u> (A)	
2 _____				Total Number of Dominant Species Across All Strata: <u>4</u> (B)	
3 _____				Percent of Dominant Species	
4 _____				That are OBL, FACW, or FAC: <u>75%</u> (A/B)	
	<u>80</u>	= Total Cover		Prevalence Index Worksheet:	
<u>Sapling/Shrub Stratum</u> (plot size: <u>30</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Rubus armeniacus</u>	<u>40</u>	<u>X</u>	<u>FAC</u>	OBL Species _____ x 1 = <u>0</u>	
2 <u>Crataegus monogyna</u>	<u>30</u>	<u>X</u>	<u>FAC</u>	FACW species _____ x 2 = <u>0</u>	
3 <u>Rosa pisocarpa</u>	<u>10</u>		<u>FAC</u>	FAC Species _____ x 3 = <u>0</u>	
4 _____				FACU Species _____ x 4 = <u>0</u>	
5 _____				UPL Species _____ x 5 = <u>0</u>	
	<u>80</u>	= Total Cover		Column Totals <u>0</u> (A) <u>0</u> (B)	
<u>Herb Stratum</u> (plot size: <u>10</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1 <u>Unidentified grass</u>	<u>10</u>	<u>X</u>	<u>(FAC)</u>	Hydrophytic Vegetation Indicators:	
2 _____				_____ 1- Rapid Test for Hydrophytic Vegetation	
3 _____				_____ <u>X</u> 2- Dominance Test is >50%	
4 _____				_____ 3-Prevalence Index is ≤ 3.0 ¹	
5 _____				_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 _____				_____ 5- Wetland Non-Vascular Plants ¹	
7 _____				_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8 _____				_____	
	<u>10</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
<u>Woody Vine Stratum</u> (plot size: _____)				Hydrophytic Vegetation Present?	
1 _____				Yes <u>X</u> No _____	
2 _____					
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum <u>90</u>					

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 2/2	100					Sandy Loam	
3-12	10YR 2/1	90	10YR 3/4	10	C	M	Sandy Loam	Medium

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): >12
 Saturation Present? Yes No Depth (inches): >12
 (includes capillary fringe)

Wetland Hydrology Present?
 Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 16
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Slope Local relief (concave, convex, none): none Slope (%): 2
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Cove clay NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes <u>X</u>	No _____
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes <u>X</u>	No _____			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status
Tree Stratum (plot size: _____)			
1	_____	_____	_____
2	_____	_____	_____
3	_____	_____	_____
4	_____	_____	_____
	<u>0</u>	= Total Cover	
Sapling/Shrub Stratum (plot size: <u>30</u>)			
1	<u>Rosa sp</u> <u>20</u>	<u>X</u>	<u>(FAC)</u>
2	<u>Crataegus monogyna</u> <u>15</u>	<u>X</u>	<u>FAC</u>
3	<u>Rubus armeniacus</u> <u>10</u>	<u>X</u>	<u>FAC</u>
4	_____	_____	_____
5	_____	_____	_____
	<u>45</u>	= Total Cover	
Herb Stratum (plot size: <u>5</u>)			
1	<u>Unidentified grass</u> <u>60</u>	<u>X</u>	<u>(FAC)</u>
2	<u>Poa sp</u> <u>20</u>	<u>X</u>	<u>(FAC)</u>
3	<u>Cynosurus cristatus</u> <u>15</u>	_____	<u>FACU</u>
4	<u>Leontodon saxatilis</u> <u>5</u>	_____	<u>FACU</u>
5	_____	_____	_____
6	_____	_____	_____
7	_____	_____	_____
8	_____	_____	_____
	<u>100</u>	= Total Cover	
Woody Vine Stratum (plot size: _____)			
1	_____	_____	_____
2	_____	_____	_____
	<u>0</u>	= Total Cover	
% Bare Ground in Herb Stratum <u>0</u>			

Dominance Test worksheet:

Number of Dominant Species That are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index Worksheet:

Total % Cover of	Multiply by:	
OBL Species _____	x 1 =	<u>0</u>
FACW species _____	x 2 =	<u>0</u>
FAC Species _____	x 3 =	<u>0</u>
FACU Species _____	x 4 =	<u>0</u>
UPL Species _____	x 5 =	<u>0</u>
Column Totals <u>0</u> (A)		<u>0</u> (B)

Prevalence Index =B/A = #DIV/0!

Hydrophytic Vegetation Indicators:

_____ 1- Rapid Test for Hydrophytic Vegetation

X 2- Dominance Test is >50%

_____ 3-Prevalence Index is ≤ 3.0¹

_____ 4-Morphological Adaptations¹ (provide supporting data in Remarks or on a separate sheet)

_____ 5- Wetland Non-Vascular Plants¹

_____ Problematic Hydrophytic Vegetation¹ (Explain)

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-4	10YR 2/2	90	5YR 3/4	5	C	M	Sandy Loam	fine
0-4			5YR 3/4	5	C	M		Fine
4-12	10YR 2/2	95	5YR 3/4	5	C	M	Sandy Loam	Fine

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): >12
 Saturation Present? Yes No Depth (inches): >12
 (includes capillary fringe)

Wetland Hydrology Present?

Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 17
 Investigator(s): MS/TF Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): Mound Local relief (concave, convex, none): None Slope (%): 2-3
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Cove clay NWI Classification: None
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes <u>X</u>	No _____			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks: _____

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: <u>30</u>)				Number of Dominant Species	
1 <u>Pinus ponderosa</u>	<u>25</u>	<u>X</u>	<u>FACU</u>	That are OBL, FACW, or FAC:	<u>5</u> (A)
2 _____				Total Number of Dominant	
3 _____				Species Across All Strata:	<u>6</u> (B)
4 _____	<u>25</u>		= Total Cover	Percent of Dominant Species	
Sapling/Shrub Stratum (plot size: <u>30</u>)				That are OBL, FACW, or FAC:	
1 <u>Rosa pisocarpa</u>	<u>60</u>	<u>X</u>	<u>FAC</u>		<u>83%</u> (A/B)
2 <u>Crataegus monogyna</u>	<u>30</u>	<u>X</u>	<u>FAC</u>	Prevalence Index Worksheet:	
3 <u>Rubus armeniacus</u>	<u>25</u>	<u>X</u>	<u>FAC</u>	Total % Cover of	Multiply by:
4 <u>Symphoricarpos albus</u>	<u>10</u>		<u>FACU</u>	OBL Species	x 1 = <u>0</u>
5 _____				FACW species	x 2 = <u>0</u>
	<u>125</u>		= Total Cover	FAC Species	x 3 = <u>0</u>
Herb Stratum (plot size: <u>10</u>)				FACU Species	x 4 = <u>0</u>
1 <u>Poa sp</u>	<u>60</u>	<u>X</u>	<u>(FAC)</u>	UPL Species	x 5 = <u>0</u>
2 <u>Agrostis capillaris</u>	<u>40</u>	<u>X</u>	<u>FAC</u>	Column Totals	<u>0</u> (A) <u>0</u> (B)
3 _____				Prevalence Index =B/A = <u>#DIV/0!</u>	
4 _____				Hydrophytic Vegetation Indicators:	
5 _____				1- Rapid Test for Hydrophytic Vegetation	
6 _____				<u>X</u> 2- Dominance Test is >50%	
7 _____				3-Prevalence Index is ≤ 3.0 ¹	
8 _____	<u>100</u>		= Total Cover	4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
Woody Vine Stratum (plot size: _____)				5- Wetland Non-Vascular Plants ¹	
1 _____				Problematic Hydrophytic Vegetation ¹ (Explain)	
2 _____				¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
	<u>0</u>		= Total Cover	Hydrophytic Vegetation Present?	
% Bare Ground in Herb Stratum _____				Yes <u>X</u>	No _____

Remarks: _____

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (Inches)	Matrix		Redox Features				Texture	Remarks
	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²		
0-3	10YR 3/2	95	10YR 6/8	5	C	M	Silt Loam	fine mottles
3-12+	7.5YR 3/2	85	7.5YR 3/3	15	C	M	Silt Loam	fine mottles

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains.

²Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

Indicators for Problematic Hydric Soils³:

<input type="checkbox"/> Histosol (A1)	<input type="checkbox"/> Sandy Redox (S5)	<input type="checkbox"/> 2 cm Muck (A10)
<input type="checkbox"/> Histic Epipedon (A2)	<input type="checkbox"/> Stripped Matrix (S6)	<input type="checkbox"/> Red Parent Material (TF2)
<input type="checkbox"/> Black Histic (A3)	<input type="checkbox"/> Loamy Mucky Mineral (F1) (except MLRA 1)	<input type="checkbox"/> Very Shallow Dark Surface (TF12)
<input type="checkbox"/> Hydrogen Sulfide (A4)	<input type="checkbox"/> Loamy Gleyed Matrix (F2)	<input type="checkbox"/> Other (explain in Remarks)
<input type="checkbox"/> Depleted Below Dark Surface (A11)	<input type="checkbox"/> Depleted Matrix (F3)	
<input type="checkbox"/> Thick Dark Surface (A12)	<input checked="" type="checkbox"/> Redox Dark Surface (F6)	
<input type="checkbox"/> Sandy Mucky Mineral (S1)	<input type="checkbox"/> Depleted Dark Surface (F7)	
<input type="checkbox"/> Sandy Gleyed Matrix (S4)	<input type="checkbox"/> Redox Depressions (F8)	

³Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____
 Depth (inches): _____

Hydric Soil Present? Yes No

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

Secondary Indicators (2 or more required)

<input type="checkbox"/> Surface Water (A1)	<input type="checkbox"/> Water stained Leaves (B9) (Except MLRA 1, 2, 4A, and 4B)	<input type="checkbox"/> Water stained Leaves (B9) (MLRA1, 2, 4A, and 4B)
<input type="checkbox"/> High Water Table (A2)	<input type="checkbox"/> Salt Crust (B11)	<input type="checkbox"/> Drainage Patterns (B10)
<input type="checkbox"/> Saturation (A3)	<input type="checkbox"/> Aquatic Invertebrates (B13)	<input type="checkbox"/> Dry-Season Water Table (C2)
<input type="checkbox"/> Water Marks (B1)	<input type="checkbox"/> Hydrogen Sulfide Odor (C1)	<input type="checkbox"/> Saturation Visible on Aerial Imagery (C9)
<input type="checkbox"/> Sediment Deposits (B2)	<input type="checkbox"/> Oxidized Rhizospheres along Living Roots (C3)	<input type="checkbox"/> Geomorphic Position (D2)
<input type="checkbox"/> Drift Deposits (B3)	<input type="checkbox"/> Presence of Reduced Iron (C4)	<input type="checkbox"/> Shallow Aquitard (D3)
<input type="checkbox"/> Algal Mat or Crust (B4)	<input type="checkbox"/> Recent Iron Reduction in Plowed Soils (C6)	<input type="checkbox"/> Fac-Neutral Test (D5)
<input type="checkbox"/> Iron Deposits (B5)	<input type="checkbox"/> Stunted or Stressed Plants (D1) (LRR A)	<input type="checkbox"/> Raised Ant Mounds (D6) (LRR A)
<input type="checkbox"/> Surface Soil Cracks (B6)	<input type="checkbox"/> Other (Explain in Remarks)	<input type="checkbox"/> Frost-Heave Hummocks (D7)
<input type="checkbox"/> Inundation Visible on Aerial Imagery (B7)		
<input type="checkbox"/> Sparsely Vegetated Concave Surface (B8)		

Field Observations:

Surface Water Present? Yes No Depth (inches): _____
 Water Table Present? Yes No Depth (inches): >12+
 Saturation Present? Yes No Depth (inches): >12+
 (includes capillary fringe)

Wetland Hydrology Present?

