City of Oregon City

625 Center Street
Oregon City, OR 97045
503-657-0891

Meeting Agenda

Planning Commission

Monday, July 24, 2017 | **7:00 PM** | **Commission Chambers**

1. Call to Order

2. Public Comments

Public Comments on Non-Agenda Items

3. Public Hearings

3a. Request for Continuance - Planning Files CP-17-0002, DP-17-0003, and NR-17-0004.

Sponsors: Pete Walter
Attachments: Commission Report
Applicant's Continuance Request
Notice

3b. Proposal to Replace an Existing Fire Station at 19340 Molalla Avenue. PLanning files: SP 17-40: Site Plan and Design Review, CU 17-02: Conditional Use, VR 17-02: Variance for Site Layout/Configuration, and VR 17-03: Variance for Building Exterior

Sponsors: Planner Trevor Martin
Attachments: Commission Report
Staff Report
Exhibit 1: Vicinity Map
Exhibit 2: Applicants Submittal
Exhibit 3: Dorothy Dahlsrud Comments

4. Communications

5. Adjournment

Public Comments: The following guidelines are given for citizens presenting information or raising issues relevant to the City but not listed on the agenda.

- *Complete a Comment Card prior to the meeting and submit it to the staff member.*
- *When the Chair calls your name, proceed to the speaker table and state your name and city of residence into the microphone.*
- *Each speaker is given 3 minutes to speak. To assist in tracking your speaking time, refer to the timer at the dais.*
- *As a general practice, Oregon City Officers do not engage in discussion with those making comments.*

Agenda Posted at City Hall, Pioneer Community Center, Library, and City Web site(oregon-city.legistar.com).
Video Streaming & Broadcasts: The meeting is streamed live on Oregon City's Web site at www.orcity.org and is available on demand following the meeting.
ADA: City Hall is wheelchair accessible with entry ramps and handicapped parking located on the east side of the building. Hearing devices may be requested from the City staff member prior to the meeting. Disabled individuals requiring other assistance must make their request known 48 hours preceding the meeting by contacting the City Recorder's Office at 503-657-0891.

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Staff Report

File Number: PC 17-080

Agenda Date: 7/24/2017

Status: Agenda Ready

To: Planning Commission

Agenda #: 3a.

From: Pete Walter

File Type: Land Use Item

SUBJECT:
Request for Continuance: Development on Washington Street. Planning Files CP 17-02: General Development (Concept Master) Plan, DP 17-03: Detailed Development Plan, NR 17-04: Natural Resource Overlay District Verification

RECOMMENDED ACTION (Motion):
Staff recommends that the Planning Commission open the public hearing, take testimony from any member of the public present who wishes to testify, then continue the Public Hearing for Planning Files CP-17-0002, DP-17-0003, and NR-17-0004 to the date certain of August 14, 2017, with the record open.

BACKGROUND:
The applicant requests approval of a General Development Plan with a Detailed Development Plan for the first phase of a two-phase project. The first phase includes a five-story, 99-room hotel with parking and landscaping improvements to the historic Hackett House site. The second development phase proposed consists of a 99-room hotel, 131 apartment units, 9,500 square-feet of retail space, and a 2,500 square-foot coffee shop. The overall timeline for the General Development Plan would be 10-years with the Phase I hotel and improvements completed in five years.

The proposed development is located on the northwest side of Washington Street between 17th Street and Oregon City's Amtrak Station. The site, located opposite the End of the Oregon Trail Interpretive Center, is approximately 4.1 acres in size.

Please see attached letter from the applicant's attorney Mike Robinson. The applicant has requested a continuance to August 14, 2017. The applicant has authorized Mr. Robinson, pursuant to ORS 227.178(5), to extend the 120-day period by 21 days.

Staff will provide a Staff Report with recommended findings for Planning Files CP-17-0002, DP-17-0003, and NR-17-0004 one week prior to the August 14, 2017 Public Hearing.

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Agenda Date: 7/24/2017

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PERKINSCOIE

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July 17, 2017

Michael C. Robinson
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D. +1.503.727.2264
F. +1.503.346.2264

VIA EMAIL

Mr. Peter Walter, AICP, Planner
City of Oregon City Community Development Department
Planning Division
221 Molalla Avenue, Suite 2000
Oregon City, OR 97045

Re: City of Oregon City File Nos. CP-17-0002, DP-17-0003, and NR-17-0004; Application by Hackett Hospitality Group, LLC for Type III Master Plan and Detailed Development Plan Approval

Dear Mr. Walter:

This office represents the Applicant. The Applicant has authorized me, pursuant to ORS 227.178(5), to extend the 120-day period in ORS 227.178(1) by twenty-one (21) days, the amount of time between the hearing now scheduled for July 24, 2017 and the continued hearing date of August 14, 2017. The Applicant has requested the continuance because there may not be a quorum of Planning Commission members at the July 24, 2017 public hearing.

The City deemed this application complete on May 23, 2017. The Applicant has not requested another extension of the 120-day period. Therefore, with this twenty-one (21) day extension, the 120-day period will end on October 11, 2017.

Please place this letter in the official Planning Department file and before the Planning Commission at the commencement of the public hearing on July 24, 2017. Please ask the Planning Commission to open the public hearing and continue the public hearing to the date and time certain of August 14, 2017 at 7:00 p.m.

Very truly yours,

Michael C Robinson

Michael C. Robinson

MCR:sv
Cc: Ms. Laura Terway (via email)
Mr. Dan Fowler (via email)
Mr. Lloyd Hill (via email)
Mr. Alkesh Patel (via email)
Ms. Carrie Richter (via email)

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

NOTICE OF LAND USE APPLICATION

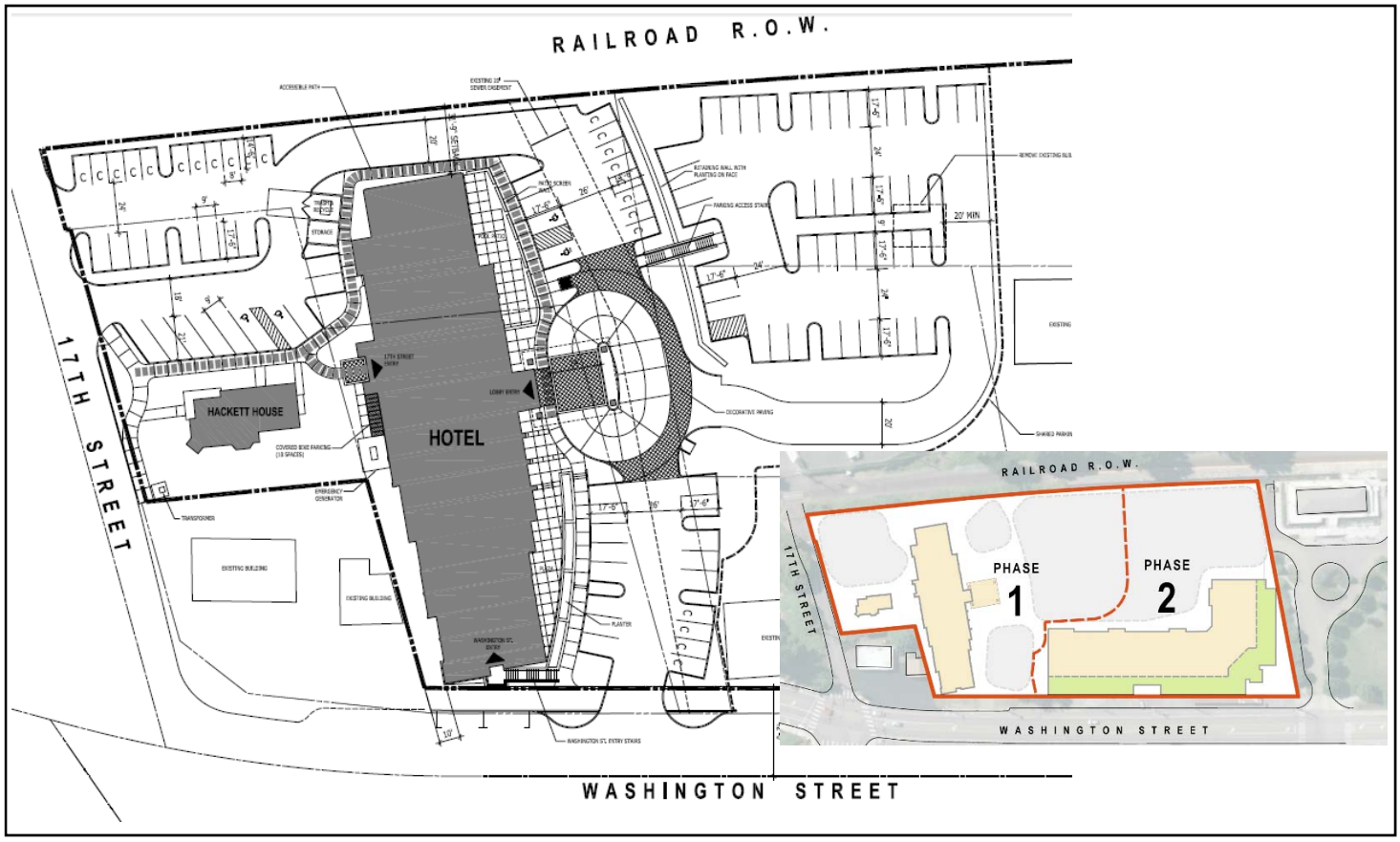
Mailed on June 1, 2017

COMMENT DEADLINE:	On Monday, **July 24, 2017,** the **City of Oregon City - Planning Commission** will conduct a public hearing at 7:00 p.m. in the Commission Chambers at City Hall, 625 Center Street, Oregon City 97045 on the following Type III Land Use Applications. Any interested party may testify at the public hearing or submit written testimony at or prior to the close of the Planning Commission hearing. Written comments on these Type III Land Use Applications must be received by the Oregon City Planning Division, no later than 3:30 p.m. on July 10, 2017 to be included in the Staff Report. Comments received after this date will be provided to the Planning Commission at the hearing. The public record will remain open until the Planning Commission closes the public hearing.
FILE NUMBER:	CP 17-02: General Development (Concept Master) Plan DP 17-03: Detailed Development Plan NR 17- 04: Natural Resource Overlay District Verification
APPLICANT:	Hill Architects 1750 Blankenship Road, Suite 400 West Linn, Oregon 97068
OWNER:	Historic Properties LLC 1300 Adams Street Oregon City, Oregon 97045
REPRESENTATIVE:	Hackett Hospitality Group LLC 1419 W. Main Street Battleground, Washington 98604
REQUEST:	The applicant submitted a General Development (Concept Master) Plan, Detailed Development Plan, and Natural Resource Overlay District Exemption for a phased, mixed-use development and construction of Phase 1 consisting of a hotel and associated parking.
LOCATION:	415 17th Street + no address on Washington Street Map number 2-2E-29CA, Tax Lots 601, 900, 1000, 1100, 1200, 1300, 1301
CONTACT PERSON:	Pete Walter, AICP, Planner (503) 496-1568, pwalter@orcity.org
NEIGHBORHOOD ASSOCIATION:	Two Rivers Neighborhood Association
CRITERIA:	Administration and Procedures are set forth in Chapter 17.50, Off-Street Parking and Loading in Chapter 17.52, Supplemental Zoning Regulations and Exceptions in Chapter 17.54, Site Plan and Design Review in Chapter 17.62, Tree Protection Standards in Chapter 17.41, Streets, Sidewalks and Public Places in Chapter 12.04, Public and Street Trees in Chapter 12.08, Lawful Nonconforming Uses, Structure and Lots in Chapter 17.58, Stormwater Management in Chapter 13.12, Grading, Filling and Excavating in Chapter 15.48, Natural Resources Overlay District in Chapter 17.49, Master Plans in Chapter 17.65, Mixed Use Downtown District in Chapter 17.34, Flood Management Overlay District in Chapter 17.42 and Geologic Hazards in Chapter 17.44 of the Oregon City Municipal Code. The City Code Book is available on-line at www.orcity.org.

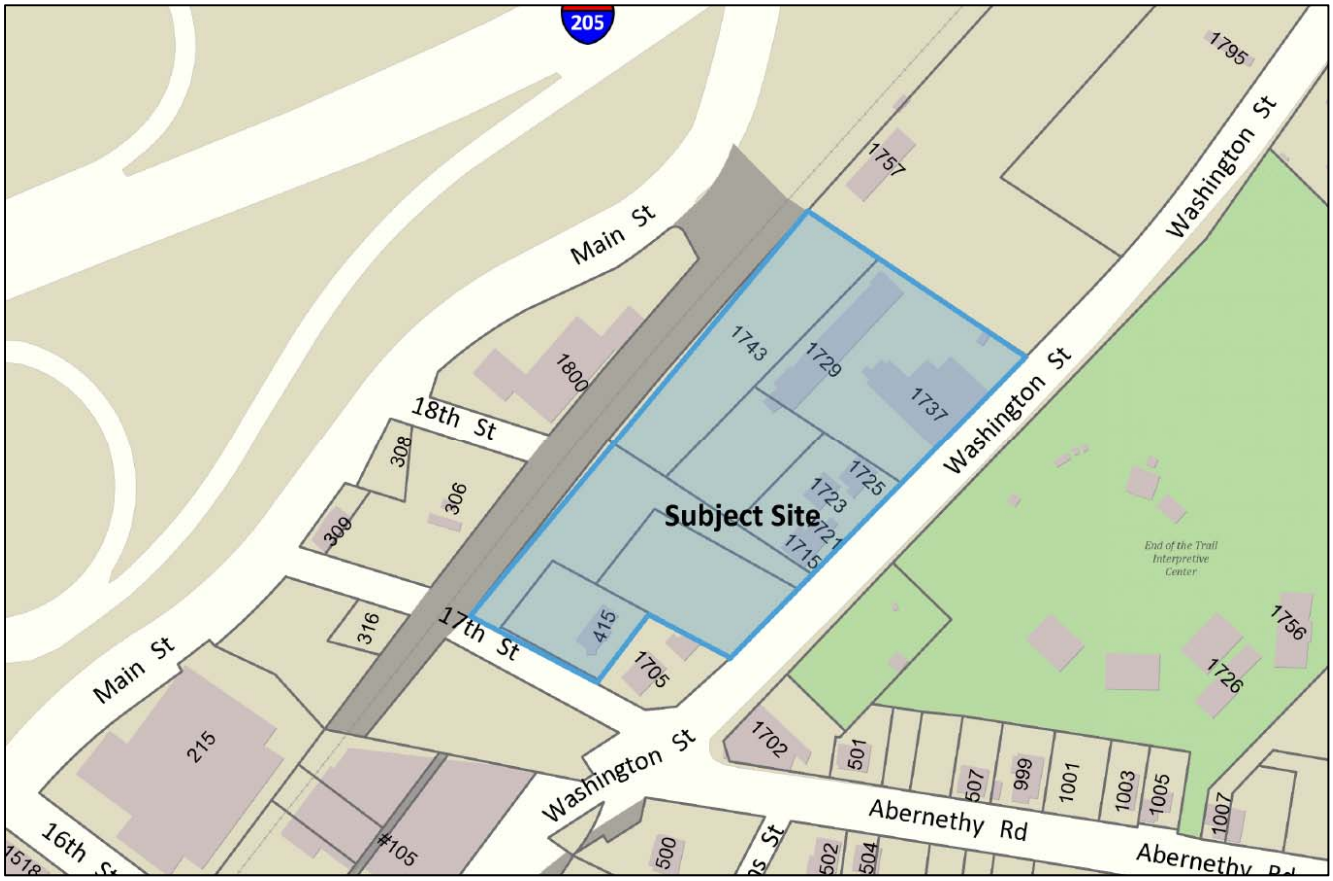
The application and all documents submitted by or on behalf of the applicant are available for inspection at no cost and copies will be provided at reasonable cost at the Oregon City Planning Division, 221 Molalla Avenue, Oregon City, Oregon 97045, from 8:30 a.m. to 3:30 p.m. Monday thru Friday. The staff report, with all the applicable approval criteria, will also be available for inspection seven days prior to the hearing. Copies of these materials may be obtained for a reasonable cost in advance. Please be advised that any issue that is intended to provide a basis for appeal must be raised before the close of the Planning Commission hearing, in person or by letter, with sufficient specificity to afford the Planning Commission and the parties an opportunity to respond to the issue. Failure to raise an issue with sufficient specificity will preclude any appeal on that issue. The decision of the Planning Commission may be appealed to the City Commission by parties with standing within fourteen (14) calendar days of the notice of decision. Any appeal will be based on the record. The procedures that govern the hearing will be posted at the hearing and are found in OCMC Chapter 17.50 and ORS 197.763.

A city-recognized neighborhood association requesting an appeal fee waiver pursuant to OCMC 17.50.290(C) must officially approve the request through a vote of its general membership or board at a duly announced meeting prior to the filing of an appeal.

Excerpt of Applicant's Proposal



Vicinity Map



City of Oregon City

625 Center Street
Oregon City, OR 97045
503-657-0891

Staff Report

File Number: PC 17-081

Agenda Date: 7/24/2017

Status: Agenda Ready

To: Planning Commission

Agenda #: 3b.

From: Planner Trevor Martin

File Type: Land Use Item

SUBJECT:
Proposal to Replace an Existing Fire Station at 19340 Molalla Avenue. PLanning files: SP 17-40: Site Plan and Design Review, CU 17-02: Conditional Use, VR 17-02: Variance for Site Layout/Configuration, and VR 17-03: Variance for Building Exterior

RECOMMENDED ACTION (Motion): Staff recommends the Planning Commission approve Planning files SP 17-40, CU 17-02, VR 17-02, VR 17-03 with conditions.

BACKGROUND:The 1.39 acre parcel is located at 19340 Molalla Avenue, in Oregon City. The site is currently constructed as a fire station for Clackamas Fire District (CFD) #1, known as Station 16. The station developed a mold infestation and in May of 2016 it was determined that the station was uninhabitable for the firefighters. On June 1, 2016, the City Commission approved Resolution No. 16-12 to declare an emergency, exempted CFD1 's Station 16 from Planning code requirements on a temporary basis to allow a modular unit to be placed onsite so the firefighters to maintain their response times for the community.

Since that time, CFD1 has worked with architects to develop a station design that would fit on the property and an application has been submitted to the Planning Division for demolition of the existing station and construction of a new station. However, the Fire District determined that there isn't sufficient room on the property to house the modular unit during construction and received approval from the City Commission to temporally relocating the fire station to Clackamas Community College until the new station is complete. The City Commission declared an emergency to exempt a temporary fire station at Clackamas Community College until October 1, 2018 from Planning Division requirements and processes while the existing Station 16 is being demolished and rebuilt. The temporary fire station at CCC consists of three separate structures which would be located near Inskeep Drive.

This development proposal entails the demolition of the existing structures onsite and construction of a new 12,300 square foot fire station. The station includes, but is not limited to:

1) A 4,200 square foot apparatus bay to store emergency vehicles
2) A public/visitor entry, which includes a small lobby, ADA restroom, and a call button which can be used by the public 24 hours a day in case of emergency
3) Living quarters to accommodate 8 fire crew per shift

BUDGET IMPACT:
Amount:
FY(s):
Funding Source:

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OREGON CITY

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TYPE III –CONDITIONAL USE, SITE PLAN AND DESIGN REVIEW, VARIANCES
STAFF REPORT AND RECOMMENDATION
July 17, 2017

FILE NUMBER: SP 17-40: Site Plan and Design Review
CU 17-02: Conditional Use
VR 17-02: Variance for Site Layout/Configuration
VR 17-03: Variance for Building Exterior

APPLICANT: Hennebery Eddy Architects, Inc
921 SW Washington Street, Suite 250
Portland, Oregon 97205

OWNER: Clackamas Fire District #1
11300 SE Fuller Road
Clackamas, Oregon 97222

REQUEST: The applicant submitted a Site Plan and Design Review, Conditional Use, and two Variance applications to construct a new fire station within the "C" General Commercial District.

LOCATION: 19340 Molalla Avenue, Oregon City, Oregon 97045
Clackamas County Map 3-2E-9B, Tax Lot 1601

REVIEWER: Trevor Martin, Planner, (503) 722-3789, tmartin@orcity.org

RECOMMENDATION: Approval with Conditions.

PROCESS: Type III Quasi-Judicial Public Hearing. Pursuant to OCMC 17.50. C. Type III decisions involve the greatest amount of discretion and evaluation of subjective approval standards, yet are not required to be heard by the city commission, except upon appeal. In the event that any decision is not classified, it shall be treated as a Type III decision. The process for these land use decisions is controlled by ORS 197.763. Notice of the application and the planning commission or the historic review board hearing is published and mailed to the applicant, recognized neighborhood association(s) and property owners within three hundred feet. Notice must be issued at least twenty days pre-hearing, and the staff report must be available at least seven days pre-hearing. At the evidentiary hearing held before the planning commission or the historic review board, all issues are addressed. The decision of the planning

commission or historic review board is appealable to the city commission, on the record. The city commission decision on appeal from the historic review board or the planning commission is the city's final decision and is appealable to LUBA within twenty-one days of when it becomes final. A city-recognized neighborhood association requesting an appeal fee waiver pursuant to 17.50.290(C) must officially approve the request through a vote of its general membership or board at a duly announced meeting prior to the filing of an appeal. IF YOU HAVE ANY QUESTIONS ABOUT THIS APPLICATION, PLEASE CONTACT THE PLANNING DIVISION OFFICE AT (503) 722-3789.

Recommended Conditions of Approval

(P) = Verify that condition of approval has been met with the Planning Division.
(DS) = Verify that condition of approval has been met with the Development Services Division.
(B) = Verify that condition of approval has been met with the Building Division.
(F) = Verify that condition of approval has been met with Clackamas Fire Department.

The applicant shall include the following information with submittal of a public improvement and/or grading permit associated with the proposed Site Plan and Design Review application. The information shall be approved prior to issuance.

1. All water and sanitary facilities shall be designed to meet City's design standards.
2. The existing pedestrian path across the driveway and the pedestrian ramps on each side shall meet ADA requirements.
3. Fire signal on Molalla shall be upgraded to meet requirements Clackamas County. Pole style and color will be determined by the City of Oregon City. Depending on timing of upcoming street improvement project for Molalla, fee in lieu for the signal may be collected for future installation of the signal assembly located on the west side of Molalla.
4. The stormwater plan and report shall be revised and resubmitted with facilities designed in accordance with the Stormwater and Grading Design Standards.
5. The applicant shall provide an Erosion Prevention and Sedimentation Control Plan to the City to be reviewed and approved prior to issuance of an Erosion and Sediment Control permit.
6. The applicant shall submit documentation demonstrating compliance with the fence height requirements in OCMC 17.54.100. Per OCMC 17.54.100.B.4, fencing may be allowed to be up to 8 feet in height adjacent to or behind the front of the building.

The applicant shall include the following information with submittal of a Building permit associated with the proposed Site Plan and Design Review application. The information shall be approved prior to issuance.

7. A photometric plan demonstrating compliance with Table 1-17.62.065 for pedestrian accessways.
8. Reflective, glazed, mirrored or tinted glass is limited to ten percent of the lineal footage of windows on the street facing facade. Highly reflective or glare-producing glass with a reflective factor of one-quarter or greater is prohibited on all building facades. Any glazing materials shall have a maximum fifteen percent outside visual light reflectivity value. No exception shall be made for reflective glass styles that appear transparent when internally illuminated.
9. A revised landscaping plan demonstrating:
    a. Documentation by a registered landscape architect approving the landscaping plan and tree removal and mitigation plan.
    b. Paperbark maple trees will be planted at a minimum of 2 inches in caliper.
    c. Perimeter Parking Lot Landscaping
        i. An additional tree within the perimeter parking lot landscaping north of the pedestrian crossing as well as trees spaced a maximum of 35 feet apart in front of the structure on the southern portion of the perimeter parking lot landscaping (with a tree at the entryway).

ii. Replacing the Mexican beach pebble with landscaping in compliance with OCMC 17.52

d. The applicant shall submit a revised street tree plan displaying 5 street trees in accordance with OCMC 12.08. If 5 trees cannot be located within the frontage due to the limitations of spacing and the curb cut the applicant may plant street trees on the private property (with the recording of a covenant) or provide a fee in lieu for any tree not identified.

e. A revised landscaping plan identifying the trees onsite utilized for each type of the required landscaping as well as mitigation trees. The plan shall demonstrate that the 7 mitigation trees are not counted toward the required landscaping onsite and that the mitigation trees are: planted onsite, planted on another property in Oregon City with a recorded covenant (as necessary), or a fee is paid in lieu of each tree not planted. All options shall comply with the requirements in OCMC 12.08.

10. No new chainlink fencing may be installed. Repairs to existing chainlink fencing is allowed.

<u>The applicant shall include the following information prior to issuance of an occupancy permit associated with the proposed Site Plan and Design Review application. The information shall be approved prior to issuance.</u>

11. All replanted and saved trees shall be protected by a permanent restrictive covenant or easement approved in form by the city.

I. BACKGROUND:

1. Existing Conditions

The +/- 1.39-acre parcel is located at 19340 Molalla Avenue, in Oregon City. The site is currently constructed as a fire station for Clackamas Fire District (CFD) #1, known as Station 16. The station developed a mold infestation and in May of 2016 it was determined that the station was uninhabitable for the firefighters. On June 1, 2016, the City Commission approved Resolution No. 16-12 to declare an emergency, exempted CFD1 's Station 16 from Planning code requirements on a temporary basis to allow a modular unit to be placed onsite so the firefighters to maintain their response times for the community.

Since that time, CFD1 has worked with architects to develop a station design that would fit on the property and an application has been submitted to the Planning Division for demolition of the existing station and construction of a new station. However, the Fire District determined that there isn't sufficient room on the property to house the modular unit during construction and received approval from the City Commission to temporally relocating the fire station to Clackamas Community College until the new station is complete. The City Commission declared an emergency to exempt a temporary fire station at Clackamas Community College until October 1, 2018 from Planning Division requirements and processes while the existing Station 16 is being demolished and rebuilt. The temporary fire station at CCC consists of three separate structures which would be located near Inskeep Drive.

The site is bordered by Molalla Avenue to the west, and commercial/industrial development to the north, east, and south. The site gently slopes to the west with a total relief of approximately 8 feet. The site is currently occupied by the existing single-story fire station, a storage building, and a temporary modular building. Most the remainder of the site is paved with asphalt concrete parking lot and drive lanes. Vegetation on the site is limited to grasses and landscaped trees in planters on the edges of the parking area.

Figure 1. Vicinity Map

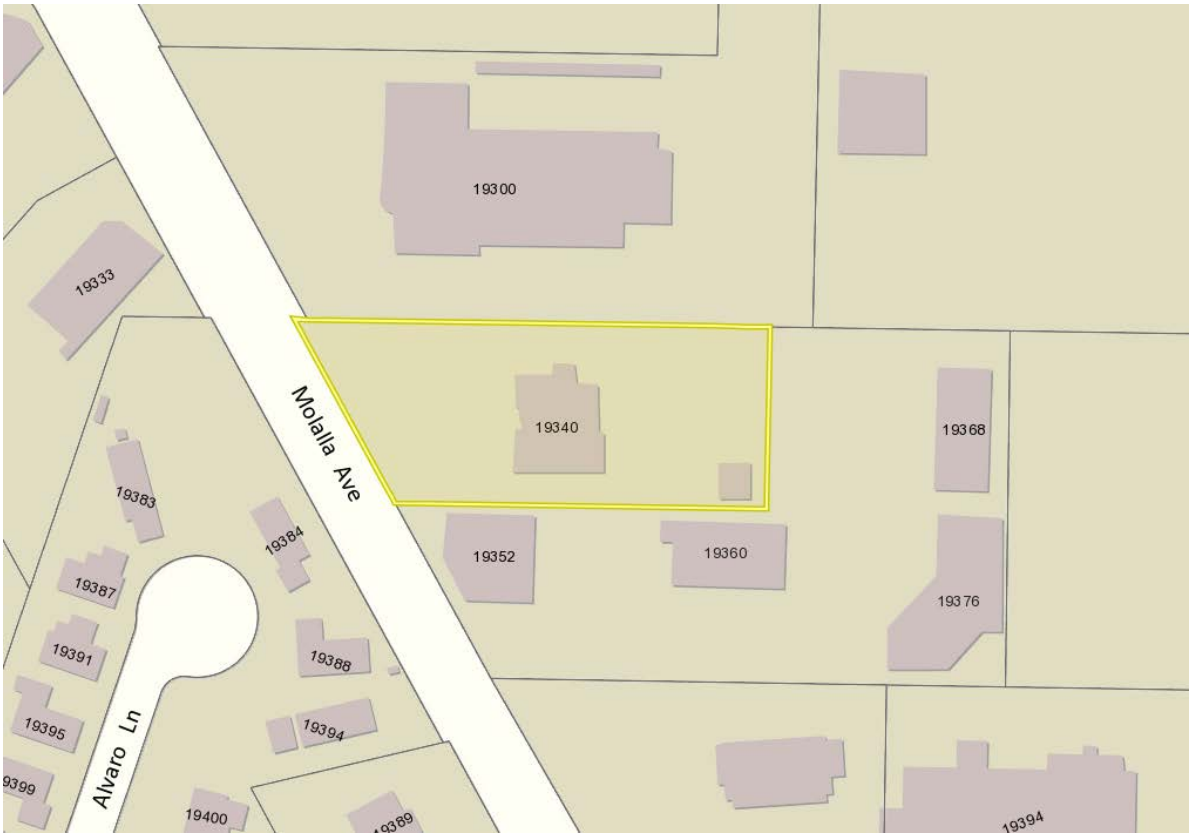


Figure 2: Existing Conditions – Aerial Image



2. Project Description

The proposed development entails the demolition of the existing structures onsite and construction of a new 12,300 square foot fire station. Three distinctive programs support the 24-hour emergency response requirements:

1) The Apparatus Bay, which houses emergency vehicles. The 4,200 square foot apparatus bay which is proposed to be doubledeep and 3 fire trucks wide.
2) The public/visitor entry, which includes a small lobby and ADA restroom. While the front door is generally kept locked, there is a call button which can be used by the public 24 hours a day in case of emergency.
3) The Living Quarters, which is where the staff live while they are on shift. The facility will accommodate 8 fire crew per shift.

The fire station requires a site configuration that is driven by the operational requirements of 24-hour emergency response. The life safety operational requirements dictate how the site is configured, as it is necessary and extremely important to have the most unobstructed, safe, and efficient route of travel to the scene of an emergency and limit public access to the staff parking area. A 6 foot tall gate will limit access to the rear of the site.

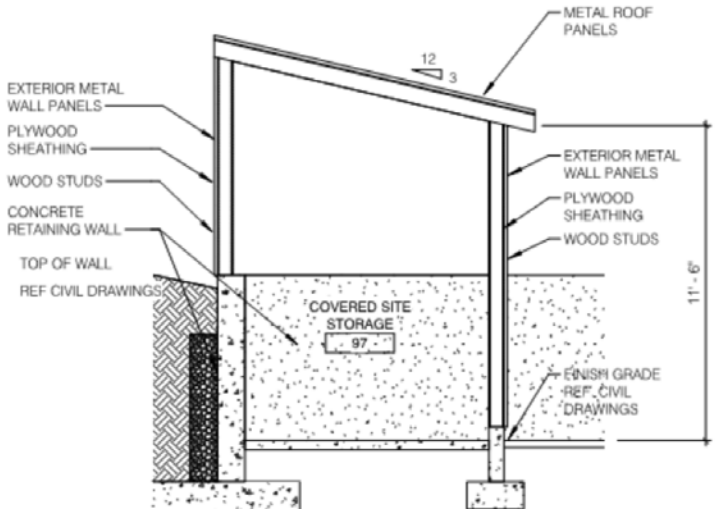
Figure 3: Building Rendering



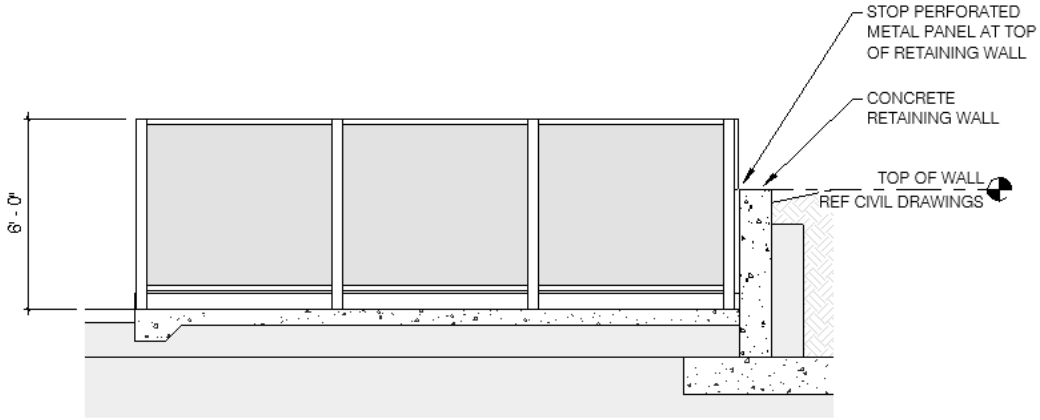
The applicant has also proposed to construct multiple accessory structures, including but not limited to:

- Flagpole: The proposed flagpole will be an inground mounted flagpole with an overall height of 30-feet above finish grade. The flagpole will be 6-inches in diameter at the base and taper to 3-inches at the top.
- Covered Site Storage: A 10.5’ by 21’ covered site storage is proposed in the northeast corner of the subject property, adjacent to the retaining wall. The exterior facade material will utilize the same exterior metal wall panel as the proposed fire station.

Figure 4: Covered Site Storage



- Fuel Station / Generator: A 19’ by 17’3” area is proposed to retain an existing fuel station and generator. The proposed location will be screened on the north, south and east sides by a 6-0” tall enclosure. The west side of the enclosure which faces the proposed fire station needs to remain open so the fire apparatus can access the fuel tank. The screened portions of the enclosure utilize a painted steel enclosure with ribbed (10% open area) perforated metal wall panel system, which match the proposed fire station metal wall panel profile.



- Mechanical / Refuse Enclosure: Information regarding the fuel station and generator equipment is provided on page 30 in the land use narrative. Additional information is provided herein.
  The mechanical / refuse enclosure utilizes a 6’-0” tall, painted steel enclosure with ribbed (10% open area) perforated metal wall panel system on all sides, which match the proposed fire station metal wall panel profile. See attached plan and section.
- Pedestrian Seating: (5) colored precast concrete seats measuring 16” w x 17” H x 16” L will be provided in the pedestrian plaza area adjacent to the public sidewalk along Molalla Avenue. The plaza will be located in between the proposed fire station and Molalla Ave., and will be open to the general public. The plaza will also serve as an area for the people walking or biking to the fire station to move out of the way of any fire apparatus vehicles responding to an emergency.

The applications include:

- Conditional Use for the proposed use as a fire station. A previously approved conditional use was not identified.
- Site Plan and Design Review for the construction of a new building, parking lot, landscaping, accessory structures, etc.
- Variance for the site layout/configuration of the structure, parking lot, etc.
- Variance for the exterior design of the structure.

Figure 6: Proposed Site Plan

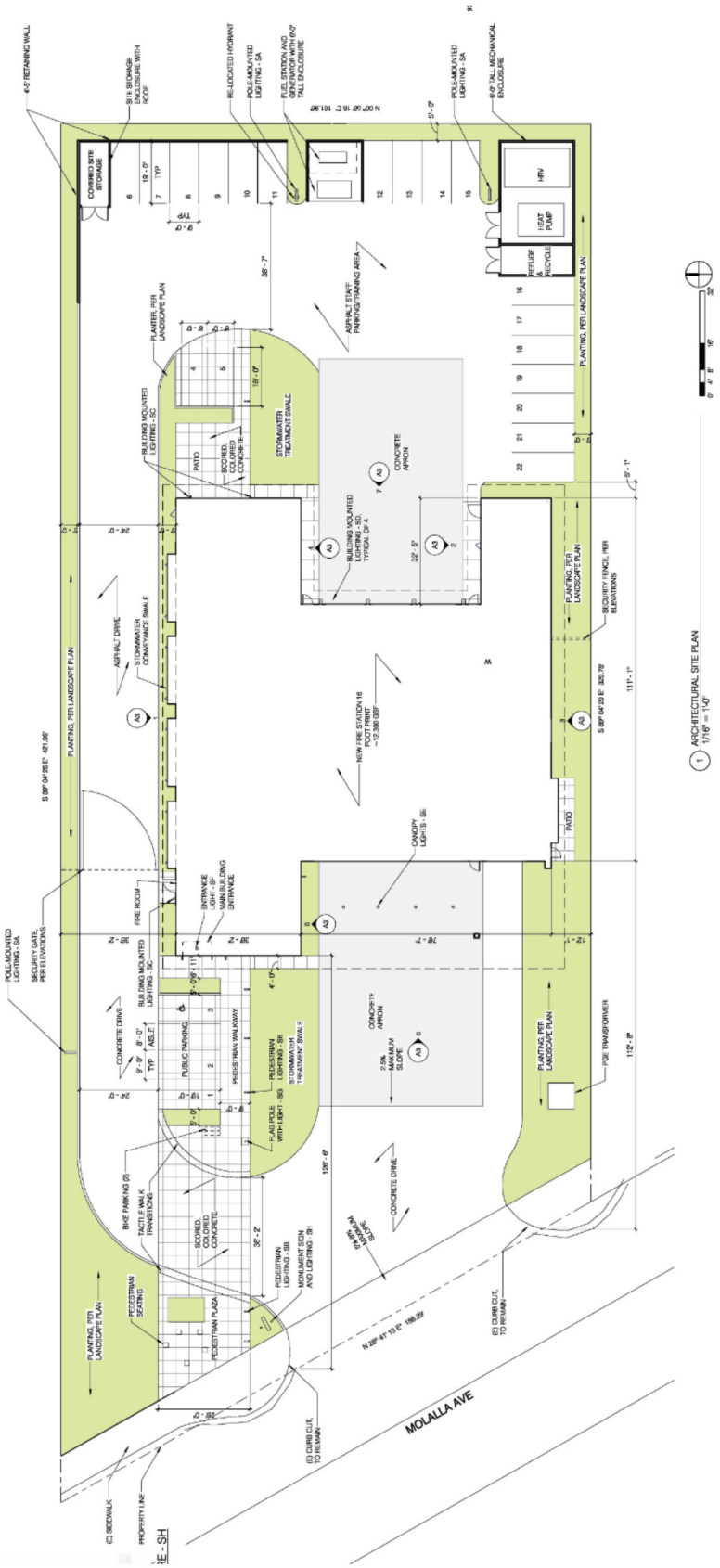
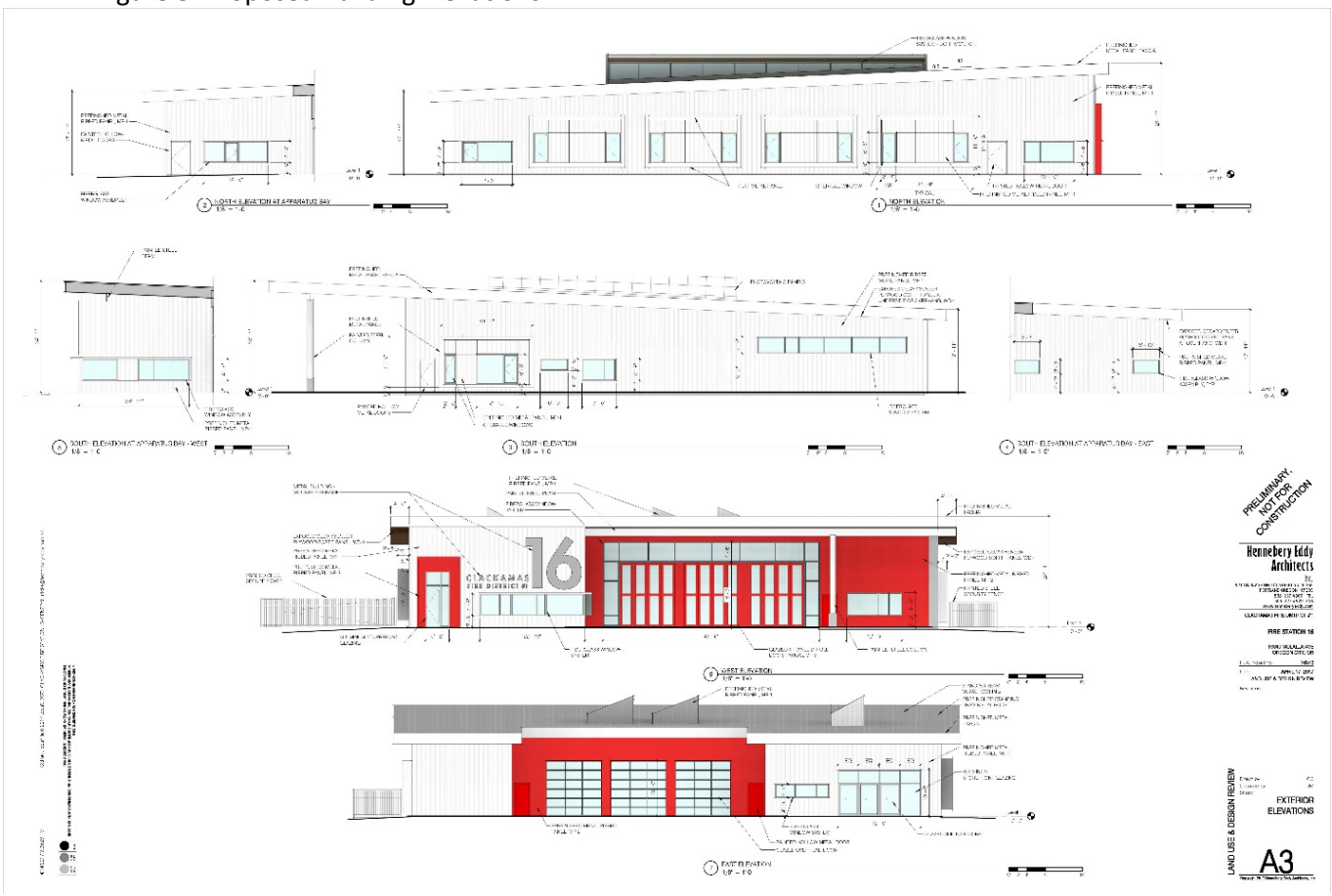


Figure 7: Landscaping Plan

FLAG POLE
CONCRETE WHEEL STOP, TYP
VEHICULAR CONCRETE PAVING, TYPE 1, TYP
6'-HIGH STEEL VEHICULAR GATE
PEDESTRIAN CONCRETE PAVING, TYPE 1, TYP
VEHICULAR CONCRETE PAVING, TYPE 1, TYP
PEDESTRIAN CONCRETE PAVING, TYPE 1, TYP
PRECAST CONCRETE SEATING, TYP
DETECTABLE TACTILE WARNING PANELS, TYP
FIRE STATION MONUMENT SIGN
VEHICULAR CONCRETE PAVING, TYPE 2, TYP
MOLALLA AVENUE
2"-3" MEXICAN BEACH PEBBLE, TYP
CONCRETE RETAINING WALL, HEIGHT VARIES, SEE CIVIL
VEHICULAR ASPHALT PAVING, TYP
VEHICULAR CONCRETE DRIVE APRON, TYP
PEDESTRIAN CONCRETE PAVING, TYPE 2, TYP
6'-HIGH STEEL PRIVACY FENCE
EXISTING FENCE, TO BE PROTECTED
N
1 LANDSCAPE PLAN
Plan
1"=16'-0"

Figure 8: Proposed Building Elevations



3. **Municipal Code Standards and Requirements:** The following sections of the Oregon City Municipal Code are applicable to this land use approval:
   12.04 - Streets, Sidewalks, and Public Places
   12.08 - Public and Street Trees
   13.12 - Stormwater Management
   15.48 - Grading, Filling and Excavating
   17.32 – General Commercial District
   17.41 – Tree Protection
   17.47 - Erosion and Sediment Control
   17.50 - Administration and Procedures
   17.62 - Site Plan and Design Review
   17.52 - Off Street Parking and Loading
   17.54.100 – Fences
   17.58 - Nonconforming Uses, Structures, and Lots
   17.56 – Conditional Use
   17.60 – Variance
   The City Code Book is available on-line at www.orcity.org.