Yes No

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 18
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): none Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WGS85
 Soil Map Unit Name: Hillsboro loam NWI Classification: PEM1C
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1	_____	_____	_____	That are OBL, FACW, or FAC: <u>2</u> (A)	
2	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)	
3	_____	_____	_____	Percent of Dominant Species	
4	_____	_____	_____	That are OBL, FACW, or FAC: <u>67%</u> (A/B)	
	<u>0</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>30</u>)				Total % Cover of _____ Multiply by: _____	
1	<u>25</u>	<u>X</u>	<u>FAC</u>	OBL Species _____ x 1 = <u>0</u>	
2	<u>20</u>	<u>X</u>	<u>FACU</u>	FACW species _____ x 2 = <u>0</u>	
3	<u>5</u>	_____	<u>FACU</u>	FAC Species _____ x 3 = <u>0</u>	
4	<u>5</u>	_____	<u>(FAC)</u>	FACU Species _____ x 4 = <u>0</u>	
5	<u>5</u>	_____	<u>FACU</u>	UPL Species _____ x 5 = <u>0</u>	
	<u>60</u>	= Total Cover		Column Totals <u>0</u> (A) <u>0</u> (B)	
Herb Stratum (plot size: <u>10</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1	<u>35</u>	<u>X</u>	<u>(FAC)</u>	Hydrophytic Vegetation Indicators:	
2	<u>3</u>	_____	<u>FACU</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3	<u>2</u>	_____	<u>FACU</u>	_____ <u>X</u> 2- Dominance Test is >50%	
4	_____	_____	_____	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5	_____	_____	_____	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6	_____	_____	_____	_____ 5- Wetland Non-Vascular Plants ¹	
7	_____	_____	_____	_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8	_____	_____	_____	_____	
	<u>40</u>	= Total Cover		¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
Woody Vine Stratum (plot size: _____)				Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
1	_____	_____	_____		
2	_____	_____	_____		
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum <u>60</u>					

Remarks:

WETLAND DETERMINATION DATA FORM - Western Mountains, Valleys, and Coast Region

Project/Site: Walgrave Property City/County: Tualatin/Washington Sampling Date: 9/15/2021
 Applicant/Owner: Phelan Development State: OR Sampling Point: 18
 Investigator(s): TF/MS Section, Township, Range: Section 22, Township 2S, Range 1W
 Landform (hillslope, terrace, etc.): none Local relief (concave, convex, none): none Slope (%): 1
 Subregion (LRR): LRR A Lat: _____ Long: _____ Datum: WSG85
 Soil Map Unit Name: Hillsboro loam NWI Classification: none
 Are climatic/hydrologic conditions on the site typical for this time of year? Yes X No _____ (if no, explain in Remarks)
 Are vegetation _____ Soil _____ or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? (Y/N) Y
 Are vegetation _____ Soil _____ or Hydrology _____ naturally problematic? If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes <u>X</u>	No _____	Is Sampled Area within a Wetland?	Yes _____	No <u>X</u>
Hydric Soil Present?	Yes _____	No <u>X</u>			
Wetland Hydrology Present?	Yes _____	No <u>X</u>			

Remarks:

VEGETATION - Use scientific names of plants.

	absolute % cover	Dominant Species?	Indicator Status	Dominance Test worksheet:	
Tree Stratum (plot size: _____)				Number of Dominant Species	
1 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>3</u> (A)	
2 _____	_____	_____	_____	Total Number of Dominant Species Across All Strata: <u>3</u> (B)	
3 _____	_____	_____	_____	Percent of Dominant Species	
4 _____	_____	_____	_____	That are OBL, FACW, or FAC: <u>100%</u> (A/B)	
	<u>0</u>	= Total Cover		Prevalence Index Worksheet:	
Sapling/Shrub Stratum (plot size: <u>30</u>)				Total % Cover of _____ Multiply by: _____	
1 <u>Rubus armeniacus</u>	<u>45</u>	<u>X</u>	<u>FAC</u>	OBL Species _____	x 1 = <u>0</u>
2 <u>Crataegus monogyna</u>	<u>3</u>	_____	<u>FAC</u>	FACW species _____	x 2 = <u>0</u>
3 <u>Frangula purshiana</u>	<u>2</u>	_____	<u>FAC</u>	FAC Species _____	x 3 = <u>0</u>
4 <u>Corylus cornuta</u>	<u>1</u>	_____	<u>FACU</u>	FACU Species _____	x 4 = <u>0</u>
5 <u>Quercus garryana</u>	<u>1</u>	_____	<u>FACU</u>	UPL Species _____	x 5 = <u>0</u>
	<u>52</u>	= Total Cover		Column Totals <u>0</u> (A)	<u>0</u> (B)
Herb Stratum (plot size: <u>10</u>)				Prevalence Index =B/A = <u>#DIV/0!</u>	
1 <u>Unidentified grass</u>	<u>20</u>	<u>X</u>	<u>(FAC)</u>	Hydrophytic Vegetation Indicators:	
2 <u>Bromus sp</u>	<u>15</u>	<u>X</u>	<u>(FAC)</u>	_____ 1- Rapid Test for Hydrophytic Vegetation	
3 <u>Trifolium arvense</u>	<u>5</u>	_____	<u>UPL</u>	_____ <u>X</u> 2- Dominance Test is >50%	
4 <u>Centaurium erythraea</u>	<u>5</u>	_____	<u>FAC</u>	_____ 3-Prevalence Index is ≤ 3.0 ¹	
5 <u>Hypochaeris radicata</u>	<u>4</u>	_____	<u>FACU</u>	_____ 4-Morphological Adaptations ¹ (provide supporting data in Remarks or on a separate sheet)	
6 <u>Unidentified forb</u>	<u>3</u>	_____	<u>(FAC)</u>	_____ 5- Wetland Non-Vascular Plants ¹	
7 <u>Daucus carota</u>	<u>1</u>	_____	<u>FACU</u>	_____ Problematic Hydrophytic Vegetation ¹ (Explain)	
8 _____	_____	_____	_____	¹ Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.	
	<u>53</u>	= Total Cover		Hydrophytic Vegetation Present? Yes <u>X</u> No _____	
Woody Vine Stratum (plot size: _____)					
1 _____	_____	_____	_____		
2 _____	_____	_____	_____		
	<u>0</u>	= Total Cover			
% Bare Ground in Herb Stratum <u>30</u>					

Remarks:
At the edge of a field. Half of the plot was plowed field, the other half was blackberry thicket.

Appendix C

Photo documentation





Photo A:

Looking west across the VC at the north end of lot 551.

Photo taken: September 24, 2021

Photo B:

Looking west into forested and shrub upland west of Wetland A.

Photo taken: September 24, 2021



Project #6904

Date 10/22/21



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo documentation

Walgraeve Partition - Tualatin, Oregon



Photo C:

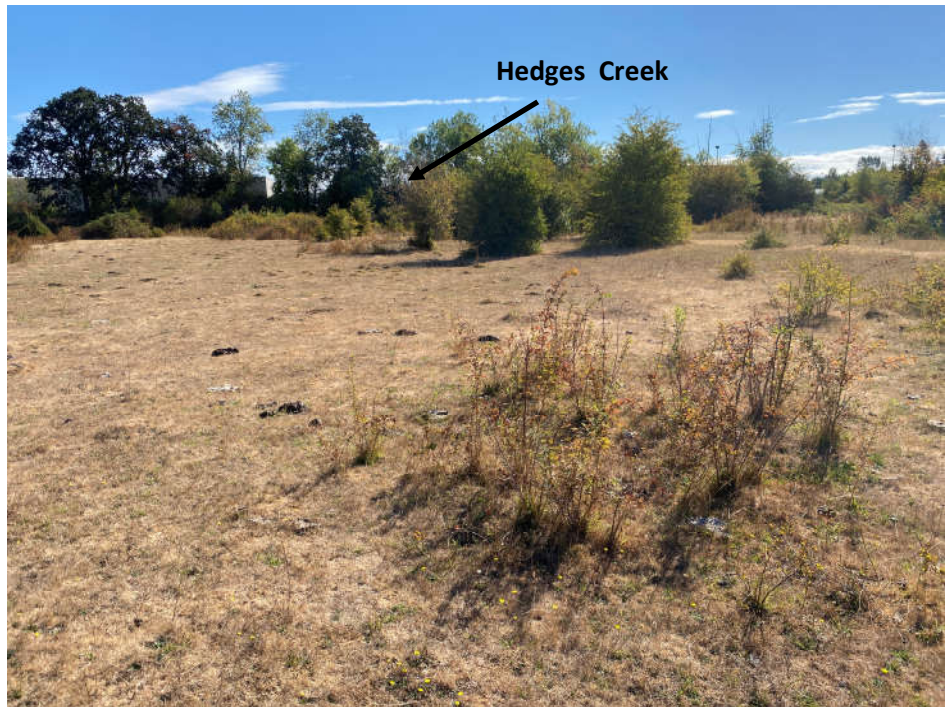
Looking northwest into a forested area in the northwest portion of lot 550.

Photo taken: September 24, 2021

Photo D:

Looking south across an upland "island" north of Hedges Creek.

Photo taken: September 24, 2021



Project #6904

Date 10/22/21



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo documentation

Walgraeve Partition - Tualatin, Oregon



Photo E:

Looking east across
grazed upland south of
the wetland.

Photo taken: September 24,
2021

Photo F:

Looking southeast into
blackberry dominated VC
south of Wetland A.

Photo taken: September 24, 2021



Project #6904

Date 10/22/21



Pacific Habitat Services, Inc.
9450 SW Commerce Circle, Suite 180
Wilsonville, OR 97070

Photo documentation

Walgraeve Partition - Tualatin, Oregon

Project Contact Information

Walgraeves Industrial

Property Owner:

Walgraeves
11345 SW Herman Rd.
Tualatin, OR 97062
503.692.0766
farmboys@comcast.net

Applicant:

Phelan Development Company
6750 SW Bradbury Ct.
Portland, OR 97224
503.718.8837
mdearmey@phelandevco.com

Architect:

CCA, Inc.
18600 MacArthur Boulevard, Suite 300
Irvine, CA 92612
949.833.1930
alexj@ccarchitects.com

Engineer:

AAI Engineering
4875 SW Griffith Drive #100
Beaverton, OR 97005
503.620.3030
craigh@aaieng.com

Planner:

AAI Engineering
4875 SW Griffith Drive #100
Beaverton, OR 97005
503.620.3030
bethz@aaieng.com

Landscape Architect

AAI Engineering
4875 SW Griffith Drive #100
Beaverton, OR 97005
503.620.3030
teresal@aaieng.com

Traffic Engineer:

Lancaster Mobley Engineering
321 SW 4th Ave. #400
Portland, OR 97204
503.248.0373
daniel@lancastermobley.com

Environmental Engineer:

Pacific Habitat Services Inc.
9450 SW Commerce Circle, #180
Wilsonville, OR 97070
503.570.0800
jvs@pacifichabitat.com



10285 Southwest Ridder Road, Wilsonville, OR 97070
a 503 570 0636 f 503 520 9107 republicservices.com

November 10, 2021

Alex Jewel
Carlile Coatsworth Architects

Re: Walgraeve Property
11345 SW Herman Rd.
Tualatin, OR 97062

Dear Alex,

Thank you, for sending us the preliminary site plans for this proposed development in Tualatin.

My Company: Republic Services of Clackamas and Washington Counties has the franchise agreement to service this area with the City of Tualatin. We will provide complete commercial waste removal and recycling services as needed on a weekly basis for this location

The commercial design plan that you provided on 11/4/2021 which includes a standard trash/recycle enclosure design of 10' x 20' and includes two enclosures per buildings A, B, and C, totaling six enclosures, will provide adequate space for our trash and recycle receptacles and are accessible for our collection trucks to provide service. You communicated that SW Myslony Street is planned for extension and that the site access aprons will connect with the planned street extension which will allow access for our trucks to enter the site. The site driveway design plan will allow for our trucks to navigate this location.

Thanks Alex, for your help and concerns for our services prior to this project being developed.

Sincerely,

A handwritten signature in blue ink, appearing to read "Kelly Herrod", written over a light blue horizontal line.

Kelly Herrod
Operations Supervisor
Republic Services Inc.



www.tvfr.com

Command & Business Operations Center
and North Operating Center
11945 SW 70th Avenue
Tigard, Oregon 97223-8566
503-649-8577

South Operating Center
8445 SW Elligsen Road
Wilsonville, Oregon
97070-9641
503-649-8577

Training Center
12400 SW Tonquin Road
Sherwood, Oregon
97140-9734
503-259-1600

FIRE DEPARTMENT ACCESS AND WATER SUPPLY PERMIT CHECKLIST

Project Name	Address and/or Legal Description	TVF&R Permit #
Walgraevs	25122 D00050	
Description of Proposed Work:	Three-structure Industrial Park w/assoc. site work.	Jurisdiction:
Bldg. Square Footage: 442,035 (total)	Type of Construction: V-B	Fire Sprinklers: Y <input checked="" type="checkbox"/> N <input type="checkbox"/>
Fire Alarms: Y <input checked="" type="checkbox"/> N <input type="checkbox"/>	Bldg. Height: (Measured to gutter line or top of parapet) 41'-8"	ERRC <input type="checkbox"/> MERRC <input type="checkbox"/> N/A <input type="checkbox"/>

Complete checklist below if the submittal involves constructing or altering a building.

ITEM #	PROVIDED	REQUIREMENT	CODE REF
1	Y <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Fire service plans shall consist of a site plan and elevation views of buildings. The site plan shall be labeled as FS-1. Elevation view sheets shall be FS-2, FS-3, etc.	OFC 105.4.2
2	Y <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Access roads shall be within 150 feet of all portions of the exterior wall of the first story of the building as measured by an approved route around the exterior of the building or facility. An approved turnaround is required if the remaining distance to an approved intersecting roadway, as measured along the fire apparatus access road, is greater than 150 feet. (OFC 503.1.1)	OFC 503.1.1
3	Y <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Dead end fire apparatus access roads in excess of 150 feet in length shall be provided with an approved turnaround. Diagrams can be found in the corresponding guide located at: http://www.tvfr.com/DocumentCenter/View/1296 .	OFC 503.2.5 & D103.1
4	Y <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Buildings exceeding 30 feet in height or three stories in height shall have at least two separate means of fire apparatus access.	D104.1
5	Y <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Buildings or facilities having a gross building area of more than 62,000 square feet shall have at least two approved separate means of fire apparatus access. Exception: Projects having a gross building area of up to 124,000 square feet that have a single approved fire apparatus access road when all buildings are equipped throughout with approved automatic sprinkler systems.	OFC D104.2
6	Y <input type="checkbox"/> N/A <input checked="" type="checkbox"/>	Multifamily projects having more than 100 dwelling units shall be provided with two separate and approved fire apparatus access roads. Exception: Projects having up to 200 dwelling units may have a single approved fire apparatus access road when all buildings, including nonresidential occupancies, are equipped throughout with an approved automatic sprinkler system in accordance with section 903.3.1.1, 903.3.1.2. Projects having more than 200 dwelling units shall be provided with two separate and approved fire apparatus roads regardless of whether they are equipped with an approved automatic sprinkler system.	OFC D106
7	Y <input checked="" type="checkbox"/> N/A <input type="checkbox"/>	Buildings with a vertical distance between the grade plane and the highest roof surface that exceeds 30 feet in height shall be provided with a fire apparatus access road constructed for use by aerial apparatus with an unobstructed driving surface width of not less than 26 feet. For the purposes of this section, the highest roof surface shall be determined by	OFC D105.1, D105.2

20120.30

ITEM #	PROVIDED		REQUIREMENT	CODE REF
			measurement to the eave of a pitched roof, the intersection of the roof to the exterior wall, or the top of the parapet walls, whichever is greater. Any portion of the building may be used for this measurement, provided that it is accessible to firefighters and is capable of supporting ground ladder placement.	
8	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Developments of one- or two-family dwellings, where the number of dwelling units exceeds 30, shall be provided with separate and approved fire apparatus access roads and shall meet the requirements of Section D104.3. Exception: Where there are more than 30 dwelling units on a single public or private fire apparatus access road and all dwelling units are equipped throughout with an approved automatic sprinkler system in accordance with section 903.3.1.1, 903.3.1.2, or 903.3.1.3 of the International Fire Code, access from two directions shall not be required.	OFC D107
9	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	At least one of the required aerial access routes shall be located within a minimum of 15 feet and a maximum of 30 feet from the building, and shall be positioned parallel to one entire side of the building. The side of the building on which the aerial access road is positioned shall be approved by the Fire Marshal. Overhead utility and power lines shall not be located over the aerial access road or between the aerial access road and the building.	OFC D105.3, D105.4
10	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Where two access roads are required, they shall be placed a distance apart equal to not less than one half of the length of the maximum overall diagonal dimension of the area to be served (as identified by the Fire Marshal), measured in a straight line between accesses.	OFC D104.3
11	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Fire apparatus access roads shall have an unobstructed driving surface width of not less than 20 feet (26 feet adjacent to fire hydrants and an unobstructed vertical clearance of not less than 13 feet 6 inches).	OFC 503.2.1 & D103.1
12	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	The fire district will approve access roads of 12 feet for up to three dwelling units (Group R-3) and accessory (Group U) buildings.	OFC 503.1.1
13	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Where access roads are less than 20 feet and exceed 400 feet in length, turnouts 10 feet wide and 30 feet long may be required and will be determined on a case by case basis.	OFC 503.2.2
14	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Where fire apparatus roadways are not of sufficient width to accommodate parked vehicles and 20 feet of unobstructed driving surface, "No Parking" signs shall be installed on one or both sides of the roadway and in turnarounds as needed. Signs shall read "NO PARKING - FIRE LANE" and shall be installed with a clear space above grade level of 7 feet. Signs shall be 12 inches wide by 18 inches high and shall have red letters on a white reflective background.	OFC D103.6
15	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Where required, fire apparatus access roadway curbs shall be painted red (or as approved) and marked "NO PARKING FIRE LANE" at 25-foot intervals. Lettering shall have a stroke of not less than one inch wide by six inches high. Lettering shall be white on red background	OFC 503.3
16	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Where a fire hydrant is located on a fire apparatus access road, the minimum road width shall be 26 feet and shall extend 20 feet before and after the point of the hydrant.	OFC D103.1
17	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Where access roads are less than 20 feet and exceed 400 feet in length, turnouts 10 feet wide and 30 feet long may be required and will be determined on a case by case basis.	OFC 503.2.2
18	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Fire apparatus access roads shall be of an all-weather surface that is easily distinguishable from the surrounding area and is capable of supporting not less than 12,500 pounds point load (wheel load) and 75,000 pounds live load (gross vehicle weight). Documentation from a registered engineer that the final construction is in accordance with approved plans or the requirements of the Fire Code may be requested.	OFC 503.2.3
19	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	The inside turning radius and outside turning radius shall not be less than 28 feet and 48 feet respectively, measured from the same center point.	OFC 503.2.4 & D103.3
20	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Fire apparatus access roadway grades shall not exceed 15%. Alternate methods and materials may be available at the discretion of the Fire Marshal (for grade exceeding 15%).	OFC D103.2
21	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Approved forest dwellings (in which the structure meets all County forest dwelling fire siting, fire retardant roof, and spark arrestor requirements) are allowed up to 20% maximum grade. Access roads greater than 20% shall be considered on a case-by-case basis. Forest dwelling access roads shall be an all-weather surface capable of supporting imposed loads of not less than 37,000 pounds gross vehicle weight and be no less than 12 feet minimum width. All other access requirements, including turnarounds shall be determined upon a heavy brush unit response capability to the individual property.	OFC 503.1.1 & D102.1.1

ITEM #	PROVIDED		REQUIREMENT	CODE REF
22	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Turnarounds shall be as flat as possible and have a maximum of 5% grade with the exception of crowning for water run-off.	OFC 503.2.7 & D103.2
23	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Intersections shall be level (maximum 5%) with the exception of crowning for water run-off.	OFC 503.2.7 & D103.2
24	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Portions of aerial apparatus roads that will be used for aerial operations shall be as flat as possible. Front to rear and side to side maximum slope shall not exceed 10%.	OFC D103.2
25	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Gates securing fire apparatus roads shall comply with all of the following: <ol style="list-style-type: none"> 1. Minimum unobstructed width shall be not less than 20 feet (or the required roadway surface width). 2. Gates shall be set back at minimum of 30 feet from the intersecting roadway or as approved. 3. Electric gates shall be equipped with a means for operation by fire department personnel. 4. Electric automatic gates shall comply with ASTM F 2200 and UL 325. 	OFC D103.5, & 503.6
26	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Private bridges shall be designed and constructed in accordance with the State of Oregon Department of Transportation and American Association of State Highway and Transportation Officials Standards <i>Standard Specification for Highway Bridges</i> . Vehicle load limits shall be posted at both entrances to bridges when required by the Fire Marshal.	OFC 503.2.6
27	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Applicants shall provide documentation of a fire hydrant flow test or flow test modeling of water availability from the local water purveyor if the project includes a new structure or increase in the floor area of an existing structure. Tests shall be conducted from a fire hydrant within 400 feet for commercial projects, or 600 feet for residential development. Flow tests will be accepted if they were performed within 5 years as long as no adverse modifications have been made to the supply system. Water availability information may not be required to be submitted for every project.	OFC Appendix B
28	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Where a portion of a commercial building is more than 400 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the building, on-site fire hydrants and mains shall be provided.	OFC 507.5.1
29	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Where the most remote portion of a residential structure is more than 600 feet from a hydrant on a fire apparatus access road, as measured in an approved route around the exterior of the structure(s), on-site fire hydrants and mains shall be provided.	OFC 507.5.1
30	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Rural one-and-two-family dwellings, where there is no fixed and reliable water supply and there is approved access, shall not be required to provide a firefighting water supply.	OFC B103
31	Y <input type="checkbox"/>	N/A <input checked="" type="checkbox"/>	Detached U occupancies, in rural areas, that are in excess of 3,600 square feet are not required to have a water supply when they have approved fire department access.	OFC D102
32	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Fire hydrants shall be located not more than 15 feet from an approved fire apparatus access roadway unless approved by the Fire Marshal.	OFC C102.1
33	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	Where fire hydrants are subject to impact by a motor vehicle, guard posts, bollards or other approved means of protection shall be provided.	OFC 507.5.6 & OFC 312
34	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	FDCs shall be located within 100 feet of a fire hydrant (or as approved). Hydrants and FDC's shall be located on the same side of the fire apparatus access roadway or drive aisle, fully visible, and recognizable from the street or nearest point of the fire department vehicle access or as otherwise approved.	OFC 912.2.1 & NFPA 13

ITEM #	PROVIDED		REQUIREMENT	CODE REF
35	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	<p>In new buildings where the design reduces the level of radio coverage for public safety communications systems below minimum performance levels, a distributed antenna system, signal booster, or other method approved by TVF&R and Washington County Consolidated Communications Agency shall be provided.</p> <p>http://www.tvfr.com/DocumentCenter/View/1296.</p> <ul style="list-style-type: none"> • Emergency responder radio system testing and/or system installation is required for this building. Please contact me (using my contact info below) for further information including an alternate means of compliance that is available. If the alternate method is preferred, it must be requested from TVF&R prior to issuance of building permit. • Testing shall take place after the installation of all roofing systems; exterior walls, glazing and siding/cladding; and all permanent interior walls, partitions, ceilings, and glazing. <p>MERRC Q&A MERRC Q&A MERRC Permit Application MERRC Permit Application</p>	OFC 510, Appendix F, & OSSC 915
36	Y <input checked="" type="checkbox"/>	N/A <input type="checkbox"/>	<p>A Knox box for building access may be required for structures and gates. See Appendix B for further information and detail on required installations. Order via www.knoxbox.com or contact TVF&R for assistance and instructions regarding installation and placement.</p>	OFC 506.1

CERTIFICATION OF SIGN POSTING



The applicant must provide and post a sign pursuant to Tualatin Development Code (TDC 32.150). The block around the word "NOTICE" must remain yellow composed of the RGB color values Red 255, Green 255, and Blue 0. A template is available at:

<https://www.tualatinoregon.gov/planning/land-use-application-sign-templates>

NOTE: For larger projects, the Community Development Department may require the posting of additional signs in conspicuous locations.

As the applicant for the Walgraeve's project,
I hereby certify that on this day, Friday, May 20, 2022 sign(s) was/were posted on the subject property in
accordance with the requirements of the Tualatin Development Code and the Community Development Division.

Applicant's Name: Beth Zauner, PLA
(Please Print)

Applicant's Signature: _____

Date: 5/20/2022

EXHIBIT A.