4. **Permits and Approvals:** The applicant is responsible for obtaining approval and permits from each applicable governmental agency and department at Oregon City including but not limited to the Engineering and Building Divisions.

5. **Notice and Public Comment**

Notice of the proposal was sent to various City departments, affected agencies, property owners within 300 feet, and the Neighborhood Association. Additionally, the subject property was posted with signs identifying that a land use action was occurring on the property. Public comments submitted include (Exhibit 3):
One Public comment was received from Dorothy Dahlsrud who said "Yes, I approve" to the proposal.

Comments of the Public Works Department and Development Services Division are incorporated into this report and Conditions of Approval.
None of the comments provided indicate that an approval criterion has not been met or cannot be met through the Conditions of Approval attached to this Staff Report.

II. ANALYSIS AND FINDINGS:

OREGON CITY MUNICIPAL CODE

CHAPTER 17.32 "C" GENERAL COMMERCIAL DISTRICT

17.32.020 - Permitted uses.
A. Any use permitted in the MUC - Mixed Use Corridor zone with no maximum footprint size, unless otherwise restricted in Sections 17.24.020, 17.24.030 or17.24.040;
B. Hotels and motels;
C. Drive-in or drove through facilities;
D. Passenger terminals (water, auto, bus, train);
E. Gas stations;
F. Outdoor markets that do not meet Section 17.29.020.H;
G. Motor vehicle and recreational vehicle sales and/or incidental service;
H. Motor vehicle and recreational vehicle repair and/or service;
I. Custom or specialized vehicle alterations or repair wholly within a building.
Finding: Not applicable. The proposed fire station use is classifies as an emergency services which is considered a Conditional use in OCMC Section 17.32.030.G.

17.32.030 - Conditional uses.
The following conditional uses are permitted when authorized and in accordance with the standards contained in Chapter 17.56:
A. Religious institutions;
B. Hospitals;
C. Self service storage facilities;
D. Public utilities, including sub-stations (such as buildings, plants and other structures);
E. Public and/or private educational or training facilities;
F. Parking structures and lots not in conjunction with a primary use;
G. Emergency service facilities (police and fire), excluding correctional facilities.
Finding: Complies as proposed. The proposed development is listed as a conditional use in 17.32.030.G. The submitted application is a request to demolish the existing fire station located at 19340 Molalla Ave., and rebuild a fire station for the Clackamas Fire District on the existing site.

17.32.040 - Prohibited uses in the General Commercial District.
The following uses are prohibited in the General Commercial District:
A. Distribution, wholesaling and warehousing.

B. Outdoor sales or storage (Except secured areas for overnight parking or temporary parking of vehicles used in the business. Sales of products not located under a roof may be allowed if they are located in an area that is architecturally connected to the primary structure, is an ancillary use and is approved through the Site Plan and Design Review process. This area may not exceed fifteen percent of the building footprint of the primary building).
C. General manufacturing or fabrication.
D Heavy equipment service, repair, sales, storage or rental (including but not limited to construction equipment and machinery and farming equipment).
Finding: Not applicable. The applicant has not proposed any prohibited uses.

17.32.050 - Dimensional standards.
A. Minimum lot area: None.
Finding: Complies as Proposed. There is no minimum lot size within "C" General Commercial zoned properties**.**

B. Maximum building height: Sixty feet.
Finding: Complies as Proposed. The proposed fire station building height varies from front (West) to back (East). The high point (West) is 24-feet and the low point is 18-feet. The applicant additionally proposed accessory structures which are less than 10 feet in height and a 30 foot tall flagpole.

C. Minimum required setbacks if not abutting a residential zone: None.
Finding: Complies as Proposed. The site is adjacent to the General Commercial and General Industrial Districts, neither which are limited to residential uses. There is no minimum required setback required. The applicant has indicated the setbacks in the chart below:

Location	Minimum Setback Required	Proposed
North (side)	None	35'-2"
South (Side)	None	12'-0"
East (Side)	None	115'-6"

D. Minimum required interior and rear yard setbacks if abutting a residential zone: twenty feet, plus one foot additional yard setback for every two feet of building height over thirty-five feet.
Finding: Not Applicable. As demonstrated above, the site is not abutting a residential zone.

E. Maximum Allowed Setbacks.
1. Front yard setback: Five feet (may be expanded with Site Plan and Design Review Section 17.62.055).
Finding: Refer to Site Variance responses provided in Section 17.60.

2. Interior side yard setback: None.
Finding: Complies as Proposed. See chart above.

3. Corner side yard setback abutting street: None
Finding: Not Applicable. The site is not a corner lot.

4. Rear yard setback: None.
Finding: Complies as Proposed. See chart above.

F. Maximum site coverage of building and parking lot: Eighty-five percent
Finding: Complies as Proposed. The applicant has indicated that the proposed redevelopment of the site will cover 55% percent of the site (33,080/60,548=0.55). The applicant has provided site and landscaping plans to illustrate the lot coverage.

G. Minimum landscaping requirement (including parking lot): Fifteen percent.
Finding: Complies as Proposed. The proposal includes landscaping over 18% of the site (11,089/60,548=0.18).

CHAPTER 17.62 SITE PLAN AND DESIGN REVIEW

***17.62.015** Modifications that will better meet design review requirements.*
The review body may consider modification of site-related development standards. These modifications are done as part of design review and are not required to go through the Variance process pursuant to section 17.60.020. Adjustments to use-related development standards (such as floor area ratios, intensity of use, size of the use, number of units, or concentration of uses) are required to go through the Variance process pursuant to section 17.60.020. Modifications that are denied through design review may be requested as Variance through the Variance process pursuant to section 17.60.020. The review body may approve requested modifications if it finds that the applicant has shown that the following approval criteria are met:
Finding: Complies as proposed. The applicant has not request any modifications to within the application, however, the applicant has request variances for the proposed building. The criteria for the variances can be found in the report below.

***17.62.015.A.** The modification will result in a development that better meets design guidelines; and*
Findings: Not Applicable.

***17.62.015.B.** The modification meets the intent of the standard. On balance, the proposal will be consistent with the purpose of the standard for which a modification is requested.*
Findings: Not Applicable.

17.62.020 - Preapplication conference.
Prior to filing for site plan and design review approval, the applicant shall confer with the community development director pursuant to Section 17.50.030. The community development director shall identify and explain the relevant review procedures and standards.
Finding: Complies as proposed. A pre-application conference was held on March 15, 2017 with Hennebery Eddy Architects, Clackamas Fire District and City staff to discuss all relevant review procedures and standards.

17.62.030 - When required.
Site plan and design review shall be required for all development of real property in all zones except the R-10, R-8, R-6, R-5 and R-3.5 zoning districts, unless otherwise provided for by this title or as a condition of approval of a permit. Site plan and design review shall also apply to all conditional uses, cottage housing development, multi-family and non-residential uses in all zones. No building permit or other permit authorization for development shall be issued prior to site plan and design review approval. Parking lots and parking areas accessory to uses regulated by this chapter also shall require site plan and design review approval. Site plan and design review shall not alter the type and category of uses permitted in zoning districts.
Finding: Complies as Proposed. The applicant proposed development of property in the General Commercial zone (C), the application is subject to demonstrate compliance with this chapter.

17.62.035 - Minor site plan and design review.
This section provides for a minor site plan and design review process. Minor Site Plan Review is a Type II decision subject to administrative proceedings described in OCMC 17.50 section and may be utilized as

the appropriate review process only when authorized by the community development director. The purpose of this type of review is to expedite design review standards for uses and activities that require only a minimal amount of review, typical of minor modifications and/or changes to existing uses or buildings.
A. Generally. Minor site plan and design review applies to the following uses and activities:
1. Modification of an office, commercial, industrial, institutional, public or multi-family structure for the purpose of enhancing the aesthetics of the building and not increasing the interior usable space (for example covered walkways or entryways, addition of unoccupied features such as clock tower, etc.).
2. Modification to parking lot layout and landscaping or the addition of up to 5 parking spaces.
3. A maximum addition of up to one thousand square feet to a commercial, office, institutional, public, multi-family, or industrial building provided that the addition is not more than thirty-five percent of the original building square footage.
4. Other land uses and activities may be added if the community development director makes written findings that the activity/use will not increase off-site impacts and is consistent with the type and/or scale of activities/uses listed above.
Finding: Not Applicable. The submitted application is going through a full site plan and design review.

17.62.040 - Plans required.
Finding: Complies as proposed. The applicant has submitted all requested application items. In addition, notification of the proposal was provided to the tribes and to the State Historic Preservation Office, whom submitted a response on March 14, 2017 which was provided to the applicant.

17.62.050 - Standards.
A. All development shall comply with the following standards:
1. Landscaping, A minimum of fifteen percent of the lot shall be landscaped. Existing native vegetation shall be retained to the maximum extent practicable. All plants listed on the Oregon City Nuisance Plant List shall be removed from the site prior to issuance of a final occupancy permit for the building.
Finding: Complies as Proposed. The proposal includes landscaping over 18% of the site (11,089/60,548=0.18). The plan also identifies the removal of nuisance plants onsite prior to occupancy.

a. Except as allowed elsewhere in the zoning and land division chapters of this Code, all areas to be credited towards landscaping must be installed with growing plant materials. A reduction of up to twenty-five percent of the overall required landscaping may be approved by the community development director if the same or greater amount of pervious material is incorporated in the non-parking lot portion of the site plan (pervious material within parking lots are regulated in OCMC 17.52.070).
Finding: Complies as Proposed. The applicant has indicated that all areas credited towards landscaping will contain living plat material.

b. Pursuant to Chapter 17.49, landscaping requirements within the Natural Resource Overlay District, other than landscaping required for parking lots, may be met by preserving, restoring and permanently protecting native vegetation and habitat on development sites.
Finding: Not applicable. A small portion of the Natural Resource Overlay District currently encroaches the site along the back side of the existing sidewalk along Molalla Avenue. It is anticipated with the 0.5-feet dedication of right-of-way requirement, the NROD will no longer reside on the subject property. The existing impervious street and sidewalk area will not be increased as part of the proposed development. No changes will be made to the existing impervious surfaces where the NROD encroaches, therefore there will be not impacts to the existing NROD area as a result of the proposed project.

c. The landscaping plan shall be prepared by a registered landscape architect and include a mix of vertical (trees and shrubs) and horizontal elements (grass, groundcover, etc.) that within three years will cover one hundred percent of the Landscape area. No mulch, bark chips, or similar materials shall be allowed at the time of landscape installation except under the canopy of shrubs and within two feet of the base of trees. The community development department shall maintain a list of trees, shrubs and vegetation acceptable for landscaping.
Finding: Complies with condition. The landscape plan is prepared by Lango Hansen Landscape Architects, but the name or qualifications of the registered landscape architect was not identified. The plan includes a mix of vertical and horizontal elements and the narrative indicated full coverage within the landscaped area. The landscape plan and associated narrative did not identify if mulch, bark chips, or similar materials shall be allowed at the time of landscape installation except under the canopy of shrubs and within two feet of the base of trees. Prior to issuance of a permit associated with the proposed development the applicant shall submit documentation identifying that no mulch, bark chips, or similar materials shall be allowed at the time of landscape installation except under the canopy of shrubs and within two feet of the base of trees. In addition, the applicant shall submit documentation by a registered landscape architect approving the landscaping plan and tree removal and mitigation plan.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

d. For properties within the Downtown Design District, or for major remodeling in all zones subject to this chapter, landscaping shall be required to the extent practicable up to the ten percent requirement.
Finding: Not Applicable. The site is not within the downtown design district.

e. Landscaping shall be visible from public thoroughfares to the extent practicable.
Finding: Complies as proposed. The landscape plan for this project is visible from public thoroughfares to the extent practicable. A majority of the landscaping is located adjacent to the perimeter of the site and in front of the building.

f. Interior parking lot landscaping shall not be counted toward the fifteen percent minimum, unless otherwise permitted by the dimensional standards of the underlying zone district.
Finding: Complies as proposed. The dimensional standards set forth in the underlying zone district (General Commercial) allow for interior parking lot landscape to be counted toward the fifteen percent minimum.

2. Vehicular Access and Connectivity.
a. Parking areas shall be located behind buildings, below buildings, or on one or both sides of buildings.
Finding: Please refer to the Variance for site layout in 17.60.

b. Ingress and egress locations on thoroughfares shall be located in the interest of public safety. Access for emergency services (fire and police) shall be provided.
Finding: Complies with condition. The proposal includes retention of the existing driveway with dimensions adequate for the fire truck. The entrance is relatively flat and featureless, which creates a smooth transition from the subject site to the Molalla Ave. right of way when responding to an emergency.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

c. Alleys or vehicular access easements shall be provided in the following Districts: R-2, MUC-1, MUC-2, MUD and NC zones unless other permanent provisions for access to off-street parking and loading

facilities are approved by the decision-maker. The corners of alley intersections shall have a radius of not less than ten feet.
Finding: Not applicable. Though the site is within the "C" General Commercial District.

d. Sites abutting an alley shall be required to gain vehicular access from the alley unless deemed impracticable by the community development director.
Finding: Not Applicable. The site is not adjacent an alley.

e. Where no alley access is available, the development shall be configured to allow only one driveway per frontage. On corner lots, the driveway(s) shall be located off of the side street (unless the side street is an arterial) and away from the street intersection. Shared driveways shall be required as needed to accomplish the requirements of this section. The location and design of pedestrian access from the sidewalk shall be emphasized so as to be clearly visible and distinguishable from the vehicular access to the site. Special landscaping, paving, lighting, and architectural treatments may be required to accomplish this requirement.
Finding: Complies as proposed. The existing driveway serving the subject property is along Molalla Avenue (Major Arterial). Pedestrian access from the existing sidewalk system is provided. Driveway locations meet standards set forth in 12.04.

f. Driveways that are at least twenty-four feet wide shall align with existing or planned streets on adjacent sites.
Finding: Not applicable. No streets are existing or planned across Molalla Avenue from the site.

g. Development shall be required to provide existing or future connections to adjacent sites through the use of vehicular and pedestrian access easements where applicable. Such easements shall be required in addition to applicable street dedications as required in Chapter 12.04.
Finding: Complies as Proposed. The applicant indicated that:
The subject site does not have any existing connections to the adjacent sites, other than the existing public sidewalk system along Molalla Avenue. The proposed development will incorporate a pedestrian sidewalk system connecting the building entry to the public sidewalk. Easements for vehicular and pedestrian connections to the adjacent sites are not proposed due to the life safety operational requirements and security aspects of the proposed fire station.

The proposed use of the site if for a fire station and limited interference on site during an emergency so there is no delay for the fire service, as well as for security of the site. Pedestrian connection is facilitated by the adjacent sidewalk.

h. Vehicle and pedestrian access easements may serve in lieu of streets when approved by the decision maker only where dedication of a street is deemed impracticable by the city.
Finding: Not applicable. **No streets or easements in** lieu **of streets are required or proposed.**

i. Vehicular and pedestrian easements shall allow for public access and shall comply with all applicable pedestrian access requirements.
Finding: Not applicable. No streets or easements in lieu of streets are required or proposed.
j. In the case of dead-end stub streets that will connect to streets on adjacent sites in the future, notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future.
Finding: Not applicable. The site is not adjacent to a dead end or proposed street.

k. Parcels larger than three acres shall provide streets as required in Chapter 12.04. The streets shall connect with existing or planned streets adjacent to the site.
Finding: Not applicable. The site is approximately 1.4 acres, less than three acres.

l. Parking garage entries shall not dominate the streetscape. They shall be designed and situated to be ancillary to the use and architecture of the ground floor. This standard applies to both public garages and any individual private garages, whether they front on a street or private interior access road.
Finding: Not applicable. A parking garage is not proposed with this development.

m. Buildings containing above-grade structured parking shall screen such parking areas with landscaping or landscaped berms, or incorporate contextual architectural elements that complement adjacent buildings or buildings in the area. Upper level parking garages shall use articulation or fenestration treatments that break up the massing of the garage and/or add visual interest.
Finding: Not applicable. A parking garage is not proposed with this development.

3. Building structures shall be complimentary to the surrounding area. All exterior surfaces shall present a finished appearance. All sides of the building shall include materials and design characteristics consistent with those on the front. Use of inferior or lesser quality materials for side or rear facades or decking shall be prohibited.
a. Alterations, additions and new construction located within the McLoughlin Conservation District, Canemah National Register District, and the Downtown Design District and when abutting a designated Historic Landmark shall utilize materials and a design that incorporates the architecture of the subject building as well as the surrounding district or abutting Historic Landmark. Historic materials such as doors, windows and siding shall be retained or replaced with in kind materials unless the community development director determines that the materials cannot be retained and the new design and materials are compatible with the subject building, and District or Landmark. The community development director may utilize the Historic Review Board's Guidelines for New Constriction (2006) to develop findings to show compliance with this section.
b. In historic areas and where development could have a significant visual impact, the review authority may request the advisory opinions of appropriate experts designated by the community development director from the design fields of architecture, landscaping and urban planning. The applicant shall pay the costs associated with obtaining such independent professional advice; provided, however, that the review authority shall seek to minimize those costs to the extent practicable.
Finding: Complies with condition. The site is not located in a Historic District, or designated as an individually designed historic property. The design will comply with the standards in the Oregon City Municipal Code with the conditions of approval. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

4. Grading shall be in accordance with the requirements of Chapter 15.48 and the public works stormwater and grading design standards.
Finding: See findings under section 15.48 of this report.

5. Development subject to the requirements of the Geologic Hazard overlay district shall comply with the requirements of that district.
Finding: Not applicable. The site is not within the Geologic Hazard Overlay District.

6.Drainage shall be provided in accordance with city's drainage master plan, Chapter 13.12, and the public works stormwater and grading design standards.
Finding: See findings under section 13.12 of this report.

7. Parking, including carpool, vanpool and bicycle parking, shall comply with city off-street parking standards, Chapter 17.52.
Finding: Please refer to the findings under Chapter 17.52.

8. Sidewalks and curbs shall be provided in accordance with the city's transportation master plan and street design standards. Upon application, the community development director may waive this requirement in whole or in part in those locations where there is no probable need, or comparable alternative location provisions for pedestrians are made.
Finding: See findings under section 12.04 of this report.

9. A well-marked, continuous and protected on-site pedestrian circulation system meeting the following standards shall be provided:
a. Pathways between all building entrances and the street are required. Pathways between the street and buildings fronting on the street shall be direct. Exceptions may be allowed by the director where steep slopes or protected natural resources prevent a direct connection or where an indirect route would enhance the design and/or use of a common open space.
Finding: Please refer to the Variance request. A pathway between the building entrance and the street has been provided, but it crosses a drive aisle and is thus not direct. Please refer to the Variance section.

In addition, a fire room is accessed from the northwest corner of the building adjacent to the drive aisle leading to the rear of the site. This room is not anticipated to be used on a regular basis and thus the sidewalk is not required to be extended to this location. The small sidewalk segment is instead utilized for landscaping. The sidewalk is not required, due to the infrequent use of the room and because the adjacent driveway is also expected to be infrequently utilized.

b. The pedestrian circulation system shall connect all main entrances on the site. For buildings fronting on the street, the sidewalk may be used to meet this standard. Pedestrian connections to other areas of the site, such as parking areas, recreational areas, common outdoor areas, and any pedestrian amenities shall be required.
Finding: Complies as proposed. The proposed design provides a sidewalk connecting all of the main entranceways onsite.

c. Elevated external stairways or walkways, that provide pedestrian access to multiple dwelling units located above
the ground floor of any building are prohibited. The community development director may allow exceptions for external stairways or walkways located in, or facing interior courtyard areas provided they do not compromise visual access from dwelling units into the courtyard.
Finding: Not applicable. No exterior walkways which provide connection to dwelling units are proposed on a structure.

d. The pedestrian circulation system shall connect the main entrances of adjacent buildings on the same site.
Finding: Not Applicable. With the exception of accessory structures contained within the rear area of the site, there is only one building included in the proposal.

e. The pedestrian circulation system shall connect the principal building entrance to those of buildings on adjacent commercial and residential sites where practicable. Walkway linkages to adjacent developments shall not be required within industrial developments or to industrial developments or to vacant industrially-zoned land.

Finding: Complies as proposed. The pedestrian circulation system will connect the principal building entrance to the adjacent commercial sites by utilizing an enhanced walkway system connecting to the existing sidewalk system along Molalla Avenue. Connections to adjacent properties are limited due to the security and desired efficiency needed in order to provide the public with adequate emergency response times.

f. On-site pedestrian walkways shall be hard surfaced, well drained and at least five feet wide. Surface material shall contrast visually to adjoining surfaces. When bordering parking spaces other than spaces for parallel parking, pedestrian walkways shall be a minimum of seven feet in width unless curb stops are provided. When the pedestrian circulation system is parallel and adjacent to an auto travel lane, the walkway shall be raised or separated from the auto travel lane by a raised curb, bollards, landscaping or other physical barrier. If a raised walkway is used, the ends of the raised portions shall be equipped with curb ramps for each direction of travel. Pedestrian walkways that cross drive isles or other vehicular circulation areas shall utilize a change in textual material or height to alert the driver of the pedestrian crossing area.

Finding: Complies with Condition.

Applicant has indicated an enhanced pedestrian circulation system at the northwest corner of the property provides a direct connection from the public sidewalk system to the building entry. The width of the circulation path varies from 28'-0" wide to 9'-0" wide. Where the circulation system abuts offstreet parking, wheelstops and raised curbs are provided. The circulation path will be constructed using colored concrete with a scored pattern. Where the surface crosses the internal vehicular driveway, the path will be flush with the adjacent asphalt surface and incorporate a dissimilar color and detectable warning texture to provide safety for pedestrian. Safety and convenience have been maximized.

Staff has found that the proposed pedestrian walkway intersects with the portion of the driveway where the emergency vehicles would gain access on to Molalla Ave. The applicant shall provide a cross section of the subject area to the Oregon City Planning Division for planning staff to ensure this portion of the site has be proficiently marked.

Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval

10. There shall be provided adequate means to ensure continued maintenance and necessary normal replacement of private common facilities and areas, drainage ditches, streets and other ways, structures, recreational facilities, landscaping, fill and excavation areas, screening and fencing, groundcover, garbage storage areas and other facilities not subject to periodic maintenance by the city or other public agency.

Finding: Complies as proposed. The development application identified adequate means and accesses to ensure continued maintenance and necessary replacement of facilities and areas.

11. Site planning shall conform to the requirements of OCMC Chapter 17.41 Tree Protection.

Finding: Please refer to the analysis in Chapter 17.41 of this report.

12. Development shall be planned, designed, constructed and maintained to protect water resources and habitat conservation areas in accordance with the requirements of the city's Natural Resources Overlay District, Chapter 17.49, as applicable.

Finding: Please refer to the analysis in Chapter 17.49 of this report.

13. All development shall maintain continuous compliance with applicable federal, state, and city standards pertaining to air and water quality, odor, heat, glare, noise and vibrations, outdoor storage, radioactive materials, toxic or noxious matter, and electromagnetic interference. Prior to issuance of a building permit, the community development director or building official may require submission of

evidence demonstrating compliance with such standards and receipt of necessary permits. The review authority may regulate the hours of construction or operation to minimize adverse impacts on adjoining residences, businesses or neighborhoods. The emission of odorous gases or other matter in such quantity as to be readily detectable at any point beyond the property line of the use creating the odors or matter is prohibited.
Finding: Complies as proposed. The development proposal assured compliance with this section.

14. Adequate public water and sanitary sewer facilities sufficient to serve the proposed or permitted level of development shall be provided. The applicant shall demonstrate that adequate facilities and services are presently available or can be made available concurrent with development. Service providers shall be presumed correct in the evidence, which they submit. All facilities shall be designated to city standards as set out in the city's facility master plans and public works design standards. A development may be required to modify or replace existing offsite systems if necessary to provide adequate public facilities. The city may require over sizing of facilities where necessary to meet standards in the city's facility master plan or to allow for the orderly and efficient provision of public facilities and services. Where over sizing is required, the developer may request reimbursement from the city for over sizing based on the city's reimbursement policy and fund availability, or provide for recovery of costs from intervening properties as they develop.
Finding: Complies with condition. There is an existing 10-inch water main that runs within the north side of the property which is within an existing 15-feet wide easement. The proposed development will connect to the existing water main to provide domestic use and fire protection water services adequate to serve the proposed facility. There is an existing 6-inch sanitary sewer lateral serving the site that connects to the existing 8-inch sanitary sewer main located within Molalla Avenue, which is adequate to serve the site. The proposed development will connect to the existing sanitary sewer lateral to provide sanitary sewer services to serve the proposed facility. All water and sanitary facilities shall be designed to meet City's design standards.

15. Adequate right-of-way and improvements to streets, pedestrian ways, bike routes and bikeways, and transit facilities shall be provided and be consistent with the city's transportation master plan and design standards and this title. Consideration shall be given to the need for street widening and other improvements in the area of the proposed development impacted by traffic generated by the proposed development. This shall include, but not be limited to, improvements to the right-of-way, such as installation of lighting, signalization, turn lanes, median and parking strips, traffic islands, paving, curbs and gutters, sidewalks, bikeways, street drainage facilities and other facilities needed because of anticipated vehicular and pedestrian traffic generation. Compliance with [Chapter] 12.04, Streets, Sidewalks and Public Places shall be sufficient to achieve right-of-way and improvement adequacy.
Finding: Complies as proposed. Applicant responded as follows:
No increased traffic is anticipated to be generated by the proposed replacement fire station. The existing sidewalk along Molalla Avenue lies within the subject property boundary. Therefore, right-of-way dedication of 0.5-feet behind the sidewalk will be conveyed to the City of Oregon City. In addition, a 10-foot wide public utility easement (PUE) will be required along the Molalla Avenue frontage. The existing Molalla Avenue fire signal will need to meet current ODOT/County/MUTCD standards. Engineered drawings and documentation will be submitted as part of the development permit showing compliance with current standards.

16. If a transit agency, upon review of an application for an industrial, institutional, retail or office development, recommends that a bus stop, bus turnout lane, bus shelter, accessible bus landing pad, lighting, or transit stop connection be constructed, or that an easement or dedication be provided for one of these uses, consistent with an agency adopted or approved plan at the time of development, the review authority shall require such improvement, using designs supportive of transit use. Improvements

at a major transit stop may include intersection or mid-block traffic management improvements to allow for crossings at major transit stops, as identified in the transportation system plan.
Finding: Complies as proposed. The subject site is located on a transit route 99. Though the application was transmitted to Tri-Met, no comments were received.

17. All utility lines shall be placed underground.
Find Finding: Complies as proposed. All utility lines will be placed underground.

18. Access and facilities for physically handicapped people shall be incorporated into the site and building design consistent with applicable federal and state requirements, with particular attention to providing continuous, uninterrupted access routes.
Finding: Complies as proposed. The applicant indicated that the site includes ADA compliant parking stalls, accessible units as well as pedestrian accessways. Compliance with ADA and accessibility standards will be reviewed upon submittal of a building permit.

19. For a residential development, site layout shall achieve at least eighty percent of the maximum density of the base zone for the net developable area. Net developable area excludes all areas for required right-of-way dedication, land protected from development through Natural Resource or Geologic Hazards protection, and required open space or park dedication.
Finding: Not applicable. The is no residential development planned on site.

20. Screening of Mechanical Equipment:
a. Rooftop mechanical equipment, including HVAC equipment and utility equipment that serves the structure, shall be screened. Screening shall be accomplished through the use of parapet walls or a sight-obscuring enclosure around the equipment constructed of one of the primary materials used on the primary facades of the structure, and that is an integral part of the building's architectural design. The parapet or screen shall completely surround the rooftop mechanical equipment to an elevation equal to or greater than the highest portion of the rooftop mechanical equipment being screened. In the event such parapet wall does not fully screen all rooftop equipment, then the rooftop equipment shall be enclosed by a screen constructed of one of the primary materials used on the primary facade of the building so as to achieve complete screening.
Finding: Not applicable. No rooftop mechanical equipment are proposed. This standard is not applicable.

b. Wall-mounted mechanical equipment shall not be placed on the front facade of a building or on a facade that faces a right-of-way. Wall-mounted mechanical equipment, including air conditioning or HVAC equipment and groups of multiple utility meters, that extends six inches or more from the outer building wall shall be screened from view from streets; from residential, public, and institutional properties; and from public areas of the site or adjacent sites through the use of (a) sight-obscuring enclosures constructed of one of the primary materials used on the primary facade of the structure, (b) sight-obscuring fences, or (c) trees or shrubs that block at least eighty percent of the equipment from view or (d) painting the units to match the building. Wall-mounted mechanical equipment that extends six inches or less from the outer building wall shall be designed to blend in with the color and architectural design of the subject building.
Finding: Not Applicable. No wall-mounted mechanical equipment or utility meters are proposed on the front facade that faces Molalla Ave.

c. Ground-mounted above-grade mechanical equipment shall be screened by ornamental fences, screening enclosures, trees, or shrubs that block at least eighty percent of the view. Placement and type of screening shall be determined by the community development director.

Finding: Complies as proposed. The applicant indicated HVAC equipment and utility equipment (Generator, fueling station) will be ground mounted and screened from adjacent properties. Screening will be accomplished utilizing 6'-0" tall enclosure consisting of painted steel structure with perforated metal wall panels. Landscape shrubs will also be placed around the enclosures where adjacent to adjacent properties.

d. All mechanical equipment shall comply with the standards in this section. If mechanical equipment is installed outside of the site plan and design review process, planning staff shall review the plans to determine if additional screening is required. If the proposed screening meets this section, no additional planning review is required.
Finding: Complies as Proposed. Please refer to the analysis within this report.

e. This section shall not apply to the installation of solar energy panels, photovoltaic equipment or wind power generating equipment.
Finding: Complies as Proposed. The applicant has indicated solar panels will be installed along the south facing surface of the proposed roof monitors.

21. Building Materials.
a. Preferred building materials. Building exteriors shall be constructed from high quality, durable materials. Preferred exterior building materials that reflect the city's desired traditional character are as follows:
i. Brick.
Ii. Basalt stone or basalt veneer.
iii. Narrow horizontal wood or composite siding (generally five inches wide or less); wider siding will be considered where there is a historic precedent.
iv. Board and baton siding.
v. Other materials subject to approval by the community development director.
vi. Plywood with battens or fiber/composite panels with concealed fasteners and contagious aluminum sections at each joint that are either horizontally or vertically aligned.
vii. Stucco shall be trimmed in wood, masonry, or other approved materials and shall be sheltered from extreme weather by roof overhangs or other methods.
Finding: Complies as proposed. The applicant has indicated the proposed fire station exterior facade primary material will be prefinished metal wall panels with accent areas utilizing prefinished metal cladding. Each of the prefinished metal materials are of the highest quality meeting or exceeding industry testing and approval standards for quality and durability. No highly reflective sheet metal is proposed.



b. Prohibited materials. The following materials shall be prohibited in visible locations unless an exception is granted by the community development director based on the integration of the material into the overall design of the structure.
i. Vinyl or plywood siding (including T-111 or similar plywood).
Ii. Glass block or highly tinted, reflected, translucent or mirrored glass (except stained glass) as more than ten percent of the building facade.
iii. Corrugated fiberglass.
iv. Chain link fencing (except for temporary purposes such as a construction site or as a gate for a refuse enclosure).
[v.] Crushed colored rock/crushed tumbled glass.
[vi.] Non-corrugated and highly reflective sheet metal.
Finding: Complies with condition. No prohibited materials are identified within the submittal. The applicant did propose to retain existing chainlink fencing around the perimeter of the site. No new chainlink fencing may be installed. Repairs to existing chainlink fencing is allowed. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

c. Special material standards: The following materials are allowed if they comply with the requirements found below:
1. Concrete block. When used for the front facade of any building, concrete blocks shall be split, rock- or ground-faced and shall not be the prominent material of the elevation. Plain concrete block or plain concrete may be used as foundation material if the foundation material is not revealed more than three feet above the finished grade level adjacent to the foundation wall.
2. Metal siding. Metal siding shall have visible corner moldings and trim and incorporate masonry or other similar durable/permanent material near the ground level (first two feet above ground level).
3. Exterior Insulation and Finish System (EIFS) and similar toweled finishes shall be trimmed in wood, masonry, or other approved materials and shall be sheltered from extreme weather by roof overhangs or other methods.

4. Building surfaces shall be maintained in a clean condition and painted surfaces shall be maintained to prevent or repair peeling, blistered or cracking paint.
Finding: Please refer to variances.
22. Conditions of Approval. The review authority may impose such conditions as it deems necessary to ensure compliance with these standards and other applicable review criteria, including standards set out in city overlay districts, the city's master plans, and city public works design standards. Such conditions shall apply as described in Sections 17.50.310, 17.50.320 and 17.50.330. The review authority may require a property owner to sign a waiver of remonstrance against the formation of and participation in a local improvement district where it deems such a waiver necessary to provide needed improvements reasonably related to the impacts created by the proposed development. To ensure compliance with this chapter, the review authority may require an applicant to sign or accept a legal and enforceable covenant, contract, dedication, easement, performance guarantee, or other document, which shall be approved in form by the city attorney.
Finding: Complies with Condition. The applicant recognizes any conditions of approval imposed will need to be met to allow operation of the permitted conditional use.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

17.62.055 - Institutional and commercial building standards.
A. Purpose. The primary objective of the regulations contained in this section is to provide a range of design choices that promote creative, functional, and cohesive development that is compatible with surrounding areas. Buildings approved through this process are intended to serve multiple tenants over the life of the building, and are not intended for a one-time occupant. The standards encourage people to spend time in the area, which also provides safety though informal surveillance. Finally, this section is intended to promote the design of an urban environment that is built to human scale by creating buildings and streets that are attractive to pedestrians, create a sense of enclosure, provide activity and interest at the intersection of the public and private spaces, while also accommodating vehicular movement.
B. Applicability. In addition to Section 17.62.050 requirements, institutional and commercial buildings shall comply with design standards contained in this section.
Finding: Complies as Proposed. The applicant has indicated the proposed fire station is intended to replace the existing fire station that is no longer habitable due to mold and moisture issues. The new fire station is situated approximately in the same area as the existing fire station. Pedestrian access to the site is incorporated to the maximum extent feasible while still maintaining safety and operational requirements of a 24-hour emergency service use. Proposed building articulation, building materials, and landscaping provides a relationship transition from the Urban-to-Sub-Urban-to-Rural developments. The applicant has elected to use materials that are resistant to the wear of intended use of the proposed building as well as the weather elements of Oregon. The chosen materials will help ensure the façade of the building maintains a relationship with the human scale while maintaining functionality into the future.

C. Relationship between zoning district design standards and requirements of this section.
1. Building design shall contribute to the uniqueness of the underlying zoning district by applying appropriate materials, elements, features, color range and activity areas tailored specifically to the site and its context.
Finding: Complies with conditions. The structures comply with the standards in the Oregon City Municipal Code with the conditions of approval.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

2. A standardized prototype or franchise design shall be modified if necessary to meet the provisions of this section.
Finding: Complies with conditions. The structures comply with the standards in the Oregon City Municipal Code with the conditions of approval.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

3. In the case of a multiple building development, each individual building shall include predominant characteristics, architectural vocabulary and massing shared by all buildings in the development so that the development forms a cohesive place within the underlying zoning district or community.
Finding: Complies as proposed. The proposal is for one primary building and accessory structures, such as refuse and HVAC enclosures, which are made of the same metal building materials.

4. With the exception of standards for building orientation and building front setbacks, in the event of a conflict between a design standard in this section and a standard or requirement contained in the underlying zoning district, the standard in the zoning district shall prevail.
Finding: Not applicable. A conflict has not arisen.

5. On sites with one hundred feet or more of frontage at least sixty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line, unless a greater setback is accepted under the provisions of Section 17.62.055D. For sites with less than one hundred feet of street frontage, at least fifty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line unless a greater setback is accepted under the provisions of Section 17.62.055D.
Finding: The applicant is requesting a variance to this standard. Refer to Site Variance responses provided in Section 17.60.

D. Relationship of Buildings to Streets and Parking.
1. Buildings shall be placed no farther than five feet from the front property line. A larger front yard setback may be approved through site plan and design review if the setback area incorporates at least one element from the following list for every five feet of increased setback requested:
a. Tables, benches or other approved seating area.
b. Cobbled, patterned or paved stone or enhanced concrete.
c. Pedestrian scale lighting.
d. Sculpture/public art.
e. Fountains/Water feature.
f. At least twenty square feet of landscaping or planter boxes for each tenant facade fronting on the activity area.
g. Outdoor café.
h. Enhanced landscaping or additional landscaping.
i. Other elements, as approved by the community development director, that can meet the intent of this section.
Finding: The applicant is requesting a variance to this standard. Refer to responses in Section 17.60 – Variance**.**

2. The front most architecturally significant facade shall be oriented toward the street and shall be accessed from a public sidewalk. Primary building entrances shall be clearly defined and recessed or framed by a sheltering element such as an awning, arcade or portico in order to provide shelter from the summer sun and winter weather.
Finding: Complies as proposed. The front façade of the proposed fire station contains an entranceway, architectural articulation, a variety of windows, and building materials and is oriented toward Molalla

Avenue. The applicant has enhanced the primary building entrance clearly defining by an enhanced recessed alcove and full height storefront entry system allowing full transparency. The proposal also includes an enhanced pedestrian plaza and sidewalk system provides a direction connection to the public sidewalk system along Molalla Avenue.

3. Entryways. The primary entranceway for each commercial or retail establishment shall face the major street. The entrance may be recessed behind the property line a maximum of five feet unless a larger setback is approved pursuant to Section 17.62.055.D.1 and shall be accessed from a public sidewalk. Primary building entrances shall be clearly defined, highly visible and recessed or framed by a sheltering element including at least four of the following elements, listed below.
a. Canopies or porticos;
b. Overhangs;
c. Recesses/projections;
d. Arcades;
e. Raised corniced parapets over the door;
f. Peaked roof forms;
g. Arches;
h. Outdoor patios;
i. Display windows;
j. Architectural details such as tile work and moldings which are integrated into the building structure and design;
k. Integral planters or wing walls that incorporate landscaped areas and/or places for sitting.
l. Planter boxes and street furniture placed in the right-of-way shall be approved for use according to materials, scale and type.
Finding: Complies as Proposed/See Variance. The primary building entry faces Molalla Avenue, however the applicant is requesting a variance to this standard as it relates to the placement of the entrance relative to the street. Refer to responses in Section 17.60 – Variance.

The applicant indicated that "The entry is recessed back from the main facade wall plane 4-feet and the roof provides an overhang of 4'-8". The entry portal is clearly defined by color and a 14-inch deep by 4-inch wide band. Full height (12'-0" tall) storefront entry glazing system offers full transparency". The design of the entryway includes a recess, canopy on the roof structure, windows, red color architectural detailing, as well as landscaping and nearby bike parking, patio.