Resident	Address	City/ State	Zip
Janine Wilson	18325 SW 135th Terrace	Tualatin, OR	97062
Chris Tunstall	17400 SW Cheyenne Way	Tualatin, OR	97062
Dan Hardy	23070 SW Lodgepole Ave	Tualatin, OR	97062
Kate Pinamonti	10240 SW Fulton Drive	Tualatin, OR	97062
Jeanne Raikoglo	17630 SW Shawnee Trail	Tualatin, OR	97062
Daniel Bachhuber	10205 SW Casteel Ct	Tualatin, OR	97062
Doug Ulmer	7149 SW Sagert St., Unit 105	Tualatin, OR	97062
Dana Holland	7237 SW Delaware Ct.	Tualatin, OR	97062
Margarita Crowell	7237 SW Delaware Ct.	Tualatin, OR	97062
Tammy Palumbo	9510 SW Siuslaw Ln	Tualatin, OR	97062
Sallie Olson	8960 SW Arapaho Rd	Tualatin, OR	97062
Del Moore	8790 SW Nisqually Ct	Tualatin, OR	97062
Jamison Shields	8182 SW Paiute	Tualatin, OR	97062
Claudia Sterling	20600 SW Shoshone Dr	Tualatin, OR	97062
Janet Gilkey	21132 SW 86th Ct	Tualatin, OR	97062
Roy Loop	20190 SW 86th Ct	Tualatin, OR	97062
Ed Casey	22255 SW 102nd Pl.	Tualatin, OR	97062
Julie Makarowsky	10775 SW Willow St.	Tualatin, OR	97062
Patricia Parsons	21690 SW 109th Terrace	Tualatin, OR	97062
Ray Winkowski	10652 SW Cottonwood St	Tualatin, OR	97062
Alex Thurber	9875 SW Iowa Dr	Tualatin, OR	97062
Mary Lyn Westenhover	9845 SW Iowa Dr	Tualatin, OR	97062
Deb Fant	22680 SW Eno Pl.	Tualatin, OR	97062
Cathy Holland	10740 SW Lucas Dr.	Tualatin, OR	97062
Scott Miller	12976 SW Hillside Terrace	Tualatin, OR	97062
Chris Tunstall	17400 SW Cheyenne Way	Tualatin, OR	97062
Brian Fant	22680 SW Eno Pl.	Tualatin, OR	97062

TLID	OWNER1
2S122DD00600	ZAMPELL TUALATIN LLC
2S122DA00300	WETLANDS CONSERVANCY INC
2S1220000500	WASHINGTON COUNTY FACILITIES MGMT
2S122D000552	WALGRAEVE GARY & WALGRAEVE RICKY
2S122C001500	TUALATIN YARDS LLC
2S122DA90021	TUALATIN INDUSTRIAL VENTURES LLC
2S127AB00300	TAMARISK TUALATIN LLC
2S122DD00400	SIDIEL LLC
2S122DA00700	S BENNER HEATHERBRAE LLC & M BENNER HEATHERBRAE LLC
2S127AB00100	PNWP LLC
2S1220000300	PHIGHT LLC
2S122AD01200	PASCUZZI INVESTMENT LLC
2S122DA00900	PACIFIC METAL COMPANY
2S127BA00500	OFIPLEX OR LLC
2S122C002600	NORSTAR BUSINESS CENTER WEST #2 LLC
2S122DD00300	NDH LLC & HOLMES THOMAS L
2S122C002700	MYSLONY LLC
2S122AD00800	MORGAN WILLIAM RAY & JANICE ELLEN REV LIV TRUST
2S122DA00100	METRO
2S122AD01000	MARSHALL ASSOCIATED LLC
2S122C001502	MARINE LUMBER COMPANY
2S122DA01900	MANHASSET BUSINESS CENTER OWNERS ASSOC
2S122DD00200	MANHASSET INDUSTRIAL LLC
2S122C000300	MAJNARICH FAMILY LP
2S122C002300	LUMBER FAMILY CO LLC
2S122C002500	LIGHTSPEED TECHNOLOGIES INC
2S122DA90011	LIC LLC
2S127BA00900	HEDGES D AN LLC
2S122AD01100	GARSKE TRAVIS W
2S1220000400	FUJIMI CORPORATION
2S122DA00600	EVE LAND INVESTMENTS LLC
2S122C002100	D&B PROPERTY LEASING LLC
2S122DA90031	CJO PROPERTIES LLC
2S122AD00900	CEDAR LANDSCAPE MAINTENANCE LLC
2S122DD00100	BT PROPERTY LLC
2S122C000103	AW & JS ENTERPRISES LLC
2S127AB00600	AMU PROPERTIES LLC
2S122AD01300	ABBOTT TUALATIN LLC
2S122D000600	112TH & MYSLONY JPMJD/USICV LLC
	AAI Engineering Beth Zauner

OWNERADDR	OWNERCITY	OWNERSTATE	OWNERZIP
3 STANLEY TUCKER DR	NEWBURYPORT	MA	01950
4640 SW MACADAM AVE #50	PORTLAND	OR	97239
169 N 1ST AVE #42	HILLSBORO	OR	97124
11345 SW HERMAN RD	TUALATIN	OR	97062
19100 SW 51ST AVE	TUALATIN	OR	97062
1101 SE TECH CENTER DR #160	VANCOUVER	WA	98683
1099 18TH STE 2900	DENVER	CO	80202
PO BOX 1696	BEAVERTON	OR	97075
3329 WINTERCREEK CT	EUGENE	OR	97405
6600 SW 105TH AVE, STE 175	BEAVERTON	OR	97008
ONE BOWERMAN DR	BEAVERTON	OR	97005
10250 SW NORTH DAKOTA	TIGARD	OR	97223
10700 SW MANHASSET DR	TUALATIN	OR	97062
5348 VEGAS DR	LAS VEGAS	NV	89108
PO BOX 1696	BEAVERTON	OR	97075
PO BOX 111	CANBY	OR	97013
11555 SW MYSLONY ST	TUALATIN	OR	97062
4500 SW ADVANCE RD	WILSONVILLE	OR	97070
600 NE GRAND AVE	PORTLAND	OR	97232
PO BOX 278	TUALATIN	OR	97062
11800 SW MYSLONY ST	TUALATIN	OR	97062
1498 SE TECH CENTER PL #150	VANCOUVER	WA	98683
8625 EVERGREEN WAY STE 200	EVERETT	WA	98208
8338 SW 11TH AVE	PORTLAND	OR	97219
PO BOX 1427	TUALATIN	OR	97062
11509 SW HERMAN RD	TUALATIN	OR	97062
7650 SW VILLAGE GREEN CIR	WILSONVILLE	OR	97070
PO BOX 15523	SEATTLE	WA	98115
PO BOX 729	COLBERT	WA	99005
11200 SW LEVETON DR	TUALATIN	OR	97062
PO BOX 19856	PORTLAND	OR	97280
8060 SW PFAFFLE ST STE 200	TIGARD	OR	97223
14859 SW 162ND TER	TIGARD	OR	97224
6107 SW MURRAY BLVD #175	BEAVERTON	OR	97008
55 GLENLAKE PKWY NE	ATLANTA	GA	30328
PO BOX 849	TUALATIN	OR	97062
20049 SW 112TH AVE	TUALATIN	OR	97062
3030 BRIDGEWAY	SAUSALITO	CA	94965
450 NEWPORT CENTER DR STE 405	NEWPORT BEACH	CA	92660
4875 SW Griffith Dr. #100	Beaverton	OR	97005



NOTICE OF HEARING AND OPPORTUNITY TO COMMENT
CASE FILE: AR 21-0018— Walgraev Industrial Park (Hedges Creek)

EXHIBIT B.

NOTICE IS HEREBY GIVEN that a public hearing before the Architectural Review Board will be held:

Wednesday, June 29, 2022 at 6:30 pm

Location: Tualatin Service Center

10699 SW Herman Road, Tualatin, OR 97062

Zoom Teleconference: Link with log-in instructions available

www.tualatinoregon.gov/meetings

AR 21-0018

Walgraev Industrial Park (Hedges Creek)

AAI Engineering, on behalf of Ricky and Gary Walgraev, is requesting approval to construct three buildings. Building A will be 148,600 square feet, Building B will be 142,550 square feet and Building C will be 151,425 square feet for a total of 442,575 square feet on a 21 acre site zoned General Manufacturing (MG).

To view the application materials, visit:

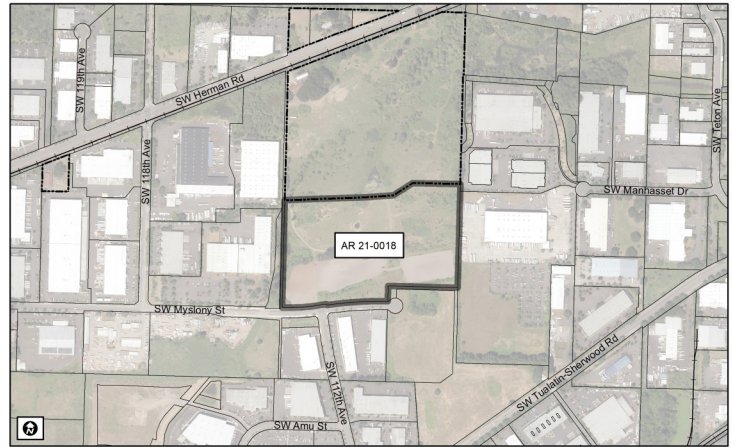
www.tualatinoregon.gov/projects

Comments and questions may be submitted to:

Keith Leonard, Associate Planner

Email: kleonard@tualatin.gov or Phone: 503-691-3029

The property is located at: 11345 SW Herman Road, Tax Lot: 2S122D000550.



- **Type III Architectural Review Criteria:** Tualatin Development Code Chapters: 32, 33, 61, 63, 70, 71, 72, 73A-D, 74, 75
- **Staff report** will be available at least seven days before the hearing for inspection at no cost, and copies will be provided at a reasonable cost.
- **Print copies** of the application are available at a reasonable cost.



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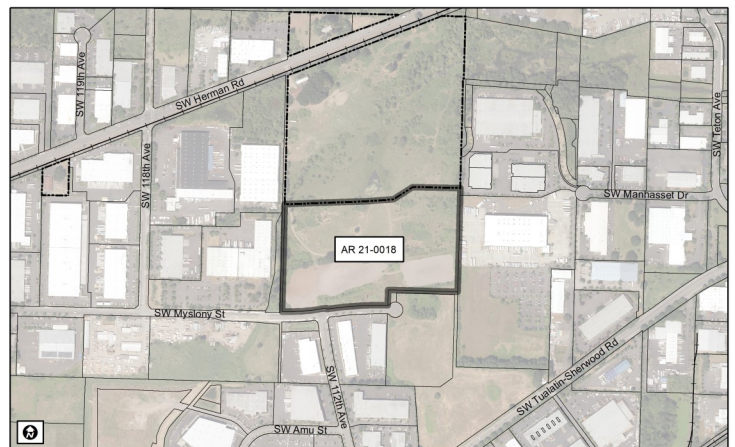
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- **Individuals wishing to comment on the application** must do so in writing to the Planning Division prior to the hearing, or in writing and/or orally at the hearing. Materials must be received by June 8, 2022 to be included in the hearing packet.
- **The public hearing will begin** with a staff presentation, followed by testimony by proponents, testimony by opponents, and rebuttal. The time of individual testimony may be limited. If a participant requests, before the hearing is closed, the record shall remain open for at least 7 days after the hearing.
- **All citizens are invited to attend and be heard:** Failure of an issue to be raised in the hearing, in person, or by letter, or failure to provide sufficient specificity to afford the decision maker an opportunity to respond to the issue precludes appeal to the State Land Use Board of Appeals (LUBA) based on that issue. The failure of the applicant to raise constitutional or other issues relating to the proposed conditions of approval with sufficient specificity to the decision maker to respond to the issue precludes an action for damages in circuit court.
- **Notice of the Decision** will only be provided to those who submit written comments regarding that application or testify at the hearing.

You received this mailing because you own property within 1,000 feet (ft) of the site or within a residential subdivision which is partly within 1,000 ft.

For additional information contact:

Keith Leonard, Associate Planner, kleonard@tualatin.gov or 503-691-3029

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**FIRE CODE / LAND USE / BUILDING REVIEW
APPLICATION**



North Operating Center
11945 SW 70th Avenue
Tigard, OR 97223
Phone: 503-649-8577

South Operating Center
8445 SW Elligsen Rd
Wilsonville, OR 97070
Phone: 503-649-8577

REV 6-30-20

Project Information

Applicant Name: Beth Zauner
Address: 4875 SW Griffith Dr. Beaverton, OR 97005
Phone: 503-620-3030
Email: bzauner@msn.com
Site Address: 11345 SW Herman Road.
City: Tualatin
Map & Tax Lot #: 2S122D000550
Business Name: TBD
Land Use/Building Jurisdiction: City of Tualatin
Land Use/ Building Permit # AR21-0018

Choose from: Beaverton, Tigard, Newberg, Tualatin, North Plains, West Linn, Wilsonville, Sherwood, Rivergrove, Durham, King City, Washington County, Clackamas County, Multnomah County, Yamhill County

Project Description

This project proposes a three structure, Industrial Park facility with associated parking, loading, landscape and utilities.

Permit/Review Type (check one):

- Land Use / Building Review - Service Provider Permit
- Emergency Radio Responder Coverage Install/Test
- LPG Tank (Greater than 2,000 gallons)
- Flammable or Combustible Liquid Tank Installation (Greater than 1,000 gallons)
 - * Exception: Underground Storage Tanks (UST) are deferred to DEQ for regulation.
- Explosives Blasting (Blasting plan is required)
- Exterior Toxic, Pyrophoric or Corrosive Gas Installation (in excess of 810 cu.ft.)
- Tents or Temporary Membrane Structures (in excess of 10,000 square feet)
- Temporary Haunted House or similar
- OLCC Cannabis Extraction License Review
- Ceremonial Fire or Bonfire (For gathering, ceremony or other assembly)

For Fire Marshal's Office Use Only

TVFR Permit # 2022 - 0072
Permit Type: Service Provider Permit
Submittal Date: 6/15/22
Assigned To: Darby
Due Date: _____
Fees Due: _____
Fees Paid: _____

**Approval/Inspection Conditions
(For Fire Marshal's Office Use Only)**

This section is for application approval only

[Signature] 0806
Fire Marshal or Designee Date

Conditions:

See Attached Conditions: Yes No

Site Inspection Required: Yes No

This section used when site inspection is required

Inspection Comments:

Final TVFR Approval Signature & Emp ID Date

MEMORANDUM

Date: June 9, 2022
To: Keith Leonard, Associate Planner, City of Tualatin
From: Jackie Sue Humphreys, Clean Water Services (CWS)
Subject: Walgraeve Industrial Park, AR 21-0018, 2S122D000550

Please include the following comments when writing your conditions of approval:

PRIOR TO ANY WORK ON THE SITE

A Clean Water Services (CWS) Storm Water Connection Permit Authorization must be obtained. Application for CWS Permit Authorization must be in accordance with the requirements of the Design and Construction Standards, Resolution and Order No. 19-5 as amended by R&O 19-22, or prior standards as meeting the implementation policy of R&O 18-28, and is to include:

- a. Detailed plans prepared in accordance with Chapter 2, Section 2.04.
- b. Detailed grading and erosion control plan. An Erosion Control Permit will be required. Area of Disturbance must be clearly identified on submitted construction plans. If site area and any offsite improvements required for this development exceed one-acre of disturbance, project will require a 1200-CN Erosion Control Permit. If site area and any offsite improvements required for this development exceed five-acres of disturbance, project will require a 1200-C Erosion Control Permit.
- c. Detailed plans showing the development having direct access by gravity to public storm and sanitary sewer.
- d. Provisions for water quality in accordance with the requirements of the above named design standards. Water Quality is required for all new development and redevelopment areas per R&O 19-5, Section 4.04. Access shall be provided for maintenance of facility per R&O 19-5, Section 4.07.6.

- e. If use of an existing offsite or regional Water Quality Facility is proposed, it must be clearly identified on plans, showing its location, condition, capacity to treat this site and, any additional improvements and/or upgrades that may be needed to utilize that facility.
- f. If private lot LIDA systems proposed, must comply with the current CWS Design and Construction Standards. A private maintenance agreement, for the proposed private lot LIDA systems, needs to be provided to the City for review and acceptance.
- g. Show all existing and proposed easements on plans. Any required storm sewer, sanitary sewer, and water quality related easements must be granted to the City.
- h. Application may require additional permitting and plan review from CWS Source Control Program. For any questions or additional information, please contact Source Control at (503) 681-5175.
- i. Applicant shall comply with the conditions as set forth in the Service Provider Letter No. 22-000820, dated March 29, 2022.
- j. Clean Water Services shall require an easement over the Vegetated Corridor conveying storm and surface water management to Clean Water Services that would prevent the owner of the Vegetated Corridor from activities and uses inconsistent with the purpose of the corridor and any easements therein.
- k. Detailed plans showing the sensitive area and corridor delineated, along with restoration and enhancement of the corridor.
- l. If there is any activity within the sensitive area, the applicant shall gain authorization for the project from the Oregon Department of State Lands (DSL) and US Army Corps of Engineers (USACE). The applicant shall provide Clean Water Services or its designee (appropriate city) with copies of all DSL and USACE project authorization permits.
- m. Any proposed offsite construction activities will require an update or amendment to the current Service Provider Letter for this project.

CONCLUSION

This Land Use Review does not constitute CWS approval of storm or sanitary sewer compliance to the NPDES permit held by CWS. CWS, prior to issuance of any connection permits, must approve final construction plans and drainage calculations.



Tualatin Parks & Recreation Memo

DATE: June 15, 2022

TO: Keith Leonard, Associate Planner

FROM: Rich Mueller, Parks Planning & Development Manager

SUBJECT: AR21-0018- Walgraev Industrial Park (Hedges Creek)

The Parks and Recreation Department has reviewed the materials provided with the Application and has the following comments for AR21-0018 - Walgraev Industrial Park (Hedges Creek), 11345 SW Herman Road.

Please incorporate the following conditions of approval and findings as a requirement of development.

Conditions of Approval

Based on the Findings and Conclusions presented herein, Walgraev Industrial Park development approval is supported by Tualatin Parks and Recreation subject to the following:

Prior to Issuance of Building Permits

Eastside of Property (North South) Easement

1. Applicant shall provide a north south active transportation pedestrian and bike easement on the east side of the property as shown in 3.1 A-2 Preliminary Site Plan dated April 12, 2022.
2. Easement is to be a minimum of 15' wide to accommodate the 12' multi use regional Ice Age Tonquin Trail.
3. The easement will run from Myslony Street, along the eastside of the property, to the terminus of the property at the north boundary.
4. Applicant shall execute and record the easement in accordance with City standards.

Prior to Occupancy

Myslony Street Right of Way

1. Applicant shall design and construct a 12 foot-wide multi-use pathway (regional Ice Age Tonquin Trail) on the north side of Myslony Street in ROW from the intersection at 112th Avenue to the termination of the property on the east end.
2. To include required mitigation, enhancement, and related improvements or facilities.
3. Design and construction standards for the pathway and related facilities shall be approved by the Parks and Recreation Director in accordance with City Public Works Construction

Tualatin Parks & Recreation Memo
AR21-0018 - Walgraeve Industrial Park (Hedges Creek)

Code, Parks Multi Use Pathway Standards, and Street Design Standards for a 12' multi-use path.

4. Trees and shrubs shall be planted between the pathway and the properties adjoining the Subject Property to create and maintain visual privacy. Plant selection and location shall be in accordance with City standards.

Eastside of Property (North South) Easement

1. Applicant shall grade the trail easement to ADA compliant slope and evaluations shown in 3.1 A-2 Preliminary Site Plan dated April 12, 2022 (attached) or substantially similar as approved by the Parks & Recreation Director.

In accordance with TDC 74 the applicant must:

TDC 74.120. - Public Improvements.

1. Except as specially provided, all public improvements must be installed at the expense of the applicant. All public improvements installed by the applicant must be constructed and guaranteed as to workmanship and material as required by the Public Works Construction Code prior to acceptance by the City. Work must not be undertaken on any public improvement until after the construction plans have been approved by the City Manager and a Public Works Permit issued and the required fees paid.

TDC 74.140. - Construction Timing.

1. All the public improvements required under this chapter must be completed and accepted by the City prior to the issuance of a Certificate of Occupancy; or, for subdivision and partition applications, in accordance with the requirements of the Subdivision regulations.

TDC 74.310. - Greenway, Natural Area, Bike, and Pedestrian Path Dedications and Easements.

1. Areas dedicated to the City for Greenway or Natural Area purposes or easements or dedications for bike and pedestrian facilities during the development application process must be surveyed, staked and marked with a City approved boundary marker prior to acceptance by the City.
2. For subdivision and partition applications, the Greenway, Natural Area, bike, and pedestrian path dedication and easement areas must be shown to be dedicated to the City on the final subdivision or partition plat prior to approval of the plat by the City; or
3. For all other development applications, Greenway, Natural Area, bike, and pedestrian path dedications and easements must be submitted to the City Manager; building permits must not be issued for the development prior to acceptance of the dedication or easement by the City.

TDC 74.420. - Street Improvements.

When an applicant proposes to develop land adjacent to an existing or proposed street, including land which has been excluded under TDC 74.220, the applicant should be responsible for the improvements to the adjacent existing or proposed street that will bring the improvement of the street into conformance with the Transportation Plan (TDC Chapter 11), TDC 74.425 (Street Design Standards), and the City's Public Works Construction Code, subject to the following provisions:

1. For any development proposed within the City, roadway facilities within the right-of-way described in TDC 74.210 must be improved to standards as set out in the Public Works Construction Code.
6. All required street improvements must include curbs, sidewalks with appropriate buffering, storm drainage, street lights, street signs, street trees, and, where designated, bikeways and transit facilities.
8. For development applications other than subdivisions and partitions, all street improvements

Tualatin Parks & Recreation Memo
AR21-0018 - Walgraeve Industrial Park (Hedges Creek)

required by this section must be completed and accepted by the City prior to the issuance of Certificate of Occupancy.

12. Sidewalks with appropriate buffering must be constructed along both sides of each internal street and at a minimum along the development side of each external street in accordance with the Public Works Construction Code.

TDC 74.425. - Street Design Standards.

2. The proposed street design standards are shown in Figures 72A through 72G. The typical roadway cross sections comprise the following elements: right-of-way, number of travel lanes, bicycle and pedestrian facilities, and other amenities such as landscape strips. These figures are intended for planning purposes for new road construction, as well as for those locations where it is physically and economically feasible to improve existing streets.

TDC 74.450. - Bikeways and Pedestrian Paths.

1. Where proposed development abuts or contains an existing or proposed bikeway, pedestrian path, or multi-use path, as set forth in TDC Chapter 11, Transportation Figure 11-4, the City may require that a bikeway, pedestrian path, or multi-use path be constructed, and an easement or dedication provided to the City.

2. Where required, bikeways and pedestrian paths must be provided as follows:

a. Bike and pedestrian paths must be constructed and surfaced in accordance with the Public Works Construction Code.

b. The applicant must install the striping and signing of the bike lanes and shared roadway facilities, where designated.

Findings

The south and east sides of the project site, tax lot 2S122D000550, AR21-0018- Walgraeve Industrial Park (Hedges Creek), 11345 SW Herman Road has been identified on the regional Ice Age Tonquin Trail as shown in Paths and Trails Map 72.2 of the Tualatin Development Code, and in the City of Tualatin Transportation Plan.

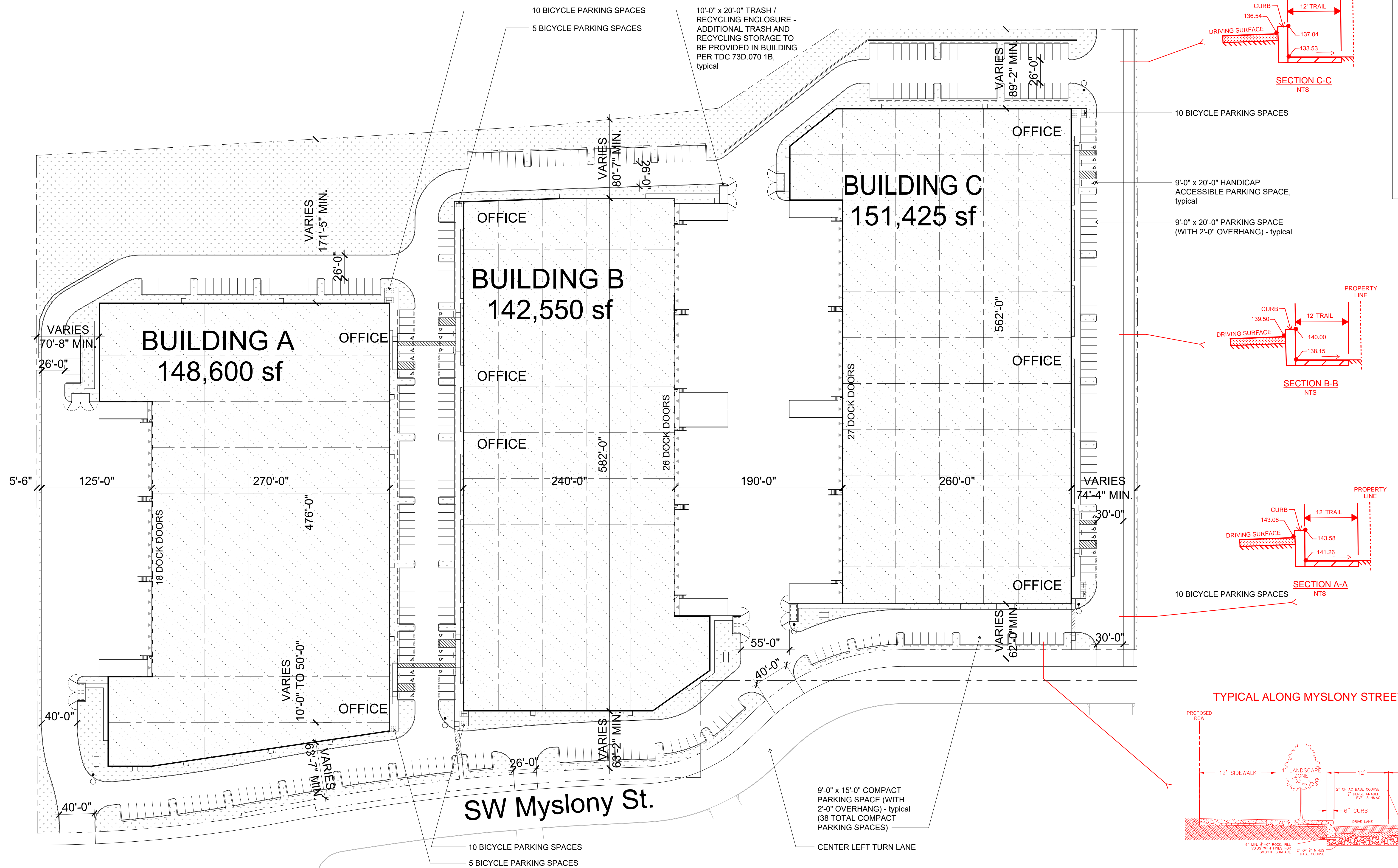
The City's Parks and Transportation System plans indicate that the Ice Age Tonquin Trail public facility be constructed during development on the southern and eastern property boundary or ROW.