4. Where additional stores will be located in the large retail establishment, each such store shall have at least one exterior customer entrance, which shall conform to the same requirements. (Ord. 01-1002 §2, 2001)
Finding: Not Applicable. No retail is proposed.

5. Trellises, canopies and fabric awnings may project up to five feet into front setbacks and public rights-of-way, provided that the base is not less than eight feet at the lowest point and no higher than ten feet above the sidewalk. Awnings shall be no longer than a single storefront.
Finding: Not applicable. The applicant has not proposed a trellis, canopy or awning in the public right-of-way.

E. Corner Lots.
For buildings located at the corner of intersections, the primary entrance of the building shall be located at the corner of the building or within twenty-five feet of the corner of the building. Additionally, one of the following treatments shall be required:

1. Incorporate prominent architectural elements, such as increased building height or massing, cupola, turrets, or pitched roof, at the corner of the building or within twenty-five feet of the corner of the building.
2. Chamfer the corner of the building (i.e. cut the corner at a forty-five-degree angle and a minimum of ten feet from the corner) and incorporate extended weather protection (arcade or awning), special paving materials, street furnishings, or plantings in the chamfered area.
Finding: Not Applicable. The site is not a corner lot.

F. Commercial First Floor Frontage.
In order to ensure that the ground floor of structures have adequate height to function efficiently for retail uses, the first floor height to finished ceiling of new infill buildings in the mixed use and neighborhood commercial districts shall be no lower than fourteen feet floor to floor. Where appropriate, the exterior facade at the ceiling level of new structures shall include banding, a change of materials or relief which responds to the cornice lines and window location of existing buildings that abut new structures.
Finding: Not Applicable. The site is not within a mixed use ot neighborhood retail district.

G. Variation in Massing.
1. A single, large, dominant building mass shall be avoided in new buildings and, to the extent reasonably feasible, in development projects involving changes to the mass of existing buildings.
Finding: Complies with Conditions. The proposed development, with the conditions of approval will provide adequate massing to avoid a single, large dominant building mass.
Staff has determined it is possible, likely and reasonable the applicant can meet this standard by complying with all of the Conditions of Approval.

2. Horizontal masses shall not exceed a height: width ratio of one-to-three without substantial variation in massing that includes a change in height and projecting or recessed elements.
Finding: Complies as Proposed/See Variance. The tallest portion of the structure is measured at the front entranceway (on the west façade) and is approximately 24 feet in height. With a height to width ratio of 3:1, every 97.5 feet there must be a substantial variation in massing that includes a change in height and projecting or recessed elements.

- North Façade- The face length is 140 feet. The applicant has used windows to break up the massing of the façade and applied for a Variance for the substantial variation on the northern portion of the building.
- East Façade- The façade length is approximately 118 feet and is broke up into three sections and effectively uses recessing of these section to break up the massing of the proposed building.
- South Façade- The face length is approximately 140 feet, the applicant/owner will be installing hedging and fence screening, which will effectively reduce the visible massing along this portion of the building. In addition a significant recess is provided for the front office area.
- West Façade- The façade length is approximately 118 feet and serves as the primary façade facing Molalla Ave. in an effort to reduce the impact of the massing of the building, the front façade uses different colors and significant recessing of the apparatus bay.

Metal ribbed panels incorporated into the roof provide visual relief for the height of the building on each facade.

3. Changes in mass shall be related to entrances, the integral structure and/or the organization of interior spaces and activities and not merely for cosmetic effect.
Finding: Complies as Proposed. The applicant has indicated the changes in mass reflect the interior space uses and their layout. The public entry is expressed within the mass with a recessed alcove and projected trim. The apparatus bay mass is offset from the public entry wall mass to allow for emergency

vehicle maneuvering and use of the site by emergency vehicles. The wall plane projection along the north facade is integral with the bunk rooms and the wall plane projection along the south facade is integral with the Quarters / Shop area.

H. Minimum Wall Articulation.
1. Facades shall add architectural interest and variety and avoid the effect of a single, long or massive wall with no relation to human size. No wall that faces a street or connecting walkway shall have a blank, uninterrupted length exceeding thirty feet without including, but not be limited to, at least two of the following:
i. Change in plane,
ii Change in texture or masonry pattern or color,
iii. Windows, treillage with landscaping appropriate for establishment on a trellis.
iv. An equivalent element that subdivides the wall into human scale proportions.
Finding: Complies as Proposed. All facades have incorporated windows, color, texture or variations in massing to avoid a long wall. This standard additionally includes a criteria for walls which face a street or connecting walkway to incorporate two elements. The western (Molalla Avenue) façade is the only façade meeting this criteria. It is approximately 118 foot long front facade is broken down into (2) definable sections. The main entrance wall mass and the apparatus bay wall mass. The main entrance wall mass is approximately 38-feet long and is offset from the front of the apparatus bay wall mass 29-feet. Each section is definable by different window treatments (size and area) and color creating human scale.

2. Facades greater than one hundred feet in length, measured horizontally, shall incorporate wall plane projections or recesses having a depth of at least three percent of the length of the facade and extending at least twenty percent of the length of the facade. No uninterrupted length of any facade shall exceed one hundred horizontal feet.
Finding: Complies as Proposed/See Variance. This standard applies to each of the facades.

- North Façade- The building length is 140 feet, requiring 4.2' of recess/projection (140*0.03=4.2) for a length of 28' (140*0.2=28). The applicant has used windows to break up the massing of the façade and applied for a Variance for the substantial variation on the northern portion of the building.
- East Façade- The building length is 118 feet, requiring 4.2' of recess/projection (118*0.03=3.5) for a length of 28' (118*0.2=23.6). The façade recesses 32.5' for a distance of 55' in the front of the structure.
- South Façade- The building length is 140 feet, requiring 4.2' of recess/projection (140*0.03=4.2) for a length of 28' (140*0.2=28). The façade recesses 76'7" for a distance of 26' 9.5" in the front of the structure.
- West Façade- The building length is 118 feet, requiring 4.2' of recess/projection (118*0.03=3.5) for a length of 28' (118*0.2=23.6). The façade recesses 26' 9.5" for a distance of 76'7" in the front of the structure.

3. Ground floor facades that face public streets shall have arcades, display windows, entry areas, awnings or other such features along no less than sixty percent of their horizontal length.
Finding: Complies as Proposed. The west façade includes a glass door apparatus bay, with a canopy that spans 73% of the primary façade.

4. Building facades must include a repeating pattern that includes any one or more of the following elements:
a. Color change;
b. Texture change;

c. Material module change.
Finding: Complies as proposed. All facades, contain a repeating pattern of windows and incorporate he metal siding with a repeating vertical ribbed pattern. The east and west facades additionally include a color change with a fire engine red.

5. Facades shall have an expression of architectural or structural bays through a change in plane no less than twelve inches in width, such as an offset, reveal or projecting rib.
Finding: Complies as Proposed. The applicant has indicated the front and rear facades have (3) distinct sections; the apparatus bay flanked by program support spaces on the north and south. The north facade proposed projections express architectural bays related to interior living quarters use. The South façade has requested a variance to adjust the standards regulating this portion of the building.

6. Facades shall have at least one of elements subsections H.4. or H.5. of this section repeat horizontally. All elements shall repeat at intervals of no more than thirty feet, either horizontally or vertically.
Finding: Complies as proposed. Each of the façade of the building contains a pattern of metal siding, broken up by windows as well as a distinct roof feature.

I. Facade Transparency.
1. Transparent windows or doors facing the street are required. The main front elevation shall provide at least sixty percent windows or transparency at the pedestrian level. Facades on corner lots shall provide at least sixty percent windows or transparency on all corner-side facades. All other side elevations shall provide at least thirty percent transparency. The transparency is measured in lineal fashion. For example, a one hundred-foot long building elevation shall have at least sixty feet (sixty percent of one hundred feet) of transparency in length. Reflective, glazed, mirrored or tinted glass is limited to ten percent of the lineal footage of windows on the street facing facade. Highly reflective or glare-producing glass with a reflective factor of one-quarter or greater is prohibited on all building facades. Any glazing materials shall have a maximum fifteen percent outside visual light reflectivity value. No exception shall be made for reflective glass styles that appear transparent when internally illuminated.
Finding: Complies with condition. The applicant has designed the building using windows placed as the human scale and has emphasized the transparency along the west (front) side of the proposed building. The proposed transparency is as follows:

Façade	Façade Length	Min. Transparency Reqd.	Transparency Proposed
Front (West)	118’	60%	83’-7” (71%)
Rear (East)	118’	0%	68’-7” (58%)
Side (North)	140’	30%	42’-0” (30%)
Side (South)	140’	30%	57’-4” (41%)

The applicant did not indicate if reflective, glazed, mirrored or tinted glass is proposed. Reflective, glazed, mirrored or tinted glass is limited to ten percent of the lineal footage of windows on the street facing facade. Highly reflective or glare-producing glass with a reflective factor of one-quarter or greater is prohibited on all building facades. Any glazing materials shall have a maximum fifteen percent outside visual light reflectivity value. No exception shall be made for reflective glass styles that appear transparent when internally illuminated.
Staff has determined it is possible, likely and reasonable the applicant can meet this standard by complying with all of the Conditions of Approval.

2. Side or rear walls that face walkways may include false windows and door openings only when actual doors and windows are not feasible because of the nature of the use of the interior use of the building. False windows located within twenty feet of a right-of-way shall be utilized as display windows with a minimum display depth of thirty-six inches.

Finding: Not applicable. The proposed building does not include any false windows or doors.

J. Roof Treatments.
1. All facades shall have a recognizable "top" consisting of, but not limited to:
a. Cornice treatments, other than just colored "stripes" or "bands," with integrally textured materials such as stone or other masonry or differently colored materials; or
b. Sloping roof with overhangs and brackets; or
c. Stepped parapets;
d. Special architectural features, such as bay windows, decorative roofs and entry features may project up to three feet into street rights-of-way, provided that they are not less than nine feet above the sidewalk.
2. Mixed use buildings: For flat roofs or facades with a horizontal eave, fascia, or parapet, the minimum vertical dimension of roofline modulation is the greater of two feet or 0.1 multiplied by the wall height (finish grade to top of wall). The maximum length of any continuous roofline shall be seventy-five feet.
3. Other roof forms consistent with the design standards herein may satisfy this standard if the individual segments of the roof with no change in slope or discontinuity are less than forty feet in width (measured horizontally).
Finding: Complies as proposed. The proposed building meets the standards of the section with a sloped roof delineated by a metal band.

K. Drive-through facilities shall:
1. Be located at the side or rear of the building.
2. Be designed to maximize queue storage on site.
Finding: Not applicable. The proposal does not include a drive thru.

17.62.056 - Additional standards for large retail establishments.
Finding: Not Applicable. No retail has be proposed.

17.62.057 - Multi-family standards.
Finding: Not Applicable. No multi-family has been proposed.

17.62.059 - Cottage housing.
Finding: Not applicable. The application does not include cottage housing.

17.62.065 - Outdoor lighting.
B. Applicability.
1. General.
a. All exterior lighting for any type of commercial, mixed-use, industrial or multi-family development shall comply with the standards of this section, unless excepted in subsection B.3.
b. The city engineer/public works director shall have the authority to enforce these regulations on private property if any outdoor illumination is determined to present an immediate threat to the public health, safety and welfare.
Finding: Applies. The proposed fire station requires compliance with this section.

2. Lighting Plan Requirement.
All commercial, industrial, mixed-use, cottage housing and multi-family developments shall submit a proposed exterior lighting plan. The plan must be submitted concurrently with the site plan. The exterior lighting plan shall include plans and specifications for streetlights, parking lot lights, and exterior building lights. The specifications shall include details of the pole, fixture height and design, lamp type, wattage, and spacing of lights.

Finding: Complies as proposed. The applicant submitted a photometric plan indicating proposed lighting levels in foot-candles along with manufacturer specification sheets for each of the lighting features to be installed on the site.

3. Excepted Lighting.
The following types of lighting are excepted from the requirements of this section.
a. Residential lighting for single-family attached and detached homes, and duplexes.
b. Public street and right-of-way lighting.
c. Temporary decorative seasonal lighting provided that individual lamps have a light output of sixty watts or less.
d. Temporary lighting for emergency or nighttime work and construction.
e. Temporary lighting for theatrical, television, and performance areas, or for special public events.
f. Lighting for a special district, street, or building that, according to an adopted municipal plan or ordinance, is determined to require special lighting aesthetics as part of its physical character.
g. Lighting required and regulated by the Federal Aviation Administration.
Finding: Not applicable. None of the proposed lighting is exempt lighting.

C. General Review Standard. If installed, all exterior lighting shall meet the functional security needs of the proposed land use without adversely affecting adjacent properties or the community. For purposes of this section, properties that comply with the design standards of subsection D. below shall be deemed to not adversely affect adjacent properties or the community.
Finding: Complies as Proposed. The applicant has indicated the lighting will meet the operation and security needs of the proposed fire station without adversely affecting the surrounding properties

D. Design and Illumination Standards.
General Outdoor Lighting Standard and Glare Prohibition.
1. Outdoor lighting, if provided, shall be provided in a manner that enhances security, is appropriate for the use, avoids adverse impacts on surrounding properties, and the night sky through appropriate shielding as defined in this section. Glare shall not cause illumination on other properties in excess of a measurement of 0.5 footcandles of light as measured at the property line. In no case shall exterior lighting add more than 0.5 footcandle to illumination levels at any point off-site. Exterior lighting is not required except for purposes of public safety. However, if installed, all exterior lighting shall meet the following design standards:
Finding: Complies as proposed. The development application included a photometric plan which demonstrated compliance with this standard. The on-site lighting is no more than 0.5 foot-candles at the property line.

2. Any light source or lamp that emits more than nine hundred lumens (thirteen watt compact fluorescent or sixty watt incandescent) shall be concealed or shielded with a full cut-off style fixture in order to minimize the potential for glare and unnecessary diffusion on adjacent property. All fixtures shall utilize one of the following bulb types: metal halide, induction lamp, compact fluorescent, incandescent (including tungsten-halogen), or high pressure sodium with a color rendering index above seventy.
Finding: Complies as Proposed. The applicant has indicated that all exterior lighting will be LED fixtures to meet the Oregon Path to Net Zero. The equivalent wattages is less that this standard above. LED is an acceptable alterniative to the bub types identified above.

3. The maximum height of any lighting pole serving a multi-family residential use shall be twenty feet. The maximum height serving any other type of use shall be twenty-five feet, except in parking lots larger

than five acres, the maximum height shall be thirty-five feet if the pole is located at least one hundred feet from any residential use.
Finding: Complies as proposed. The maximum height will not exceed 25 feet.

4. Lighting levels:
Table 1-17.62.065. Foot-candle Levels

Location	*Min*	*Max*	*Avg*
Pedestrian Walkways	*0.5*	*7:1 max/min ratio*	*1.5*
Pedestrian Walkways in Parking Lots		*10:1 max/min ratio*	*0.5*
Pedestrian Accessways	*0.5*	*7:1 max/min ratio*	*1.5*
Building Entrances	*3*		
Bicycle Parking Areas	*3*		
Abutting property	*N/A*	*.05*	

Finding: Complies with condition. The applicant provided a lighting plan with no more than 0.5 foot-candles at the abutting property, and a minimum of 3 foot-candles at the building entranceways and bicycle parking. However, the plan did not provide calculations for the pedestrian walkways. Prior to issuance of a building permit the applicant shall provide a photometric plan demonstrating compliance with Table 1-17.62.065 for pedestrian accessways. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

5. Parking lots and other background spaces shall be illuminated as unobtrusively as possible while meeting the functional needs of safe circulation and protection of people and property. Foreground spaces, such as building entrances and outside seating areas, shall utilize pedestrian scale lighting that defines the space without glare.
Finding: Complies as Proposed. The applicant has indicated the main building entrance, parking lot, and building operational use areas will be illuminated to meet all functional needs for emergency services and safe circulation. Pedestrian level lighting will be utilized at the pedestrian plaza and walkway connection to the main building entrance to illuminate the ground surface.

6. Any on-site pedestrian circulation system shall be lighted to enhance pedestrian safety and allow employees, residents, customers or the public to use the walkways at night. Pedestrian walkway lighting through parking lots shall be lighted to light the walkway and enhance pedestrian safety pursuant to Table 1.
Finding: Complies with condition. The applicant has provided a lighting plan which did not provide calculations for the pedestrian walkways. Prior to issuance of a building permit the applicant shall provide a photometric plan demonstrating compliance with Table 1-17.62.065 for pedestrian accessways. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**
7. Pedestrian Accessways. To enhance pedestrian and bicycle safety, pedestrian accessways required pursuant to OCMC 12.28 shall be lighted with pedestrian-scale lighting. Accessway lighting shall be to a minimum level of one-half foot-candles, a one and one-half foot-candle average, and a maximum to minimum ratio of seven-to-one and shall be oriented not to shine upon adjacent properties. Street

lighting shall be provided at both entrances. Lamps shall include a high-pressure sodium bulb with an unbreakable lens.
Finding: Not Applicable. An off-site pedestrian accessway is not proposed.

8. Floodlights shall not be utilized to light all or any portion of a building facade between ten p.m. and six a.m.
Finding: Not Applicable. No floodlights have been proposed.

9. Lighting on automobile service station, convenience store, and other outdoor canopies shall be fully recessed into the canopy and shall not protrude downward beyond the ceiling of the canopy.
Finding: Complies as Proposed. The applicant has indicated all lights will be recessed

10. The style of light standards and fixtures shall be consistent with the style and character of architecture proposed on the site.
Finding: Complies as proposed. The development application included the style of all lighting fixtures, which were commercial in nature.

11. In no case shall exterior lighting add more than one foot-candle to illumination levels at any point off-site.
Finding: Complies as Proposed. The applicant has provided a lighting plan demonstrating no more than 0.5 foot-candles at the abutting property
12. All outdoor light not necessary for security purposes shall be reduced, activated by motion sensor detectors, or turned off during non-operating hours.
Finding: Complies as Proposed. The applicant has indicated the proposed fire station is a 24-hour emergency service use. Light fixtures related to security and emergency response services will remain on during operating hours. All nonsecurity and non-emergency service related light fixtures will either be turned off or placed on motion sensors.

13. Light fixtures used to illuminate flags, statues, or any other objects mounted on a pole, pedestal, or platform shall use a narrow cone beam of light that will not extend beyond the illuminated object.
Finding: Complies as Proposed. The applicant has indicated the proposed lighting for illuminating the flagpole will utilize a LED light integrated into the flagpole top finial ball. The LED fixture will provide a narrow cone beam of light down on the flag. This will eliminate light trespass into the sky and beyond the subject property.

14. For upward-directed architectural, landscape, and decorative lighting, direct light emissions shall not be visible above the building roofline.
Finding: Complies as Proposed. The applicant has indicated upward directional lighting of the proposed monument sign will direct light up onto the sign and not above the building roofline. The approximate height of the monument sign is 5- feet above finish grade.

15. No flickering or flashing lights shall be permitted, except for temporary decorative seasonal lighting.
Finding: Complies as Proposed. No flickering or flashing has been proposed.

16. Wireless Sites. Unless required by the Federal Aviation Administration or the Oregon Aeronautics Division, artificial lighting of wireless communication towers and antennas shall be prohibited. Strobe lighting of wireless communication facilities is prohibited unless required by the Federal Aviation Administration. Security lighting for equipment shelters or cabinets and other on-the-ground auxiliary equipment on wireless communication facilities shall be initiated by motion detecting lighting.
Finding: Not applicable. The applicant has not proposed a wireless site.

17. Lighting for outdoor recreational uses such as ball fields, playing fields, tennis courts, and similar uses, provided that such uses comply with the following standards:
i. Maximum permitted light post height: eighty feet.
ii. Maximum permitted illumination at the property line: 0.5 foot-candles.
Finding: Not applicable. The applicant has not proposed recreational uses.

17.62.080 - Special development standards along transit streets.
B. Applicability. Except as otherwise provide in this section, the requirements of this section shall apply to the construction of new retail, office and institutional buildings which front on a transit street.
Finding: Applicable. The proposed application includes construction adjacent to Molalla Avenue, which has service by Tri-Met.

C. Development Standards.
1. All buildings shall have at least one main building entrance oriented towards the transit street. A main building entrance is oriented toward a transit street if it is directly located on the transit street, or if it is linked to the transit street by an on-site pedestrian walkway that does not cross off-street parking or maneuvering areas.
Finding: Complies as Proposed. The front façade of the structure is oriented toward Molalla Ave. and a pedestrian walkway will connect the main façade of the proposed building with Molalla Ave.

a. If the site has frontage on more than one transit street, or on a transit street and a street intersecting a transit street, the building shall provide one main building entrance oriented to the transit street or to the corner where the two streets intersect.
Finding: Not Applicable. The site only abuts one transit street.

b. For building facades over three hundred feet in length on a transit street, two or more main building entrances shall be provided as appropriate and oriented towards the transit street.
Finding: Not Applicable. The proposed building does not exceed 300 feet.

2. Main building entrances shall be well lighted and visible from the transit street. The minimum lighting level for building entries shall be three foot-candles. Lighting shall be a pedestrian scale with the source light shielded to reduce glare.
Finding: Complies as Proposed. The main building entrance will be illuminated more than 3 foot-candles and visible from Molalla Avenue.
3. In the event a requirement of this section conflicts with other requirements in Title 17, the requirements of this section shall control.
Finding: Not applicable. No conflicts have arisen.

D. Exemptions. The following permitted uses are exempted from meeting the requirements of subsection C. of this section:
1. Heavy equipment sales;
2. Motor vehicle service stations, including convenience stores associated therewith;
3. Solid waste transfer stations; and
4. Truck stops, including convenience stores, eating or drinking establishments, overnight accommodations or other similar services associated therewith. A use found by the community development director to be similar to the exempt uses above.
Finding: Not Applicable. No exemption have been requested.

17.62.085 - Refuse and recycling standards for commercial, industrial, and multi-family developments.

The purpose and intent of these provisions is to provide an efficient, safe and convenient refuse and recycling enclosure for the public as well as the local collection firm. All new development, change in property use, expansions or exterior alterations to uses other than single-family or duplex residences shall include a refuse and recycling enclosure. The area(s) shall be:
A. Sized appropriately to meet the needs of current and expected tenants, including an expansion area if necessary;
B. Designed with sturdy materials, which are compatible to the primary structure(s);
C. Fully enclosed and visually screened;
D. Located in a manner easily and safely accessible by collection vehicles;
E. Located in a manner so as not to hinder travel lanes, walkways, streets or adjacent properties;
F. On a level, hard surface designed to discharge surface water runoff and avoid ponding;
G. Maintained by the property owner;
H. Used only for purposes of storing solid waste and recyclable materials;
I. Designed in accordance with applicable sections of the Oregon City Municipal Code (including Chapter 8.20—Solid Waste Collection and Disposal) and city adopted policies.
Finding: Complies as proposed. A refuse and recycling area is proposed in the rear of the structure and designed to accommodate the needs of the proposed fire station based on full occupancy. The refuse and recycling area will be enclosed with a painted steel structure with perforated metal panels and is located in a manner to be easily accessible by the collection agency. The surface of the refuse and recycling area will be concrete and graded to discharge water runoff.

CHAPTER 17.52 OFF-STREET PARKING AND LOADING

17.52.015 - Planning commission adjustment of parking standards.
A. Purpose: The purpose of permitting a planning commission adjustment to parking standards is to provide for flexibility in modifying parking standards in all zoning districts, without permitting an adjustment that would adversely impact the surrounding or planned neighborhood. The purpose of an adjustment is to provide flexibility to those uses which may be extraordinary, unique or to provide greater flexibility for areas that can accommodate a denser development pattern based on existing infrastructure and ability to access the site by means of walking, biking or transit. An adjustment to a minimum or maximum parking standard may be approved based on a determination by the planning commission that the adjustment is consistent with the purpose of this Code, and the approval criteria can be met.
B. Procedure: A request for a planning commission parking adjustment shall be initiated by a property owner or authorized agent by filing a land use application. The application shall be accompanied by a site plan, drawn to scale, showing the dimensions and arrangement of the proposed development and parking plan, the extent of the adjustment requested along with findings for each applicable approval criteria. A request for a parking adjustment shall be processed as a Type III application as set forth in Chapter 17.50.
C. Approval criteria for the adjustment are as follows:
1. Documentation: The applicant shall document that the individual project will require an amount of parking that is different from that required after all applicable reductions have been taken.
2. Parking analysis for surrounding uses and on-street parking availability: The applicant must show that there is a continued fifteen percent parking vacancy in the area adjacent to the use during peak parking periods and that the applicant has permission to occupy this area to serve the use pursuant to the procedures set forth by the community development director.
a. For the purposes of demonstrating the availability of on street parking as defined in [Section] 17.52.020.B.3., the applicant shall undertake a parking study during time periods specified by the community development director. The time periods shall include those during which the highest parking demand is anticipated by the proposed use. Multiple observations during multiple days shall be required. Distances are to be calculated as traversed by a pedestrian that utilizes sidewalks and legal crosswalks or an alternative manner as accepted by the community development director.

b. The onsite parking requirements may be reduced based on the parking vacancy identified in the parking study. The amount of the reduction in onsite parking shall be calculated as follows:
i. Vacant on-street parking spaces within three hundred feet of the site will reduce onsite parking requirements by 0.5 parking spaces; and
ii. Vacant on-street parking spaces between three hundred and six hundred feet of the [site] will reduce onsite parking requirements by 0.2 parking spaces.
3. Function and Use of Site: The applicant shall demonstrate that modifying the amount of required parking spaces will not significantly impact the use or function of the site and/or adjacent sites.
4. Compatibility: The proposal is compatible with the character, scale and existing or planned uses of the surrounding neighborhood.
5. Safety: The proposal does not significantly impact the safety of adjacent properties and rights-of-way.
6. Services: The proposal will not create a significant impact to public services, including fire and emergency services.
Finding: Not applicable. The applicant has not requested an adjustment to the parking standards.

17.52.020 - Number of automobile spaces required.
A. The number of parking spaces shall comply with the minimum and maximum standards listed in Table 17.52.020. The parking requirements are based on spaces per one thousand square feet net leasable area unless otherwise stated.
1. Multiple Uses. In the event several uses occupy a single structure or parcel of land, the total requirements for off-street parking shall be the sum of the requirements of the several uses computed separately.
Finding: Not Applicable. The proposed use if for an Emergency Service (Fire Station), a use not listed.

2. Requirements for types of buildings and uses not specifically listed herein shall be determined by the community development director, based upon the requirements of comparable uses listed.
Finding: Complies as proposed. The City of Oregon City does not have parking standards for a fire station, so the applicant has submitted a parking calculation standard based upon the requirements of the City of Salem.

Table 806-1: Minimum Off-Street Parking		
Use	**Minimum Number of Spaces Required** (1)	**Limitations & Qualifications**
Public Safety		
Emergency Services	1 per employee, plus 1 additional space per ambulance	Applicable to ambulance stations.
	1 per 500 sq. ft.	Applicable to all other Emergency Services.

(d) Maximum Off-Street Parking. Unless otherwise provided under the UDC, off-street parking shall not exceed the amounts set forth in Table 806-2.

TABLE 806-2
MAXIMUM OFF-STREET PARKING

Table 806-2: Maximum Off-Street Parking	
Minimum Number of Off-Street Parking Spaces Required *(From Table 806-1)*	**Maximum Number of Off-Street Parking Spaces Allowed**
20 Spaces or Less	2.5 times minimum number of spaces required.
More than 20 Spaces	1.75 times minimum number of spaces required.

The total square footage is 12,300 square feet, which includes 4,200 square feet of apparatus bay (fire trucks). In calculating the minimum and maximum parking for the proposed fire station, the apparatus bay square footage was not included. The following table summarizes the proposed off-street parking.

Area (Square feet)	Minimum Required	Maximum Allowed	Proposed
8,100	16	40	22

The proposed number of parking spaces provide the fire station the exact amount of spaces needed to serve the limited public use and most importantly, each shift for staff and emergency services.

The City allows for an applicant to submit a detail on parking standards if the standards for a use (or similar use) are not listed within the Oregon City Municipal Code. The proposed standard appears to be sufficient.

3. Where calculation in accordance with the above list results in a fractional space, any fraction less than one-half shall be disregarded and any fraction of one-half or more shall require one space.
Finding: Complies as proposed. Fractions were rounded in accordance with this chapter.

4. The minimum required parking spaces shall be available for the parking of operable passenger automobiles of residents, customers, patrons and employees only, and shall not be used for storage of vehicles or materials or for the parking of vehicles used in conducting the business or use.
Finding: Complies as proposed. The application indicated that parking spaces will be provided for the use employees and public users to the site.

5. A change in use within an existing habitable building located in the MUD Design District or the Willamette Falls Downtown District is exempt from additional parking requirements. Additions to an existing building and new construction are required to meet the minimum parking requirements for the areas as specified in Table 17.52.020 for the increased square footage.
Finding: Not applicable. The proposed site is within the General Commercial District.

B. Parking requirements can be met either onsite, or offsite by meeting the following conditions:
1. Mixed Uses. If more than one type of land use occupies a single structure or parcel of land, the total requirements for off-street automobile parking shall be the sum of the requirements for all uses, unless it can be shown that the peak parking demands are actually less (e.g. the uses operate on different days or at different times of the day). In that case, the total requirements shall be reduced accordingly, up to a maximum reduction of fifty percent, as determined by the community development director.
2. Shared Parking. Required parking facilities for two or more uses, structures, or parcels of land may be satisfied by the same parking facilities used jointly, to the extent that the owners or operators show that the need for parking facilities does not materially overlay (e.g., uses primarily of a daytime versus nighttime nature), that the shared parking facility is within one thousand feet of the potential uses, and provided that the right of joint use is evidenced by a recorded deed, lease, contract, or similar written instrument authorizing the joint use.
3. On-Street Parking. On-street parking may be counted toward the minimum standards when it is on the street face abutting the subject land use. An on-street parking space must not obstruct a required clear vision area and it shall not violate any law or street standard. On-street parking for commercial uses shall conform to the following standards:
a. Dimensions. The following constitutes one on-street parking space:
1. Parallel parking, each [twenty-two] feet of uninterrupted and available curb;
2. [Forty-five/sixty] degree diagonal, each with [fifteen] feet of curb;
3. Ninety degree (perpendicular) parking, each with [twelve] feet of curb.

4. Public Use Required for Credit. On-street parking spaces counted toward meeting the parking requirements of a specific use may not be used exclusively by that use, but shall be available for general public use at all times. Signs or other actions that limit general public use of on-street spaces are prohibited.

Finding: Not applicable. The applicant did not propose any of the options provided in this section. All parking stalls are accommodated onsite.

C. Reduction of the Number of Automobile Spaces Required. The required number of parking stalls may be reduced in the Downtown Parking Overlay District: Fifty percent reduction in the minimum number of spaces required is allowed prior to seeking further reductions in [sub]sections 2. and 3. below:

1. Transit Oriented Development. For projects not located within the Downtown Parking Overlay District, the community development director may reduce the required number of parking stalls up to twenty-five percent when it is determined that a project in a commercial center (sixty thousand square feet or greater of retail or office use measured cumulatively within a five hundred-foot radius) or multi-family development with over eighty units, is adjacent to or within one thousand three hundred twenty feet of an existing or planned public transit street and is within one thousand three hundred twenty feet of the opposite use (commercial center or multi-family development with over eighty units).

2. Reduction in Parking for Tree Preservation. The community development director may grant an adjustment to any standard of this requirement provided that the adjustment preserves a regulated tree or grove so that the reduction in the amount of required pavement can help preserve existing healthy trees in an undisturbed, natural condition. The amount of reduction must take into consideration any unique site conditions and the impact of the reduction on parking needs for the use, and must be approved by the community development director. This reduction is discretionary.

3. Transportation Demand Management. The community development director may reduce the required number of parking stalls up to twenty-five percent when a parking-traffic study prepared by a traffic engineer demonstrates:

a. Alternative modes of transportation, including transit, bicycles, and walking, and/or special characteristics of the customer, client, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to standard Institute of Transportation Engineers vehicle trip generation rates and further that the transportation demand management program promotes or achieves parking utilization lower than minimum city parking requirements.

b. Transportation demand management (TDM) program has been developed for approval by, and is approved by the city engineer. The plan will contain strategies for reducing vehicle use and parking demand generated by the development and will be measured annually. If, at the annual assessment, the city determines the plan is not successful, the plan may be revised. If the city determines that no good-faith effort has been made to implement the plan, the city may take enforcement actions.

Finding: Not applicable. The development proposal did not include a reduction in the automobile spaces required.

17.52.030 - Standards for automobile parking.

A. Access. Ingress and egress locations on public thoroughfares shall be located in the interests of public traffic safety. Groups of more than four parking spaces shall be so located and served by driveways so that their use will require no backing movements or other maneuvering within a street right-of-way other than an alley. No driveway with a slope of greater than fifteen percent shall be permitted without approval of the city engineer.

Finding: Complies as proposed. The existing ingress and egress driveway along Molalla Avenue meets all maneuvering standards and does not have a slope greater than 15%.

B. Surfacing. Required off-street parking spaces and access aisles shall have paved surfaces adequately maintained. The use of pervious asphalt/concrete and alternative designs that reduce storm water runoff

and improve water quality pursuant to the city's stormwater and low impact development design standards are encouraged.
Finding: Complies as proposed. All proposed off-street parking spaces and access aisles will be paved with asphalt/concrete.

C. Drainage. Drainage shall be designed in accordance with the requirements of Chapter 13.12 and the city public works stormwater and grading design standards.
Finding: See finding from Chapter 13.12 of this report.

D. Dimensional Standards.
1. Requirements for parking developed at varying angles are according to the table included in this section. A parking space shall not be less than seven feet in height when within a building or structure, and shall have access by an all-weather surface to a street or alley. Parking stalls in compliance with the American with Disabilities Act may vary in size in order to comply with the building division requirements. Up to thirty-five percent of the minimum required parking may be compact, while the remaining required parking stalls are designed to standard dimensions. The community development director may approve alternative dimensions for parking stalls in excess of the minimum requirement which comply with the intent of this chapter.
2. Alternative parking/plan. Any applicant may propose an alternative parking plan. Such plans are often proposed to address physically constrained or smaller sites, however innovative designs for larger sites may also be considered. In such situations, the community development director may approve an alternative parking lot plan with variations to parking dimensions of this section. The alternative shall be consistent with the intent of this chapter and shall create a safe space for automobiles and pedestrians while providing landscaping to the quantity and quality found within parking lot landscaping requirements.
PARKING STANDARD
PARKING ANGLE SPACE DIMENSIONS

A Parking Angle		*B Stall Width*	*C Stall to Curb*	*D Aisle Width*	*E Curb Length*	*F Overhang*
90 degrees	*Standard Compact*	*9' 8'*	*19.0' 16.0'*	*24' 22'*	*9' 8'*	*1.5*

Finding: Complies as Proposed. The proposed parking meets the 90 degree standard stall size, with exception of the ADA stall.

E. Carpool and Vanpool Parking. New developments with seventy-five or more parking spaces, and new hospitals, government offices, group homes, nursing and retirement homes, schools and transit park-and-ride facilities with fifty or more parking spaces, shall identify the spaces available for employee, student and commuter parking and designate at least five percent, but not fewer than two, of those spaces for exclusive carpool and vanpool parking. Carpool and vanpool parking spaces shall be located closer to the main employee, student or commuter entrance than all other employee, student or commuter parking spaces with the exception of ADA accessible parking spaces. The carpool/vanpool spaces shall be clearly marked "Reserved - Carpool/Vanpool Only."
Finding: Not applicable. The number of proposed spaces in under 75.

17.52.040 - Bicycle parking standards.
A. Purpose-Applicability. To encourage bicycle transportation to help reduce principal reliance on the automobile, and to ensure bicycle safety and security, bicycle parking shall be provided in conjunction with all uses other than single-family dwellings or duplexes.

Finding: Complies as Proposed. The bicycle standard applies to the proposed fire station.

B. Number of Bicycle Spaces Required. For any use not specifically mentioned in Table A, the bicycle parking requirements shall be the same as the use which, as determined by the community development director, is most similar to the use not specifically mentioned. Calculation of the number of bicycle parking spaces required shall be determined in the manner established in Section 17.52.020 for determining automobile parking space requirements. Modifications to bicycle parking requirements may be made through the site plan and design, conditional use, or master plan review process.

*TABLE A Required Bicycle Parking Spaces**

Where two options for a requirement are provided, the option resulting in more bicycle parking applies. Where a calculation results in a fraction, the result is rounded up to the nearest whole number.

* *Covered bicycle parking is not required for developments with two or fewer stalls.*

Finding: Complies as Proposed. The City of Oregon City does not have standard for bicycle parking at a fire station. The applicant has use standards set forth by the City of Salem, which states:

Table 806-8: Minimum Bicycle Parking		
Public Safety		
Emergency Services	None	Applicable to ambulance stations.
	1 per 5,000 sq. ft.	Applicable to all other Emergency Services.

trucks). In calculating the minimum and maximum bicycle parking for the proposed fire station, the apparatus bay square footage was not included. The following table summarizes the proposed off-street parking.

Area (Square Feet)	Minimum Required	Proposed
8,100	2	2

Staff has determined that the calculation provided by the applicant is sufficient.

C. Security of Bicycle Parking. Bicycle parking facilities shall be secured. Acceptable secured bicycle parking area shall be in the form of a lockable enclosure onsite, secure room in a building onsite, a covered or uncovered rack onsite, bicycle parking within the adjacent right-of-way or another form of secure parking where the bicycle can be stored, as approved by the decision maker. All bicycle racks and lockers shall be securely anchored to the ground or to a structure. Bicycle racks shall be designed so that bicycles may be securely locked to them without undue inconvenience and, when in the right-of-way shall comply with clearance and ADA requirements.

Finding: Complies as proposed. The development proposal included the design of steel bicycle racks bolted to the ground and designed to hold two bicycles, in front of the fire station.



D. Bicycle parking facilities shall offer security in the form of either a lockable enclosure or a stationary rack to which the bicycle can be locked. All bicycle racks and lockers shall be securely anchored to the ground or to a structure. Bicycle racks shall be designed so that bicycles may be securely locked to them without undue inconvenience.

Finding: Complies as Proposed. The bike rack will be a stationary rack, bolted to the ground.

Location of Bicycle Parking:
1. Bicycle parking shall be located on-site, in one or more convenient, secure and accessible location. The city engineer and the community development Director may permit the bicycle parking to be provided within the right-of-way provided adequate clear zone and ADA requirements are met. If sites have more than one building, bicycle parking shall be distributed as appropriate to serve all buildings. If a building has two or more main building entrances, the review authority may require bicycle parking to be distributed to serve all main building entrances, as it deems appropriate.
Finding: Complies as Proposed. The bike rack is proposed in front of the main entrance to the fire station.

2. Bicycle parking areas shall be clearly marked or visible from on-site buildings or the street. If a bicycle parking area is not plainly visible from the street or main building entrance, a sign must be posted indicating the location of the bicycle parking area. Indoor bicycle parking areas shall not require stairs to access the space unless approved by the community development director.
Finding: Complies as proposed. The applicant has indicated two bicycle parking spaces will be provided along the scored concrete pedestrian walkway adjacent to the public parking stalls. This location is plainly visible from Molalla Avenue.

3. All bicycle parking areas shall be located to avoid conflicts with pedestrian and motor vehicle movement.
a. Bicycle parking areas shall be separated from motor vehicle parking and maneuvering areas and from arterial streets by a barrier or a minimum of five feet.
b. Bicycle parking areas shall not obstruct pedestrian walkways; provided, however, that the review authority may allow bicycle parking in the right-of-way where this does not conflict with pedestrian accessibility.
Finding: Complies as Proposed. The applicant has indicated the proposed bicycle parking area is separated from the vehicle parking drive aisle a distance of 5'-0" and the public parking space by a 5'-0" wide landscape bed. The bicycle parking area does not obstruct the pedestrian walkways.

17.52.040.D.4*. Accessibility.*
a. Outdoor bicycle areas shall be connected to main building entrances by pedestrian accessible walkways.
Finding: Complies as proposed. All of the bicycle parking locations are adjacent to pedestrian accessway which are connected to the main building entrances.

17.52.060 - Parking lot landscaping.
A. Development Standards.
1. The landscaping shall be located in defined landscaped areas that are uniformly distributed throughout the parking or loading area.
Finding: Complies as proposed. The proposed landscaping is distributed throughout the site.

2. All areas in a parking lot not used for parking, maneuvering, or circulation shall be landscaped.
Finding: Complies with condition. A majority of the areas in a parking lot not used for parking, maneuvering, or circulation are landscaped with a mix of trees, shrubs, and lawn cover. However, the applicant proposed mexican beach pebble in the perimeter parking lot landscaping to the south of the drive aisle leading to the apparatus bays. Prior to issuance of a permit for the site the applicant shall submit a revised landscaping plan replacing the Mexican beach pebble with landscaping in compliance with OCMC 17.52. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

3. Parking lot trees shall be a mix of deciduous shade trees and coniferous trees. The trees shall be evenly distributed throughout the parking lot as both interior and perimeter landscaping to provide shade.
Finding: Complies as proposed. The landscape plan includes a mix of deciduous and coniferous trees spread throughout the parking lot, including paperbark maple, princeton sentry ginko, and edith brgue magnolia.