To achieve the purposes of the Tualatin Development Code, Paths and Trails Map 72.2 the applicant shall construct a 12 foot-wide multi-use pathway (regional Ice Age Tonquin Trail) on the north side of Myslony Street in ROW from the intersection at 112 to the termination of the property on the east end, required mitigation, enhancement, and related improvements or facilities. Final design and construction standards for the pathway and related facilities shall be approved by the Parks and Recreation Director in accordance with City Public Works Construction Code, Parks Multi Use Pathway Standards and Street Design Standard for a 12' multi-use path.

The applicant will provide a north south active transportation pedestrian and bike easement on the east side of the property as shown in 3.1 A-2 Preliminary Site Plan dated April 12, 2022. The easement is to be a minimum of 15' wide to accommodate the 12' multi use regional Ice Age Tonquin Trail and run from Myslony Street to the terminus of the property north. Applicant shall execute and record the easement in accordance with City standards.

NET LOT AREA:	± 914,700 sf 21.00 acres
TOTAL BUILDING AREA:	442,575 sf
BUILDING A:	148,600 sf
BUILDING B:	142,550 sf
BUILDING C:	151,425 sf
SITE COVERAGE (on NET):	48.13 %
DOCK DOOR RATIO:	
BUILDING A:	1 / 8,255 sf
BUILDING B:	1 / 5,483 sf
BUILDING C:	1 / 5,608 sf
PARKING REQUIRED	308 spaces
BUILDING A:	104 spaces
WAREHOUSE (70%) at .3 per 1,000:	32 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	72 spaces
BUILDING B:	99 spaces
WAREHOUSE (70%) at .3 per 1,000:	30 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	69 spaces
BUILDING C:	105 spaces
WAREHOUSE (70%) at .3 per 1,000:	32 spaces
MANUFACTURING (30%) at 1.6 per 1,000:	73 spaces
PARKING PROVIDED:	335 spaces
LANDSCAPE REQUIRED:	137,205 sf (15%)
LANDSCAPE PROVIDED:	143,321 sf (15.67%)

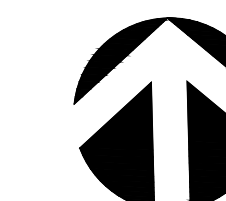
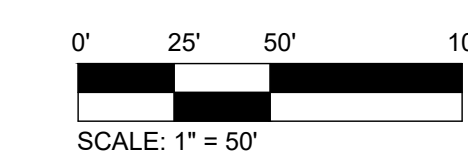
21 April 2022 p:\2019\19500 phelan development\19500.36-walgraave property, or/new road schemes\19500.36 site plan - ar package - 04212022.dwg



PRELIMINARY SITE PLAN

21 April 2022

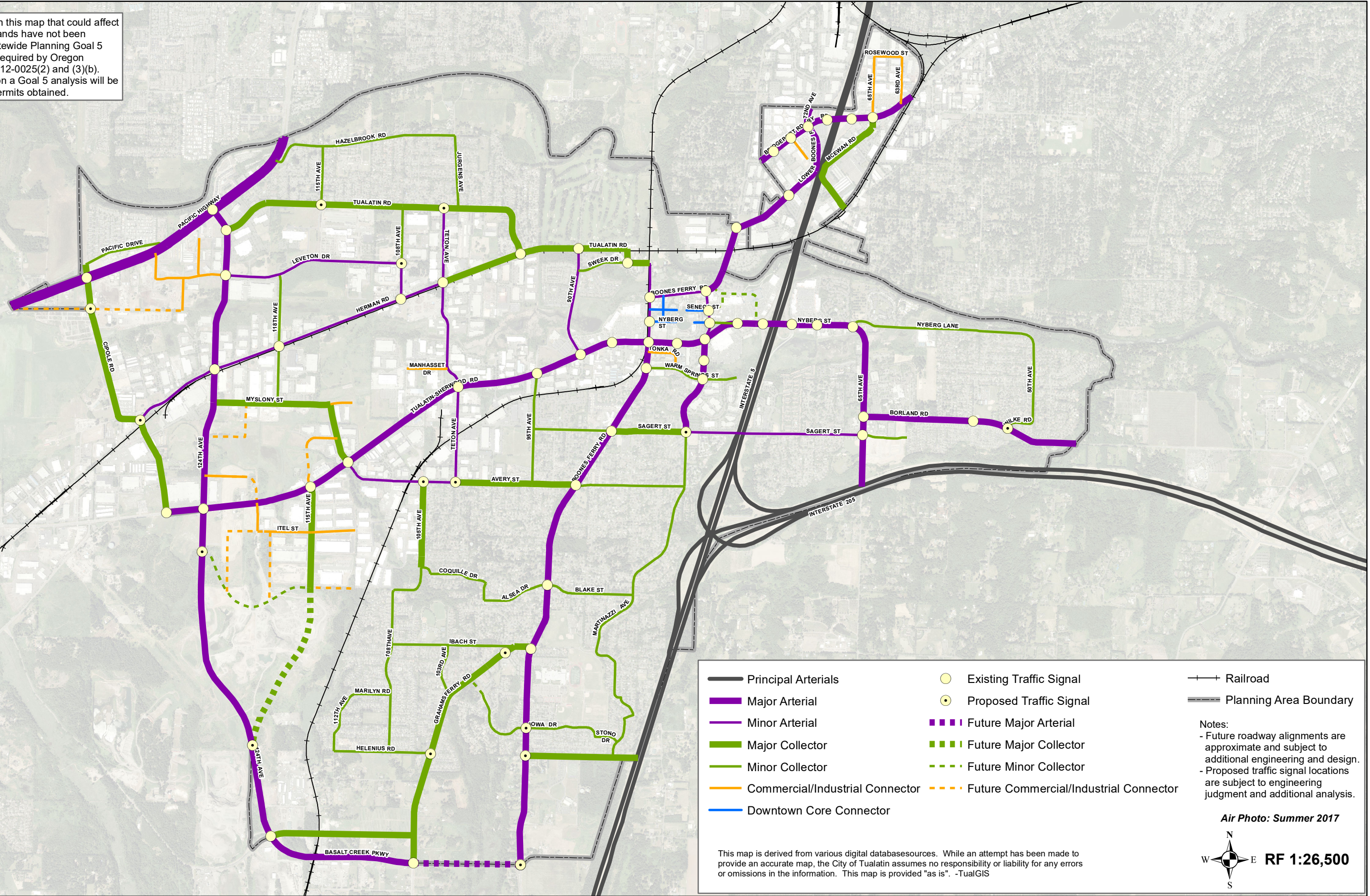
Hedges Creek
11345 SW Herman Road
Tualatin, Oregon



A-2

Map 8-1: Functional Classification and Traffic Signal Plan

The projects embodied in this map that could affect rivers, streams and wetlands have not been analyzed in terms of Statewide Planning Goal 5 (Natural Resources) as required by Oregon Administrative Rule 660-12-0025(2) and (3)(b). Thus, prior to construction a Goal 5 analysis will be completed and proper permits obtained.



Principal Arterials	Existing Traffic Signal	Railroad
Major Arterial	Proposed Traffic Signal	Planning Area Boundary
Minor Arterial	Future Major Arterial	Notes: - Future roadway alignments are approximate and subject to additional engineering and design. - Proposed traffic signal locations are subject to engineering judgment and additional analysis.
Major Collector	Future Major Collector	
Minor Collector	Future Commercial/Industrial Connector	
Commercial/Industrial Connector		
Downtown Core Connector		

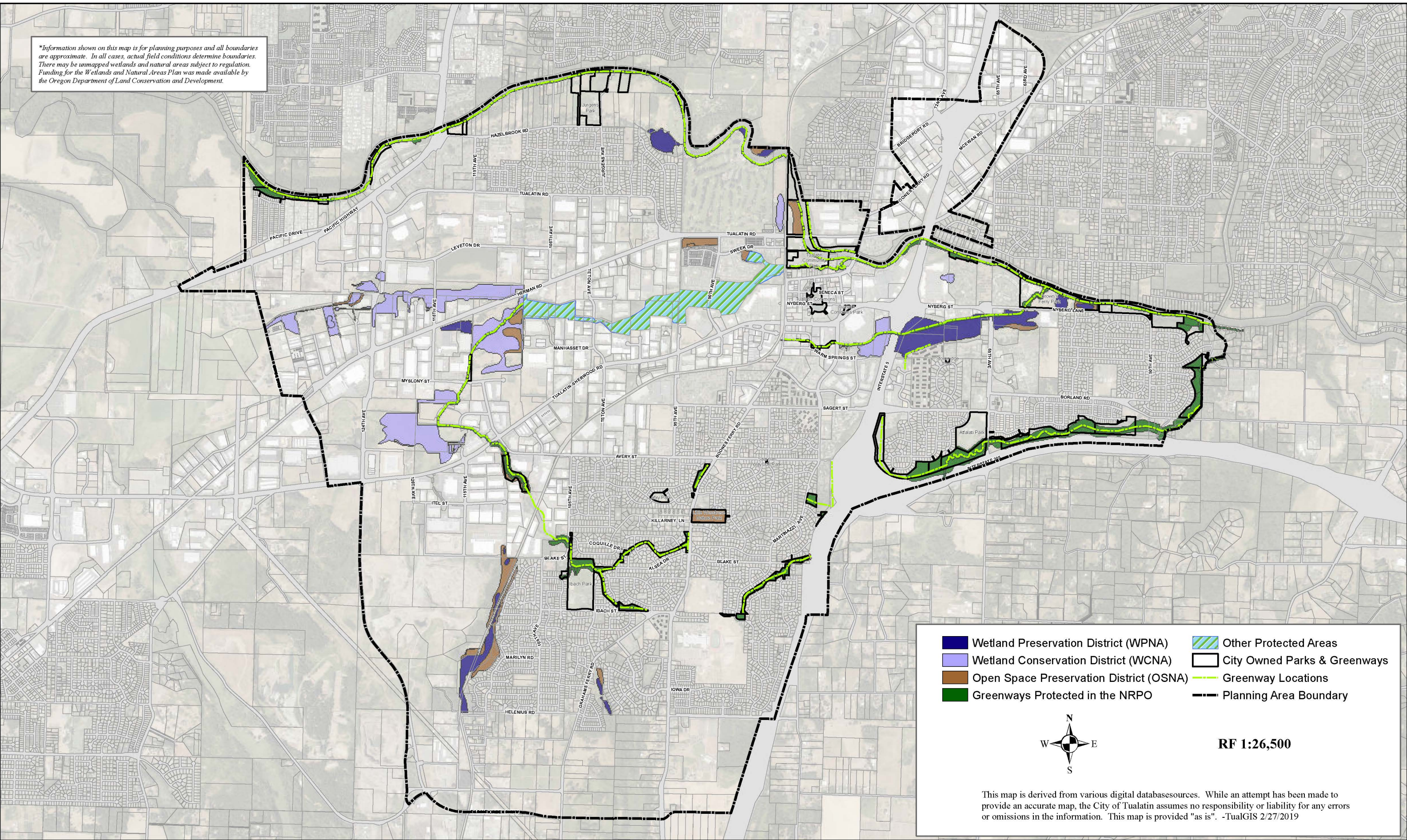
This map is derived from various digital databasesources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -TualGIS

Air Photo: Summer 2017

RF 1:26,500

Map 72-1: Natural Resources Protection Overlay District (NRPO) and Greenway Locations

*Information shown on this map is for planning purposes and all boundaries are approximate. In all cases, actual field conditions determine boundaries. There may be unmapped wetlands and natural areas subject to regulation. Funding for the Wetlands and Natural Areas Plan was made available by the Oregon Department of Land Conservation and Development.