4. Required landscaping trees shall be of a minimum two-inch minimum caliper size (though it may not be standard for some tree types to be distinguished by caliper), planted according to American Nurseryman Standards, and selected from the Oregon City Street Tree List;
Finding: Complies with condition. The proposal induces 3" caliper princeton sentry ginko, and edith brgue magnolia, but the paperbark maple is identified as 7' in height. The applicant shall provide a revised landscaping plan demonstrating that the paperbark maple trees will be planted at a minimum of 2 inches in caliper. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

5. Landscaped areas shall include irrigation systems unless an alternate plan is submitted, and approved by the community development director, that can demonstrate adequate maintenance;
Finding: Complies as proposed. The applicant has indicated all planting areas shall be irrigated with a permanent below-ground automatic irrigation system providing 100% head-to-head spray coverage or 100% coverage with a subsurface drip irrigation system.

6. All plant materials, including trees, shrubbery and ground cover should be selected for their appropriateness to the site, drought tolerance, year-round greenery and coverage and staggered flowering periods. Species found on the Oregon City Native Plant List are strongly encouraged and species found on the Oregon City Nuisance Plant List are prohibited.
Finding: Complies as proposed. The applicant has indicated a variety of plants comprised of a mix of vertical and horizontal elements which include trees, shrubs, and groundcovers have been selected that are hardy to the Pacific Northwest and low maintenance. Plants are spaced so that 100% of the Landscape area will be covered within 3 years. The applicant has provided a landscaping plan to illustrate the distribution of onsite vegetation.

7. The landscaping in parking areas shall not obstruct lines of sight for safe traffic operation and shall comply with all requirements of Chapter 10.32, Traffic Sight Obstructions.
Finding: Complies as Proposed. A mix of shrubs and groundcovers will be selected so as to not inhibit safe traffic operation or obstruct traffic sight lines.
On May 10, 2017, the Planning division received a comment from John Replinger, the City's Traffic Engineering Consultant, who said not transportation analysis was necessary.

8. Landscaping shall incorporate design standards in accordance with Chapter 13.12, Stormwater Management.
Finding: Please refer to the analysis in Chapter 13.12 of this report.

B. Perimeter Parking Lot Landscaping and Parking Lot Entryway/Right-of-Way Screening. Parking lots shall include a five-foot wide landscaped buffer where the parking lot abuts the right-of-way and/or adjoining properties. In order to provide connectivity between non-single-family sites, the community development director may approve an interruption in the perimeter parking lot landscaping for a single driveway where the parking lot abuts property designated as multi-family, commercial or industrial. Shared driveways and parking aisles that straddle a lot line do not need to meet perimeter landscaping requirements.
1. The perimeter parking lot are[a] shall include:

a. Trees spaced a maximum of thirty-five feet apart (minimum of one tree on either side of the entryway is required). When the parking lot is adjacent to a public right-of-way, the parking lot trees shall be offset from the street trees;

Finding: Complies with condition. The landscaping plan includes perimeter parking lot landscaping between the parking lot and the right-of-way and adjoining properties. Landscape buffers along the perimeter of the parking lot areas meet or exceed the 5-foot minimum. The applicant has provided a landscaping plan denoting the types of vegetation proposed on the site. The proposed landscaping plan appears to need an additional perimeter parking lot landscaping tree north of the pedestrian accessway which crosses the drive aisle and well as an additional tree(s) on the southern portion of the perimeter parking lot landscaping at the front of the site, particularly located adjacent to the right-of-way on the southern portion of the entryway. Prior to issuance of a building permit for the site, the applicant shall provide a revised landscaping plan including an additional tree within the perimeter parking lot landscaping north of the pedestrian crossing as well as trees spaced a maximum of 35 feet apart in front of the structure on the southern portion of the perimeter parking lot landscaping (with a tree at the entryway). **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

b. Ground cover, such as wild flowers, spaced a maximum of 16-inches on center covering one hundred percent of the exposed ground within three years. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees; and

Finding: Complies with condition. The applicant has indicated a variety of plants comprised of a mix of vertical and horizontal elements which include trees, shrubs, and groundcovers have been selected that are hardy to the Pacific Northwest and low maintenance. Plants are spaced so that 100% of the Landscape area will be covered within 3 years. The applicant has provided a landscaping plan to illustrate the distribution of onsite vegetation. However, the applicant proposed mexican beach pebble in the perimeter parking lot landscaping to the south of the drive aisle leading to the apparatus bays. Prior to issuance of a permit for the site the applicant shall submit a revised landscaping plan replacing the Mexican beach pebble with landscaping in compliance with OCMC 17.52. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

c. An evergreen hedge screen of thirty to forty-two inches high or shrubs spaced no more than four feet apart on average. The hedge/shrubs shall be parallel to and not nearer than two feet from the right-of-way line. The required screening shall be designed to allow for free access to the site and sidewalk by pedestrians. Visual breaks, no more than five feet in width, shall be provided every thirty feet within evergreen hedges abutting public right-of-ways.

Finding: Complies as proposed. The landscaping plan includes shrubs in the required locations, but the plan does not identify the height of the hedge at time of planting, or that the hedge/shrubs shall be parallel to and not nearer than two feet from the right-of-way line. However, the written narrative demonstrated compliance with this standard.

C. Parking Area/Building Buffer. Parking areas shall be separated from the exterior wall of a structure, exclusive of pedestrian entranceways or loading areas, by one of the following:

1. Minimum five-foot wide landscaped planter strip (excluding areas for pedestrian connection) abutting either side of a parking lot sidewalk with:

a. Trees spaced a maximum of thirty-five feet apart;

b. Ground cover such as wild flowers, spaced a maximum of sixteen-inches on center covering one hundred percent

of the exposed ground within three years. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees; and

c. An evergreen hedge of thirty to forty-two inches or shrubs placed no more than four feet apart on average; or
2. Seven-foot sidewalks with shade trees spaced a maximum of thirty-five feet apart in three-foot by five-foot tree wells.
Finding: Please refer to the alternative landscaping section below. The applicant proposed onsite stormwater swales in the location of the parking area/building buffer. The size of the landscaping area complies with this standard but the landscaping is evaluated against the criteria in the stormwater manual.

D. Interior Parking Lot Landscaping. Surface parking lots shall have a minimum ten percent of the interior of the gross area of the parking lot devoted to landscaping to improve the water quality, reduce storm water runoff, and provide pavement shade. Interior parking lot landscaping shall not be counted toward the fifteen percent minimum total site landscaping required by Section 17.62.050(1) unless otherwise permitted by the dimensional standards of the underlying zone district. Pedestrian walkways or any impervious surface in the landscaped areas are not to be counted in the percentage. Interior parking lot landscaping shall include:
Finding: Complies as proposed. The applicant indicated that 1,013 square feet of the parking lot is landscaped, equal to 10%. Per Chapter 17.32.050.G, the interior parking lot landscaping may be counted toward the overall landscaping.

a. A minimum of one tree per six parking spaces.
Finding: Complies as Proposed. The site plan includes 22 parking stalls requiring 4 trees within the interior parking lot landscaping (22/4=3.6). The landscaping plan provided by the applicant illustrates 5 trees within the interior parking lot landscaping.

b. Ground cover, such as wild flowers, spaced a maximum of sixteen-inches on center covering one hundred percent of the exposed ground within three years. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees.
c. Shrubs spaced no more than four feet apart on average.
Finding: Please refer to the alternative landscaping section below. The applicant proposed onsite stormwater swales in the location of the interior parking lot landscaping. The within this area is evaluated against the criteria in the stormwater manual.

d. No more than eight contiguous parking spaces shall be created without providing an interior landscape strip between them. Landscape strips shall be provided between rows of parking shall be a minimum of six feet in width and a minimum of ten feet in length.
Finding: Complies as Proposed. Proposed parking spaces do not exceed more than 7 contiguous parking spaces and are provided with landscape strips 6-feet in width.

e. Pedestrian walkways shall have shade trees spaced a maximum of every thirty-five feet in a minimum three-foot by five-foot tree wells; or

> *Trees spaced every thirty-five feet, shrubs spaced no more than four feet apart on average, and ground cover covering one hundred percent of the exposed ground. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees.*

Finding: Not applicable. No pedestrian accessways are proposed in the parking lot.

E. Installation.
1. All landscaping shall be installed according to accepted planting procedures, according to American Nurseryman Standards.

2. The site, soils and proposed irrigation systems shall be appropriate for the healthy and long-term maintenance of the proposed plant species.
3. Certificates of occupancy shall not be issued unless the landscaping requirements have been met or other arrangements have been made and approved by the city, such as the posting of a surety.
Finding: Complies as Proposed. The applicant indicated that all landscaping shall be installed according to accepted planting procedures, according to American Nurseryman Standards. In addition, irrigation is proposed.

17.52.070 - Alternative landscaping plan.
Any applicant may propose an alternative landscaping plan. Such plans are often proposed to address physically constrained or smaller sites, however innovative designs for larger sites may also be considered. Alternative plans may include the use of low impact development techniques and minimized landscaping requirements. In such situations, the community development director may approve variations to the landscaping standards of section 17.52.060.
A. General Review Standard. The alternative shall be meet or exceed the intent of this chapter and shall create a safe space for automobiles and pedestrians. The alternative landscaping plan shall be prepared by a licensed landscape architect.
B. Credit for Pervious/Low Impact Development. The community development director may count up to fifty percent of the square footage of any pervious hardscaped landscape material within a parking lot that is designed and approved pursuant to the city's adopted stormwater and low impact development design standards toward minimum landscaping requirements for the site. (This includes porous pavement detention, open celled block pavers, porous asphalt, porous concrete pavement, porous turf, porous gravel, etc).
Finding: Complies as proposed. The applicant proposed onsite stormwater swales in the location of the parking area/building buffer and in the interior parking lot landscaping. The size of the landscaping area complies with this standard but the landscaping is evaluated against the criteria in the stormwater manual.

17.52.080 - Maintenance.
The owner, tenant and their agent, if any, shall be jointly and severally responsible for the maintenance of the site including but not limited to the off-street parking and loading spaces, bicycle parking and all landscaping which shall be maintained in good condition so as to present a healthy, neat and orderly appearance and shall be kept free from refuse and debris.
All plant growth in interior landscaped areas shall be controlled by pruning, trimming, or otherwise so that:
a. It will not interfere with the maintenance or repair of any public utility;
b. It will not restrict pedestrian or vehicular access; and
c. It will not constitute a traffic hazard due to reduced visibility.
Finding: Complies as Proposed. The property owner acknowledges responsibility for the maintenance of the site.

17.52.090 - Loading areas.
B. Applicability.
1. Section 17.52.090 applies to uses that are expected to have service or delivery truck visits with a forty-foot or longer wheelbase, at a frequency of one or more vehicles per week. The city engineer and decision maker shall determine through site plan and design review the number, size, and location of required loading areas, if any.
Finding: Not Applicable. No delivery services to the site are proposed.
CHAPTER 17.56 CONDITIONAL USES

17.56.010.A.1. The use is listed as a conditional use in the underlying district;

Finding: Complies as Proposed. An Emergency Service Facility (police and fire) is identified as a Conditional use in the underlying C – General Commercial District. When the fire station was built (Unknown year), the current zoning codes where not in place. The existing fire station is considered a legal non-conforming use. Therefore, the proposed demolition and fire station replacement has triggered a review of the current zoning status and compliance with the requirement for a conditional use permit, site and design review, and variance.

17.56.010.A.2 The characteristics of the site are suitable for the proposed use considering size, shape, location, topography, existence of improvements and natural features;
Finding: Complies with Conditions. The site is flat with virtually no overlays, there is a small portion of the NROD that crosses onto the site, but the portion of the site the overlay touches is on the Molalla Ave. sidewalk abutting the site. No changes have been proposed to the Molalla Ave. sidewalk.
There is a fire station currently existing on the site, however the fire station is currently unused due to an unsafe condition with the building. The existing driveway has a large curb cut leading out onto Molalla Ave. No changes have been proposed between access to the site and Molalla Ave.
Emergency Services are a Conditional Use in all zones, this site is serves an emergency services facility well by providing quick access onto an arterial street, nearby Highway 213, and convenient access to the central southeastern portion of the City. The location serves the community by providing a distributed fire department to adequately serve all areas of the community in a timely manner.
The proposed building will comply with the Oregon City Municipal Code with the conditions of approval.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

17.56.010.A.3. Development shall demonstrate compliance with Chapter 12.04, Streets, Sidewalks and Public Places;
Finding:. Please see section 12.04 for analysis.

17.56.010.A.4. The proposed use will not alter the character of the surrounding area in a manner which substantially limits, impairs or precludes the use of surrounding properties for the primary uses listed in the underlying district;.
Findings: Complies as Proposed. The proposed development will not substantially limit, impair or preclude the use of surrounding properties because the proposed fire station is a replacement of the existing fire station onsite. The proposed fire station is comparable in size, height, placement, and thus impact as the existing facility.

17.56.010.A.5. The proposal satisfies the goals and policies of the city comprehensive plan which apply to the proposed use.
Finding: Complies as Proposed. The applicable Comprehensive Plan policies are as follows:

> ***Goal 1.1 Citizen Involvement Program*** *Implement a Citizen Involvement Program that will provide an active and systematic process for citizen participation in all phases of the land-use decision making process to enable citizens to consider and act upon a broad range of issues affecting the livability, community sustainability, and quality of neighborhoods and the community as a whole.*
> ***Policy 1.1.1 -*** *Utilize neighborhood associations as the vehicle for neighborhood-based input to meet the requirements of the Land Conservation and Development Commission (LCDC) Statewide Planning Goal 1, Citizen Involvement. The Citizen Involvement Committee (CIC) shall serve as the officially recognized citizen committee needed to meet LCDC Statewide Planning Goal 1.*
> *Policy 1.2.1 - Encourage citizens to participate in appropriate government functions and land-use planning.*

Policy 1.4.1 - *Notify citizens about community involvement opportunities when they occur.*
Finding: Complies as proposed. The applicant met with the neighborhood association prior to submittal of a complete application. Furthermore, the application was posted on the City's website, posted in a local newspaper and signs were posted on the subject site informing the public. In addition, notice of the proposal was mailed to all property owners within 300 feet of the site and emailed to a variety of agencies, as well as each Citizen Involvement Committee member and each neighborhood association chair. Each of the notifications informed the public of the proposal and invited applicants to comment on the proposal. Lastly, the agenda for each Planning Commission hearing is posted at a variety of City facilities and emailed to the public.

Goal 2.4 *Neighborhood Livability - Provide a sense of place and identity for residents and visitors by protecting and maintaining neighborhoods as the basic unit of community life in Oregon City while implementing the goals and policies of the other sections of the Comprehensive Plan.*
Finding: Complies as proposed. The proposal replaces an existing fire station with a new station of comparable size. The location of the fire station supports sufficient fire department services throughout the City and adjacent county. The fire station supports the community with public restrooms.

Policy 2.4.2 *Strive to establish facilities and land uses in every neighborhood that help give vibrancy, a sense of place, and a feeling of uniqueness; such as activity centers and points of interest.*
Finding: Complies as proposed. The proposed fire station provides a location to serve all members of the public. The glass doors on the fire station provide an opportunity for the public to look into the station and see the fire engines, thus contributing to the uniqueness of the neighborhood.

Goal 6.3 *Nightlighting Protect the night skies above Oregon City and facilities that utilize the night sky, such as the Haggart Astronomical Observatory, while providing for nightlighting at appropriate levels to ensure safety for residents, businesses, and users of transportation facilities, to reduce light trespass onto neighboring properties, to conserve energy, and to reduce light pollution via use of night-friendly lighting.*
Policy 6.3.1 - *Minimize light pollution and reduce glare from reaching the sky and trespassing onto adjacent properties.*
Finding: Complies as proposed. The development submitted a photometric plan which demonstrated that no more than 0.5 foot-candles would be cast on adjacent properties.

Policy 6.3.2 *-Encourage new developments to provide even and energy-efficient lighting that ensures safety and discourages vandalism. Encourage existing developments to retrofit when feasible.*
Finding: Complies as proposed. The applicant proposed LED lighting.

Goal 6.4 Noise- *Prevent excessive noise that may jeopardize the health, welfare, and safety of the citizens or degrade the quality of life.*
Policy 6.4.1- Provide *for noise abatement features such as sound-walls, soil berms, vegetation, and setbacks, to buffer neighborhoods from vehicular noise and industrial uses.*
Finding: Complies as proposed. As the proposed fire station is replacing an existing station in the same location, the noise would not be increased with the development.

Policy 11.1.4 - *Support development on underdeveloped or vacant buildable land within the city where public facilities and services are available or can be provided and where land-use compatibility can be found relative to the environment, zoning, and Comprehensive Plan goals.*
Finding: Complies as proposed. The fire station is proposed to be located on a major arterial street to provide optimal access to serve the public.

Policy 11.4.3 - *Ensure parking lot designs that mitigate stormwater impacts. Take measures to reduce waterflow and increase water absorption through the use of bioswales, vegetated landscaped islands with curb cuts to allow water inflow, and tree planting.*
Policy 11.4.5 *- Design stormwater facilities to discharge surfacewater at pre-development rates and enhance stormwater quality in accordance with criteria in City of Oregon City Public Works Stormwater and Grading Design Standards.*
Finding: Complies as proposed. The proposal includes installation of multiple stormwater facilities throughout the site.

Goal 14.2 *Orderly Redevelopment of Existing City Areas- Reduce the need to develop land within the Urban Growth Boundary by encouraging redevelopment of underdeveloped or blighted areas within the existing city limits.*
Finding: Complies as proposed. The applicant is proposing to redevelopment of an existing site within the urban growth boundary and on a major roadway within the City.

Policy 14.2.1 *- Maximize public investment in existing public facilities and services by encouraging redevelopment as appropriate.*
Finding: Complies as proposed. The applicant is proposing to redevelopment of an existing site within the urban growth boundary and on a major roadway within the City.

Policy 14.2.2 *- Encourage redevelopment of city areas currently served by public facilities through regulatory and financial incentives.*
Finding: Complies as proposed. The applicant is proposing to redevelopment of an existing site served by public facilities. The proposed redevelopment is requesting variances to better accommodate the building on the site in relationship to how the site is going to be used.

Policy 14.3.1 - *Maximize new public facilities and services by encouraging new development within the Urban Growth Boundary at maximum densities allowed by the Comprehensive Plan.*
Finding: Complies as proposed. The applicant is proposing to redevelopment of an existing site served by public facilities.

17.56.010.B. Permits for conditional uses shall stipulate restrictions or conditions which may include, but are not limited to, a definite time limit to meet such conditions, provisions for a front, side or rear yard greater than the minimum dimensional standards of the zoning ordinance, suitable landscaping, off-street parking, and any other reasonable restriction, condition or safeguard that would uphold the spirit and intent of the zoning ordinance, and mitigate adverse effect upon the neighborhood properties by reason of the use, extension, construction or alteration allowed as set forth in the findings of the planning commission.
Finding: Complies with Conditions. Staff recommends conditions of approval described in this report.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

17.56.010.C. Any conditional use shall meet the dimensional standards of the zone in which it is to be located pursuant to subsection B of this section unless otherwise indicated, as well as the minimum conditions listed below.
Finding: Please refer to the analyses within this report.

17.56.010.D. In the case of a use existing prior to the effective date of the ordinance codified in this title and classified in this title as a conditional use, any change of use, expansion of lot area or expansion of structure shall conform with the requirements for conditional use.
Finding: Complies as proposed. The fire station on this parcel was establish prior to the current zoning code and a Conditional Use was not previously identified for the site. The applicant submitted this conditional use application..

17.56.010.E. The planning commission may specifically permit, upon approval of a conditional use, further expansion to a specified maximum designated by the planning commission without the need to return for additional review.
Finding: Not applicable. Clackamas Fire District #1 has not identified future expansion of the proposed fire station.

17.56.020 - Permit—Application.
A. A property owner or authorized agent shall initiate a request for a conditional use by filing an application with the city recorder. The applicant shall submit a site plan, drawn to scale, showing the dimensions and arrangement of the proposed development. The application shall be accompanied by the filing fee listed in Section 17.50.[0]80 to defray the costs of publication, investigation and processing.
Finding: Complies as Proposed. Clackamas Fire District #1 is initiated the request for a conditional use by filing the appropriate land use application, including site plan and filing fees.

B. Before the planning commission may act on a conditional use application, it shall hold a public hearing thereon, following procedure as established in Chapter 17.50.
Finding: Complies as Proposed. The application is being processed as a Type III land use review process, including public notices, and a public hearing before the Oregon City Planning Commission.

17.56.025 - Minor modifications to legal conditional uses.
Minor modifications to an approved conditional use permit may be permitted. If permitted, the modification shall be reviewed as a minor site plan and design review. A minor modification to an approved conditional use permit is considered one of the following:
Finding: Not Applicable. No major modification to a conditional use is proposed.

17.56.040.A. *Building Openings. The city may limit or prohibit building openings within fifty feet of residential property in a residential zone if the openings will cause glare, excessive noise or excessive traffic which would adversely affect adjacent residential property as set forth in the findings of the planning commission.*
Finding: Not Applicable. The site is not within 50 feet of a residential zone. The site is adjacent to the General Commercial and General Industrial Districts.

17.56.040.B Additional Street Right-of-Way. The dedication of additional right-of-way may be required where the city plan indicates need for increased width and where the street is inadequate for its use; or where the nature of the proposed development warrants increased street width.
Finding: Please refer to the analysis in 12.04 of this report.

17.56.040.C Public Utility or Communication Facility. Such facilities as a utility substation, water storage tank, radio or television transmitter, tower, tank, power transformer, pumping station and similar structures shall be located, designed and installed with suitable regard for aesthetic values. The base of these facilities shall not be located closer to the property line than a distance equal to the height of the structure. Hydroelectric generation facilities shall not exceed ninety megawatts of generation capacity.
Finding: Not Applicable. No such facilities are proposed or required with this development application.

17.56.040.D Schools. The site must be located to best serve the intended area, must be in conformance with the city plan, must have adequate access, and must be in accordance with appropriate State standards.
Finding: Not Applicable. The applicant has not proposed a school use.

17.56.040.E Helipad Landing Facility. In evaluating a conditional use application for a helipad, the planning commission shall consider such matters as the following:
Finding: Not Applicable. The applicant has not proposed a helicopter landing facility with this development.

17.56.040.F Residential Care Facilities.
1. In addition to the general provisions of Section 17.56.020, any application shall include a description of the proposed use, including the number of residents and the nature of the condition or circumstances for which care, or a planned treatment or training program will be provided, the number of staff and the estimated length of stay per resident and the name of the agency responsible for regulating or sponsoring the use.
Finding: Not Applicable. The applicant has not proposed a resident care facility.

17.56.040.G Bed and Breakfast Inns.
Finding: Not Applicable. The proposed use if for an Emergency Service Facility

17.56.060 Revocation of conditional use permits.
The Planning Commission or the City Commission may initiate administrative action under Chapter 17.50 to revoke any conditional use permit previously issued by the city or, with regard to lands annexed by the city, those such permits issued by the county. The Planning Commission or, on review, the City Commission, may revoke such permit upon determining:
A. One or more conditions attached to the grant of the conditional use permit have not been fulfilled; and
Finding: Not Applicable. The applicant has applied for a new Conditional Use permit. An existing Conditional Use could not be identified.

B. The unfulfilled condition is substantially related to the issuance of the conditional use permit.
Finding: Not Applicable. The applicant has applied for a new Conditional Use permit.

17.56.070 Periodic review of conditional use permits.
A. The City Commission may provide for the periodic review of some or all of the conditional use permits previously issued by the city, or, with regard to lands annexed by the city, those such permits issued by the county. In providing for such review, the City Commission may designate classes of such previously issued permits for which periodic review shall be undertaken.
B. Such review shall be accomplished as an administrative action under Chapter 17.50 and shall be limited to the question of whether additional conditions should be imposed on a conditional use in the light of changing circumstances and more efficient implementation of the city's comprehensive plan.

C. Notwithstanding the provisions of Chapter 17.58, any additional conditions shall be met as a requirement for continued operation of the conditional use.

Finding: Not applicable. This is a new application for conditional use approval and the applicant has indicated they recognize any conditions that may be placed on the proposed development through the review process.

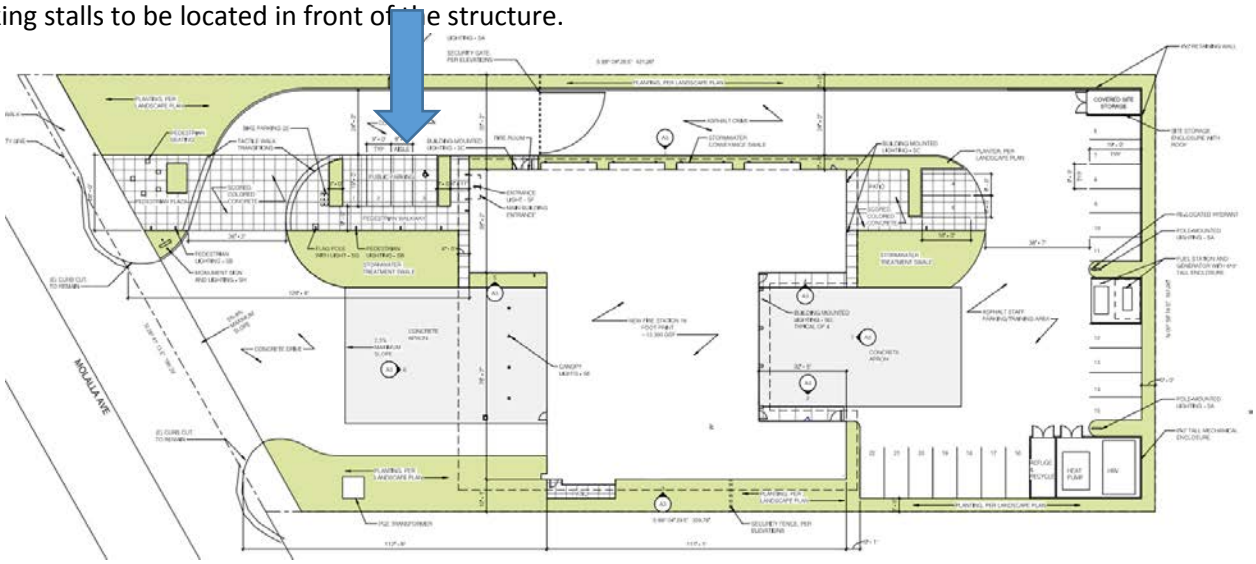
CHAPTER 17.60 - VARIANCE

17.60.030 – Variance - Grounds.

The applicant has submitted the following request for variances:

Variance related to Site Design/Configuration.

Variance to allow the building to be setback from the Molalla Avenue frontage, and allowance of three (3) parking stalls to be located in front of the structure.



Variances to the following criteria are proposed:

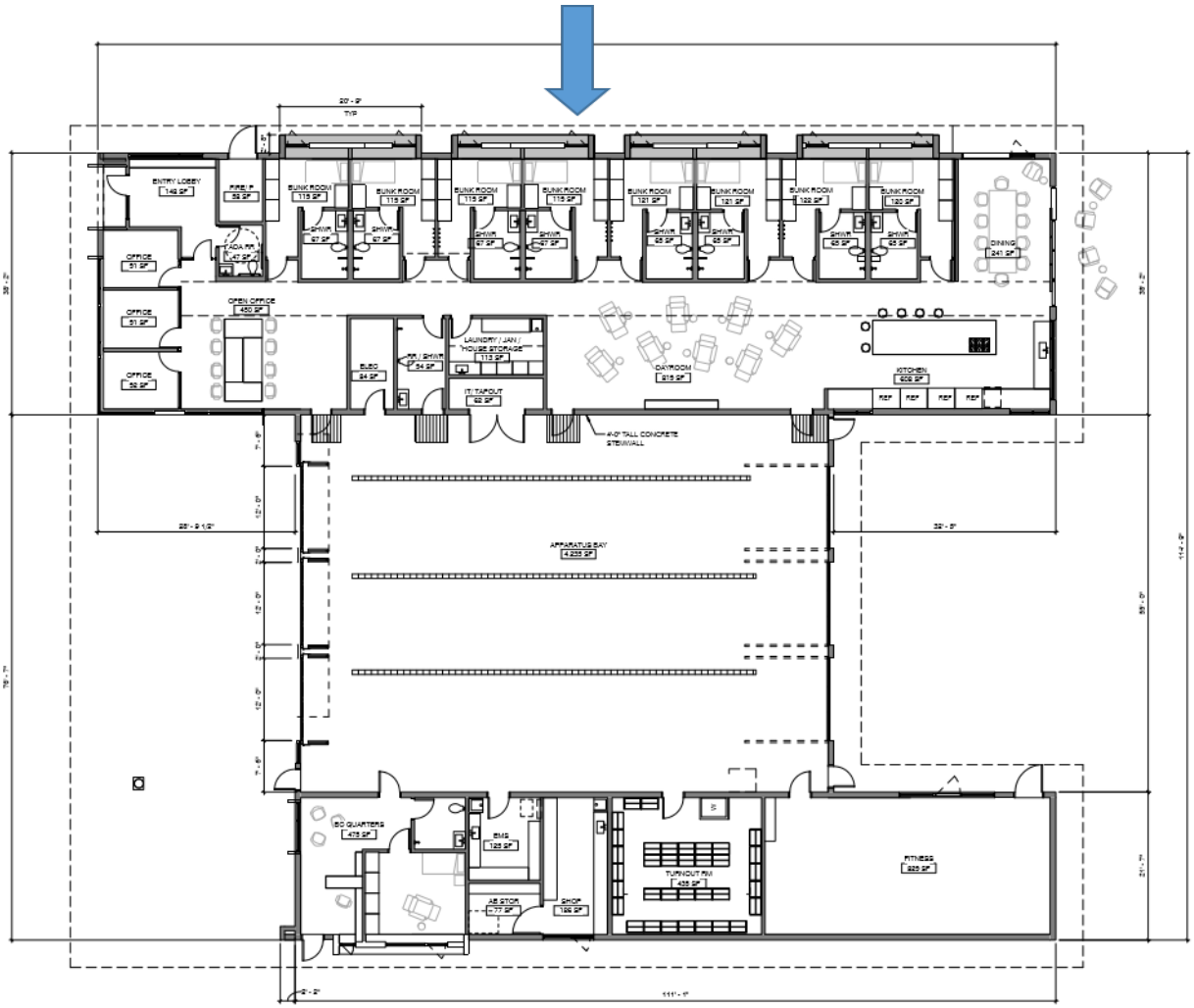
- OCMC 17.62.050.A.2.a. Parking areas shall be located behind buildings, below buildings, or on one or both sides of buildings.
- OCMC 17.62.050.A.9. A well-marked, continuous and protected on-site pedestrian circulation system meeting the following standards shall be provided:
  a. Pathways between all building entrances and the street are required. Pathways between the street and buildings fronting on the street shall be direct. Exceptions may be allowed by the director where steep slopes or protected natural resources prevent a direct connection or where an indirect route would enhance the design and/or use of a common open space.
- OCMC 17.62.055.C.5. On sites with one hundred feet or more of frontage at least sixty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line, unless a greater setback is accepted under the provisions of Section 17.62.055D. For sites with less than one hundred feet of street frontage, at least fifty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line unless a greater setback is accepted under the provisions of Section 17.62.055D.
- OCMC 17.62.055.D.1. Buildings shall be placed no farther than five feet from the front property line. A larger front yard setback may be approved through site plan and design review if the setback area incorporates at least one element from the following list for every five feet of increased setback requested:

a. Tables, benches or other approved seating area.
b. Cobbled, patterned or paved stone or enhanced concrete.
c. Pedestrian scale lighting.
d. Sculpture/public art.
e. Fountains/Water feature.
f. At least twenty square feet of landscaping or planter boxes for each tenant facade fronting on the activity area.
g. Outdoor café.
h. Enhanced landscaping or additional landscaping.
i. Other elements, as approved by the community development director, that can meet the intent of this section.

- OCMC 17.62.055.D.3. …The primary entranceway for each commercial or retail establishment shall face the major street. The entrance may be recessed behind the property line a maximum of five feet unless a larger setback is approved pursuant to Section 17.62.055.D.1 and shall be accessed from a public sidewalk….

Variance related to Building Design.

Variance to allow an alternative façade articulation on the north facade.



Variances to the following criteria are proposed:

- OCMC 17.62.055.G.2. Horizontal masses shall not exceed a height: width ratio of one-to-three without substantial variation in massing that includes a change in height and projecting or recessed elements. – North façade
  The proposed design does not include a substantial variation in massing.
- OCMC 17.62.055.H.2. Facades greater than one hundred feet in length, measured horizontally, shall incorporate wall plane projections or recesses having a depth of at least three percent of the length of the facade and extending at least twenty percent of the length of the facade. No uninterrupted length of any facade shall exceed one hundred horizontal feet. – North facade
  The building length along the north facade of the proposed fire station is 140 feet, requiring 4.2' of recess/projection (140*0.03=4.2) for a length of 28' (140*0.2=28). The applicant is requesting a variance to the 3% depth of the required projections.
- OCMC 17.62.050.A.21.c.2. Metal siding. Metal siding shall have visible corner moldings and trim and incorporate masonry or other similar durable/permanent material near the ground level (first two feet above ground level).
  The proposed fire station has been designed with metal siding in a vertical orientation and will have standard trim and moldings. The metal siding will have a highly durable prefinished color. The applicant indicated that base of the metal siding will be set-up off the adjacent grade a minimum of 6-inches with the foundation wall acting as a durable material adjacent to landscape and pedestrian hardscape surfaces.

Variances - Grounds
17.60.030. A variance may be granted only in the event that all of the following conditions exist:
A. That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title;
Finding: Complies as proposed. The requested site variances will not impact adjacent properties by reducing light, air, safe access or other desirable or necessary qualities. The current and propose use of the site will remain an emergency use service (Fire Station). Each of the proposed site elements incorporated into the site provide the desirable and necessary qualities promoting design and neighborhood livability. Additionally there are no surround residential uses that will be adversely impact due to the reconstruction of the site.

Variance related to Site Design/Configuration.
The existing structure is proposed in approximately the same location as the existing structure, setback from the Molalla Avenue right-of-way. The configuration allows safe operational requirements of the 24-hour emergency response to remain intact and provide both efficient and safe vehicular site circulation. The adjoining properties would have no increase in reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title.

Variance related to Building Design.
The lack of modulation on the northern façade of the structure will not negatively affect the adjoining post office, as the façade is setback from the property line by two landscaping strips, a drive aisle, and a fence. In addition, the subject site is lower in elevation.

The lack of stone at the base of the proposed building material will also not cause harm, as the structure is proposed in the middle of the property and the base of the structure is visually blocked by landscaping. Additionally the metal will be finished and there will not be any unfinished highly reflective surfaces. One of the reason the Clackamas Fire Department is looking to construct a new building is because the previous building was contaminated by mold.

The newly proposed building materials will be more resistant to environmental factors, as well as, be able to withstand the day to day use of the Fire Department.

B. That the request is the minimum variance that would alleviate the hardship;
Finding: Complies as Proposed.

Variance related to Site Design/Configuration.
The variance request to the building setback distance and public parking location is the minimum variance feasible to maintain current emergency operational requirements. Placing the building at the specified 5' setback distance would cause the fire station to be removed from its current location and greatly impact life safety operational requirements for fire apparatus to safely and efficiently travel to a scene of an emergency. While locating the public parking to the rear of the building would jeopardize the security and safety of the fire fighters. Additionally locating the primary building further back on the parcel would allow the fire apparatus more time to assess the road condition prior to leaving the site. The applicant has proposed to install a large public walkway to and from the building and incorporate benches in the public walking area.

The off-street parking area for the public is proposed to be in front of the building. The parking area will accommodate (3) parking spaces, which includes an accessible parking space. The off-street parking area for the staff will be located behind the building. Onsite circulation keeps the emergency response vehicular traffic separate from the public vehicular traffic as much as possible to ensure safe site circulation and secured staff parking and training area. Locating the public parking area to behind the fire station would greatly burden the safety and security of the firefighters. The proposed site plan is designed to provide a safe environment for access to and from the public way for pedestrians and automobiles, while offering appropriate opportunities for privacy and security transitions from public to private spaces/areas. The parking area in front of the building is designed to blend into the public plaza walk as much as possible.

The subject property frontage is approximately 186 feet in length and runs north-south at an obtuse angle from the south property line. The proposed building is oriented perpendicular to the street lot line, thus creating varying setback distances from 112', 126', and 148' along the street frontage. The proposed building front facing facade is 114'-7" wide. The south end (apparatus bay), 67% of this facade is setback between 112' and 126' from the front property, matching the existing fire station setback distance. The north end (Public Entry) of this facade is setback is setback between 126' and 148' from the front property line. In comparison, the existing fire station north end is setback between 147'-0" and 164'-0", thus moving the building closer to the street frontage by an average of 18'-0".

Due to existing site configuration and operational requirements of the 24-hour emergency response, the proposed fire station is set as close as possible to the front property line to maintain operational and emergency response requirements. Each of the fire apparatus vehicles need to be able to utilize the full maneuvering area between the apparatus bay exterior wall and the street to; 1) traverse in a safe and responsive way for emergency responses; 2) Response and turn-out times require fire apparatus vehicles, including a 65-foot ladder truck to fully exit the apparatus bay, stop and then exit out onto Molalla Avenue; 3) The maximum slope the apron can be in in front of the apparatus bay for fire apparatus vehicle maneuvering is 2.5%.

According to the applicant, placing the fire station any closer to the front property line, would greatly jeopardize maneuverability, emergency responses, and generate extensive site grade cuts creating an expenditure that is cost prohibitive.

Variance related to Building Design.
The second variance is requesting a variance to the overall building design of proposed fire station. Those design variances include:
A change to the façade articulation along the north façade.
The portion of the building will have limited visibility from the public right of way. The applicant has proposed a gate that would limit access into the portion of the site where the proposed articulation has been designed. The only time the public will be able to see this portion of the building would be while the gate is open for the fire apparatus vehicle.

The applicant has used windows to break up the massing of the façade and applied for a Variance for the substantial variation on the northern portion of the building. Adjacent to the north facade is an on-site storm treatment/retention swale (which is the required landscaping buffer between the building and the drive aisle) and the main internal driveway aisle used by the fire apparatus and staff vehicles. To minimize the impact the projections would have on the storm treatment/retention swale and driveway aisle, the proposed projection depths are set at a depth of 2'-8". The total length of the proposed projections exceeds the minimum by 40% (83'-0") and have been placed to coincide with the interior bunk rooms.

The proposed fire station has been designed with metal siding in a vertical orientation and will have standard trim and moldings. The metal siding will have a highly durable prefinished color. The applicant indicated that base of the metal siding will be set-up off the adjacent grade a minimum of 6-inches with the foundation wall acting as a durable material adjacent to landscape and pedestrian hardscape surfaces.
The lack of stone at the base of the proposed building material will also not cause harm, as the structure is proposed in the middle of the property and the base of the structure is visually blocked by landscaping. Additionally the metal will be finished and there will not be any unfinished highly reflective surfaces. One of the reason the Clackamas Fire Department is looking to construct a new building is because the previous building was contaminated by mold. The newly proposed building materials will be more resistant to environmental factors, as well as, be able to withstand the day to day use of the Fire Department.

C. Granting the variance will equal or exceed the purpose of the regulation to be modified.
Finding: Complies as Proposed.

Variance related to Site Design/Configuration.
The applicant has indicated the purpose of the 5-foot setback maximum and off-street parking placement is to ensure that building placement supports convenient and safe pedestrian access from public streets, and promotes architectural interest and human scale to the street facing facade. As noted above, the proposed site plan configuration is designed to maintain current operational requirements of the 24-hour emergency response while also upholding the utmost safe environment for access to and from the public way for pedestrians and automobiles, while offering appropriate opportunities for privacy and security transitions from public to private spaces/areas. Both the public parking area, pedestrian amenities, and landscape enhancements are meeting the intent of the ordinance.

Additionally, the applicant has demonstrated they are willing to install oversized pedestrian connectivity to compensate for the inconsistency in the design. The increased setback will allow for more fire apparatus maneuverability when responding to an emergency. Granting the variance will allow the proposed development to be rebuilt approximately where the existing building stands today. In replacing the building in its approximate location will not further remove the context of the newly proposed building from the rest of the neighborhood. Directly to the north of the site is the USPS facility, which is approximately 100 feet from the Molalla Ave. right of way at the buildings closest point and approximately 180 feet away from the Molalla Ave. right of way at the furthest point.
The applicant has proposed some variation in the walk, but not as much as the code requires.

Variance related to Building Design.
The second variance is requesting a variance to the overall building design of proposed fire station. Those design variances include:
A change to the façade articulation along the north façade.
The portion of the building will have limited visibility from the public right of way. The applicant has proposed a gate that would limit access into the portion of the site where the proposed articulation has been designed. The only time the public will be able to see this portion of the building would be while the gate is open for the fire apparatus vehicle.

The applicant has used windows to break up the massing of the façade and applied for a Variance for the substantial variation on the northern portion of the building. Adjacent to the north facade is an on-site storm treatment/retention swale (which is the required landscaping buffer between the building and the drive aisle) and the main internal driveway aisle used by the fire apparatus and staff vehicles. To minimize the impact the projections would have on the storm treatment/retention swale and driveway aisle, the proposed projection depths are set at a depth of 2'-8". The total length of the proposed projections exceeds the minimum by 40% (83'-0") and have been placed to coincide with the interior bunk rooms.

D. Any impacts resulting from the adjustment are mitigated.
Complies as proposed.

Variance related to Site Design/Configuration.
The first variance the applicant has requested is a variance to place parking in front of the newly proposed building and requesting to located the building approximately 126 feet, at the furthest point, from the Molalla Ave. right of way. The applicant has requested to place the parking and setback in this configuration to better accommodate for the general function of a fire station. Placing the parking in the area proposed removes and public vehicles from the direct path of any fire apparatus crossing, while giving the public the best available access to the building.
Maintaining the setback allows be fire apparatus maneuverability on the site, as well as, better access timing to Molalla Ave.
The applicant has listed a variety of items they would like to place on the site to mitigate for the parking and setback situation. Those items include:

- Tables, benches or other approved seating area:
  (5) colored precast concrete seats will be provided in the pedestrian plaza area adjacent to the public sidewalk along Molalla Avenue.
- Cobbled, patterned or paved stone or enhanced concrete:
  Scored, colored concrete at the pedestrian circulation system/plaza will be utilized to enhance the concrete surface of the pedestrian circulation system/plaza.
- Pedestrian scale lighting:

The use of pedestrian scale lighting (bollards) along the pedestrian circulation system and plaza will be utilized to enhance the pedestrian experience and safety of the site.

- At least twenty square feet of landscaping or planter boxes for each tenant facade fronting on the activity area.
  Approximately 3,625 square feet of landscaped area between the building facade and the front property line is proposed.
- Enhanced landscaping or additional landscaping.
  The landscape plan has been designed to maximize the visual interest, create a lively atmosphere, while also maintaining operational functions for the fire station emergency services. The landscape design proposed exceeds the minimum site landscape area requirements by 3% (2,006 sf) and the minimum tree planting requirements by 2 (Minimum required = 24, Proposed = 26). The overall design is to not just meet minimum standards but to create a nice landscape for the proposed fire station and along Molalla Avenue.
  There will also be a tree and shrubs in-between the parking spaces and the Molalla Ave. right of way to help mitigate for any visual impact of the vehicles in front of the proposed building.
- Additional elements incorporated into the design.
  - Art: The fire district will procure a piece of public art to be incorporated into the pedestrian plaza area, adjacent or near the seating area. Size and type is unknown at this time.
  - Reader Board: A reader board providing community and emergency service information will be incorporated into the monument sign.

Variance related to Building Design.

The second variance is requesting a variance to the overall building design of proposed fire station. Those design variances include:
A change to the façade articulation along the north façade.
The portion of the building will have limited visibility from the public right of way. The applicant has proposed a gate that would limit access into the portion of the site where the proposed articulation has been designed. The only time the public will be able to see this portion of the building would be while the gate is open for the fire apparatus vehicle.

The applicant has used windows to break up the massing of the façade and applied for a Variance for the substantial variation on the northern portion of the building. Adjacent to the north facade is an on-site storm treatment/retention swale (which is the required landscaping buffer between the building and the drive aisle) and the main internal driveway aisle used by the fire apparatus and staff vehicles. To minimize the impact the projections would have on the storm treatment/retention swale and driveway aisle, the proposed projection depths are set at a depth of 2'-8". The total length of the proposed projections exceeds the minimum by 40% (83'-0") and have been placed to coincide with the interior bunk rooms.
The portion of the building where the widow articulation will occur is going to be screened by a fence limiting accessibility to the site, only fire department personnel will be allowed to access this portion of the site. Neither the side of the building or the windows will be visible from the Molalla Ave. right of way.

The lack of stone at the base of the proposed building material will also not cause harm, as the structure is proposed in the middle of the property and the base of the structure is visually blocked by landscaping. Additionally the metal will be finished and there will not be any unfinished highly reflective surfaces. One of the reason the Clackamas Fire Department is looking to construct a new building is because the previous building was contaminated by mold.

The newly proposed building materials will be more resistant to environmental factors, as well as, be able to withstand the day to day use of the Fire Department.

E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance.

Finding: Complies as Proposed. Variance related to Site Design/Configuration.
The design removes and vehicles directly leaving the building on to Molalla Ave., giving drivers more time to access traffic and for pedestrians and vehicles to react to and emergency vehicle. Only three public parking spaces will be located in front of the building and the applicant has proposed mitigation measure for the requesting parking configuration.
Overall, the site layout best conforms to the fire apparatus vehicles as far as providing adequate access and maneuverability. Any other configurations to the site do not appear to be as practical as the one proposed once and emergency response is added to the equation.

Variance related to Building Design.
The window articulation will be screened by a gate limiting access to site, this portion of the site will only be accessible to fire station employees. The reason for the request is so the design can adequately maintain a swale and a safe lane for the fire apparatus vehicle to travel to and from the fire station.
The purpose of the proposed design is to withstand the day to day operations of the fire station as well as not have the facility be susceptible to the same environmental problems of the past. The proposed materials will be able to accomplish the practical approach the applicant has put forth.

F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.
Finding: Complies as Proposed. The proposed Fire Station conforms to the Comprehensive Plan finding listed earlier in the staff report.

Variance related to Site Design/Configuration.
Goal 2.4 *Neighborhood Livability - Provide a sense of place and identity for residents and visitors by protecting and maintaining neighborhoods as the basic unit of community life in Oregon City while implementing the goals and policies of the other sections of the Comprehensive Plan.*
Finding: Complies as proposed. The proposal replaces an existing fire station with a new station of comparable size. The location of the fire station supports sufficient fire department services throughout the City and adjacent county. The fire station supports the community with public restrooms.
Policy 2.4.2 *Strive to establish facilities and land uses in every neighborhood that help give vibrancy, a sense of place, and a feeling of uniqueness; such as activity centers and points of interest.*
Finding: Complies as proposed. The proposed fire station provides a location to serve all members of the public. The glass doors on the fire station provide an opportunity for the public to look into the station and see the fire engines, thus contributing to the uniqueness of the neighborhood.
Policy 11.1.4 - *Support development on underdeveloped or vacant buildable land within the city where public facilities and services are available or can be provided and where land-use compatibility can be found relative to the environment, zoning, and Comprehensive Plan goals.*
Finding: Complies as proposed. The fire station is proposed to be located on a major arterial street to provide optimal access to serve the public.

Policy 11.4.3 - *Ensure parking lot designs that mitigate stormwater impacts. Take measures to reduce waterflow and increase water absorption through the use of bioswales, vegetated landscaped islands with curb cuts to allow water inflow, and tree planting.*
Policy 11.4.5 *- Design stormwater facilities to discharge surfacewater at pre-development rates and enhance stormwater quality in accordance with criteria in City of Oregon City Public Works Stormwater and Grading Design Standards.*
Finding: Complies as proposed. The proposal includes installation of multiple stormwater facilities throughout the site.

Variance related to Building Design.
Policy 14.2.1 *- Maximize public investment in existing public facilities and services by encouraging redevelopment as appropriate.*
Finding: Complies as proposed. The applicant is proposing to redevelopment of an existing site within the urban growth boundary and on a major roadway within the City.
Policy 14.2.2 *- Encourage redevelopment of city areas currently served by public facilities through regulatory and financial incentives.*
Finding: Complies as proposed. The applicant is proposing to redevelopment of an existing site served by public facilities. The proposed redevelopment is requesting variances to better accommodate the building on the site in relationship to how the site is going to be used.

CHAPTER 12.04 - STREETS SIDEWALKS AND PUBLIC PLACES

12.04.003 - Applicability.
A. Compliance with this chapter is required for all land divisions, site plan and design review, master plan, detailed development plan and conditional use applications and all public improvements.
B. Compliance with this chapter is also required for new construction or additions which exceed fifty percent of the existing square footage, of all single and two-family dwellings. All applicable single and two-family dwellings shall provide any necessary dedications, easements or agreements as identified in the transportation system plan and this chapter. In addition, the frontage of the site shall comply with the following prioritized standards identified in this chapter:
1. Improve street pavement, construct curbs, gutters, sidewalks and planter strips; and
2. Plant street trees.
The cost of compliance with the standards identified in 12.04.003.B.1 and 12.04.003.B.2 is limited to ten percent of the total construction costs. The value of the alterations and improvements as determined by the community development director is based on the entire project and not individual building permits. It is the responsibility of the applicant to submit to the community development director the value of the required improvements. Additional costs may be required to comply with other applicable requirements associated with the proposal such as access or landscaping requirements.
Finding: Applicable. The proposed development requires a site plan and design review.

12.04.005 - Jurisdiction and management of the public rights-of-way.
A. The city has jurisdiction and exercises regulatory management over all public rights-of-way within the city under authority of the City Charter and state law by issuing separate public works right-of-way permits or permits as part of issued public infrastructure construction plans. No work in the public right-of-way shall be done without the proper permit. Some public rights-of-way within the city are regulated by the State of Oregon Department of Transportation (ODOT) or Clackamas County and as such, any work in these streets shall conform to their respective permitting requirements.

B. Public rights-of-way include, but are not limited to, streets, roads, highways, bridges, alleys, sidewalks, trails, paths, public easements and all other public ways or areas, including the subsurface under and air space over these areas.
C. The city has jurisdiction and exercises regulatory management over each public right-of-way whether the city has a fee, easement, or other legal interest in the right-of-way. The city has jurisdiction and regulatory management of each right-of-way whether the legal interest in the right-of-way was obtained by grant, dedication, prescription, reservation, condemnation, annexation, foreclosure or other means.
D. No person may occupy or encroach on a public right-of-way without the permission of the city. The city grants permission to use rights-of-way by franchises, licenses and permits.
E. The exercise of jurisdiction and regulatory management of a public right-of-way by the city is not official acceptance of the right-of-way, and does not obligate the city to maintain or repair any part of the right-of-way.
Finding: Complies as proposed. The application is being reviewed by the appropriate jurisdictions.

12.04.007 - Modifications.
The review body may consider modification of this standard resulting from constitutional limitations restricting the city's ability to require the dedication of property or for any other reason, based upon the criteria listed below and other criteria identified in the standard to be modified. All modifications shall be processed through a Type II Land Use application and may require additional evidence from a transportation engineer or others to verify compliance. Compliance with the following criteria is required:
A. The modification meets the intent of the standard;
Finding. Complies as Proposed. No modifications to the site have been proposed.

B. The modification provides safe and efficient movement of pedestrians, motor vehicles, bicyclists and freight;
Finding. Complies as Proposed. No modifications to the site have been proposed.
The site will have improved traffic signals to sufficiently warn passing traffic and pedestrians of a fire apparatus vehicles leaving the site. There is a proposed plaza on the site which will also give pedestrians a place to move and stand safely when a fire apparatus is leaving the property.

C. The modification is consistent with an adopted plan; and
Finding. Complies as Proposed. No modifications to the site have been proposed.

D. The modification is complementary with a surrounding street design; or, in the alternative;
Finding. Complies as Proposed. The site already contains frontage improvements and no frontage along Molalla Ave. will be altered as a result of this project.

E. If a modification is requested for constitutional reasons, the applicant shall demonstrate the constitutional provision or provisions to be avoided by the modification and propose a modification that complies with the state or federal constitution. The city shall be under no obligation to grant a modification in excess of that which is necessary to meet its constitutional obligations.
Finding: Complies as proposed. The subject property is served by one access driveway off Molalla Avenue with a width that is approximately 80-feet. The applicant proposes to maintain the driveway's location and width the same, arguing that it is extremely important to have the most unobstructed, safe, and efficient route of travel for the fire apparatus vehicles to ingress and egress the site.
The City will grant the above proposed modification.

12.04.010 - Construction specifications—Improved streets.
All sidewalks hereafter constructed in the city on improved streets shall be constructed to city standards and widths required in the Oregon City Transportation System Plan. The curb shall be constructed at the

same time as the construction of the sidewalk and shall be located as provided in the ordinance authorizing the improvement of said street next proceeding unless otherwise ordered by the city commission. Both sidewalks and curbs are to be constructed according to plans and specifications provided by the city engineer.
Finding: Complies with condition. Although Molalla Avenue is fully improved and no improvements are proposed. The existing pedestrian path across the driveway and the pedestrian ramps on each side shall meet ADA requirements. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

12.04.020 - Construction specifications—Unimproved streets.
Sidewalks constructed on unimproved streets shall be constructed of concrete according to lines and grades established by the city engineer and approved by the city commission. On unimproved streets curbs do not have to be constructed at the same time as the sidewalk.
Finding: Not Applicable. Molalla Avenue is fully improved.

12.04.025 - Street design—Driveway curb cuts.
A. One driveway shall be allowed per frontage. In no case shall more than two driveways be allowed on any single or two-family residential property with multiple frontages.
B. With the exception of the limitations identified in 12.04.025.C, all driveway curb cuts shall be limited to the following dimensions.

Property Use	*Minimum Driveway Width at sidewalk or property line*	*Maximum Driveway Width at sidewalk or property line*
Single or two-family dwelling with one car garage/parking space	*10 feet*	*12 feet*
Single or two-family dwelling with two car garage/parking space	*12 feet*	*24 feet*
Single or two-family dwelling with three or more car garages/parking space	*18 feet*	*30 feet*
Nonresidential or multi-family residential driveway access	*15 feet*	*40 feet*

The driveway width abutting the street pavement may be extended three feet on either side of the driveway to accommodate turn movements. Driveways may be widened onsite in locations other than where the driveway meets sidewalk or property line (for example between the property line and the entrance to a garage).
Figure 12.04.025: Example Driveway Curb Cut
Finding: See findings from section 12.04.007 of this report.

C. The decision maker shall be authorized through a Type II process, unless another procedure applicable to the proposal applies, to minimize the number and size of curb cuts (including driveways) as far as practicable for any of the following purposes:
1. To provide adequate space for on-street parking;
2. To facilitate street tree planting requirements;
3. To assure pedestrian and vehicular safety by limiting vehicular access points; and
4. To assure that adequate sight distance requirements are met.

a. Where the decision maker determines any of these situations exist or may occur due to the approval of a proposed development for non-residential uses or attached or multi-family housing, a shared driveway shall be required and limited to twenty-four feet in width adjacent to the sidewalk or property line and may extend to a maximum of thirty feet abutting the street pavement to facilitate turning movements.
b. Where the decision maker determines any of these situations exist or may occur due to approval of a proposed development for detached housing within the "R-5" Single-Family Dwelling District or "R-3.5" Dwelling District, driveway curb cuts shall be limited to twelve feet in width adjacent to the sidewalk or property line and may extend to a maximum of eighteen feet abutting the street pavement to facilitate turning movements.
Finding: Not applicable. No new driveway curb cuts are proposed.

D. For all driveways, the following standards apply.
1. Each new or redeveloped curb cut shall have an approved concrete approach or asphalted street connection where there is no concrete curb and a minimum hard surface for at least ten feet and preferably twenty feet back into the lot as measured from the current edge of street pavement to provide for controlling gravel tracking onto the public street. The hard surface may be concrete, asphalt, or other surface approved by the city engineer.
2. Driving vehicles, trailers, boats, or other wheeled objects across a sidewalk or roadside planter strip at a location other than an approved permanent or city-approved temporary driveway approach is prohibited. Damages caused by such action shall be corrected by the adjoining property owner.
3. Placing soil, gravel, wood, or other material in the gutter or space next to the curb of a public street with the intention of using it as a permanent or temporary driveway is prohibited. Damages caused by such action shall be corrected by the adjoining property owner.
4. Any driveway built within public street or alley right-of-way shall be built and permitted per city requirements as approved by the city engineer.
Finding: Not applicable. No changes to the existing driveway are proposed or required for this project.

E. Exceptions. The public works director reserves the right to waive this standard, if it is determined through a Type II decision including written findings that it is in the best interest of the public to do so.
Finding: See findings from section 12.04.007 of this report.

12.04.030 - Maintenance and repair.
The owner of land abutting the street where a sidewalk has been constructed shall be responsible for maintaining said sidewalk and abutting curb, if any, in good repair.
Finding: Complies as proposed. The property owner will maintain the sidewalk.

12.04.031 - Liability for sidewalk injuries.
A. The owner or occupant of real property responsible for maintaining the adjacent sidewalk shall be liable to any person injured because of negligence of such owner or occupant in failing to maintain the sidewalk in good condition.
B. If the city is required to pay damages for an injury to persons or property caused by the failure of a person to perform the duty that this ordinance imposes, the person shall compensate the city for the amount of the damages paid. The city may maintain an action in a court of competent jurisdiction to enforce this section.
Finding: Not applicable. The proposal does not include a sidewalk injury.

12.04.032 - Required sidewalk repair.
A. When the public works director determines that repair of a sidewalk is necessary he or she shall issue a notice to the owner of property adjacent to the sidewalk.

B. The notice shall require the owner of the property adjacent to the defective sidewalk to complete the repair of the sidewalk within ninety days after the service of notice. The notice shall also state that if the repair is not made by the owner, the city may do the work and the cost of the work shall be assessed against the property adjacent to the sidewalk.
C. The public works director shall cause a copy of the notice to be served personally upon the owner of the property adjacent to the defective sidewalk, or the notice may be served by registered or certified mail, return receipt requested. If after diligent search the owner is not discovered, the public works director shall cause a copy of the notice to be posted in a conspicuous place on the property, and such posting shall have the same effect as service of notice by mail or by personal service upon the owner of the property.
D. The person serving the notice shall file with the city recorder a statement stating the time, place and manner of service or notice.
Finding: Complies with condition. Although Molalla Avenue is fully improved and no improvements are proposed. The existing pedestrian path across the driveway and the pedestrian ramps on each side shall meet ADA requirements. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

12.04.033 - City may do work.
If repair of the sidewalk is not completed within ninety days after the service of notice, the public works director shall carry out the needed work on the sidewalk. Upon completion of the work, the public works director shall submit an itemized statement of the cost of the work to the finance director. The city may, at its discretion, construct, repair or maintain sidewalks deemed to be in disrepair by the public works director for the health, safety and general welfare of the residents of the city.
Finding: Not applicable. The city is not proposing to do sidewalk repair with this application.

12.04.034 - Assessment of costs.
Upon receipt of the report, the finance director shall assess the cost of the sidewalk work against the property adjacent to the sidewalk. The assessment shall be a lien against the property and may be collected in the same manner as is provided for in the collection of street improvement assessment.
Finding: Not applicable. The city is not proposing to do sidewalk repair with this application.

12.04.040 - Streets—Enforcement.
Any person whose duty it is to maintain and repair any sidewalk, as provided by this chapter, and who fails to do so shall be subject to the enforcement procedures of Chapters 1.16, 1.20 and 1.24. Failure to comply with the provisions of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.
Finding: Not applicable. This application does not include an enforcement action.

12.04.050 - Retaining walls—Required.
Every owner of a lot within the city, abutting upon an improved street, where the surface of the lot or tract of land is above the surface of the improved street and where the soil or earth from the lot, or tract of land is liable to, or does slide or fall into the street or upon the sidewalk, or both, shall build a retaining wall, the outer side of which shall be on the line separating the lot, or tract of land from the improved street, and the wall shall be so constructed as to prevent the soil or earth from the lot or tract of land from falling or sliding into the street or upon the sidewalk, or both, and the owner of any such property shall keep the wall in good repair.
Finding: Not applicable. The applicant has not proposed to construct a retaining wall in the right-of-way.

12.04.060 - Retaining walls—Maintenance.
When a retaining wall is necessary to keep the earth from falling or sliding onto the sidewalk or into a public street and the property owner or person in charge of that property fails or refuses to build such a

wall, such shall be deemed a nuisance. The violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.
Finding: Not applicable. Grading of the site with shallow slopes will not allow soil to slide or fall into the street.

12.04.070 - Removal of sliding dirt.
It shall be the duty of the owner of any property as mentioned in Section 12.04.050, and in case the owner is a nonresident, then the agent or other person in charge of the same, to remove from the street or sidewalk or both as the case may be, any and all earth or dirt falling on or sliding into or upon the same from the property, and to build and maintain in order at all times, the retaining wall as herein required; and upon the failure, neglect or refusal of the land owner, the agent or person in charge of the same to clean away such earth or dirt, falling or sliding from the property into the street or upon the sidewalk, or both, or to build the retaining wall, shall be deemed guilty of a misdemeanor.
Finding: Not Applicable. Grading of the site with shallow slopes will not allow soil to slide or fall into the street.

12.04.080 - Excavations—Permit required.
It shall be unlawful for any person to dig up, break, excavate, disturb, dig under or undermine any public street or alley, or any part thereof or any macadam, gravel, or other street pavement or improvement without first applying for and obtaining from the engineer a written permit so to do.
Finding: Not applicable. The applicant does not propose excavations beyond what is to be permitted through the plan review process.

12.04.090 - Excavations—Permit restrictions.
The permit shall designate the portion of the street to be so taken up or disturbed, together with the purpose for making the excavation, the number of days in which the work shall be done, and the trench or excavation to be refilled and such other restrictions as may be deemed of public necessity or benefit.
Finding: Not applicable. The applicant does not propose excavations beyond what is to be permitted through the plan review process.

12.04.100 - Excavations—Restoration of pavement.
Whenever any excavation shall have been made in any pavement or other street improvement on any street or alley in the city for any purpose whatsoever under the permit granted by the engineer, it shall be the duty of the person making the excavation to restore the pavement in accordance with the City of Oregon City Public Works Pavement Cut Standard in effect at the time a right-of-way permit application is filed. The city commission may adopt and modify the City of Oregon City Public Works Pavement Cut Standards by resolution as necessary to implement the requirements of this chapter.
Finding: Complies as proposed. No pavement cut and restoration proposed in the ROW.

12.04.110 - Excavations—Nuisance—Penalty.
Any excavation in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.
Finding: Not applicable. No violation has been identified.

12.04.120 - Obstructions—Permit required.
A. Permanent Obstructions. It is unlawful for any person to place, put or maintain any obstruction, other than a temporary obstruction, as defined in subsection B. of this section, in any public street or alley in the city, without obtaining approval for a right-of-way permit from the commission by passage of a resolution.
1. The city engineer shall provide applicants with an application form outlining the minimum submittal requirements.

2. The applicant shall submit at least the following information in the permitting process in order to allow the commission to adequately consider whether to allow the placement of an obstruction and whether any conditions may be attached:
a. Site plan showing right-of-way, utilities, driveways as directed by staff;
b. Sight distance per Chapter 10.32, Traffic Sight Obstructions;
c. Traffic control plan including parking per Manual on Uniform Traffic Control Devices (MUTCD);
d. Alternative routes if necessary;
e. Minimizing obstruction area; and
f. Hold harmless/maintenance agreement.
3. If the commission adopts a resolution allowing the placement of a permanent obstruction in the right-of-way, the city engineer shall issue a right-of-way permit with any conditions deemed necessary by the commission.
B. Temporary Obstructions.
1. A "temporary obstruction" is defined as an object placed in a public street, road or alley for a period of not more than sixty consecutive days. A "temporary obstruction" includes, but is not limited to, moving containers and debris dumpsters.
2. The city engineer, or designee, is authorized to grant a permit for a temporary obstruction.
3. The city engineer shall provide applicants with an application form outlining the minimum submittal requirements.
4. The applicant shall submit, and the city engineer, or designee, shall consider, at least the following items in the permitting process. Additional information may be required in the discretion of the city engineer:
a. Site plan showing right-of-way, utilities, driveways as directed by staff;
b. Sight distance per Chapter 10.32, Traffic Sight Obstructions;
c. Traffic control plan including parking per Manual on Uniform Traffic Control Devices (MUTCD);
d. Alternative routes if necessary;
e. Minimizing obstruction area; and
f. Hold harmless/maintenance agreement.
5. In determining whether to issue a right-of-way permit to allow a temporary obstruction, the city engineer may issue such a permit only after finding that the following criteria have been satisfied:
a. The obstruction will not unreasonably impair the safety of people using the right-of-way and nearby residents;
b. The obstruction will not unreasonably hinder the efficiency of traffic affected by the obstruction;
c. No alternative locations are available that would not require use of the public right-of-way; and
d. Any other factor that the city engineer deems relevant.
6. The permittee shall post a weatherproof copy of the temporary obstruction permit in plain view from the right-of-way.
C. Fees. The fee for obtaining a right-of-way permit for either a permanent obstruction or a temporary obstruction shall be set by resolution of the commission.
Finding: Not applicable. No permanent or temporary obstructions are planned for the project.

12.04.130 - Obstructions—Sidewalk sales.
A. It is unlawful for any person to use the public sidewalks of the city for the purpose of packing, unpacking or storage of goods or merchandise or for the display of goods or merchandise for sale. It is permissible to use the public sidewalks for the process of expeditiously loading and unloading goods and merchandise.
B. The city commission may, in its discretion, designate certain areas of the city to permit the display and sale of goods or merchandise on the public sidewalks under such conditions as may be provided.
Finding: Not applicable. No sidewalk sales proposed.

12.04.140 - Obstructions—Nuisance—Penalty.

Any act or omission in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.
Finding: Not applicable. No violation has been identified.

12.04.150 - Street and alley vacations—Cost.
At the time of filing a petition for vacation of a street, alley or any part thereof, a fee as established by city commission resolution shall be paid to the city.
Finding: No applicable. No street or alley vacations are proposed as part of this project.

12.04.160 - Street vacations—Restrictions.
The commission, upon hearing such petition, may grant the same in whole or in part, or may deny the same in whole or in part, or may grant the same with such reservations as would appear to be for the public interest, including reservations pertaining to the maintenance and use of underground public utilities in the portion vacated.
Finding: Not applicable. A street vacation has not been proposed.

12.04.170 - Street design—Purpose and general provisions.
All development shall be in conformance with the policies and design standards established by this chapter and with applicable standards in the city's public facility master plan and city design standards and specifications. In reviewing applications for development, the city engineer shall take into consideration any approved development and the remaining development potential of adjacent properties. All street, water, sanitary sewer, storm drainage and utility plans associated with any development must be reviewed and approved by the city engineer prior to construction. All streets, driveways or storm drainage connections to another jurisdiction's facility or right-of-way must be reviewed by the appropriate jurisdiction as a condition of the preliminary plat and when required by law or intergovernmental agreement shall be approved by the appropriate jurisdiction.
Finding: Not applicable. No offsite utility extensions or roadway extensions are proposed as part of this project.

12.04.175 - Street design—Generally.
The location, width and grade of street shall be considered in relation to: existing and planned streets, topographical conditions, public convenience and safety for all modes of travel, existing and identified future transit routes and pedestrian/bicycle accessways, overlay districts, and the proposed use of land to be served by the streets. The street system shall assure an adequate traffic circulation system with intersection angles, grades, tangents and curves appropriate for the traffic to be carried considering the terrain. To the extent possible, proposed streets shall connect to all existing or approved stub streets that abut the development site. The arrangement of streets shall either:
A. Provide for the continuation or appropriate projection of existing principal streets in the surrounding area and on adjacent parcels or conform to a plan for the area approved or adopted by the city to meet a particular situation where topographical or other conditions make continuance or conformance to existing streets impractical;
B. Where necessary to give access to or permit a satisfactory future development of adjoining land, streets shall be extended to the boundary of the development and the resulting dead-end street (stub) may be approved with a temporary turnaround as approved by the city engineer. Notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future. Access control in accordance with [Chapter] 12.04 shall be required to preserve the objectives of street extensions.
Finding: Not applicable. No new streets are proposed as part of this project.

12.04.180 - Street design.

All development regulated by this chapter shall provide street improvements in compliance with the standards in Figure 12.04.180 depending on the street classification set forth in the Transportation System Plan and the Comprehensive Plan designation of the adjacent property, unless an alternative plan has been adopted. The standards provided below are maximum design standards and may be reduced with an alternative street design which may be approved based on the modification criteria in [Section] 12.04.007. The steps for reducing the maximum design below are found in the Transportation System Plan.

Table 12.04.180 Street Design

To read the table below, select the road classification as identified in the Transportation System Plan and the Comprehensive Plan designation of the adjacent properties to find the maximum design standards for the road cross section. If the Comprehensive Plan designation on either side of the street differs, the wider right-of-way standard shall apply.

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Major Arterial	Mixed Use, Commercial or Public/Quasi Public	116 ft.	94 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft. x 5 ft. tree wells		6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.
	Industrial	120 ft.	88 ft.	0.5 ft.	5 ft.	10.5 ft.	6 ft.	N/A	(5) 14 ft. Lanes	6 ft.
	Residential	126 ft.	94 ft.	0.5 ft.	5 ft.	10.5 ft.	6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.

1. Pavement width includes, bike lane, street parking, travel lanes and median.

2. Public access, sidewalks, landscape strips, bike lanes and on-street parking are required on both sides of the street in all designations. The right-of-way width and pavement widths identified above include the total street section.

3. A 0.5 foot curb is included in landscape strip or sidewalk width.

4. Travel lanes may be through lanes or turn lanes.

5. The 0.5 foot public access provides access to adjacent public improvements.

6. Alleys shall have a minimum right-of-way width of twenty feet and a minimum pavement width of sixteen feet. If alleys are provided, garage access shall be provided from the alley.

Finding: Not applicable. No new streets are proposed as part of this project.

12.04.185 - Street design—Access control.

A. A street which is dedicated to end at the boundary of the development or in the case of half-streets dedicated along a boundary shall have an access control granted to the city as a city controlled plat restriction for the purposes of controlling ingress and egress to the property adjacent to the end of the

dedicated street. The access control restriction shall exist until such time as a public street is created, by dedication and accepted, extending the street to the adjacent property.
B. The city may grant a permit for the adjoining owner to access through the access control.
C. The plat shall contain the following access control language or similar on the face of the map at the end of each street for which access control is required: "Access Control (See plat restrictions)."
D. Said plats shall also contain the following plat restriction note(s): "Access to (name of street or tract) from adjoining tracts (name of deed document number[s]) shall be controlled by the City of Oregon City by the recording of this plat, as shown. These access controls shall be automatically terminated upon the acceptance of a public road dedication or the recording of a plat extending the street to adjacent property that would access through those Access Controls."
Finding: Not applicable. No new streets are proposed as part of this project.

12.04.190 - Street design—Alignment.
The centerline of streets shall be:
A. Aligned with existing streets by continuation of the centerlines; or
B. Offset from the centerline by no more than five (5) feet, provided appropriate mitigation, in the judgment of the city engineer, is provided to ensure that the offset intersection will not pose a safety hazard.
Finding: Not applicable. No new streets are proposed as part of this project.

12.04.194 - Traffic sight obstructions.
All new streets shall comply with the Traffic Sight Obstructions in Chapter 10.32.
Finding: Not applicable. No new streets are proposed as part of this project.

12.04.195 - Spacing standards.
A. All new streets shall be designed as local streets unless otherwise designated as arterials and collectors in Figure 8 in the transportation system plan. The maximum block spacing between streets is five hundred thirty feet and the minimum block spacing between streets is one hundred fifty feet as measured between the right-of-way centerlines. If the maximum block size is exceeded, pedestrian accessways must be provided every three hundred thirty feet. The spacing standards within this section do not apply to alleys.
B. All new development and redevelopment shall meet the minimum driveway spacing standards identified in Table 12.04.195.B.

Table 12.04.195.B Minimum Driveway Spacing Standards

Street Functional Classification	*Minimum Driveway Spacing Standards*	*Distance*
Major Arterial Streets	*Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings*	*175 ft.*
Minor Arterial Streets	*Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings*	*175 ft.*
Collector Streets	*Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings*	*100 ft.*

Local Streets	*Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings*	*25 ft.*

The distance from a street corner to a driveway is measured along the right-of-way from the edge of the intersection right-of-way to the nearest portion of the driveway and the distance between driveways is measured at the nearest portions of the driveway at the right-of-way.

Finding: Not applicable. No new streets or driveways are proposed as part of this project.

12.04.199 - Pedestrian and bicycle accessways.

Finding: Not applicable. No new off-site accessways are proposed as part of this project.

12.04.205 - Mobility standards.

Development shall demonstrate compliance with intersection mobility standards. When evaluating the performance of the transportation system, the City of Oregon City requires all intersections, except for the facilities identified in subsection D below, to be maintained at or below the following mobility standards during the two-hour peak operating conditions. The first hour has the highest weekday traffic volumes and the second hour is the next highest hour before or after the first hour. Except as provided otherwise below, this may require the installation of mobility improvements as set forth in the transportation system plan or as otherwise identified by the city transportation engineer.

A. For intersections within the regional center, the following mobility standards apply:

1. During the first hour, a maximum v/c ratio of 1.10 shall be maintained. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.

2. During the second hour, a maximum v/c ratio of 0.99 shall be maintained at signalized intersections. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.

3. Intersections located on the Regional Center boundary shall be considered within the Regional Center.

B. For intersections outside of the Regional Center but designated on the Arterial and Throughway Network, as defined in the Regional Transportation Plan, the following mobility standards apply:

1. During the first hour, a maximum v/c ratio of 0.99 shall be maintained. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.

2. During the second hour, a maximum v/c ratio of 0.99 shall be maintained at signalized intersections. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.

C. For intersections outside the boundaries of the Regional Center and not designated on the Arterial and Throughway Network, as defined in the Regional Transportation Plan, the following mobility standards apply:

1. For signalized intersections:

a. During the first hour, LOS "D" or better will be required for the intersection as a whole and no approach operating at worse than LOS "E" and a v/c ratio not higher than 1.0 for the sum of the critical movements.

b. During the second hour, LOS "D" or better will be required for the intersection as a whole and no approach operating at worse than LOS "E" and a v/c ratio not higher than 1.0 for the sum of the critical movements.

2. For unsignalized intersections outside of the boundaries of the Regional Center:

a. For unsignalized intersections, during the peak hour, all movements serving more than twenty vehicles shall be maintained at LOS "E" or better. LOS "F" will be tolerated at movements serving no more than twenty vehicles during the peak hour.
D. Until the city adopts new performance measures that identify alternative mobility targets, the city shall exempt proposed development that is permitted, either conditionally, outright, or through detailed development master plan approval, from compliance with the above-referenced mobility standards for the following state-owned facilities:
I-205/OR 99E Interchange
I-205/OR 213 Interchange
OR 213/Beavercreek Road
State intersections located within or on the Regional Center Boundaries
1. In the case of conceptual development approval for a master plan that impacts the above references intersections:
a. The form of mitigation will be determined at the time of the detailed development plan review for subsequent phases utilizing the Code in place at the time the detailed development plan is submitted; and
b. Only those trips approved by a detailed development plan review are vested.
2. Development which does not comply with the mobility standards for the intersections identified in [Section] 12.04.205.D shall provide for the improvements identified in the Transportation System Plan (TSP) in an effort to improve intersection mobility as necessary to offset the impact caused by development. Where required by other provisions of the Code, the applicant shall provide a traffic impact study that includes an assessment of the development's impact on the intersections identified in this exemption and shall construct the intersection improvements listed in the TSP or required by the Code.
Finding: Complies as proposed. No new intersections are proposed as part of this project.
On May 10, 2017, the Planning division received a comment from John Replinger, the City's Traffic Engineering Consultant, who said not transportation analysis was necessary.

12.04.210 - Street design—Intersection angles.
Except where topography requires a lesser angle, streets shall be laid out to intersect at angles as near as possible to right angles. In no case shall the acute angles be less than eighty degrees unless there is a special intersection design. An arterial or collector street intersecting with another street shall have at least one hundred feet of tangent adjacent to the intersection unless topography requires a lesser distance. Other streets, except alleys, shall have at least fifty feet of tangent adjacent to the intersection unless topography requires a lesser distance. All street intersections shall be provided with a minimum curb return radius of twenty-five feet for local streets. Larger radii shall be required for higher street classifications as determined by the city engineer. Additional right-of-way shall be required to accommodate curb returns and sidewalks at intersections. Ordinarily, intersections should not have more than two streets at any one point.
Finding: Not applicable. No new intersections are proposed as part of this project.

12.04.215 - Street design—Off-site street improvements.
During consideration of the preliminary plan for a development, the decision maker shall determine whether existing streets impacted by, adjacent to, or abutting the development meet the city's applicable planned minimum design or dimensional requirements. Where such streets fail to meet these requirements, the decision-maker shall require the applicant to make proportional improvements sufficient to achieve conformance with minimum applicable design standards required to serve the proposed development.
Finding: Complies with condition. The existing Molalla fire signal does not meet current County standards and must be upgraded as required. Fire signal on Molalla shall be upgraded to meet requirements Clackamas County. Pole style and color will be determined by the City of Oregon City.

Depending on timing of upcoming street improvement project for Molalla, fee in lieu for the signal may be collected for future installation of the signal assembly located on the west side of Molalla.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

12.04.220 - Street design—Half street.
Half streets, while generally not acceptable, may be approved where essential to the development, when in conformance with all other applicable requirements, and where it will not create a safety hazard. When approving half streets, the decision maker must first determine that it will be practical to require the dedication of the other half of the street when the adjoining property is divided or developed. Where the decision maker approves a half street, the applicant must construct an additional ten feet of pavement width so as to make the half street safe and usable until such time as the other half is constructed. Whenever a half street is adjacent to property capable of being divided or developed, the other half of the street shall be provided and improved when that adjacent property divides or develops. Access control may be required to preserve the objectives of half streets.
When the remainder of an existing half-street improvement is made it shall include the following items: dedication of required right-of-way, construction of the remaining portion of the street including pavement, curb and gutter, landscape strip, sidewalk, street trees, lighting and other improvements as required for that particular street. It shall also include at a minimum the pavement replacement to the centerline of the street. Any damage to the existing street shall be repaired in accordance with the city's "Moratorium Pavement Cut Standard" or as approved by the city engineer.
Finding: Not applicable. No half street proposed or required.

12.04.225 - Street design—Cul-de-sacs and dead-end streets.
The city discourages the use of cul-de-sacs and permanent dead-end streets except where construction of a through street is found by the decision maker to be impracticable due to topography or some significant physical constraint such as geologic hazards, wetland, natural or historic resource areas, dedicated open space, existing development patterns, arterial access restrictions or similar situation as determined by the community development director. When permitted, access from new cul-de-sacs and permanent dead-end streets shall be limited to a maximum of twenty-five dwelling units and a maximum street length of two hundred feet, as measured from the right-of-way line of the nearest intersecting street to the back of the cul-de-sac curb face. In addition, cul-de-sacs and dead end roads shall include pedestrian/bicycle accessways as required in this chapter. This section is not intended to preclude the use of curvilinear eyebrow widening of a street where needed.
Where approved, cul-de-sacs shall have sufficient radius to provide adequate turn-around for emergency vehicles in accordance with fire district and city adopted street standards. Permanent dead-end streets other than cul-de-sacs shall provide public street right-of-way/easements sufficient to provide turn-around space with appropriate no-parking signs or markings for waste disposal, sweepers, and other long vehicles in the form of a hammerhead or other design to be approved by the decision maker. Driveways shall be encouraged off the turnaround to provide for additional on-street parking space.
Finding: Not applicable. No half cul-de-sac or dead end is proposed or required.

12.04.230 - Street design—Street names.
Except for extensions of existing streets, no street name shall be used which will duplicate or be confused with the name of an existing street. Street names shall conform to the established standards in the city and shall be subject to the approval of the city.
Finding: Not applicable. No new street is proposed or required.

12.04.235 - Street design—Grades and curves.

Grades and center line radii shall conform to the standards in the city's street design standards and specifications.
Finding: Not applicable. No new streets are proposed as part of this project.

12.04.240 - Street design—Development abutting arterial or collector street.
Where development abuts or contains an existing or proposed arterial or collector street, the decision maker may require: access control; screen planting or wall contained in an easement or otherwise protected by a restrictive covenant in a form acceptable to the decision maker along the rear or side property line; or such other treatment it deems necessary to adequately protect residential properties or afford separation of through and local traffic. Reverse frontage lots with suitable depth may also be considered an option for residential property that has arterial frontage. Where access for development abuts and connects for vehicular access to another jurisdiction's facility then authorization by that jurisdiction may be required.
Finding: Not applicable. The site does abut an arterial street, though no screening or planting is required or proposed.

12.04.245 - Street design—Pedestrian and bicycle safety.
Where deemed necessary to ensure public safety, reduce traffic hazards and promote the welfare of pedestrians, bicyclists and residents of the subject area, the decision maker may require that local streets be so designed as to discourage their use by nonlocal automobile traffic.
All crosswalks shall include a large vegetative or sidewalk area which extends into the street pavement as far as practicable to provide safer pedestrian crossing opportunities. These curb extensions can increase the visibility of pedestrians and provide a shorter crosswalk distance as well as encourage motorists to drive slower. The decision maker may approve an alternative design that achieves the same standard for constrained sites or where deemed unnecessary by the city engineer.
Finding: Not applicable. No new street improvements are proposed as part of this project.

12.04.255 - Street design—Alleys.
Public alleys shall be provided in the following districts R-5, R-3.5, R-2, MUC-1, MUC-2 and NC zones unless other permanent provisions for private access to off-street parking and loading facilities are approved by the decision maker. The corners of alley intersections shall have a radius of not less than ten feet.
Finding: Not applicable. The site is within the General Commercial District.

12.04.260 - Street design—Transit.
Streets shall be designed and laid out in a manner that promotes pedestrian and bicycle circulation. The applicant shall coordinate with transit agencies where the application impacts transit streets as identified in [Section] 17.04.1310. Pedestrian/bicycle access ways shall be provided as necessary in Chapter 12.04 to minimize the travel distance to transit streets and stops and neighborhood activity centers. The decision maker may require provisions, including easements, for transit facilities along transit streets where a need for bus stops, bus pullouts or other transit facilities within or adjacent to the development has been identified.
Finding: Complies as proposed. The subject site is adjacent to a transit street. The development proposal was transmitted to Tri-Met who did not comment on the application.