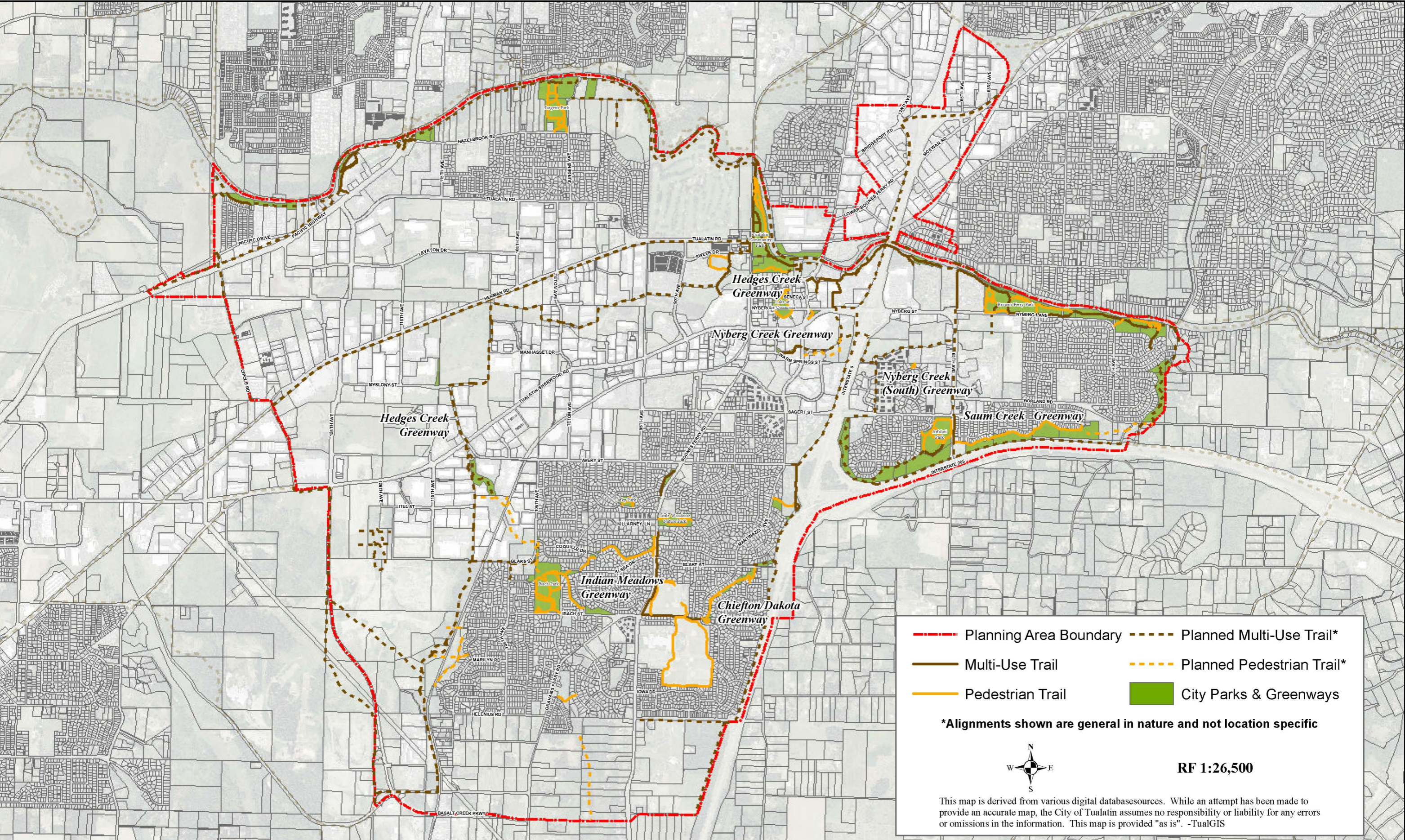


Wetland Preservation District (WPNA)	Other Protected Areas
Wetland Conservation District (WCNA)	City Owned Parks & Greenways
Open Space Preservation District (OSNA)	Greenway Locations
Greenways Protected in the NRPO	Planning Area Boundary



RF 1:26,500

This map is derived from various digital databasesources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -TualGIS 2/27/2019



- - - - - Planning Area Boundary
- — — — — Planned Multi-Use Trail*
- Multi-Use Trail
- - - - - Planned Pedestrian Trail*
- Pedestrian Trail
- City Parks & Greenways

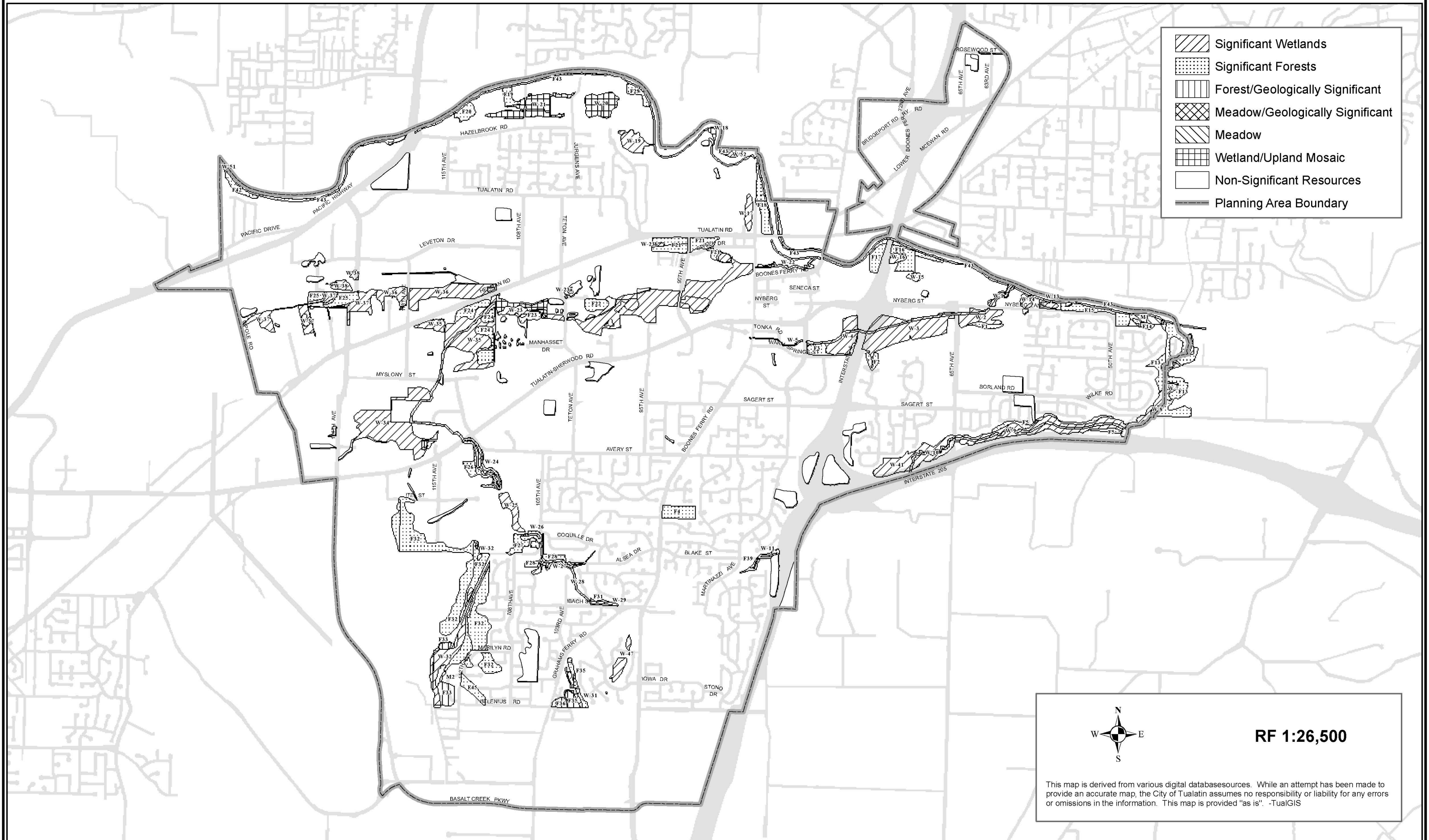
*Alignments shown are general in nature and not location specific



RF 1:26,500

This map is derived from various digital databasesources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -TualGIS

Map 72-3: Significant Natural Resources



- Significant Wetlands
- Significant Forests
- Forest/Geologically Significant
- Meadow/Geologically Significant
- Meadow
- Wetland/Upland Mosaic
- Non-Significant Resources
- Planning Area Boundary

RF 1:26,500

This map is derived from various digital databasesources. While an attempt has been made to provide an accurate map, the City of Tualatin assumes no responsibility or liability for any errors or omissions in the information. This map is provided "as is". -TualGIS



Emailed **May 3, 2022**

AAI Engineering
Attn: Beth Zauner
4875 SW Griffith Dr., #300
Beaverton, OR 97005
bethz@aaieng.com

Site: 11345 SW Herman Road, Tualatin, Oregon
Submitted: December 29, 2021

Dear Ms. Zauner,

In accordance with Oregon Revised Statutes (ORS) 227.178(2) this application was deemed incomplete on January 27, 2022 due to certain missing submittal items. Per subsection (a) you have provided all of the missing information needed to proceed with the review of your project but we do list several advisory items below that should be addressed. Therefore, your application has been deemed complete as of **May 3, 2022**. Pursuant to ORS 227.178(1) the City is required to take final action on your application for this application, including resolution of all appeals under ORS 227.180, within 120 days after the application is deemed complete, or **August 31, 2022**.

Advisory Items:

These elements do not need to be corrected in order to deem the application complete but will need to be addressed either through Conditions of Approval or plan modifications in order to meet approvability standards. We would appreciate the following items being addressed as soon as possible.

1. Traffic Impact Analysis Memorandum – We advise that an updated Traffic Memorandum addressing comments and issues raised in DKS’s letter dated April 14, 2022 (attached) be submitted for staff review.
2. Recording Documentation for PLA22-0001 – Please provide proof of the recorded property line adjustment associated with local file PLA22-0001.
3. Flood Storage System - For continued City consideration of flood storage to meet floodplain requirements for this property, please submit the approved floodplain permit and all supporting documentation for AAI’s previously shared example project, Walgreens store at W Arlington and McLoughlin in Gladstone.
4. Building Architecture – We suggest reviewing TDC 73A.010 and revising the current building architectural drawings to better meet the purpose of this section of the TDC such as providing more attractive wall articulation, roof design, materials, and placement of elements such as windows, doors, and other identification features. An email dated April 8, 2022, was sent to Ms. Zauner suggesting adjustments be made to building architectural design to better meet the purpose and objectives of TDC 73A.010.

Next Steps:

Our next step will be to schedule an Architectural Review Board hearing for the Architectural Features element of the review.

Please contact me with any questions at 503-691-3029 or kleonard@tualatin.gov.

Sincerely,

A handwritten signature in blue ink, appearing to read 'K Leonard'.

Keith Leonard, AICP
Associate Planner

cc: Kim McMillan, PE, Community Development Director
Steve Koper, AICP, Assistant Community Development Director
Tony Doran, EIT, Engineering Associate
Lindsey Hagerman, Office Coordinator
Heidi Springer, PE, City Engineer
Mike McCarthy, Principal Transportation Engineer
Gary and Ricky Walgraeve (by email at farmerboy5@comcast.net)

Attachment: DKS letter dated April 14, 2022

File: AR 21-0018

From: Keith Leonard
Sent: Friday, April 8, 2022 3:27 PM
To: Beth Zauner
Subject: Hedges Creek - building design

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Beth,

We reviewed the elevations of the proposed buildings in light of what occurred at the most recent Architectural Review Board (ARB) hearing. The proposed buildings architecture will likely generate a lot of feedback and possible additional conditions of approval based on a recent ARB hearing. The ARB included the following condition of approval for the recent Logistics Park project (ARB21-0011):

*The applicant must submit a Final Site Plan Set (in PDF format) to the Planning Division that is in substantial conformance to the submitted site plans and includes:
Additional elements to add diversity of building form, scale, articulation of walls, roof design, materials, and placement of elements such as windows, doors, paint and identification features.*

The Purpose and Objective statements found in [TDC 73A.010](#).

(1) Purpose. The purpose of the site and building design objectives and standards found in TDC 73A through TDC 73G is to promote functional, safe, innovative, and attractive sites and buildings that are compatible with the surrounding environment, including, but not limited to:

(a) The building form, articulation of walls, roof design, materials, and placement of elements such as windows, doors, and identification features; and

(b) The placement, design, and relationship of proposed site elements such as buildings, vehicular parking, circulation areas, bikeways and bike parking, accessways, walkways, buffer areas, and landscaping.

(2) Objectives. The objectives of site and building design standards in TDC 73A through TDC 73G are to:

(a) Enhance Tualatin through the creation of attractively designed development and streetscapes;

(b) Encourage originality, flexibility, and innovation in building design;

(c) Create opportunities for, or areas of, visual and aesthetic interest for occupants and visitors to the site;

(d) Provide a composition of building elements which responds to function, land form, identity and image, accessibility, orientation and climatic factors;

(e) Conserve, protect, and restore fish and wildlife habitat areas, and maintain or create visual and physical corridors to adjacent fish and wildlife habitat areas;

(f) Enhance energy efficiency through the use of landscape and architectural elements; and

(g) Minimize disruption of natural site features such as topography, trees, and water features.