12.04.265 - Street design—Planter strips.
All development shall include vegetative planter strips that are five feet in width or larger and located adjacent to the curb. This requirement may be waived or modified if the decision maker finds it is not practicable. The decision maker may permit constrained sites to place street trees on the abutting private property within ten feet of the public right-of-way if a covenant is recorded on the title of the property identifying the tree as a city street tree which is maintained by the property owner. Development proposed

along a collector, minor arterial, or major arterial street may use tree wells with root barriers located near the curb within a wider sidewalk in lieu of a planter strip, in which case each tree shall have a protected area to ensure proper root growth and reduce potential damage to sidewalks, curbs and gutters.
To promote and maintain the community tree canopy adjacent to public streets, trees shall be selected and planted in planter strips in accordance with Chapter 12.08, Street Trees. Individual abutting lot owners shall be legally responsible for maintaining healthy and attractive trees and vegetation in the planter strip. If a homeowners' association is created as part of the development, the association may assume the maintenance obligation through a legally binding mechanism, e.g., deed restrictions, maintenance agreement, etc., which shall be reviewed and approved by the city attorney. Failure to properly maintain trees and vegetation in a planter strip shall be a violation of this code and enforceable as a civil infraction.
Finding: Not applicable. The site is currently constructed with planter strips. No new streets are proposed as part of this project.

12.04.270 - Standard construction specifications.
The workmanship and materials for any work performed under permits issued per this chapter shall be in accordance with the edition of the "Oregon Standard Specifications for Construction" as prepared by the Oregon Department of Transportation (ODOT) and the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the city in accordance with this ordinance, in effect at the time of application. The exception to this requirement is where this chapter and the Public Works Street Design Drawings provide other design details, in which case the requirements of this chapter and the Public Works Street Design Drawings shall be complied with. In the case of work within ODOT or Clackamas County rights-of-way, work shall be in conformance with their respective construction standards.
Finding: Applicable. All work shall comply with construction specifications.

12.04.280 - Violation—Penalty.
Any act or omission in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.
Finding: Not applicable. No violation has been identified.

CHAPTER 12.08 - PUBLIC AND STREET TREES[2]

12.08.015 - Street tree planting and maintenance requirements.
All new construction or major redevelopment shall provide street trees adjacent to all street frontages. Species of trees shall be selected based upon vision clearance requirements, but shall in all cases be selected from the Oregon City Street Tree List or be approved by a certified arborist. If a setback sidewalk has already been constructed or the Development Services determines that the forthcoming street design shall include a setback sidewalk, then all street trees shall be installed with a planting strip. If existing street design includes a curb-tight sidewalk, then all street trees shall be placed within the front yard setback, exclusive of any utility easement.
Finding: Complies as Proposed. The applicant submitted a street tree plan which included three existing trees placed along the frontage of the development. These trees will not be removed as part of the application.

A. One street tree shall be planted for every thirty-five feet of property frontage. The tree spacing shall be evenly distributed throughout the total development frontage. The community development director may approve an alternative street tree plan if site or other constraints prevent meeting the placement of one street tree per thirty-five feet of property frontage.
B. The following clearance distances shall be maintained when planting trees:
1. Fifteen feet from streetlights;

2. Five feet from fire hydrants;
3. Twenty feet from intersections;
4. A minimum of five feet (at mature height) below power lines.
C. All trees shall be a minimum of two inches in caliper at six inches above the root crown and installed to city specifications.
D. All established trees shall be pruned tight to the trunk to a height that provides adequate clearance for street cleaning equipment and ensures ADA complaint clearance for pedestrians.
Finding: Complies with condition. The existing street frontage is approximately 186 feet, requiring 5 street trees (186/35=5.3). Three trees are planted along the subject property frontage, and no changes have been proposed. Due to the 80 foot wide driveway, the locations to plant additional trees onsite are limited. The applicant shall submit a revised street tree plan displaying 5 street trees. If 5 trees cannot be located within the frontage due to the limitations of spacing and the curb cut the applicant may plant street trees on the private property (with the recording of a covenant) or provide a fee in lieu for any tree not identified. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

12.08.020 - Street tree species selection.
The community development director may specify the species of street trees required to be planted if there is an established planting scheme adjacent to a lot frontage, if there are obstructions in the planting strip, or if overhead power lines are present.
Finding: Complies with condition. The applicant shall submit a revised street tree plan in compliance with OCMC 12.08**. Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

12.08.025 - General tree maintenance.
Abutting property owners shall be responsible for the maintenance of street trees and planting strips. Topping of trees is permitted only under recommendation of a certified arborist, or other qualified professional, if required by city staff. Trees shall be trimmed appropriately. Maintenance shall include trimming to remove dead branches, dangerous limbs and to maintain a minimum seven-foot clearance above all sidewalks and ten-foot clearance above the street. Planter strips shall be kept clear of weeds, obstructing vegetation and trash.
Finding: Complies as proposed. The maintenance of street trees and planting strips is anticipated to be the responsibility of the property owner.

12.08.030 - Public property tree maintenance.
The city shall have the right to plant, prune, maintain and remove trees, plants and shrubs in all public rights-of-way and public grounds, as may be necessary to ensure public safety or to preserve and enhance the symmetry or other desirable characteristics of such public areas. The natural resources committee may recommend to the community development director the removal of any tree or part thereof which is in an unsafe condition, or which by reason of its nature is injurious to above or below-ground public utilities or other public improvements.
Finding: Complies as Proposed. The owner recognizes the city has the right to plant, prune, maintain and remove trees in all public ways to ensure public safety.

12.08.035 - Public tree removal.
Existing street trees shall be retained and protected during construction unless removal is specified as part of a land use approval or in conjunction with a public facilities construction project, as approved by the community development director. A diseased or hazardous street tree, as determined by a registered arborist and verified by the City, may be removed if replaced. A non-diseased, non-hazardous street tree that is removed shall be replaced in accordance with the Table 12.08.035.

All new street trees will have a minimum two-inch caliper trunk measured six inches above the root crown. The community development director may approve off-site installation of replacement trees where necessary due to planting constraints. The community development director may additionally allow a fee in-lieu of planting the tree(s) to be placed into a city fund dedicated to planting trees in Oregon City in accordance with Oregon City Municipal Code 12.08.

Table 12.08.035

Replacement Schedule for Trees Determined to be Dead, Diseased or Hazardous by a Certified Arborist		*Replacement Schedule for Trees Not Determined to be Dead, Diseased or Hazardous by a Certified Arborist*	
Diameter of tree to be Removed (Inches of diameter at 4-ft height)	*Number of Replacement Trees to be Planted*	*Diameter of tree to be Removed (Inches of diameter at 4-ft height)*	*Number of Replacement Trees to be Planted*
Any Diameter	*1 Tree*	*Less than 6"*	*1 Tree*
		6" to 12"	*2 Trees*
		13" to 18"	*3 Trees*
		19" to 24"	*4 Trees*
		25" to 30"	*5 Trees*
		31" and over	*8 Trees*

Finding: Not Applicable. No street trees have been proposed for removal**.**

12.08.040 - Heritage Trees and Groves.

Finding: Not applicable. The applicant did not propose to designate or remove a heritage tree or grove.

CHAPTER 13.12 - STORMWATER MANAGEMENT

13.12.050 - Applicability and exemptions.

This chapter establishes performance standards for stormwater conveyance, quantity and quality. Additional performance standards for erosion prevention and sediment control are established in OCMC 17.47.

A. Stormwater Conveyance. The stormwater conveyance requirements of this chapter shall apply to all stormwater systems constructed with any development activity, except as follows:

1. The conveyance facilities are located entirely on one privately owned parcel;

2. The conveyance facilities are privately maintained; and

3. The conveyance facilities receive no stormwater runoff from outside the parcel's property limits.

Those facilities exempted from the stormwater conveyance requirements by the above subsection will remain subject to the requirements of the Oregon Uniform Plumbing Code. Those exempted facilities shall be reviewed by the building official.

Finding: Applicable. Construction of improvements to public stormwater conveyance facilities is required to serve this development.

B. Water Quality and Flow Control. The water quality and flow control requirements of this chapter shall apply to the following proposed uses or developments, unless exempted under subsection C:

1. *Activities located wholly or partially within water quality resource areas pursuant to Chapter 17.49 that will result in the creation of more than five hundred square feet of impervious surface within the WQRA or will disturb more than one thousand square feet of existing impervious surface within the WQRA as part of a commercial or industrial redevelopment project. These square footage measurements will be considered cumulative for any given five-year period; or*
2. *Activities that create or replace more than five thousand square feet of impervious surface per parcel or lot, cumulated over any given five-year period.*

Finding: Applicable. The proposed development will create or replace more than 5000 sf of impervious area, will create more than 500 sf of new impervious area in the NROD, or will disturb more than 1000 sf of existing impervious surface within the NROD for a commercial development.

C. Exemptions. The following exemptions to subsection B of this section apply:

1. *An exemption to the flow control requirements of this chapter will be granted when the development site discharges to the Willamette River, Clackamas River or Abernethy Creek; and either lies within the one hundred-year floodplain or is up to ten feet above the design flood elevation as defined in Chapter 17.42, provided that the following conditions are met:*
    a. *The project site is drained by a conveyance system that is comprised entirely of manmade elements (e.g. pipes, ditches, culverts outfalls, outfall protection, etc.) and extends to the ordinary high water line of the exempt receiving water; and*
    b. *The conveyance system between the project site and the exempt receiving water has sufficient hydraulic capacity and erosion stabilization measures to convey discharges from the proposed conditions of the project site and the existing conditions from non-project areas from which runoff is collected.*
2. *Projects in the following categories are generally exempt from the water quality and flow control requirements:*
    a. *Stream enhancement or restoration projects approved by the city.*
    b. *Farming practices as defined by ORS 30.960 and farm use as defined in ORS 214.000; except that buildings associated with farm practices and farm use are subject to the requirements of this chapter.*
    c. *Actions by a public utility or any other governmental agency to remove or alleviate an emergency condition.*
    d. *Road and parking area preservation/maintenance projects such as pothole and square cut patching, surface sealing, replacing or overlaying of existing asphalt or concrete pavement, provided the preservation/maintenance activity does not expand the existing area of impervious coverage above the thresholds in subsection B of this section.*
    e. *Pedestrian and bicycle improvements (sidewalks, trails, pathways, and bicycle paths/lands) where no other impervious surfaces are created or replaced, built to direct stormwater runoff to adjacent vegetated areas.*
    f. *Underground utility projects that replace the ground surface with in-kind material or materials with similar runoff characteristics.*
    g. *Maintenance or repair of existing utilities.*

Finding: Not Applicable. The proposed development does not meet the criteria for exemption.

D. Uses Requiring Additional Management Practices. In addition to any other applicable requirements of this chapter, the following uses are subject to additional management practices, as defined in the Public Works Stormwater and Grading Design Standards:

1. *Bulk petroleum storage facilities;*
2. *Above ground storage of liquid materials;*
3. *Solid waste storage areas, containers, and trash compactors for commercial, industrial, or multi-family uses;*

4. *Exterior storage of bulk construction materials;*
5. *Material transfer areas and loading docks;*
6. *Equipment and/or vehicle washing facilities;*
7. *Development on land with suspected or known contamination;*
8. *Covered vehicle parking for commercial or industrial uses;*
9. *Industrial or commercial uses locating in high traffic areas, defined as average daily count trip of two thousand five hundred or more trips per day; and*
10. *Land uses subject to DEQ 1200-Z Industrial Stormwater Permit Requirements.*

Finding: Not Applicable. The proposal (Application) does not contain elements requiring additional stormwater management practices. However, if the development proposes to utilize the garage as an equipment and/or vehicle washing facilities additional management practices, as defined in the Public Works Stormwater and Grading Design Standards will be required.

13.12.080 - Submittal requirements.

A. *Applications subject to stormwater conveyance, water quality, and/or flow control requirements of this chapter shall prepare engineered drainage plans, drainage reports, and design flow calculation reports in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards.*
B. *Each project site, which may be composed of one or more contiguous parcels of land, shall have a separate valid city approved plan and report before proceeding with construction.*

Finding: Complies with Condition. The submitted stormwater plan and report did not size proposed stormwater facilities in accordance with Chapter 4 of the Stormwater and Grading Design Standards. The stormwater plan and report shall be revised and resubmitted with facilities designed in accordance with the Stormwater and Grading Design Standards. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

13.12.090 - Approval criteria for engineered drainage plans and drainage report.
An engineered drainage plan and/or drainage report shall be approved only upon making the following findings:

A. The plan and report demonstrate how the proposed development and stormwater facilities will accomplish the purpose statements of this chapter.
B. The plan and report meet the requirements of the Public Works Stormwater and Grading Design Standards adopted by resolution under Section 13.12.020.
C. The storm drainage design within the proposed development includes provisions to adequately control runoff from all public and private streets and roof, footing, and area drains and ensures future extension of the current drainage system.
D. Streambank erosion protection is provided where stormwater, directly or indirectly, discharges to open channels or streams.
E. Specific operation and maintenance measures are proposed that ensure that the proposed stormwater quantity control facilities will be properly operated and maintained.

Finding: Complies with Condition. The stormwater plan and report shall be revised and resubmitted with facilities designed in accordance with the Stormwater and Grading Design Standards. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

13.12.100 - Alternative materials, alternative design and methods of construction.

The provisions of this chapter are not intended to prevent the use of any material, alternate design or method of construction not specifically prescribed by this chapter or the Public Works Stormwater and Grading Design Standards, provided any alternate has been approved and its use authorized by the city engineer. The city engineer may approve any such alternate, provided that the city engineer finds that the

proposed design is satisfactory and complies with the intent of this chapter and that the material, method, or work offered is, for the purpose intended, at least the equivalent of that prescribed by this chapter in effectiveness, suitability, strength, durability and safety. The city engineer shall require that sufficient evidence or proof be submitted to substantiate any claims that may be made regarding its use. The details of any action granting approval of an alternate shall be recorded and entered in the city files.
Finding: Not Applicable. The applicant has not proposed alternative design methods requiring special approval by the City Engineer. However, should the applicant propose such methods with the public facilities construction plan submittal, the proposal will be reviewed and approved by the City Engineer as required.

13.12.120 - Standard construction specifications.

The workmanship and materials shall be in accordance with the edition of the "Standard Specifications for Public Works Construction," as prepared by the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the city, in effect at the time of application. The exception to this requirement is where this chapter and the Public Works Stormwater and Grading Design Standards provide other design details, in which case the requirements of this chapter and the Public Works Stormwater and Grading Design Standards shall be complied with.
Finding: Complies as Proposed. The proposal appears to be in accordance with the Stormwater and Grading Design Standards adopted August 18, 2015, which are in effect at time of application.

CHAPTER 15.48 - GRADING, FILLING AND EXCAVATING

15.48.030 Applicability—Grading permit required.
A. A city-issued grading permit shall be required before the commencement of any of the following filling or grading activities:
1. Grading activities in excess of ten cubic yards of earth;
2. Grading activities which may result in the diversion of existing drainage courses, both natural and man-made, from their natural point of entry or exit from the grading site;
3. Grading and paving activities resulting in the creation of impervious surfaces greater than two thousand square feet or more in area;
4. Any excavation beyond the limits of a basement or footing excavation, having an unsupported soil height greater than five feet after the completion of such a structure; or
5. Grading activities involving the clearing or disturbance of one-half acres (twenty-one thousand seven hundred eighty square feet) or more of land.
Finding: See findings under section 15.48.090 of this report. Submittal of construction plans for review and approval by all applicable City departments is adequate to meet grading permit requirements.

15.48.090 Submittal requirements.
An engineered grading plan or an abbreviated grading plan shall be prepared in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards whenever a city approved grading permit is required. In addition, a geotechnical engineering report and/or residential lot grading plan may be required pursuant to the criteria listed below.
A. Abbreviated Grading Plan. The city shall allow the applicant to submit an abbreviated grading plan in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards if the following criteria are met:
1. No portion of the proposed site is within the flood management area overlay district pursuant to Chapter 17.42, the unstable soils and hillside constraints overlay district pursuant to Chapter 17.44, or a water quality resource area pursuant to Chapter 17.49; and
2. The proposed filling or grading activity does not involve more than fifty cubic yards of earth.

B. Engineered Grading Plan. The city shall require an engineered grading plan in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer if the proposed activities do not qualify for abbreviated grading plan.
C. Geotechnical Engineering Report. The city shall require a geotechnical engineering report in compliance with the minimum report requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer who specializes in geotechnical work when any of the following site conditions may exist in the development area:
1. When any publicly maintained facility (structure, street, pond, utility, park, etc.) will be supported by any engineered fill;
2. When an embankment for a stormwater pond is created by the placement of fill;
3. When, by excavation, the soils remaining in place are greater than three feet high and less than twenty feet wide.
D .Residential Lot Grading Plan. The city shall require a residential lot grading plan in compliance with the minimum report requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer for all land divisions creating new residential building lots or where a public improvement project is required to provide access to an existing residential lot.
Finding: Complies as Proposed. The applicant provided an engineered grading plan with the construction plan submittal.

CHAPTER 17.47 - EROSION AND SEDIMENT CONTROL

17.47.070 Erosion and sediment control plans.
A. An application for an erosion and sediment control permit shall include an erosion and sediment control plan, which contains methods and interim measures to be used during and following construction to prevent or control erosion prepared in compliance with City of Oregon City public works standards for erosion and sediment control. These standards are incorporated herein and made a part of this title and are on file in the office of the city recorder.
Finding: Complies with Condition. The applicant shall provide an Erosion Prevention and Sedimentation Control Plan to the City to be reviewed and approved prior to issuance of an Erosion and Sediment Control permit. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

CHAPTER 17.41 - TREE PROTECTION STANDARDS

17.41.020 - Tree protection—Applicability.
1. Applications for development subject to Chapters 16.08 or 16.12 (Subdivision or Minor Partition) or Chapter 17.62 (Site Plan and Design Review) shall demonstrate compliance with these standards as part of the review proceedings for those developments.
2. For public capital improvement projects, the city engineer shall demonstrate compliance with these standards pursuant to a Type II process.
3. Tree canopy removal greater than twenty-five percent on sites greater than twenty-five percent slope, unless exempted under Section 17.41.040, shall be subject to these standards.
4. A heritage tree or grove which has been designated pursuant to the procedures of Chapter 12.08.050 shall be subject to the standards of this section.
Finding: Applicable. The proposed development includes a Site Plan and Design Review, therefore this section applies.

17.41.030 - Tree protection—Conflicting code provisions.

Except as otherwise specified in this section, where these standards conflict with adopted city development codes or policies, the provision which provides the greater protection for regulated trees or groves, as defined in Section 17.04, shall govern.
Finding: Applicable. The trees within the boundaries of the property or associated with the proposed development onsite are regulated under this section of code and do not fall under any other protections within the City's development codes.

17.41.040 - Same—Exemptions.
These regulations are not intended to regulate normal cutting, pruning and maintenance of trees on private property except where trees are located on lots that are undergoing development review or are otherwise protected within the Natural Resource Overlay District (NROD) of section 17.49. These standards are not intended to regulate farm and forest practices as those practices are defined under ORS 30.930. Farm or forest resources. An applicant for development may claim exemption from compliance with these standards if the development site containing the regulated grove or trees was a designated farm or forest use, tree farm, Christmas tree plantation, or other approved timber use within one year prior to development application. "Forest practices" and "forestlands" as used in this subsection shall have the meaning as set out in ORS 30.930. The community development director has the authority to modify or waive compliance in this case.
Finding: Not Applicable. The applicant has not proposed an exemption in accordance with this provision.

17.41.050 - Same—Compliance options.
Applicants for review shall comply with these requirements through one or a combination of the following procedures:
A. Option 1—Mitigation. Retention and removal of trees, with subsequent mitigation by replanting pursuant to Sections 17.41.060 or 17.41.070. All replanted and saved trees shall be protected by a permanent restrictive covenant or easement approved in form by the city.
B. Option 2—Dedicated Tract. Protection of trees or groves by placement in a tract within a new subdivision or partition plat pursuant to Sections 17.41.080—17.41.100; or
C. Option 3—Restrictive Covenant. Protection of trees or groves by recordation of a permanent restrictive covenant pursuant to Sections 17.41.110—17.41.120; or
D. Option 4—Cash-in-lieu of planting pursuant to Section 17.41.130.
A regulated tree that has been designated for protection pursuant to this section must be retained or permanently protected unless it has been determined by a certified arborist to be diseased or hazardous, pursuant to the following applicable provisions.
The community development director, pursuant to a Type II procedure, may allow a property owner to cut a specific number of trees within a regulated grove if preserving those trees would:
1. Preclude achieving eighty percent of minimum density with reduction of lot size; or
2. Preclude meeting minimum connectivity requirements for subdivisions.
Finding: Complies with condition. The applicant has proposed to utilize option 1, mitigation. As identified in this section, all replanted and saved trees shall be protected by a permanent restrictive covenant or easement approved in form by the city. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.41.060 - Tree removal and replanting—Mitigation (Option 1).
A. Applicants for development who select this option shall ensure that all healthy trees shall be preserved outside the construction area as defined in Chapter 17.04to the extent practicable. Compliance with these standards shall be demonstrated in a tree mitigation plan report prepared by a certified arborist, horticulturalist or forester or other environmental professional with experience and academic credentials in forestry or arborculture. At the applicant's expense, the city may require the report to be reviewed by

a consulting arborist. The number of replacement trees required on a development site shall be calculated separately from, and in addition to, any public or street trees in the public right-of-way required under section 12.08—Community Forest and Street Trees.
B. The applicant shall determine the number of trees to be mitigated on the site by counting all of the trees six inch DBH (minimum four and one-half feet from the ground) or larger on the entire site and either:
1. Trees that are removed outside of the construction area, shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2; or
2. Diseased or hazardous trees, when the condition is verified by a certified arborist to be consistent with the definition in Section 17.04.1360, may be removed from the tree replacement calculation. Regulated healthy trees that are removed outside of the construction area, shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Regulated healthy trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2.
Table 17.41.060-1
Tree Replacement Requirements
All replacement trees shall be either:
Two-inch caliper deciduous, or
Six-foot high conifer

Size of tree removed (DBH)	*Column 1* *Number of trees to be planted. (If removed Outside of construction area)*	*Column 2* *Number of trees to be planted. (If removed Within the construction area)*
6 to 12"	*3*	*1*
13 to 18"	*6*	*2*
19 to 24"	*9*	*3*
25 to 30"	*12*	*4*
31 and over"	*15*	*5*

Steps for calculating the number of replacement trees:
1. Count all trees measuring six inches DBH (minimum four and one-half feet from the ground) or larger on the entire development site.
2. Designate (in certified arborists report) the condition and size (DBH) of all trees pursuant to accepted industry standards.
3. Document any trees that are currently diseased or hazardous.
4. Subtract the number of diseased or hazardous trees in step 3. from the total number of trees on the development site in step 1. The remaining number is the number of healthy trees on the site. Use this number to determine the number of replacement trees in steps 5. through 8.
5. Define the construction area (as defined in Chapter 17.04).
6. Determine the number and diameter of trees to be removed within the construction area. Based on the size of each tree, use Column 2 to determine the number of replacement trees required.
7. Determine the number and diameter of trees to be removed outside of the construction area. Based on the size of each tree, use Column 1 to determine the number of replacement trees required.

8. Determine the total number of replacement trees from steps 6. and 7.
Finding: Complies with Condition. This section requires the tree mitigation plan report be prepared by a certified arborist, horticulturalist, forester or other environmental professionals with experience and academic credentials in forestry or arboriculture, however the name and credentials of the person whom prepared the report was not identified. The applicant has indicated 3 trees will be removed within the construction area to accommodate the proposed building and parking lot. The trees to be removed are (1) 30" tree, (1) 16" tree, and (1) 8" tree. Per table 17.41.060-1, 7 new replacement trees are required. 18 new trees are currently proposed, however, the applicant may not consider a tree required in OCMC 17.52, parking lot landscaping requirements to be considered towards mitigation. Prior to issuance of a building permit associated with this development, the applicant shall submit a revised landscaping plan identifying the trees onsite utilized for each type of the required landscaping as well as mitigation trees. The plan shall demonstrate that the 7 mitigation trees are not counted toward the required landscaping onsite and that the mitigation trees are: planted onsite, planted on another property in Oregon City with a recorded covenant (as necessary), or a fee is paid in lieu of each tree not planted. All options shall comply with the requirements in OCMC 12.08. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.41.070 - Planting area priority for mitigation (Option 1).
Development applications which opt for removal of trees with subsequent replanting pursuant to section 17.41.050A. shall be required to mitigate for tree cutting by complying with the following priority for replanting standards below:
A. First Priority. Replanting on the development site.
B. Second Priority. Off-site replacement tree planting locations. If the community development director determines that it is not practicable to plant the total number of replacement trees on-site, a suitable off-site planting location for the remainder of the trees may be approved that will reasonably satisfy the objectives of this section. Such locations may include either publicly owned or private land and must be approved by the community development director.
Finding: Complies with condition. The applicant indicated that the trees will be planted on the subject site, though as demonstrated within this report, a revised plan is required. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.41.075 - Alternative mitigation plan.
The community development director may, subject to a Type II procedure, approve an alternative mitigation plan that adequately protects habitat pursuant to the standards for the natural resource overlay district alternative mitigation plan, Section 17.49.190.
Finding: Complies with condition. The applicant indicated that the trees will be planted on the subject site, though as demonstrated within this report, a revised plan is required. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.41.080 - Tree preservation within subdivisions and partitions—Dedicated tract (Option 2).
A. Applicants for new subdivision and partition plats may delineate and show the regulated trees or groves as either a separate tract or part of a larger tract that meets the requirements of subsection D. of this section.
B. The standards for land divisions subject to this section shall apply in addition to the requirements of the city land division ordinance and zoning ordinance, provided that the minimum lot area, minimum average lot width, and minimum average lot depth standards of the base zone may be superseded in order to allow for a reduction of dimensional standards pursuant to Section 17.41100 below.

C. Prior to preliminary plat approval, the regulated tree or grove area shall be shown either as a separate tract or part of a larger tract that meets the requirements of subsection D. of this section, which shall not be a part of any parcel used for construction of a structure. The size of the tract shall be the minimum necessary as recommended by a consulting arborist to adequately encompass the dripline of the tree, protect the critical root zone and ensure long term survival of the tree or grove.
D. Prior to final plat approval, ownership of the regulated tree or grove tract shall be identified to distinguish it from lots intended for sale. The tract may be identified as any one of the following:
1. Private open space held by the owner or a homeowners association; or
2. For residential land divisions, private open space subject to an easement conveying stormwater and surface water management rights to the city and preventing the owner of the tract from activities and uses inconsistent with the purpose of this document; or
3. At the owners option, public open space where the tract has been dedicated to the city or other governmental unit; or
4. Any other ownership proposed by the owner and approved by the community development director.
Finding: Not Applicable. The proposed development is not within a land division.

17.41.090 - Density transfers incentive for tree protection tracts (Option 2).
A. The purpose of this section is to allow dimensional adjustments within a regulated tree protection tract to be transferred outside said tract to the remainder of the site. This provision applies on-site and density shall not be transferred beyond the boundaries of the development site.
B. Development applications for subdivisions and minor partitions that request a density transfer shall:
1. Provide a map showing the net buildable area of the tree protection tract;
2. Provide calculations justifying the requested dimensional adjustments;
3. Demonstrate that the minimum lot size requirements can be met based on an average of all lots created, including the tree protection tract created pursuant toSection 17.41.080;
4. Demonstrate that, with the exception of the tree protection tract created pursuant to Section 17.41.080, no parcels have been created which would be unbuildable in terms of minimum yard setbacks;
5. Meet all other standards of the base zone except as modified in section 17.41.100.
C. The area of land contained in a tree protection tract may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code.
Finding: Not Applicable. Option 2 is not being proposed.

17.41.100 - Permitted modifications to dimensional standards (Option 2 only).
A. An applicant proposing to protect trees in a dedicated tract pursuant to section 17.41.080 may request, and the community development director, pursuant to a Type II procedure, may grant a reduction to, the lot size, width, depth, and setbacks of the underlying zone district in approving a subdivision or partition if necessary to retain a regulated tree or grove in a tract, as long as the calculation of average lot size, including tree protection tracts, meet the minimum lot size for the zone. The applicant may choose to make the adjustments over as many lots as required. For example, the lot reduction could be spread across all the remaining lots in the proposed subdivision or partition or could be applied to only those needed to incorporate the area of the tree tract.

Table 17.41.100 A
Lot Size Reduction

ZONE	*Min. Lot Size [sq. feet]*	*Min. Lot Width*	*Min. Lot Depth*
R-10	*5,000 sq. feet*	*50'*	*65'*

R-8	*4,000 sq. feet*	*45'*	*60'*
R-6	*3,500 sq. feet*	*35'*	*55'*
R-5	*3,000 sq. feet*	*30'*	*50'*
R-3.5	*1,800 sq. feet*	*20'*	*45'*

Table 17.41.100 B
Reduced Dimensional Standards for Detached Single-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
8,000—9,999 square feet	*15 feet*	*20 feet*	*7/9 feet*	*15 feet*	*40%*
6,000—7,999 square feet	*10 feet*	*15 feet*	*5/7 feet*	*15 feet*	*40%*
4,000—5,999 square feet	*10 feet*	*15 feet*	*5/5 feet*	*10 feet*	*40%*
1,800—3,999 square feet	*5 feet*	*15 feet*	*5/5 feet*	*10 feet*	*55%*

Table 17.41.100 C
Reduced Dimensional Standards for Single-Family Attached or Two-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
3,500—7,000 square feet	*10 feet*	*15 feet*	*5/0* feet*	*10 feet*	*40%*
1,800—3,499 square feet	*5 feet*	*15 feet*	*5/0* feet*	*10 feet*	*55%*

**0 foot setback is only allowed on single-family attached units*

Finding: Not Applicable. Option 2 is not being proposed.

17.41.110 - Tree protection by restrictive covenant (Option 3).
Any regulated tree or grove which cannot be protected in a tract pursuant toSection 17.41.080 above shall be protected with a restrictive covenant in a format to be approved by the community development director. Such covenant shall be recorded against the property deed and shall contain provisions to permanently protect the regulated tree or grove unless such tree or grove, as determined by a certified arborist and approved by the community development director, are determined to be diseased or hazardous.

Finding: Not Applicable. Option 3 is not being proposed.

17.41.120 - Permitted adjustments (Option 3 Only).
A. The community development director, pursuant to a Type II procedure, may grant an adjustment to the side, front and rear yard setback standards by up to 50 percent if necessary to retain a Regulated Tree or Grove through a restrictive covenant pursuant to this section. In no case may the side yard setback be reduce less than three feet. The adjustment shall be the minimum necessary to accomplish preservation of trees on the lot and shall not conflict with other conditions imposed on the property.
B. The community development director, pursuant to a Type II procedure, may grant an adjustment to street standards, pursuant to adopted public works standards, in order to preserve a tree. This may include flexibility to redesign sidewalk and planter strip sizes and locations and allow placement of sidewalks and planter strips in an easement within private lots.
C. The community development director, pursuant to a Type II procedure, may allow other adjustments in order to preserve any healthy tree that cannot be moved due to its size, but will contribute to the landscape character of the area and will not present a foreseeable hazard if retained.
Finding: Not Applicable. Option 3 is not being proposed.

17.41.1[25] - Cash-in-lieu of planting (tree bank/fund) (Option 4).
The applicant may choose this option in-lieu-of or in addition to Compliance Options 1 through 3. In this case, the community development director may approve the payment of cash-in-lieu into a dedicated fund for the remainder of trees that cannot be replanted in the manner described above.
A. The cash-in-lieu payment per tree shall be as listed on the adopted fee schedule and shall be adjusted annually based on the Consumer Price Index (Index). The price shall include the cost of materials, transportation and planting.
B. The amount of the cash-in-lieu payment into the tree bank shall be calculated as the difference between the value of the total number of trees an applicant is required to plant, including cost of installation and adjusted for Consumer Price Index, minus the value of the trees actually planted. The value of the trees shall be based on the adopted fee schedule.
Finding: Complies with condition. The applicant indicated that the trees will be planted on the subject site, though as demonstrated within this report, a revised plan is required. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

17.41.130 - Regulated tree protection procedures during construction.
A. No permit for any grading or construction of public or private improvements may be released prior to verification by the community development director that regulated trees designated for protection or conservation have been protected according to the following standards. No trees designated for removal shall be removed without prior written approval from the community development director.
B. Tree protection shall be as recommended by a qualified arborist or, as a minimum, to include the following protective measures:
1. Except as otherwise determined by the community development director, all required tree protection measures set forth in this section shall be instituted prior to any development activities, including, but not limited to clearing, grading, excavation or demolition work, and such measures shall be removed only after completion of all construction activity, including necessary landscaping and irrigation installation, and any required plat, tract, conservation easement or restrictive covenant has been recorded.
2. Approved construction fencing, a minimum of four feet tall with steel posts placed no farther than ten feet apart, shall be installed at the edge of the tree protection zone or dripline, whichever is greater. An alternative may be used with the approval of the community development director.

3. Approved signs shall be attached to the fencing stating that inside the fencing is a tree protection zone, not to be disturbed unless prior approval has been obtained from the community development director.
4. No construction activity shall occur within the tree protection zone, including, but not limited to; dumping or storage of materials such as building supplies, soil, waste items; nor passage or parking of vehicles or equipment.
5. The tree protection zone shall remain free of chemically injurious materials and liquids such as paints, thinners, cleaning solutions, petroleum products, and concrete or dry wall excess, construction debris, or run-off.
6. No excavation, trenching, grading, root pruning or other activity shall occur within the tree protection zone unless directed by an arborist present on site and approved by the community development director.
7. No machinery repair or cleaning shall be performed within ten feet of the dripline of any trees identified for protection.
8. Digging a trench for placement of public or private utilities or other structure within the critical root zone of a tree to be protected is prohibited. Boring under or through the tree protection zone may be permitted if approved by the community development director and pursuant to the approved written recommendations and on-site guidance and supervision of a certified arborist.
9. The city may require that a certified arborist be present during any construction or grading activities that may affect the dripline of trees to be protected.
10. The community development director may impose conditions to avoid disturbance to tree roots from grading activities and to protect trees and other significant vegetation identified for retention from harm. Such conditions may include, if necessary, the advisory expertise of a qualified consulting arborist or horticulturist both during and after site preparation, and a special maintenance/management program to provide protection to the resource as recommended by the arborist or horticulturist.
C. Changes in soil hydrology due to soil compaction and site drainage within tree protection areas shall be avoided. Drainage and grading plans shall include provision to ensure that drainage of the site does not conflict with the standards of this section. Excessive site run-off shall be directed to appropriate storm drainage facilities and away from trees designated for conservation or protection.
Finding: Complies as Proposed. The applicant has indicated that no existing trees will remain on the subject site. The applicant has submitted a landscaping plan illustrating the placement of the new trees required for mitigation of the removal of all the trees on the site.

CHAPTER 17.50 - ADMINISTRATION AND PROCEDURES

17.50.030 Summary of the City's Decision-Making Processes.
Finding: Complies as Proposed. The proposed Site Plan and Design Review, Conditional Use, and variance application is being reviewed pursuant to the Type III process. Notice was posted onsite, online and mailed to property owners within 300 feet of the proposed development site and posted in the paper.

17.50.050 Preapplication Conference
A. Preapplication Conference. Prior to submitting an application for any form of permit, the applicant shall schedule and attend a preapplication conference with City staff to discuss the proposal. To schedule a preapplication conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans. The purpose of the preapplication conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval

standards, fees and other information that may affect the proposal. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the preapplication conference. Notwithstanding any representations by City staff at a preapplication conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.
B.A preapplication conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant must schedule and attend another conference before the city will accept a permit application. The community development director may waive the preapplication requirement if, in the Director's opinion, the development does not warrant this step. In no case shall a preapplication conference be valid for more than one year.
Finding: Complies as Proposed. A pre-application conference was held on March 15, 2017 with Hennebery Eddy Architects, Clackamas Fire District and City staff to discuss all relevant review procedures and standards.

17.50.055 Neighborhood Association Meeting
Finding: Complies as Proposed. The applicant's representatives attended the Gaffney Lane Neighborhood general membership meeting on April 28, 2017 to present conceptual plans for the proposed development.

17.50.060 Application Requirements.
Finding: Complies as Proposed. All application materials required are submitted with this narrative. The applicant has provided full-size and two reduced size sets of plans to accompany the submittal items.

17.50.070 Completeness Review and 120-day Rule.
Finding: Complies as Proposed. This land use application was submitted on April 17, 2017. The application was deemed incomplete on May 17, 2017 and after the submittal of additional information the application on May 222, 2017, the application was deemed incomplete again on May 25, 2017. Additional information was submitted June 2, 2017 and the application was deemed complete on July 14, 2017. The City has until October 11, 2017 to make a final determination.

17.50.080 Complete Application--Required Information.
Finding: Complies as Proposed. This land use application was submitted on April 17, 2017. The application was deemed incomplete on May 17, 2017 and after the submittal of additional information the application on May 222, 2017, the application was deemed incomplete again on May 25, 2017. Additional information was submitted June 2, 2017 and the application was deemed complete on July 14, 2017.
17.50.090 Public Notices.
Finding: Complies as Proposed. Staff provided public notice within 300' of the site via mail, the site was posted with multiple Land Use Notices, posted on the Oregon City website and in a general circulation newspaper. Staff provided email transmittal or the application and notice to affected agencies, the Natural Resource Committee and to all Neighborhood Associations requesting comment. All comments received on this application have been identified at the beginning of this report.

17.50.100 Notice Posting Requirements.
Finding: Complies as Proposed. The site was posted with a sign longer than the minimum requirement.

CHAPTER 17.54.010 – ACCESSORY STRUCTURES

Finding: Not Applicable. This section is intended to be applied to single and two-family dwellings. Accessory structures are reviewed through the Site Plan and Design Review criteria.

CHAPTER 17.54.100 - FENCES

Finding: Complies with condition. The applicant has indicated the subject property is bounded by an existing chain-link fence along its north, east and south boundaries. The north chain-link fence is 8'-0" tall and straddles the property line. The east chain-link fence is 5'-0" tall and straddles the property line. The south chain-link fence is 5'-0" tall, straddles the property line and terminates at the west end of the existing fire station. In order to maintain security for the staff and rear apparatus area of the site, (2) steel, powder-coated painted fences are proposed to tie into the north and south chain-link fences. The proposed fence at the north side of the building will incorporate a security gate. The applicant did not indicate the height of the proposed fencing or retaining walls. Prior to issuance of a permit the applicant shall submit documentation demonstrating compliance with the fence height requirements in OCMC 17.54.100. Per OCMC 17.54.100.B.4, fencing may be allowed to be up to 8 feet in height adjacent to or behind the front of the building. **Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.**

CHAPTER 17.58 LAWFUL NONCONFORMING USES, STRUCTURES AND LOTS

17.58.015 Applicability.

The regulations of this chapter apply only to those nonconforming situations that were lawfully established or that were approved through a land use decision. All nonconforming structures, uses or lots shall have been maintained over time. These situations have lawful nonconforming status. Nonconforming situations that were not allowed when established or have not been maintained over time have no lawful right to continue.

Finding: Applies. The subject site was developed prior to implementation of the existing zoning code. The structure is constructed in a manner which does not comply with exterior building design standards and in a location which is too far from the frontage. In addition, there is existing chain link fencing onsite and a variety of other designs which do not comply with the current standards in the Oregon City Municipal Code.

A structure that was lawfully established but no longer conforms to all development standards of this land use code (such as setbacks) shall be considered a lawful nonconforming structure. Notwithstanding development standard requirements in this Code, minor repairs and routing maintenance of a lawful nonconforming structure are permitted. The continuation of a lawful nonconforming structure is subject to the following:

A. Accidental Destruction. When a nonconforming structure is damaged by fire or other causes, the structure may be rebuilt using the same structure footprint.

B. Intentional Destruction. When a nonconforming structure is removed or intentionally damaged by fire or other causes within the control of the owner, the replacement structure shall comply with the development standards of this title.

C. Expansion. An expansion of a lawful nonconforming structure may be approved, conditionally approved or denied in accordance with the standards and procedures of this section.

1. In making a determination on such applications, the decision maker shall weigh the proposal's positive and negative features and the public convenience or necessity to be served against any adverse conditions that would result from authorizing the particular development at the location proposed, and, to approve such expansion, it must be found that the criteria identified in Section 17.58.060have either been met, can be met by observance of conditions, or are not applicable.