If there are any changes to the elevation plans then please send them directly to me. If you have any additional questions feel free to contact me.

Keith Leonard, AICP
Associate Planner

City of Tualatin | Planning
503.691.3029 | www.tualatinoregon.gov



From: Wil Anderson <wanderson@phelandevco.com>
Sent: Monday, May 16, 2022 5:37 PM
To: Keith Leonard; Beth Zauner
Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hi Keith,

We're getting updated drawings compiled. I hope to have to you sooner, but it may be Thursday before we can get everything compiled. We want to make sure no discrepancies.

I should also have the TIA Memo referenced in the AR Completeness letter as well. As we chatted about Friday, I don't foresee any of the other items from the completeness letter being included in that package.

Thanks,
Wil

Wil Anderson

Phelan Development Company
541.912.5387 (mobile)

From: Keith Leonard <kleonard@tualatin.gov>
Sent: Monday, May 16, 2022 12:15 PM
To: Beth Zauner <bethz@aaieng.com>; Wil Anderson <wanderson@phelandevco.com>
Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hello,

Wil, thanks for chatting with me over the phone last week regarding the Hedges Creek project and application material. Please let me know asap when you've assembled all the material for the application. We are planning on sending out the ARB notices this week and it would be best to post the most up-to-date material on the website for agencies and others to review.

Thanks!

Keith Leonard, AICP

Associate Planner
City of Tualatin | Planning
503.691.3029 | www.tualatinoregon.gov



From: Keith Leonard
Sent: Friday, May 13, 2022 10:22 AM
To: Beth Zauner <bethz@aaieng.com>; Wil Anderson <wanderson@phelandevco.com>
Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hello,

Circling back to see if you will be submitting updated plans and other supporting information? I would like to get the website up, noticing, etc...Thanks.

Keith Leonard, AICP

Associate Planner

City of Tualatin | Planning

503.691.3029 | www.tualatinoregon.gov



From: Keith Leonard

Sent: Thursday, May 12, 2022 10:37 AM

To: Beth Zauner <bethz@aaieng.com>; Wil Anderson <wanderson@phelandevco.com>

Subject: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hello,

We have a quorum for the Architectural Review Board for Wednesday June 29, 2022. I want to double check to make sure ALL supporting material, civil plans, elevations, etc...are complete. Questions like, the site plan has changed so have all those changes been made to the civil plans, elevations, etc...

It would be beneficial for you as the applicant to put together a final full application as soon as possible. I've started to weed through the material that was submitted subsequent to the initial application submittal. It would be better to get all the final documents from the applicant to make sure your most complete application is being provided for review.

Have a good day. Thanks.

Keith Leonard, AICP

Associate Planner

City of Tualatin | Planning

503.691.3029 | www.tualatinoregon.gov



From: [Randy Johnson](#)
To: [Tony Doran](#)
Cc: [Kim McMillan](#); [Mike McCarthy](#); [Steve Koper](#); [Keith Leonard](#)
Subject: Re: FW: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material
Date: Thursday, June 2, 2022 2:27:36 PM
Attachments: [image004.png](#)
[image005.png](#)
[image006.png](#)
[image007.png](#)

Hi Tony,

Sorry for going AWOL here. I was out of town for work for a week and then came back to a family with Covid. All are on the mend and I am still digging out of my workload that came in during that time.

It appears they have addressed all comments except for the trail along the eastern property line. We had requested a 16' easement for a 12' trail with 2' of shy on either side, while they are proposing a 15' easement with a 12' path. The construction code calls for a 12' path (10'min) with 3' of side graded area width. Where bike paths are separated from vehicle traffic, then 5' separation is required or a physical divider may be constructed (203.2.11A). So with their proposal of 18" on either side of the trail with a 15' easement, we are going to effectively end up with a hallway with the 12' path walled on both sides with fencing (assuming they will fence off their property from the trail and the UPS property is already fenced). I would prefer to see a 15' easement with 3' of landscaped graded shy to the east fence and the 12' path taking up the rest of the easement to the west. Then the property owner provides the 5' of landscaped (and possibly fenced) separation from truck and vehicular traffic in their parking lot. I am not sure what is needed for grading, but this extra space could help out there. Does the applicant have any landscaping setbacks between the parking and a fence? If so, that may help with getting the desired 5' of separation between the trail and the parking.

Let me know your thoughts,

Thanks,

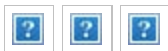
Randy Johnson, PE, PTOE | Senior Transportation Engineer

Direct: 503.972.7851 | Cell: 503.803.1360 | rsj@dksassociates.com



720 SW Washington Street, Suite 500 | Portland, OR 97205 | 503.243.3500
dksassociates.com

DKS Associates is an employee-owned company.



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DATE: April 14, 2022

REQUEST: Hedges Creek Industrial Transportation Review

TASK NO: Tualatin On-Call Task 4 (P#21208-000-004)

REVIEWER: Amanda Deering, PE and Randy Johnson, PE, PTOE, DKS Associates

DKS Associates has reviewed the updated transportation impact study (TIS) and site plan for the proposed Hedges Creek industrial development¹. The proposed project is located at 11345 SW Herman Road in Tualatin, Oregon and proposes the construction of three industrial buildings totaling approximately 442,035 square feet. The general comments are based on a review of the updated TIS analysis, comment response memo, and site plan.

TIS REVIEW

Key comments and issues related to the proposed project include:

- Overall, all required topics are covered in the TIS and look technically sufficient. Comments 1 and 2 have been sufficiently addressed.
- Regarding comment 3 on the Myslony Street/124th Avenue signal: Following a discussion with City of Tualatin staff, it was noted that the project to construct a signal at this location is not on the funded capital projects list. However, the City agrees that a signal (or a turn prohibition) would be appropriate at this location (as identified in the TIS) due to higher speeds along the 124th corridor, high truck turning movements from Myslony Street, and additional traffic (including trucks) to/from the proposed development. This signal would be creditable through the Transportation Development Tax (TDT) program. The developer will need to construct the signal and would receive TDT credits prior to occupancy.
- Remaining comments are regarding the updated site plan dated April 4, 2022.
 - Driveway 1 located at the western end of the property is in an acceptable location as shown, given it can't be located any further away from nearby driveways.
 - Driveway 2 located just east of 112th Avenue does not meet access standards (measured 130 feet edge to edge from 112th Avenue, standard is 150 feet). In addition, it is approximately 70 feet from the driveway to the east on the south side. For safety reasons it is best to avoid offset intersections in such close proximity. Left turns from offset driveways create conflicts where the drivers don't yield to opposing vehicles in the adjacent driveway. The developer should move driveway 2 to align with the southern driveway to the east, thus eliminating the offset and meeting the 150-foot required distance from 112th Avenue.

¹ Hedges Creek Industrial Transportation Impact Study, Lancaster Mobley, March 2022.

- A center turn lane appears to be provided east of 112th Avenue along the tangent section, but the width tapers from approximately 42 feet to 30 feet through the s-curve. The necessary cross-section for this street is a three-lane section. The development needs to build the center turn lane through the s-curve to the east end of the property. This will provide additional space for truck turning movements for both the property to the south and the developer's eastern driveways, as well as additional space to facilitate safe turning movements of vehicle to and from the offset intersections along the s-curve.
- Along the proposed development an easement or frontage improvement should be made for the planned Ice Age Tonquin Trail as follows: The trail should be a multi-use path from the northwest corner of 112th Avenue to the east. It would then become a normal 12-foot-wide trail with 2-foot shy distances within a public easement adjacent to the east property line, for a total of 16 feet in width. The developer shall construct the trail along their east property line to complete this segment of the Ice Age Tonquin Trail and to provide maintenance access to the public sanitary sewer line.

On Mon, May 23, 2022 at 8:46 AM Tony Doran <TDORAN@tualatin.gov> wrote:

Randy,

AR21-0018, Hedges Creek (formerly known as Walgraeves Industrial) has submitted the attached TIA response to City feedback (your letter). Would you take a glance at it and let us know if you feel their comments respond adequately to all the concerns you mentioned?

Tony Doran

Engineering Associate

(503) 691-3035

Tualatin City Services

10699 SW Herman Road

City of Tualatin

From: Keith Leonard <kleonard@tualatin.gov>

Sent: Friday, May 20, 2022 11:06 AM

To: Steve Koper <skoper@tualatin.gov>; Kim McMillan <kmcmillan@tualatin.gov>; Tony Doran <TDORAN@tualatin.gov>; Mike McCarthy <mmccarthy@tualatin.gov>; Heidi Springer <hspringer@tualatin.gov>

Subject: FW: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hi team,

Just wanted to share the latest and greatest from Hedges Creek. We will be sending out the ARB notices today so expect to see the more formal email notification sometime this afternoon. I hope you all are having a good day!

Keith Leonard, AICP

Associate Planner

City of Tualatin | Planning

503.691.3029 | www.tualatinoregon.gov




From: Wil Anderson <wanderson@phelandevco.com>

Sent: Friday, May 20, 2022 9:02 AM

To: Keith Leonard <kleonard@tualatin.gov>

Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Keith,

I am still waiting on the final piece but everything else is saved here>>>  [Phelan Hedges Updated AR Docs](#). I was supposed to have the final piece last night and was then told I will receive this morning... I will forward it immediately upon receipt.

Attached is the TIA Memo addressing comments from the AR Completeness letter. This file is also included in the above package but wanted to draw specific attention to it as it was requested.

Let me know if you need anything else.

Thanks

Wil

Wil Anderson

Phelan Development Company
541.912.5387 (mobile)

From: Keith Leonard <kleonard@tualatin.gov>
Sent: Friday, May 20, 2022 8:52 AM
To: Wil Anderson <wanderson@phelandevco.com>
Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Wil,

Do you have the timing of when the last item will be ready? We would like to get the website put together today and the notices sent out if at all possible. Thanks!

Keith Leonard, AICP

Associate Planner

City of Tualatin | Planning

503.691.3029 | www.tualatinoregon.gov



From: Wil Anderson <wanderson@phelandevco.com>
Sent: Thursday, May 19, 2022 9:24 PM
To: Keith Leonard <kleonard@tualatin.gov>
Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Keith,

I have everything compiled except one item that is being cleaned up to match. I will send a onedrive link to download the files as soon as I receive the missing piece. Should have in the AM.

Thanks

Wil

Wil Anderson

Phelan Development Company
541.912.5387 (mobile)

From: Wil Anderson
Sent: Monday, May 16, 2022 5:37 PM
To: Keith Leonard <kleonard@tualatin.gov>; Beth Zauner <bethz@aaieng.com>
Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hi Keith,

We're getting updated drawings compiled. I hope to have to you sooner, but it may be Thursday before we can get everything compiled. We want to make sure no discrepancies.

I should also have the TIA Memo referenced in the AR Completeness letter as well. As we chatted about Friday, I don't foresee any of the other items from the completeness letter being included in that package.

Thanks,

Wil

Wil Anderson

Phelan Development Company
541.912.5387 (mobile)

From: Keith Leonard <kleonard@tualatin.gov>
Sent: Monday, May 16, 2022 12:15 PM
To: Beth Zauner <bethz@aaieng.com>; Wil Anderson <wanderson@phelandevco.com>
Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hello,

Wil, thanks for chatting with me over the phone last week regarding the Hedges Creek project and application material. Please let me know asap when you've assembled all the material for the application. We are planning on sending out the ARB notices this week and it would be best to post the most up-to-date material on the website for agencies and others to review.

Thanks!

Keith Leonard, AICP

Associate Planner

City of Tualatin | Planning

503.691.3029 | www.tualatinoregon.gov



From: Keith Leonard

Sent: Friday, May 13, 2022 10:22 AM

To: Beth Zauner <bethz@aaieng.com>; Wil Anderson <wanderson@phelandevco.com>

Subject: RE: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hello,

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Keith Leonard, AICP

Associate Planner

City of Tualatin | Planning

503.691.3029 | www.tualatinoregon.gov



From: Keith Leonard

Sent: Thursday, May 12, 2022 10:37 AM

To: Beth Zauner <bethz@aaieng.com>; Wil Anderson <wanderson@phelandevco.com>

Subject: AR21-0018 - Hedges Creek - Architectural Review Board - hearing date, application material

Hello,

We have a quorum for the Architectural Review Board for Wednesday June 29, 2022. I want to double check to make sure ALL supporting material, civil plans, elevations, etc...are complete. Questions like, the site plan has changed so have all those changes been made to the civil plans, elevations, etc...

It would be beneficial for you as the applicant to put together a final full application as soon as possible. I've started to weed through the material that was submitted subsequent to the initial application submittal. It would be better to get all the final documents from the applicant to make sure your most complete application is being provided for review.

Have a good day. Thanks.

Keith Leonard, AICP

Associate Planner

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