2. An expansion of a nonconforming structure with alterations that exceed the threshold of subparagraph C.2.a. below shall comply with the development standards listed in subparagraph C.2.b. The value of the alterations and improvements is based on the entire project and not individual building permits.
a. Thresholds triggering compliance. The standards of subparagraph C.2.b. below shall be met when the value of the proposed exterior alterations or additions to the site, as determined by the community development director, is more then seventy-five thousand dollars. The following alterations and improvements shall not be included in the threshold calculation:
1. Proposed alterations to meet approved fire and life safety agreements;
2. Alterations related to the removal of existing architectural barriers, as required by the Americans with Disabilities Act, or as specified in Section 1113 of the Oregon Structural Specialty Code;
3. Alterations required to meet Seismic Design Requirements; and
4. Improvements to on-site stormwater management facilities in conformance with Oregon City Stormwater Design Standards.
b. Standards that shall be met. Developments not complying with the development standards listed below shall be brought into conformance.
1. Pedestrian circulation systems, as set out in the pedestrian standards that apply to the sites;
2. Minimum perimeter parking lot landscaping;
3. Minimum interior parking lot landscaping;
4. Minimum site landscaping requirements;
5. Bicycle parking by upgrading existing racks and providing additional spaces in order to comply with Chapter 17.52—Off-Street Parking and Loading;
6. Screening; and
7. Paving of surface parking and exterior storage and display areas.
c. Area of required improvements.
1. Generally. Except as provided in C.2.c.2. below, required improvements shall be made for the entire site.
2. Exception for sites with ground leases. Required improvements may be limited to a smaller area if there is a ground lease for the portion of the site where the alterations are proposed. If all of the following are met, the area of the ground lease will be considered as a separate site for purposes of required improvements. The applicant shall meet the following:
i. The signed ground lease — or excerpts from the lease document satisfactory to the city attorney — shall be submitted to the community development director. The portions of the lease shall include the following:
•The term of the lease. In all cases, there must be at least one year remaining on the ground lease; and
•A legal description of the boundaries of the lease.
ii. The boundaries of the ground lease shall be shown on the site plan submitted with the application. The area of the lease shall include all existing and any proposed development that is required for, or is used exclusively by, those uses within the area of the lease; and
iii. Screening shall not be required along the boundaries of ground leases that are interior to the site.
d. Timing and cost of required improvements. The applicant may choose one of the two following options for making the required improvements:
1. Option 1. Required improvements may be made as part of the alteration that triggers the required improvements. The cost of the standards that shall be met, identified in subparagraph C.2.b. above, is limited to ten percent of the value of the proposed alterations. It is the responsibility of the applicant to document to the community development director the value of the required improvements. Additional costs may be required to comply with other applicable requirements associated with the proposal. When all required improvements are not being made, the priority for the improvements shall be as listed in subparagraph C.2.b. above.
2. Option 2. Required improvements may be made over several years, based on the compliance period identified in Table 17.58—1 below. However, by the end of the compliance period, the site shall be brought fully into compliance with the standards listed in subparagraph C.2.b. Where this option is chosen, the following must be met:

i. Before a building permit is issued, the applicant shall submit the following to the community development director:
•A Nonconforming Development Assessment, which identifies in writing and on a site plan, all development that does not meet the standards listed in Subparagraph C.2.b.
•A covenant, in a form approved by the city attorney, executed by the property owner that meets the requirements of 17.50.150. The covenant shall identify development on the site that does not meet the standards listed in Subparagraph C.2.b., and require the owner to bring that development fully into compliance with this title. The covenant shall also specify the date by which the owner will be in conformance. The date must be within the compliance periods set out in Table17.58 — 1.
ii. The nonconforming development identified in the Nonconforming Development Assessment shall be brought into full compliance with the requirements of this Title within the following compliance periods. The compliance period begins when a building permit is issued for alterations to the site of more than seventy-five thousand dollars. The compliance periods are based on the size of the site (see Table 17.58—1 below).
iii. By the end of the compliance period, the applicant or owner shall request that the site by certified by the community development director as in compliance. If the request is not received within that time, or if the site is not fully in conformance, no additional building permits will be issued.
iv. If the regulations referred to by subparagraph C.2.b. are amended after the Nonconforming Development Assessment is received by the community development director, and those amendments result in development on the site that was not addressed by the Assessment becoming nonconforming, the applicant shall address the new nonconforming development using Option 1 or 2. If the applicant chooses Option 2, a separate Nonconforming Development Assessment, covenant and compliance period will be required for the new nonconforming development.
Table 17.58—1
Compliance Periods for Option 2

Square footage of site	*Compliance Period*
Less than 150,000 sq. ft.	*2 years*
150,000 sq. ft. or more, up to 300,000 sq. ft.	*3 years*
300,000 sq. ft. or more, up to 500,000 sq. ft.	*4 years*
More than 500,000 sq. ft.	*5 years*

Finding: Complies as proposed. The proposed development would comply with the Oregon City Municipal Code with approval of the proposed Variances and with compliance with the conditions of approval. The applicant proposed to demolish the site and reconstruct the following items in compliance with the code.

1. Pedestrian circulation systems, as set out in the pedestrian standards that apply to the sites;
2. Minimum perimeter parking lot landscaping;
3. Minimum interior parking lot landscaping;
4. Minimum site landscaping requirements;
5. Bicycle parking by upgrading existing racks and providing additional spaces in order to comply with Chapter 17.52—Off-Street Parking and Loading;
6. Screening; and
7. Paving of surface parking and exterior storage and display areas.

As all of the upgrades are being completed, no additional nonconforming improvements are required.
Staff has determined that it is possible, likely and reasonable that the applicant can meet this standard through the Conditions of Approval.

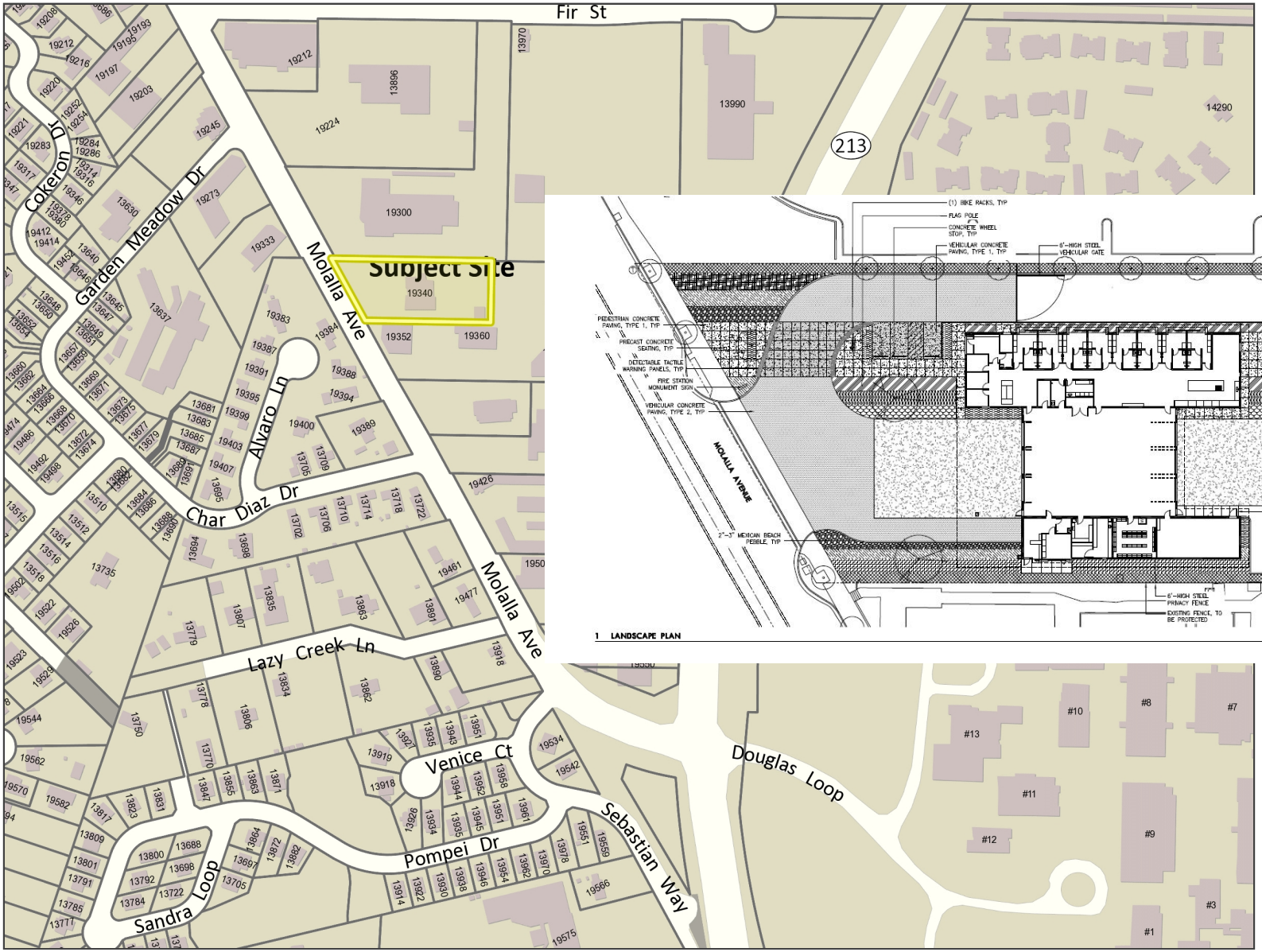
CONCLUSION AND RECOMMENDATION:

Based on the analysis and findings as described above, Staff concludes that the proposed Site Plan and Design Review, Condition Use, and two Variances for a site located at 19340 Molalla Avenue, Oregon City, Oregon 97045 and identified as Clackamas County Map 3-2E-9B, Tax Lot 1601, can meet the requirements as described in the Oregon City Municipal Code by complying with the Conditions of Approval provided in this report. Therefore, the Community Development Director recommends the Planning Commission approve files SP 17-40, CU 17-02, VR 17-02, & VR 17-03 with conditions, based upon the findings and exhibits contained in this staff report.

EXHIBITS:

1. Vicinity Map
2. Applicant's Narrative and Plans
3. Dorothy Dahlsrud Comments

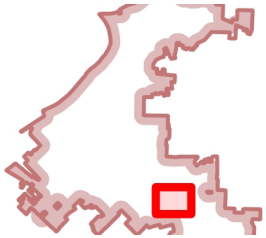
SP 17-40, CU 17-02, VR 17-02 and VR 17-03



Legend

- Taxlots
- Taxlots (Outside UGB)
- Unimproved ROW
- City Limits
- UGB
- Basemap

Overview Map



The City of Oregon City makes no representations, express or implied, as to the accuracy, completeness and timeliness of the information displayed. This map is not suitable for legal, engineering, surveying or navigation purposes. Notification of any errors is appreciated.

Map created 6/14/2017

N

0 400 800 Feet

1: 4,800

City of Oregon City
PO Box 3040
625 Center St
Oregon City
OR 97045
(503) 657-0891
www.orcity.org

TYPE III LAND USE REVIEW FOR:

EMERGENCY SERVICE FIRE STATION

CONDITIONAL USE AND SITE PLAN AND DESIGN REVIEW

OREGON CITY, OREGON

DATE: APRIL 17, 2017

APPLICANT:

CLACKAMAS FIRE DISTRICT #1
11300 SE FULLER ROAD
MILWAUKIE, OR 97222
PHONE: 503-742-2600

REPRESENTATIVES:

HENNEBERY EDDY ARCHITECTS
921 SW WASHINGTON ST. SUITE 250
PORTLAND, OR 97205
PHONE: 503-227-4860
CONTACT: CAMILLA COK

Table of Contents:

- Land Use Application Form
- Narrative
- Drawings
    - A1 - Architectural Site Plan
    - A2 - Architectural Floor Plan
    - A3 - Exterior Elevations
    - C100 - Existing Conditions Plan
    - C111 - Erosion Control Plan
    - C200 - Civil Site Plan
    - C300 - Grading Plan
    - C400 - Utilities Plan
    - L001 – Tree Mitigation Plan
    - L101 - Landscape Plan
    - E1 - Site Illumination Plan
- Appendix
    - Preliminary Title Report
    - Pre-Application Conference Summary Notes
    - Summary of Neighborhood Association Meeting
    - Archeological & Cultural Review Letter and Email
    - Light Fixture Types
    - Site Furnishings
    - Materials Board
    - Preliminary Stormwater Calculations
    - Geotechnical Investigation Report

OREGON CITY

Community Development – Planning

221 Molalla Ave. Suite 200 | Oregon City OR 97045
Ph (503) 722-3789 | Fax (503) 722-3880

LAND USE APPLICATION FORM

Type I (OCMC 17.50.030.A)	Type II (OCMC 17.50.030.B)	Type III / IV (OCMC 17.50.030.C)
☐ Compatibility Review	☐ Extension	☐ Annexation
☐ Lot Line Adjustment	☐ Detailed Development Review	☐ Code Interpretation / Similar Use
☐ Non-Conforming Use Review	☐ Geotechnical Hazards	☐ Concept Development Plan
☐ Natural Resource (NROD) Verification	☐ Minor Partition (<4 lots)	☒ Conditional Use
☐ Site Plan and Design Review	☐ Minor Site Plan & Design Review	☐ Comprehensive Plan Amendment (Text/Map)
	☐ Non-Conforming Use Review	☐ Detailed Development Plan
	☒ Site Plan and Design Review	☐ Historic Review
	☐ Subdivision (4+ lots)	☐ Municipal Code Amendment
	☐ Minor Variance	☒ Variance
	☐ Natural Resource (NROD) Review	☐ Zone Change

File Number(s): _____

Proposed Land Use or Activity: Replace existing fire station with new fire station for Clackamas Fire District #1

Project Name: Fire Station 16 **Number of Lots Proposed (If Applicable):** _____

Physical Address of Site: 19340 Molalla Avenue, Oregon City, OR

Clackamas County Map and Tax Lot Number(s): 3-2E-09B-01601

Applicant(s):

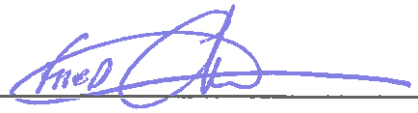
Applicant(s) Signature: 

Applicant(s) Name Printed: Ryan Hari **Date:** 4.12.17

Mailing Address: 11300 SE Fuller Road, Milwaukie, OR 97222

Phone: 503-742-2600 **Fax:** _____ **Email:** ryan.hari@clackamasfire.com

Property Owner(s):

Property Owner(s) Signature: 

Property Owner(s) Name Printed: Clackamas Fire District #1 **Date:** 4.12.17

Mailing Address: 11300 SE Fuller Road, Milwaukie, OR 97222

Phone: 503-742-2600 **Fax:** _____ **Email:** _____

Representative(s):

Representative(s) Signature: _____

Representative (s) Name Printed: Camilla Cok **Date:** 4.17.17

Mailing Address: 921 SW Washington Street, Suite 250, Portland OR 97205

Phone: 503-227-4860 **Fax:** 503-227-4920 **Email:** ccok@henneberyeddy.com

All signatures represented must have the full legal capacity and hereby authorize the filing of this application and certify that the information and exhibits herewith are correct and indicate the parties willingness to comply with all code requirements.

Clackamas Fire District #1 – Fire Station 16 Replacement
4/17/2017

OWNER/APPLICANT: Clackamas Fire District #1
11300 SE Fuller Road
Milwaukie, OR 97222
Contact: Ryan Hari
Phone: 503.742.2600

APPLICANT REPRESENTATIVE: Camilla Cok
Hennebery Eddy Architects, Inc
921 SW Washington Street, Suite 250
Portland, OR 97205
Phone: 503.227.4860

REQUEST: The request of this land use application is to construct a new fire station. The applicant is proposing an Emergency Service Facility Conditional Use, Variance, and a Site Plan Design Review. The attached land use proposal shows how the development meets the current City code and is a vital asset to the safety of the surrounding community.

LOCATION: The project site is located on 19340 Molalla Avenue, in Oregon City, Taxlot Number 3-2E-09B-01601. The zoning of the property is C – General Commercial District in a Natural Resource Overlay District.

I. BACKGROUND:

1. Existing Conditions

The +/- 1.39-acre parcel is located at 19340 Molalla Avenue, in Oregon City. The site is bordered by Molalla Avenue to the west, and commercial/industrial development to the north, east, and south. The site gently slopes to the west with a total relief of approximately 8 feet. The site is currently occupied by the existing single-story fire station, a storage building, and a temporary modular building. Most the remainder of the site is paved with asphalt concrete parking lot and drive lanes. Vegetation on the site is limited to grasses and landscaped trees in planters on the edges of the parking area.

2. Project Description

The site plan is for a proposed replacement fire station, as the existing is no longer habitable due to mold and moisture issues. The new fire station will include a new three (3) bay, double-deep, Apparatus Bay and a new Living Quarters for eight (8) fire crew per shift. Three distinctive programs support the 24-hour emergency response requirements: 1) the Apparatus Bay, which houses emergency vehicles. 2) the public/visitor entry, which includes a small lobby and ADA restroom. While the front door is generally kept locked, there is a call button which can be used by the public 24 hours a day in case of emergency. And, 3) the Living Quarters, which is where the staff live while they are on shift.

The fire station requires a site configuration that is driven by the operational requirements of 24-hour emergency response. The life safety operational requirements dictate how the site is configured, as it is necessary and extremely important to have the most unobstructed, safe, and efficient route of travel to the scene of an emergency and limit public access to the staff parking area.

II. RESPONSES TO THE OREGON CITY MUNICIPAL CODE:

CHAPTER 17.32 "C" GENERAL COMMERCIAL DISTRICT

17.32.020 - Permitted uses.
A. Any use permitted in the MUC - Mixed Use Corridor zone with no maximum footprint size, unless otherwise restricted in Sections 17.24.020, 17.24.030 or 17.24.040;
B. Hotels and motels;
C. Drive-in or drove through facilities;
D. Passenger terminals (water, auto, bus, train);
E. Gas stations;
F. Outdoor markets that do not meet Section 17.29.020.H;
G. Motor vehicle and recreational vehicle sales and/or incidental service;
H. Motor vehicle and recreational vehicle repair and/or service;
I. Custom or specialized vehicle alterations or repair wholly within a building.

Applicant's Response: Refer to response provided in Section 17.32.030.

17.32.030 - Conditional uses.
The following conditional uses are permitted when authorized and in accordance with the standards contained in Chapter 17.56:

A. Religious institutions;
B. Hospitals;
C. Self service storage facilities;
D. Public utilities, including sub-stations (such as buildings, plants and other structures);
E. Public and/or private educational or training facilities;
F. Parking structures and lots not in conjunction with a primary use;
G. Emergency service facilities (police and fire), excluding correctional facilities.

Applicant's Response: The proposed use is for an Emergency Service Facility. Refer to responses provided in Section 17.56.

7.32.040 - Prohibited uses in the General Commercial District.
The following uses are prohibited in the General Commercial District:
A. Distribution, wholesaling and warehousing.
B. Outdoor sales or storage (Except secured areas for overnight parking or temporary parking of vehicles used in the business. Sales of products not located under a roof may be allowed if they are located in an area that is architecturally connected to the primary structure, is an ancillary use and is approved through the Site Plan and Design Review process. This area may not exceed fifteen percent of the building footprint of the primary building).
C. General manufacturing or fabrication.

D. Heavy equipment service, repair, sales, storage or rental (including but not limited to construction equipment and machinery and farming equipment).
E. Marijuana production, processing, wholesaling, research, testing, and laboratories.

Applicant's Response: Not applicable. The proposed use is not a prohibited use.

17.32.050 - Dimensional standards.
A. Minimum lot area: None.

Applicant's Response: While no minimum lot area is specified for the C zone, the subject property provides sufficient space to accommodate the new fire station and site support elements.

B. Maximum building height: Sixty feet.

Applicant's Response: The proposed fire station building height varies from front (West) to back (East). The high point (West) is 24-feet and the low point is 18-feet. This standard is met.

C. Minimum required setbacks if not abutting a residential zone: None.

Applicant's Response: While no minimum setback is required for the C zone. The side and rear setback requirements and proposed distances are summarized in this table. The front yard proposed setback is addressed in 17.32.050.E and 17.62.055.

Location	Minimum Setback Required	Proposed
North (Side)	None	35'-2"
South (Side)	None	12'-0"
East (Rear)	None	115'-6"

D. Minimum required interior and rear yard setbacks if abutting a residential zone: twenty feet, plus one foot additional yard setback for every two feet of building height over thirty-five feet.

Applicant's Response: Not applicable. The subject property is not adjacent to a residential zone.

E. Maximum Allowed Setbacks.
1. Front yard setback: Five feet (may be expanded with Site Plan and Design Review Section 17.62.055).

Applicant's Response: The proposed front yard setback exceeds the five-foot maximum. A variance is being sought to exceed the setback requirement. Refer to Site Variance responses provided in Section 17.60.

2. Interior side yard setback: None.

Applicant's Response: Refer to response provided in Section 17.32.050.C.

3. Corner side yard setback abutting street: None

Applicant's Response: Not applicable. The subject property is not located on a corner

4. Rear yard setback: None.

Applicant's Response: Refer to response provided in Section 17.32.050.C.

F. Maximum site coverage of building and parking lot: Eighty-five percent

Applicant's Response: The proposed building and parking lot coverage is approximately 55% (33,080 sq. ft.). Therefore, this criterion is met.

G. Minimum landscaping requirement (including parking lot): Fifteen percent.

Applicant's Response: A total of 21% (12,486 sq. ft.) landscape is proposed for the site. Therefore, this criterion is met.

CHAPTER 17.62 SITE PLAN AND DESIGN REVIEW

17.62.015 - Modifications that will better meet design review requirements.
The review body may consider modification of site-related development standards. These modifications are done as part of design review and are not required to go through the Variance process pursuant to section 17.60.020. Adjustments to use-related development standards (such as floor area ratios, intensity of use, size of the use, number of units, or concentration of uses) are required to go through the Variance process pursuant to section 17.60.020. Modifications that are denied through design review may be requested as Variance through the Variance process pursuant to section 17.60.020. The review body may approve requested modifications if it finds that the applicant has shown that the following approval criteria are met:
A. The modification will result in a development that better meets design guidelines; and
B. The modification meets the intent of the standard. On balance, the proposal will be consistent with the purpose of the standard for which a modification is requested.

Applicant's Response: No modifications are being proposed.

17.62.020 - Preapplication conference.
Prior to filing for site plan and design review approval, the applicant shall confer with the community development director pursuant to Section 17.50.030. The community development director shall identify and explain the relevant review procedures and standards.

Applicant's Response: A pre-application conference was held on March 15, 2017 with Hennebery Eddy Architects, Clackamas Fire District and City staff to discuss all relevant review procedures and standards.

17.62.030 - When required.
Site plan and design review shall be required for all development of real property in all zones except the R-10, R-8, R-6, R-5 and R-3.5 zoning districts, unless otherwise provided for by this title or as a condition of approval of a permit. Site plan and design review shall also apply to all conditional uses, cottage housing development, multi-family and non-residential uses in all zones. No building permit or other permit authorization for development shall be issued prior to site plan and design review approval. Parking lots and parking areas accessory to uses regulated by this chapter also shall require site plan and

design review approval. Site plan and design review shall not alter the type and category of uses permitted in zoning districts.

Applicant's Response: The proposed development is in a General Commercial zone (C) and the use is an existing non-conforming use subject to a Conditional Use approval. This project will be subject to Site plan and design review.

17.62.035 - Minor site plan and design review.

Applicant's Response: Not applicable. The proposed development is for a new fire station. Therefore, a major site plan and design review is applicable.

17.62.040 - Plans required.
A complete application for site plan and design review shall be submitted. Except as otherwise in subsection I of this section, the application shall include the following plans and information:
A. A site plan or plans, to scale, containing the following:
1. Vicinity information showing streets and access points, pedestrian and bicycle pathways, transit stops and utility locations;
2. The site size, dimensions, and zoning, including dimensions and gross area of each lot or parcel and tax lot and assessor map designations for the proposed site and immediately adjoining properties;
3. Contour lines at two-foot contour intervals for grades zero to ten percent, and five-foot intervals for grades over ten percent;
4. The location of natural hazard areas on and within one hundred feet of the boundaries of the site, including:
a. Areas indicated on floodplain maps as being within the one hundred-year floodplain,
b. Unstable slopes, as defined in Section 17.44.020,
c. Areas identified on the seismic conditions map in the comprehensive plan as subject to earthquake and seismic conditions;
5. The location of natural resource areas on and within one hundred feet of the boundaries of the site, including fish and wildlife habitat, existing trees (six inches or greater in caliper measured four feet above ground level), wetlands, streams, natural areas, wooded areas, areas of significant trees or vegetation, and areas designated as being within the natural resources overlay district;
6. The location of inventoried historic or cultural resources on and within one hundred feet of the boundaries of the site;
7. The location, dimensions, and setback distances of all existing permanent structures, improvements and utilities on or within twenty-five feet of the site, and the current or proposed uses of the structures;
8. The location, dimensions, square footage, building orientation and setback distances of proposed structures, improvements and utilities, and the proposed uses of the structures by square footage;
9. The location, dimension and names, as appropriate, of all existing and platted streets, other public ways, sidewalks, bike routes and bikeways, pedestrian/bicycle accessways and other pedestrian and bicycle ways, transit street and facilities, neighborhood activity centers, and easements on and within two hundred fifty feet of the boundaries of the site;
10. The location, dimension and names, as appropriate, of all proposed streets, other public ways, sidewalks, bike routes and bikeways, pedestrian/bicycle accessways and other pedestrian and bicycle ways, transit streets and facilities, neighborhood activity centers, and easements on and within two hundred fifty feet of the boundaries of the site;
11. All parking, circulation, loading and servicing areas, including the locations of all carpool, vanpool and bicycle parking spaces as required in Chapter 52 of this title;

12. Site access points for automobiles, pedestrians, bicycles and transit;
13. On-site pedestrian and bicycle circulation;
14. Outdoor common areas proposed as open space;
15. Total impervious surface created (including buildings and hard ground surfaces).
16. The proposed location, dimensions and materials of fences and walls.
B. A landscaping plan, drawn to scale, showing the location and types of existing trees (six inches or greater in caliper measured four feet above ground level) and vegetation proposed to be removed and to be retained on the site, the location and design of landscaped areas, the varieties, sizes and spacings of trees and plant materials to be planted on the site, other pertinent landscape features, and irrigation systems required to maintain plant materials.
C. Architectural drawings or sketches, drawn to scale and showing floor plans, elevations accurately reflected to grade, and exterior materials of all proposed structures and other improvements as they will appear on completion of construction.
D. A materials board, no larger size than eleven inches by seventeen inches clearly depicting all building materials with specifications as to type, color and texture of exterior materials of proposed structures. An electronic version may be accepted as an alternative if approved by the community development director.
E. An erosion/sedimentation control plan, in accordance with the requirements of Chapter 17.47 and the Public Works Erosion and Sediment Control Standards, and a drainage plan developed in accordance with city drainage master plan requirements, Chapter 13.12 and the Public Works Stormwater and Grading Design Standards. The drainage plan shall identify the location of drainage patterns and drainage courses on and within one hundred feet of the boundaries of the site. Where development is proposed within an identified hazard area, these plans shall reflect concerns identified in the hydrological/geological/geotechnical development impact statement.
F. The legal description of the site.
G. An exterior lighting plan, drawn to scale, showing type, height, and area of illumination.
H. Archeological Monitoring Recommendation. For all projects that will involve ground disturbance, the applicant shall provide:
1. A letter or email from the Oregon State Historic Preservation Office Archaeological Division indicating the level of recommended archeological monitoring on-site, or demonstrate that the applicant had notified the Oregon State Historic Preservation Office and that the Oregon State Historic Preservation Office had not commented within forty-five days of notification by the applicant; and
2. A letter or email from the applicable tribal cultural resource representative of the Confederated Tribes of the Grand Ronde, Confederated Tribes of the Siletz, Confederated Tribes of the Umatilla, Confederated Tribes of the Warm Springs and the Confederated Tribes of the Yakama Nation indicating the level of recommended archeological monitoring on-site, or demonstrate that the applicant had notified the applicable tribal cultural resource representative and that the applicable tribal cultural resource representative had not commented within forty-five days of notification by the applicant.
If, after forty-five days notice from the applicant, the Oregon State Historic Preservation Office or the applicable tribal cultural resource representative fails to provide comment, the city will not require the letter or email as part of the completeness review. For the purpose of this section, ground disturbance is defined as the movement of native soils.
I. Such special studies or reports as the community development director may require to obtain information to ensure that the proposed development does not adversely affect the surrounding community or identified natural resource areas or create hazardous conditions for persons or improvements on the site. The community development director shall require an applicant to submit one or more development impact statements, as described in Section 16.12.050, upon determination that (1) there is a reasonable likelihood that traffic safety or capacity improvements may be required; (2) the

proposal could have significant adverse impacts on identified natural resource areas, including areas designated as being within the natural resources overlay district; or (3) the proposal would be located on or could have significant adverse impacts on natural hazard areas, including the geologic hazard and flood plain overlay districts. The community development director shall determine which types of development impact statements are necessary and provide written reasons for requiring the statement(s). The development impact statements shall include the information described in Sections 16.12.070, 16.12.080, and 16.12.120 [and this Section] 17.62.040.
J. The community development director may waive the submission of information for specific requirements of this section or may require information in addition to that required by a specific provision of this section, as follows:
1. The community development director may waive the submission of information for a specific requirement upon determination either that specific information is not necessary to evaluate the application properly, or that a specific approval standard is not applicable to the application. If submission of information is waived, the community development director shall, in the decision, identify the waived requirements, explain the reasons for the waiver, and state that the waiver may be challenged on appeal and may be denied by a subsequent review authority. If the matter is forwarded to the planning commission for initial review, the information required by this paragraph shall be included in the staff report;
2. The community development director may require information in addition to that required by a specific provision of this section upon determination that the information is needed to evaluate the application properly and that the need can be justified on the basis of a special or unforeseen circumstance. If additional information is required, the community development director shall, in the decision, explain the reasons for requiring the additional information.
K. If the applicant has not already done so as some other part of the land use review process, the applicant shall submit an erosion control plan that complies with the applicable requirements of Chapter 17.74 of this code.

Applicant's Response: Plans and supporting documents have been submitted with this application and address the above items.

17.62.050 - Standards.
A. All development shall comply with the following standards:
1. Landscaping, A minimum of fifteen percent of the lot shall be landscaped. Existing native vegetation shall be retained to the maximum extent practicable. All plants listed on the Oregon City Nuisance Plant List shall be removed from the site prior to issuance of a final occupancy permit for the building.

Applicant's Response: The existing site area is 60,548 SF, landscape area totals 18% (11,089 sf) of the site. All Oregon City Nuisance plants will be removed from the site prior to issuance of the final occupancy.

a. Except as allowed elsewhere in the zoning and land division chapters of this Code, all areas to be credited towards landscaping must be installed with growing plant materials. A reduction of up to twenty-five percent of the overall required landscaping may be approved by the community development director if the same or greater amount of pervious material is incorporated in the non-parking lot portion of the site plan (pervious material within parking lots are regulated in OCMC 17.52.070).

Applicant's Response: All areas credited towards landscaping will be installed with living plant materials.

b. Pursuant to Chapter 17.49, landscaping requirements within the Natural Resource Overlay District, other than landscaping required for parking lots, may be met by preserving, restoring and permanently protecting native vegetation and habitat on development sites.

Applicant's Response: A small portion of the Natural Resource Overlay District currently encroaches the site along the back side of the existing sidewalk along Molalla Avenue. It is anticipated with the 0.5-feet dedication of right-of-way requirement, the NROD will no longer reside on the subject property. The existing impervious street and sidewalk area will not be increased as part of the proposed development.

c. The landscaping plan shall be prepared by a registered landscape architect and include a mix of vertical (trees and shrubs) and horizontal elements (grass, groundcover, etc.) that within three years will cover one hundred percent of the Landscape area. No mulch, bark chips, or similar materials shall be allowed at the time of landscape installation except under the canopy of shrubs and within two feet of the base of trees. The community development department shall maintain a list of trees, shrubs and vegetation acceptable for landscaping.

Applicant's Response: A landscape plan has been prepared by Lango Hansen, a registered landscape architect in the State of Oregon and conforms to these standards.

d. For properties within the Downtown Design District, or for major remodeling in all zones subject to this chapter, landscaping shall be required to the extent practicable up to the ten percent requirement.

Applicant's Response: Not applicable. The subject property is not within the Downtown Design District, or a major remodel. The proposed developments' landscaping requirement is to meet a minimum of 15%.

e. Landscaping shall be visible from public thoroughfares to the extent practicable.

Applicant's Response: Proposed landscape areas adjacent to and within viewing distance of Molalla Avenue will be fully visible.

f. Interior parking lot landscaping shall not be counted toward the fifteen percent minimum, unless otherwise permitted by the dimensional standards of the underlying zone district.

Applicant's Response: The dimensional standards set forth in the underlying zone district (General Commercial) allow for interior parking lot landscape to be counted toward the fifteen percent minimum.

2. Vehicular Access and Connectivity.
a. Parking areas shall be located behind buildings, below buildings, or on one or both sides of buildings.

Applicant's Response: Proposed off-street parking for the public is in front of the building and staff parking is located behind the building. A variance is being sought to this standard. Refer to Site Variance responses provided in Section 17.60.

b. Ingress and egress locations on thoroughfares shall be located in the interest of public safety. Access for emergency services (fire and police) shall be provided.

Applicant's Response: The existing driveway is approximately 80-feet in width and currently provides ingress and egress access for the existing 2-bay fire station emergency services. The proposed replacement fire station will increase to a 3-bay wide apparatus to serve the community's emergency needs. Maintaining the driveway location and width is vital and necessary to provide the most safe, unobstructed, and efficient route of travel for each fire apparatus vehicle, including a 65-foot ladder truck when responding to an emergency call.

c. Alleys or vehicular access easements shall be provided in the following Districts: R-2, MUC-1, MUC-2, MUD and NC zones unless other permanent provisions for access to off-street parking and loading facilities are approved by the decision-maker. The corners of alley intersections shall have a radius of not less than ten feet.

Applicant's Response: Not applicable. The subject property is not located in the R-2, MUC-1, MUC-2, MUD, and NC zones.

d. Sites abutting an alley shall be required to gain vehicular access from the alley unless deemed impracticable by the community development director.

Applicant's Response: Not applicable. The subject property does not abut an alley.

e. Where no alley access is available, the development shall be configured to allow only one driveway per frontage. On corner lots, the driveway(s) shall be located off of the side street (unless the side street is an arterial) and away from the street intersection. Shared driveways shall be required as needed to accomplish the requirements of this section. The location and design of pedestrian access from the sidewalk shall be emphasized so as to be clearly visible and distinguishable from the vehicular access to the site. Special landscaping, paving, lighting, and architectural treatments may be required to accomplish this requirement.

Applicant's Response: The existing driveway serving the subject property is along Molalla Avenue (Major Arterial). Pedestrian access from the existing sidewalk system is provided with an enhanced impervious 'scored colored' concrete system and provides adequate views into and out of the site. Landscape and architectural treatments will be incorporated into the pedestrian access to emphasize the access point.

f. Driveways that are at least twenty-four feet wide shall align with existing or planned streets on adjacent sites.

Applicant's Response: Not applicable. There is no existing or planned street on the adjacent sites.

g. Development shall be required to provide existing or future connections to adjacent sites through the use of vehicular and pedestrian access easements where applicable. Such easements shall be required in addition to applicable street dedications as required in Chapter 12.04.

Applicant's Response: The subject site does not have any existing connections to the adjacent sites, other than the existing public sidewalk system along Molalla Avenue. The proposed development will incorporate a pedestrian sidewalk system connecting the building entry to the public sidewalk. Easements for vehicular and pedestrian connections to the adjacent sites are not proposed due to the life safety operational requirements and security aspects of the proposed fire station.

h. Vehicle and pedestrian access easements may serve in lieu of streets when approved by the decision maker only where dedication of a street is deemed impracticable by the city.

Applicant's Response: The subject site does not require or have existing pedestrian or vehicle access to adjacent sites. Molalla Avenue currently provides both vehicle and pedestrian access to the subject site.

i. Vehicular and pedestrian easements shall allow for public access and shall comply with all applicable pedestrian access requirements.

Applicant's Response: Refer to response in part 'g' above.

j. In the case of dead-end stub streets that will connect to streets on adjacent sites in the future, notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future.

Applicant's Response: Not applicable. The subject property is not located on a dead-end stub street.

k. Parcels larger than three acres shall provide streets as required in Chapter 12.04. The streets shall connect with existing or planned streets adjacent to the site.

Applicant's Response: Not applicable. The subject property is not larger than 3 acres.

l. Parking garage entries shall not dominate the streetscape. They shall be designed and situated to be ancillary to the use and architecture of the ground floor. This standard applies to both public garages and any individual private garages, whether they front on a street or private interior access road.

Applicant's Response: Not applicable. The proposed development does not include a parking garage.

m. Buildings containing above-grade structured parking shall screen such parking areas with landscaping or landscaped berms, or incorporate contextual architectural elements that complement adjacent buildings or buildings in the area. Upper level parking garages shall use articulation or fenestration treatments that break up the massing of the garage and/or add visual interest.

Applicant's Response: Not applicable. The proposed development does not include above-grade structured parking.

3. Building structures shall be complimentary to the surrounding area. All exterior surfaces shall present a finished appearance. All sides of the building shall include materials and design characteristics consistent with those on the front. Use of inferior or lesser quality materials for side or rear facades or decking shall be prohibited.
a. Alterations, additions and new construction located within the McLoughlin Conservation District, Canemah National Register District, and the Downtown Design District and when abutting a designated Historic Landmark shall utilize materials and a design that incorporates the architecture of the subject building as well as the surrounding district or abutting Historic Landmark. Historic materials such as doors, windows and siding shall be retained or replaced with in kind materials unless the community development director determines that the materials cannot be retained and the new design and materials are compatible with the subject building, and District or Landmark. The community

development director may utilize the Historic Review Board's Guidelines for New Constriction (2006) to develop findings to show compliance with this section.
b. In historic areas and where development could have a significant visual impact, the review authority may request the advisory opinions of appropriate experts designated by the community development director from the design fields of architecture, landscaping and urban planning. The applicant shall pay the costs associated with obtaining such independent professional advice; provided, however, that the review authority shall seek to minimize those costs to the extent practicable.

Applicant's Response: The subject property is not located in the McLoughlin Conservation District, Canemah National Register District or the Downtown Design District and does not abut a designated Historic Landmark, nor is it located in a Historic area that has visual significance. The selected materials for the exterior surfaces will all have finished appearances. All sides of the proposed building include materials and characteristics consistent with the front facade. See materials board submitted with this application.

4. Grading shall be in accordance with the requirements of Chapter 15.48 and the public works stormwater and grading design standards.

Applicant's Response: Grading and stormwwater for the proposed new sitework will be in accordance to the Oregon City design standards.

5. Development subject to the requirements of the Geologic Hazard overlay district shall comply with the requirements of that district.

Applicant's Response: Not applicable. The subject property is not located in the Geologic Hazard overlay district.

6.Drainage shall be provided in accordance with city's drainage master plan, Chapter 13.12, and the public works stormwater and grading design standards.

Applicant's Response: The proposed drainage and stormwater system will be in accordance to Oregon City standards and will include vegetated storm facilities to provide treatment and retention for new impervious area created on site. The storm system will be reconfigured and connect to the public storm main in Molalla Avenue.

7. Parking, including carpool, vanpool and bicycle parking, shall comply with city off-street parking standards, Chapter 17.52.

Applicant's Response: The proposed parking complies with the standards set forth in Chapter 17.52. A variance is being sought to allow for the public parking to be in front of the proposed building. Refer to Site Variance responses provided in Section 17.60.

8. Sidewalks and curbs shall be provided in accordance with the city's transportation master plan and street design standards. Upon application, the community development director may waive this requirement in whole or in part in those locations where there is no probable need, or comparable alternative location provisions for pedestrians are made.

Applicant's Response: The subject property street frontage has existing sidewalk and curbs. Based on the pre-application conference the existing sidewalk is within the private property boundary. Therefore, a right-of-way dedication of 0.5 feet will be conveyed behind the sidewalk to meet the City requirement. The existing ADA ramps on each side of the driveway entrance have been field observed. The south ramp meets all current ADA standards, while the north ramp cross slope exceeds ADA maximum. Therefore, the north ADA ramp will be replaced to meet current ADA standards. Any degraded curbs will be replaced in kind.

9. A well-marked, continuous and protected on-site pedestrian circulation system meeting the following standards shall be provided:
a. Pathways between all building entrances and the street are required. Pathways between the street and buildings fronting on the street shall be direct. Exceptions may be allowed by the director where steep slopes or protected natural resources prevent a direct connection or where an indirect route would enhance the design and/or use of a common open space.

Applicant's Response: An enhanced pedestrian circulation system at the northwest corner of the property provides a direct connection from the public sidewalk system to the building entry. The width of the circulation path varies from 28'-0" wide to 9'-0" wide. Where the circulation system abuts off-street parking, wheelstops and raised curbs are provided. The circulation path will be constructed using colored concrete with a scored pattern. Where the surface crosses the internal vehicular driveway, the path will be flush with the adjacent asphalt surface and incorporate a dissimilar color and detectable warning texture to provide safety for pedestrian. Safety and convenience have been maximized.

b. The pedestrian circulation system shall connect all main entrances on the site. For buildings fronting on the street, the sidewalk may be used to meet this standard. Pedestrian connections to other areas of the site, such as parking areas, recreational areas, common outdoor areas, and any pedestrian amenities shall be required.

Applicant's Response: The proposed pedestrian circulation system connects the main entrance on the site and the enhanced pedestrian plaza.

c. Elevated external stairways or walkways, that provide pedestrian access to multiple dwelling units located above the ground floor of any building are prohibited. The community development director may allow exceptions for external stairways or walkways located in, or facing interior courtyard areas provided they do not compromise visual access from dwelling units into the courtyard.

Applicant's Response: Not applicable. The proposed development is not multiple dwelling units.

d. The pedestrian circulation system shall connect the main entrances of adjacent buildings on the same site.

Applicant's Response: Not applicable. The proposed development includes one building only.

e. The pedestrian circulation system shall connect the principal building entrance to those of buildings on adjacent commercial and residential sites where practicable. Walkway linkages to adjacent developments shall not be required within industrial developments or to industrial developments or to vacant industrially-zoned land.

Applicant's Response: The pedestrian circulation system will connect the principal building entrance to the adjacent commercial sites by utilizing an enhanced walkway system connecting to the existing sidewalk system along Molalla Avenue.

f. On-site pedestrian walkways shall be hard surfaced, well drained and at least five feet wide. Surface material shall contrast visually to adjoining surfaces. When bordering parking spaces other than spaces for parallel parking, pedestrian walkways shall be a minimum of seven feet in width unless curb stops are provided. When the pedestrian circulation system is parallel and adjacent to an auto travel lane, the walkway shall be raised or separated from the auto travel lane by a raised curb, bollards, landscaping or other physical barrier. If a raised walkway is used, the ends of the raised portions shall be equipped with curb ramps for each direction of travel. Pedestrian walkways that cross drive isles or other vehicular circulation areas shall utilize a change in textual material or height to alert the driver of the pedestrian crossing area.

Applicant's Response: The pedestrian walkways in front of the main entrance and pedestrian plaza walkway borders landscaped areas and crosses an internal vehicular drive aisle. Where the pedestrian walkway crosses the vehicular drive aisle, the width is 28'-0" wide, utilizes tactile surfaces, a different color, and is scored with a pattern to provide textural difference. Where the walkway runs parallel to the public parking area, the walkway is 6-feet wide and separated with wheel stops.

10. There shall be provided adequate means to ensure continued maintenance and necessary normal replacement of private common facilities and areas, drainage ditches, streets and other ways, structures, recreational facilities, landscaping, fill and excavation areas, screening and fencing, groundcover, garbage storage areas and other facilities not subject to periodic maintenance by the city or other public agency.

Applicant's Response: The owner has adequate means to ensure continued and necessary maintenance of the subject property and private facilities.

11. Site planning shall conform to the requirements of OCMC Chapter 17.41 Tree Protection.

Applicant's Response: The proposed development will conform to the requirements of OCMC Chapter 17.41. Refer to responses in Section 17.41 of this application.

12. Development shall be planned, designed, constructed and maintained to protect water resources and habitat conservation areas in accordance with the requirements of the city's Natural Resources Overlay District, Chapter 17.49, as applicable.

Applicant's Response: The subject property does not have any existing water resources within its boundaries. A small portion of the NROD encroaches the site along the back side of the existing sidewalk along Molalla Avenue. The existing impervious street and sidewalk are will not be increased as part of the proposed development.

13. All development shall maintain continuous compliance with applicable federal, state, and city standards pertaining to air and water quality, odor, heat, glare, noise and vibrations, outdoor storage, radioactive materials, toxic or noxious matter, and electromagnetic interference. Prior to issuance of a building permit, the community development director or building official may require submission of evidence demonstrating compliance with such standards and receipt of necessary permits. The review

authority may regulate the hours of construction or operation to minimize adverse impacts on adjoining residences, businesses or neighborhoods. The emission of odorous gases or other matter in such quantity as to be readily detectable at any point beyond the property line of the use creating the odors or matter is prohibited.

Applicant's Response: The proposed development will maintain compliance with all applicable federal, state and city standards.

14. Adequate public water and sanitary sewer facilities sufficient to serve the proposed or permitted level of development shall be provided. The applicant shall demonstrate that adequate facilities and services are presently available or can be made available concurrent with development. Service providers shall be presumed correct in the evidence, which they submit. All facilities shall be designated to city standards as set out in the city's facility master plans and public works design standards. A development may be required to modify or replace existing offsite systems if necessary to provide adequate public facilities. The city may require over sizing of facilities where necessary to meet standards in the city's facility master plan or to allow for the orderly and efficient provision of public facilities and services. Where over sizing is required, the developer may request reimbursement from the city for over sizing based on the city's reimbursement policy and fund availability, or provide for recovery of costs from intervening properties as they develop.

Applicant's Response: There is an existing 10-inch water main that runs within the north side of the property which is within an existing 15-feet wide easement. The proposed development will connect to the existing water main to provide domestic use and fire protection water services adequate to serve the proposed facility. There is an existing 6-inch sanitary sewer lateral serving the site that connects to the existing 8-inch sanitary sewer main located within Molalla Avenue, which is adequate to serve the site. The proposed development will connect to the existing sanitary sewer lateral to provide sanitary sewer services to serve the proposed facility.

15. Adequate right-of-way and improvements to streets, pedestrian ways, bike routes and bikeways, and transit facilities shall be provided and be consistent with the city's transportation master plan and design standards and this title. Consideration shall be given to the need for street widening and other improvements in the area of the proposed development impacted by traffic generated by the proposed development. This shall include, but not be limited to, improvements to the right-of-way, such as installation of lighting, signalization, turn lanes, median and parking strips, traffic islands, paving, curbs and gutters, sidewalks, bikeways, street drainage facilities and other facilities needed because of anticipated vehicular and pedestrian traffic generation. Compliance with [Chapter] 12.04, Streets, Sidewalks and Public Places shall be sufficient to achieve right-of-way and improvement adequacy.

Applicant's Response: No increased traffic is anticipated to be generated by the proposed replacement fire station. The existing sidewalk along Molalla Avenue lies within the subject property boundary. Therefore, right-of-way dedication of 0.5-feet behind the sidewalk will be conveyed to the City of Oregon City. In addition, a 10-foot wide public utility easement (PUE) will be required along the Molalla Avenue frontage. The existing Molalla Avenue fire signal will need to meet current ODOT/County/MUTCD standards. Engineered drawings and documentation will be submitted as part of the development permit showing compliance with current standards.

16. If a transit agency, upon review of an application for an industrial, institutional, retail or office development, recommends that a bus stop, bus turnout lane, bus shelter, accessible bus landing pad,

lighting, or transit stop connection be constructed, or that an easement or dedication be provided for one of these uses, consistent with an agency adopted or approved plan at the time of development, the review authority shall require such improvement, using designs supportive of transit use. Improvements at a major transit stop may include intersection or mid-block traffic management improvements to allow for crossings at major transit stops, as identified in the transportation system plan.

Applicant's Response: It is anticipated no new transit facilities (stop, turnouts, shelters, etc.) are required as part of the development. Currently, Trimet does not serve Molalla Avenue.

17. All utility lines shall be placed underground.

Applicant's Response: All existing and proposed utility lines will be placed underground.

18. Access and facilities for physically handicapped people shall be incorporated into the site and building design consistent with applicable federal and state requirements, with particular attention to providing continuous, uninterrupted access routes.

Applicant's Response: One (1) ADA parking space will be provided for the public All entrances to the building will be ADA accessible and one (1) ADA accessible public restroom will be provided. All access routes will meet ADA standards.

19. For a residential development, site layout shall achieve at least eighty percent of the maximum density of the base zone for the net developable area. Net developable area excludes all areas for required right-of-way dedication, land protected from development through Natural Resource or Geologic Hazards protection, and required open space or park dedication.

Applicant's Response: Not applicable. The proposed development is not residential.

20. Screening of Mechanical Equipment:
a. Rooftop mechanical equipment, including HVAC equipment and utility equipment that serves the structure, shall be screened. Screening shall be accomplished through the use of parapet walls or a sight-obscuring enclosure around the equipment constructed of one of the primary materials used on the primary facades of the structure, and that is an integral part of the building's architectural design. The parapet or screen shall completely surround the rooftop mechanical equipment to an elevation equal to or greater than the highest portion of the rooftop mechanical equipment being screened. In the event such parapet wall does not fully screen all rooftop equipment, then the rooftop equipment shall be enclosed by a screen constructed of one of the primary materials used on the primary facade of the building so as to achieve complete screening.

Applicant's Response: No rooftop mechanical equipment is proposed.

b. Wall-mounted mechanical equipment shall not be placed on the front facade of a building or on a facade that faces a right-of-way. Wall-mounted mechanical equipment, including air conditioning or HVAC equipment and groups of multiple utility meters, that extends six inches or more from the outer building wall shall be screened from view from streets; from residential, public, and institutional properties; and from public areas of the site or adjacent sites through the use of (a) sight-obscuring enclosures constructed of one of the primary materials used on the primary facade of the structure, (b) sight-obscuring fences, or (c) trees or shrubs that block at least eighty percent of the equipment from

view or (d) painting the units to match the building. Wall-mounted mechanical equipment that extends six inches or less from the outer building wall shall be designed to blend in with the color and architectural design of the subject building.

Applicant's Response: No wall-mounted mechanical equipment or utility meters are proposed on the front facade that faces Molalla Avenue.

c. Ground-mounted above-grade mechanical equipment shall be screened by ornamental fences, screening enclosures, trees, or shrubs that block at least eighty percent of the view. Placement and type of screening shall be determined by the community development director.

Applicant's Response: HVAC equipment and utility equipment (Generator, fueling station) will be ground mounted and screened from adjacent properties. Screening will be accomplished utilizing 6'-0" tall enclosure consisting of painted steel structure with perforated metal wall panels. Landscape shrubs will also be placed around the enclosures where adjacent to adjacent properties.

d. All mechanical equipment shall comply with the standards in this section. If mechanical equipment is installed outside of the site plan and design review process, planning staff shall review the plans to determine if additional screening is required. If the proposed screening meets this section, no additional planning review is required.

Applicant's Response: All proposed mechanical equipment will comply with the standards of this section.

e. This section shall not apply to the installation of solar energy panels, photovoltaic equipment or wind power generating equipment.

Applicant's Response: Solar Energy panels will be installed along the south facing surface of the proposed roof monitors.

21. Building Materials.
a. Preferred building materials. Building exteriors shall be constructed from high quality, durable materials. Preferred exterior building materials that reflect the city's desired traditional character are as follows:
i. Brick.
Ii. Basalt stone or basalt veneer.
iii. Narrow horizontal wood or composite siding (generally five inches wide or less); wider siding will be considered where there is a historic precedent.
iv. Board and baton siding.
v. Other materials subject to approval by the community development director.
vi. Plywood with battens or fiber/composite panels with concealed fasteners and contagious aluminum sections at each joint that are either horizontally or vertically aligned.
vii. Stucco shall be trimmed in wood, masonry, or other approved materials and shall be sheltered from extreme weather by roof overhangs or other methods.

Applicant's Response: The proposed fire station exterior facade primary material will be prefinished metal wall panels with accent areas utilizing prefinished metal cladding. Each of the prefinished metal

materials are of the highest quality meeting or exceeding industry testing and approval standards for quality and durability. No highly reflective sheet metal is proposed.

b. Prohibited materials. The following materials shall be prohibited in visible locations unless an exception is granted by the community development director based on the integration of the material into the overall design of the structure.
i. Vinyl or plywood siding (including T-111 or similar plywood).
Ii. Glass block or highly tinted, reflected, translucent or mirrored glass (except stained glass) as more than ten percent of the building facade.
iii. Corrugated fiberglass.
iv. Chain link fencing (except for temporary purposes such as a construction site or as a gate for a refuse enclosure).
[v.] Crushed colored rock/crushed tumbled glass.
[vi.] Non-corrugated and highly reflective sheet metal.

Applicant's Response: The proposed fire station does not use any of the prohibited materials.

c. Special material standards: The following materials are allowed if they comply with the requirements found below:
1. Concrete block. When used for the front facade of any building, concrete blocks shall be split, rock- or ground-faced and shall not be the prominent material of the elevation. Plain concrete block or plain concrete may be used as foundation material if the foundation material is not revealed more than three feet above the finished grade level adjacent to the foundation wall.
2. Metal siding. Metal siding shall have visible corner moldings and trim and incorporate masonry or other similar durable/permanent material near the ground level (first two feet above ground level).
3. Exterior Insulation and Finish System (EIFS) and similar toweled finishes shall be trimmed in wood, masonry, or other approved materials and shall be sheltered from extreme weather by roof overhangs or other methods.
4. Building surfaces shall be maintained in a clean condition and painted surfaces shall be maintained to prevent or repair peeling, blistered or cracking paint.

Applicant's Response: The proposed fire station utilizes metal siding in a vertical orientation and will have standard trim and moldings. The metal siding will have a highly durable prefinished color. The base of the metal siding will be set-up off the adjacent grade a minimum of 6-inches with the foundation wall acting as a durable material adjacent to landscape and pedestrian hardscape surfaces.

22. Conditions of Approval. The review authority may impose such conditions as it deems necessary to ensure compliance with these standards and other applicable review criteria, including standards set out in city overlay districts, the city's master plans, and city public works design standards. Such conditions shall apply as described in Sections 17.50.310, 17.50.320 and 17.50.330. The review authority may require a property owner to sign a waiver of remonstrance against the formation of and participation in a local improvement district where it deems such a waiver necessary to provide needed improvements reasonably related to the impacts created by the proposed development. To ensure compliance with this chapter, the review authority may require an applicant to sign or accept a legal and enforceable covenant, contract, dedication, easement, performance guarantee, or other document, which shall be approved in form by the city attorney.

Applicant's Response: The applicant recognizes any conditions of approval imposed will need to be met to allow operation of the permitted conditional use.

17.62.055 - Institutional and commercial building standards.
A. Purpose. The primary objective of the regulations contained in this section is to provide a range of design choices that promote creative, functional, and cohesive development that is compatible with surrounding areas. Buildings approved through this process are intended to serve multiple tenants over the life of the building, and are not intended for a one-time occupant. The standards encourage people to spend time in the area, which also provides safety though informal surveillance. Finally, this section is intended to promote the design of an urban environment that is built to human scale by creating buildings and streets that are attractive to pedestrians, create a sense of enclosure, provide activity and interest at the intersection of the public and private spaces, while also accommodating vehicular movement.

Applicant's Response: The proposed fire station is intended to replace the existing fire station that is no longer habitable due to mold and moisture issues. The new fire station is situated approximately in the same area as the existing fire station. Pedestrian access to the site is incorporated to the maximum extent feasible while still maintaining safety and operational requirements of a 24-hour emergency service use. Proposed building articulation, building materials, and landscaping provides a relationship transition from the Urban-to-Sub-Urban-to-Rural developments.

B. Applicability. In addition to Section 17.62.050 requirements, institutional and commercial buildings shall comply with design standards contained in this section.

Applicant's Response: The proposed fire station is a commercial building and is subject to the Site and Design Review criteria in Chapter 17.62.055. The applicant is seeking a variance to (2) design standards; Site Variance: Building setback distance along the street and public parking located in front of the building; Building Variance: Variation in Massing, and Minimum Wall Articulation. The proposed fire station will otherwise comply with the design standards. Refer to Site and Building Variance responses provided in Section 17.60.

C. Relationship between zoning district design standards and requirements of this section.
1. Building design shall contribute to the uniqueness of the underlying zoning district by applying appropriate materials, elements, features, color range and activity areas tailored specifically to the site and its context.

Applicant's Response: The proposed building design contributes to the uniqueness of the underlying zone because it is an emergency service use that is vital to the surrounding community and incorporates materials, finishes, elements, and color range that acknowledge its current nexus of the transitioning Urban to Sub-Urban to Rural development. Being located amongst other commercial uses along Molalla Avenue, the proposed fire station will be an attractive addition to the neighborhood.

2. A standardized prototype or franchise design shall be modified if necessary to meet the provisions of this section.

Applicant's Response: Not Applicable. The proposed fire station is not a standardized or franchise design.

3. In the case of a multiple building development, each individual building shall include predominant characteristics, architectural vocabulary and massing shared by all buildings in the development so that the development forms a cohesive place within the underlying zoning district or community.

Applicant's Response: Not applicable. The proposed development is not a multiple building development.

4. With the exception of standards for building orientation and building front setbacks, in the event of a conflict between a design standard in this section and a standard or requirement contained in the underlying zoning district, the standard in the zoning district shall prevail.

Applicant's Response: Informational only. No response.

5. On sites with one hundred feet or more of frontage at least sixty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line, unless a greater setback is accepted under the provisions of Section 17.62.055D. For sites with less than one hundred feet of street frontage, at least fifty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line unless a greater setback is accepted under the provisions of Section 17.62.055D.

Applicant's Response: The applicant is requesting a variance to this standard. Refer to Site Variance responses provided in Section 17.60.

D. Relationship of Buildings to Streets and Parking.
1. Buildings shall be placed no farther than five feet from the front property line. A larger front yard setback may be approved through site plan and design review if the setback area incorporates at least one element from the following list for every five feet of increased setback requested:
a. Tables, benches or other approved seating area.
b. Cobbled, patterned or paved stone or enhanced concrete.
c. Pedestrian scale lighting.
d. Sculpture/public art.
e. Fountains/Water feature.
f. At least twenty square feet of landscaping or planter boxes for each tenant facade fronting on the activity area.
g. Outdoor café.
h. Enhanced landscaping or additional landscaping.
i. Other elements, as approved by the community development director, that can meet the intent of this section.

Applicant's Response: The applicant is requesting a variance to this standard. Refer to responses in Section 17.60 – Variance.

2. The front most architecturally significant facade shall be oriented toward the street and shall be accessed from a public sidewalk. Primary building entrances shall be clearly defined and recessed or framed by a sheltering element such as an awning, arcade or portico in order to provide shelter from the summer sun and winter weather.

Applicant's Response: The front façade of the proposed fire station is the most significant façade and is oriented toward Molalla Avenue. The primary building entrance is clearly defined by an enhanced recessed alcove and full height storefront entry system allowing full transparency. An enhanced pedestrian plaza and sidewalk system provides a direction connection to the public sidewalk system along Molalla Avenue.

3. Entryways. The primary entranceway for each commercial or retail establishment shall face the major street. The entrance may be recessed behind the property line a maximum of five feet unless a larger setback is approved pursuant to Section 17.62.055.D.1 and shall be accessed from a public sidewalk. Primary building entrances shall be clearly defined, highly visible and recessed or framed by a sheltering element including at least four of the following elements, listed below.
a. Canopies or porticos;
b. Overhangs;
c. Recesses/projections;
d. Arcades;
e. Raised corniced parapets over the door;
f. Peaked roof forms;
g. Arches;
h. Outdoor patios;
i. Display windows;
j. Architectural details such as tile work and moldings which are integrated into the building structure and design;
k. Integral planters or wing walls that incorporate landscaped areas and/or places for sitting.
l. Planter boxes and street furniture placed in the right-of-way shall be approved for use according to materials, scale and type.

Applicant's Response: The primary building entry faces Molalla Avenue. The entry is recessed back from the main facade wall plane 4-feet and the roof provides an overhang of 4'-8". The entry portal is clearly defined by color and a 14-inch deep by 4-inch wide band. Full height (12'-0" tall) storefront entry glazing system offers full transparency.

4. Where additional stores will be located in the large retail establishment, each such store shall have at least one exterior customer entrance, which shall conform to the same requirements. (Ord. 01-1002 §2, 2001)

Applicant's Response: Not applicable. The proposed use is not a retail establishment.

5. Trellises, canopies and fabric awnings may project up to five feet into front setbacks and public rights-of-way, provided that the base is not less than eight feet at the lowest point and no higher than ten feet above the sidewalk. Awnings shall be no longer than a single storefront.

Applicant's Response: Refer to response 17.62.055.C.5. The proposed canopy over the apparatus bays does not extend into the 5-foot setback or public right-of-way.

E. Corner Lots.
For buildings located at the corner of intersections, the primary entrance of the building shall be located at the corner of the building or within twenty-five feet of the corner of the building. Additionally, one of the following treatments shall be required:

1. Incorporate prominent architectural elements, such as increased building height or massing, cupola, turrets, or pitched roof, at the corner of the building or within twenty-five feet of the corner of the building.
2. Chamfer the corner of the building (i.e. cut the corner at a forty-five-degree angle and a minimum of ten feet from the corner) and incorporate extended weather protection (arcade or awning), special paving materials, street furnishings, or plantings in the chamfered area.

Applicant's Response: Not applicable. The subject property is not located at a corner of an intersection.

F. Commercial First Floor Frontage.
In order to ensure that the ground floor of structures have adequate height to function efficiently for retail uses, the first floor height to finished ceiling of new infill buildings in the mixed use and neighborhood commercial districts shall be no lower than fourteen feet floor to floor. Where appropriate, the exterior facade at the ceiling level of new structures shall include banding, a change of materials or relief which responds to the cornice lines and window location of existing buildings that abut new structures.

Applicant's Response: Not applicable. The proposed use is not a retail use.

G. Variation in Massing.
1. A single, large, dominant building mass shall be avoided in new buildings and, to the extent reasonably feasible, in development projects involving changes to the mass of existing buildings.

Applicant's Response: The proposed fire station is designed to have several articulated building masses, roof line, opening heights, bays, recesses, projections, and other architectural elements to add interest to the building. The west facade (front) is broken up with massing offsets and recesses, transparency window sizes, and roof overhang. The east facade (rear) is broken up by offsets, transparency window sizes and roof overhang. The north and south facades incorporate wall plane projections, window sizes, and roof overhangs.

2. Horizontal masses shall not exceed a height: width ratio of one-to-three without substantial variation in massing that includes a change in height and projecting or recessed elements.

Applicant's Response: To help alleviate the height-to-width ratio of 1:3, each horizontal mass element incorporates buildings offsets, projections, overhangs, height changes in window and entry openings to aid in breaking-up the mass ratio.

3. Changes in mass shall be related to entrances, the integral structure and/or the organization of interior spaces and activities and not merely for cosmetic effect.

Applicant's Response: The changes in mass reflect the interior space uses and their layout. The public entry is expressed within the mass with a recessed alcove and projected trim. The apparatus bay mass is offset from the public entry wall mass to allow for emergency vehicle maneuvering and use of the site by emergency vehicles. The wall plane projection along the north facade is integral with the bunk rooms and the wall plane projection along the south facade is integral with the BC Quarters / Shop area.

H. Minimum Wall Articulation.
1. Facades shall add architectural interest and variety and avoid the effect of a single, long or massive wall with no relation to human size. No wall that faces a street or connecting walkway shall have a blank, uninterrupted length exceeding thirty feet without including, but not be limited to, at least two of the following:
i. Change in plane,
ii Change in texture or masonry pattern or color,
iii. Windows, treillage with landscaping appropriate for establishment on a trellis.
iv. An equivalent element that subdivides the wall into human scale proportions.

Applicant's Response The 114'-7" long front facade is broken down into (2) definable sections. The main entrance wall mass and the apparatus bay wall mass. The main entrance wall mass is approximately 38-feet long and is offset from the front of the apparatus bay wall mass 29-feet. Each section is definable by different window treatments (size and area) and color creating human scale.

2. Facades greater than one hundred feet in length, measured horizontally, shall incorporate wall plane projections or recesses having a depth of at least three percent of the length of the facade and extending at least twenty percent of the length of the facade. No uninterrupted length of any facade shall exceed one hundred horizontal feet.

Applicant's Response: The east, west and south facades all incorporate wall plane changes using offsets and projections along the wall planes. A variance is being sought to this standard for the north facade. Refer to responses in Section 17.60 – Variance.

3. Ground floor facades that face public streets shall have arcades, display windows, entry areas, awnings or other such features along no less than sixty percent of their horizontal length.

Applicant's Response: The front facing facade includes the main building entry and apparatus bay. The facade incorporates window transparency, recessed entrance and apparatus bay across 73% of the front facade.

4. Building facades must include a repeating pattern that includes any one or more of the following elements:
a. Color change;
b. Texture change;
c. Material module change.

Applicant's Response: The proposed building exterior metal siding provides a repeating vertical ribbed pattern on all facades. The building's public entry and apparatus bay are highlighted in "Fire Engine" red, reinforcing the purpose of this emergency services building.

5. Facades shall have an expression of architectural or structural bays through a change in plane no less than twelve inches in width, such as an offset, reveal or projecting rib.

Applicant's Response: The front and rear facades have (3) distinct sections; The apparatus bay flanked by program support spaces on the north and south. The north and south facades proposed projections express architectural bays related to interior living quarters use.

6. Facades shall have at least one of elements subsections H.4. or H.5. of this section repeat horizontally. All elements shall repeat at intervals of no more than thirty feet, either horizontally or vertically.

Applicant's Response: Each building facades articulates a change in plane with the use of offsets, projections, and recesses, directly related to, and reflecting interior programmatic functions.

I. Facade Transparency.
1. Transparent windows or doors facing the street are required. The main front elevation shall provide at least sixty percent windows or transparency at the pedestrian level. Facades on corner lots shall provide at least sixty percent windows or transparency on all corner-side facades. All other side elevations shall provide at least thirty percent transparency. The transparency is measured in lineal fashion. For example, a one hundred-foot long building elevation shall have at least sixty feet (sixty percent of one hundred feet) of transparency in length. Reflective, glazed, mirrored or tinted glass is limited to ten percent of the lineal footage of windows on the street facing facade. Highly reflective or glare-producing glass with a reflective factor of one-quarter or greater is prohibited on all building facades. Any glazing materials shall have a maximum fifteen percent outside visual light reflectivity value. No exception shall be made for reflective glass styles that appear transparent when internally illuminated.

Applicant's Response: Transparency totals are summarized in this table.

Facade	Façade Length	Transparency Proposed
Front (West)	114'-7"	83'-7" (73%)
Rear (East)	114'-7"	68'-9" (60%)
Side (North)	138'-10"	42'-0" (30%)
Side (South)	138'-10"	42'-0" (30%)

No reflective, tinted or mirrored glazing is proposed. Visible light reflectivity will not exceed 15%.

2. Side or rear walls that face walkways may include false windows and door openings only when actual doors and windows are not feasible because of the nature of the use of the interior use of the building. False windows located within twenty feet of a right-of-way shall be utilized as display windows with a minimum display depth of thirty-six inches.

Applicant's Response: No public walkways face the side or rear walls of the proposed fire station.

J. Roof Treatments.
1. All facades shall have a recognizable "top" consisting of, but not limited to:
a. Cornice treatments, other than just colored "stripes" or "bands," with integrally textured materials such as stone or other masonry or differently colored materials; or
b. Sloping roof with overhangs and brackets; or
c. Stepped parapets;
d. Special architectural features, such as bay windows, decorative roofs and entry features may project up to three feet into street rights-of-way, provided that they are not less than nine feet above the sidewalk.

Applicant's Response: The proposed fire station has a single sloped roof (West-to-East) with 4'-0" overhangs. The fascia height of the overhang is approximately 2-feet and is consistent around the full perimeter of the building.

2. Mixed use buildings: For flat roofs or facades with a horizontal eave, fascia, or parapet, the minimum vertical dimension of roofline modulation is the greater of two feet or 0.1 multiplied by the wall height (finish grade to top of wall). The maximum length of any continuous roofline shall be seventy-five feet.

Applicant's Response: Not applicable. The proposed use is not a mixed-use building.

3. Other roof forms consistent with the design standards herein may satisfy this standard if the individual segments of the roof with no change in slope or discontinuity are less than forty feet in width (measured horizontally).

Applicant's Response: Not applicable.

K. Drive-through facilities shall:
1. Be located at the side or rear of the building.
2. Be designed to maximize queue storage on site.

Applicant's Response: Not applicable. The proposed use is not a drive-through facility.

17.62.056 - Additional standards for large retail establishments.
A. This section is intended to ensure that large retail building development is compatible with its surrounding area.
B. Large retail establishment shall mean a retail building occupying more than ten thousand gross square feet of floor area.
C. In addition to Sections 17.62.050 and 17.62.055 requirements, large retail buildings shall comply with design standards contained in this section.
D. Development Standards.
1. Roofs. Roofs shall include at least two of the following features:
a. Parapets concealing flat roofs and rooftop equipment from public view. The average height of such parapets shall not exceed fifteen percent of the height of the supporting wall and such parapets shall not at any point exceed one-third of the height of the supporting wall. Such parapets shall feature three-dimensional cornice treatment;
b. Overhanging eaves, extending no less than three feet past the supporting walls;
c. Sloping roofs that do not exceed the average height of the supporting walls, with an average slope greater than or equal to one foot of vertical rise for every three feet of horizontal run and less than or equal to one foot of vertical rise for every one foot of horizontal run;
d. Three or more roof slope planes.

Applicant's Response: Not applicable. The proposed use is not a retail establishment.

2. Site Design and Relationship to Surrounding Community. Retail buildings occupying more than twenty-five thousand gross square feet of floor area shall contribute to the establishment or enhancement of community and public spaces by providing at least two of the following:
a. Patio/seating area;
b. Pedestrian plaza with benches;
c. Transportation center;
d. Window shopping walkway;
e. Outdoor playground area;
f. Kiosk area, water feature;

g. Clock tower;
h. Or other such deliberately shaped area and/or a focal feature or amenity that, in the judgment of the appropriate decision maker, adequately enhances such community and public spaces. Any such areas shall have direct access to the public sidewalk network and such features shall not be constructed of materials that are inferior to the principle materials of the building and landscape.

Applicant's Response: Not applicable. The proposed use is not a retail use.

17.62.057 - Multi-family standards.

Applicant's Response: Not applicable. The proposed use is not a multi-family use.

17.62.059 - Cottage housing.

Applicant's Response: Not applicable. The proposed use is not a cottage housing use.

17.62.065 - Outdoor lighting.
B. Applicability.
1. General.
a. All exterior lighting for any type of commercial, mixed-use, industrial or multi-family development shall comply with the standards of this section, unless excepted in subsection B.3.
b. The city engineer/public works director shall have the authority to enforce these regulations on private property if any outdoor illumination is determined to present an immediate threat to the public health, safety and welfare.

Applicant's Response: The proposed exterior lighting will comply with this standard

2. Lighting Plan Requirement.
All commercial, industrial, mixed-use, cottage housing and multi-family developments shall submit a proposed exterior lighting plan. The plan must be submitted concurrently with the site plan. The exterior lighting plan shall include plans and specifications for streetlights, parking lot lights, and exterior building lights. The specifications shall include details of the pole, fixture height and design, lamp type, wattage, and spacing of lights.

Applicant's Response: An exterior site lighting plan is included with the drawing set as part of this application. Specifications (lighting cut sheets) are included in the appendix portion of this application.

3. Excepted Lighting.
The following types of lighting are excepted from the requirements of this section.
a. Residential lighting for single-family attached and detached homes, and duplexes.
b. Public street and right-of-way lighting.
c. Temporary decorative seasonal lighting provided that individual lamps have a light output of sixty watts or less.
d. Temporary lighting for emergency or nighttime work and construction.
e. Temporary lighting for theatrical, television, and performance areas, or for special public events.
f. Lighting for a special district, street, or building that, according to an adopted municipal plan or ordinance, is determined to require special lighting aesthetics as part of its physical character.
g. Lighting required and regulated by the Federal Aviation Administration.

Applicant's Response: None of the proposed exterior lighting is exempt lighting.

C. General Review Standard. If installed, all exterior lighting shall meet the functional security needs of the proposed land use without adversely affecting adjacent properties or the community. For purposes of this section, properties that comply with the design standards of subsection D. below shall be deemed to not adversely affect adjacent properties or the community.

Applicant's Response: The proposed exterior lighting will meet the operational and security needs of the proposed fire station without adversely affecting the adjacent properties.

D. Design and Illumination Standards.
General Outdoor Lighting Standard and Glare Prohibition.
1. Outdoor lighting, if provided, shall be provided in a manner that enhances security, is appropriate for the use, avoids adverse impacts on surrounding properties, and the night sky through appropriate shielding as defined in this section. Glare shall not cause illumination on other properties in excess of a measurement of 0.5 footcandles of light as measured at the property line. In no case shall exterior lighting add more than 0.5 footcandle to illumination levels at any point off-site. Exterior lighting is not required except for purposes of public safety. However, if installed, all exterior lighting shall meet the following design standards:

Applicant's Response: None of the proposed exterior lighting will exceed the 0.5FC at the property line.

2. Any light source or lamp that emits more than nine hundred lumens (thirteen watt compact fluorescent or sixty watt incandescent) shall be concealed or shielded with a full cut-off style fixture in order to minimize the potential for glare and unnecessary diffusion on adjacent property. All fixtures shall utilize one of the following bulb types: metal halide, induction lamp, compact fluorescent, incandescent (including tungsten-halogen), or high pressure sodium with a color rendering index above seventy.

Applicant's Response: All proposed exterior lighting will be LED fixtures to meet Energy Trust of Oregon Path to Net Zero. The equivalent wattage is less than this standard.

3. The maximum height of any lighting pole serving a multi-family residential use shall be twenty feet. The maximum height serving any other type of use shall be twenty-five feet, except in parking lots larger than five acres, the maximum height shall be thirty-five feet if the pole is located at least one hundred feet from any residential use.

Applicant's Response: Proposed light poles will not exceed the 25-foot height.

4. Lighting levels:
Table 1-17.62.065. Foot-candle Levels

Location	*Min*	*Max*	*Avg*
Pedestrian Walkways	*0.5*	*7:1 max/min ratio*	*1.5*
Pedestrian Walkways in Parking Lots		*10:1 max/min ratio*	*0.5*

Pedestrian Accessways	*0.5*	*7:1 max/min ratio*	*1.5*
Building Entrances	*3*		
Bicycle Parking Areas	*3*		
Abutting property	*N/A*	*0.5*	

Applicant's Response: Pedestrian walkways, Accessways, Building Entrances, Bicycle parking areas and areas abutting adjacent property will meet these lighting levels. See Lighting Plan included as part of this application.

5. Parking lots and other background spaces shall be illuminated as unobtrusively as possible while meeting the functional needs of safe circulation and protection of people and property. Foreground spaces, such as building entrances and outside seating areas, shall utilize pedestrian scale lighting that defines the space without glare.

Applicant's Response: The main building entrance, parking lot, and building operational use areas will be illuminated to meet all functional needs for emergency services and safe circulation. Pedestrian level lighting will be utilized at the pedestrian plaza and walkway connection to the main building entrance to illuminate the ground surface.

6. Any on-site pedestrian circulation system shall be lighted to enhance pedestrian safety and allow employees, residents, customers or the public to use the walkways at night. Pedestrian walkway lighting through parking lots shall be lighted to light the walkway and enhance pedestrian safety pursuant to Table 1.

Applicant's Response: The proposed pedestrian plaza and walkway connection to the main building entrance will be illuminated with pedestrian level lighting allowing for safe circulation at night. No pedestrian walkways are proposed through the staff parking lot area.

7. Pedestrian Accessways. To enhance pedestrian and bicycle safety, pedestrian accessways required pursuant to OCMC 12.28 shall be lighted with pedestrian-scale lighting. Accessway lighting shall be to a minimum level of one-half foot-candles, a one and one-half foot-candle average, and a maximum to minimum ratio of seven-to-one and shall be oriented not to shine upon adjacent properties. Street lighting shall be provided at both entrances. Lamps shall include a high-pressure sodium bulb with an unbreakable lens.

Applicant's Response: OCMC 12.28 is not applicable to this application.

8. Floodlights shall not be utilized to light all or any portion of a building facade between ten p.m. and six a.m.

Applicant's Response: No floodlights are proposed on the proposed fire station.

9. Lighting on automobile service station, convenience store, and other outdoor canopies shall be fully recessed into the canopy and shall not protrude downward beyond the ceiling of the canopy.

Applicant's Response: Light fixtures within the canopy over the apparatus bays will be recessed into the canopy.

10. The style of light standards and fixtures shall be consistent with the style and character of architecture proposed on the site.

Applicant's Response: Each of the light fixtures proposed are simple, modern, and minimal, consistent with the character and style of the proposed fire station and site.

11. In no case shall exterior lighting add more than one foot-candle to illumination levels at any point off-site.

Applicant's Response: The proposed lighting plan does not reflect any light greater than 1 foot candle at any point off site.

12. All outdoor light not necessary for security purposes shall be reduced, activated by motion sensor detectors, or turned off during non-operating hours.

Applicant's Response: The proposed fire station is a 24-hour emergency service use. Light fixtures related to security and emergency response services will remain on during operating hours. All non-security and non-emergency service related light fixtures will either be turned off or placed on motion sensors.

13. Light fixtures used to illuminate flags, statues, or any other objects mounted on a pole, pedestal, or platform shall use a narrow cone beam of light that will not extend beyond the illuminated object.

Applicant's Response: The proposed lighting for illuminating the flagpole will utilize a LED light integrated into the flagpole top finial ball. The LED fixture will provide a narrow cone beam of light down on the flag. This will eliminate light trespass into the sky and beyond the subject property.

14. For upward-directed architectural, landscape, and decorative lighting, direct light emissions shall not be visible above the building roofline.

Applicant's Response: Upward directional lighting of the proposed monument sign will direct light up onto the sign and not above the building roofline. The approximate height of the monument sign is 5-feet above finish grade.

15. No flickering or flashing lights shall be permitted, except for temporary decorative seasonal lighting.

Applicant's Response: No flickering or flashing permanent lights are proposed on the building.

16. Wireless Sites. Unless required by the Federal Aviation Administration or the Oregon Aeronautics Division, artificial lighting of wireless communication towers and antennas shall be prohibited. Strobe lighting of wireless communication facilities is prohibited unless required by the Federal Aviation

Administration. Security lighting for equipment shelters or cabinets and other on-the-ground auxiliary equipment on wireless communication facilities shall be initiated by motion detecting lighting.

Applicant's Response: Not applicable. The proposed use is not a wireless communication tower or antenna.

17. Lighting for outdoor recreational uses such as ball fields, playing fields, tennis courts, and similar uses, provided that such uses comply with the following standards:
i. Maximum permitted light post height: eighty feet.
ii. Maximum permitted illumination at the property line: 0.5 foot-candles.

Applicant's Response: Not applicable. The proposed development is not an outdoor recreational use.

17.62.080 - Special development standards along transit streets.
A. Purpose. This section is intended to provide direct and convenient pedestrian access to retail, office and institutional buildings from public sidewalks and transit facilities and to promote pedestrian and transit travel to commercial and institutional facilities.

Applicant's Response: The proposed development is for a new fire station. This project will be subject to Site and Design Review chapter 17.62.080 standards.

B. Applicability. Except as otherwise provide in this section, the requirements of this section shall apply to the construction of new retail, office and institutional buildings which front on a transit street.

Applicant's Response: The proposed development is for a new fire station. This project will be subject to Site and Design Review chapter 17.62.080 standards.

C. Development Standards.
1. All buildings shall have at least one main building entrance oriented towards the transit street. A main building entrance is oriented toward a transit street if it is directly located on the transit street, or if it is linked to the transit street by an on-site pedestrian walkway that does not cross off-street parking or maneuvering areas.

Applicant's Response: The proposed main building entrance is located at the northwest corner of the front façade and is linked to Molalla Avenue (Transit Street) with a pedestrian walkway system.

a. If the site has frontage on more than one transit street, or on a transit street and a street intersecting a transit street, the building shall provide one main building entrance oriented to the transit street or to the corner where the two streets intersect.

Applicant's Response: Not applicable. The site does not have frontage on more than one transit street.

b. For building facades over three hundred feet in length on a transit street, two or more main building entrances shall be provided as appropriate and oriented towards the transit street.

Applicant's Response: Not applicable. The proposed building facade fronting Molalla Avenue does not exceed 300-feet.

2. Main building entrances shall be well lighted and visible from the transit street. The minimum lighting level for building entries shall be three foot-candles. Lighting shall be a pedestrian scale with the source light shielded to reduce glare.

Applicant's Response: The main building entrance will be illuminated and visible from Molalla Avenue. Lighting level within the entrance alcove will provide the 3-foot candle illumination level. Pedestrian level and scaled lighting will be utilized along the pedestrian walkway linking the main building entrance to Molalla Avenue.

3. In the event a requirement of this section conflicts with other requirements in Title 17, the requirements of this section shall control.

Applicant's Response: Informational only. No response.

D. Exemptions. The following permitted uses are exempted from meeting the requirements of subsection C. of this section:
1. Heavy equipment sales;
2. Motor vehicle service stations, including convenience stores associated therewith;
3. Solid waste transfer stations; and
4. Truck stops, including convenience stores, eating or drinking establishments, overnight accommodations or other similar services associated therewith. A use found by the community development director to be similar to the exempt uses above.

Applicant's Response: Not applicable. The proposed use is not one of the exempted uses.

17.62.085 - Refuse and recycling standards for commercial, industrial, and multi-family developments. The purpose and intent of these provisions is to provide an efficient, safe and convenient refuse and recycling enclosure for the public as well as the local collection firm. All new development, change in property use, expansions or exterior alterations to uses other than single-family or duplex residences shall include a refuse and recycling enclosure. The area(s) shall be:
A. Sized appropriately to meet the needs of current and expected tenants, including an expansion area if necessary;
B. Designed with sturdy materials, which are compatible to the primary structure(s);
C. Fully enclosed and visually screened;
D. Located in a manner easily and safely accessible by collection vehicles;
E. Located in a manner so as not to hinder travel lanes, walkways, streets or adjacent properties;
F. On a level, hard surface designed to discharge surface water runoff and avoid ponding;
G. Maintained by the property owner;
H. Used only for purposes of storing solid waste and recyclable materials;
I. Designed in accordance with applicable sections of the Oregon City Municipal Code (including Chapter 8.20—Solid Waste Collection and Disposal) and city adopted policies.

Applicant's Response: The proposed refuse and recycling area is designed to accommodate the needs of the proposed fire station based on full occupancy. The refuse and recycling area will be enclosed with a painted steel structure with perforated metal panels and is located in a manner to be easily accessible by the collection agency. The surface of the refuse and recycling area will be concrete and graded to discharge water runoff.

CHAPTER 17.52 OFF-STREET PARKING AND LOADING

17.52.010 - Applicability.
The construction of a new structure or parking lot, or alterations to the size or use of an existing structure, parking lot or property use shall require site plan review approval and compliance with this chapter. This chapter does not apply to single- and two-family residential dwellings.

Applicant's Response: The proposed development is for a new fire station structure and site improvements. Therefore, Chapter 17.52 is applicable.

17.52.015 - Planning commission adjustment of parking standards.
A. Purpose: The purpose of permitting a planning commission adjustment to parking standards is to provide for flexibility in modifying parking standards in all zoning districts, without permitting an adjustment that would adversely impact the surrounding or planned neighborhood. The purpose of an adjustment is to provide flexibility to those uses which may be extraordinary, unique or to provide greater flexibility for areas that can accommodate a denser development pattern based on existing infrastructure and ability to access the site by means of walking, biking or transit. An adjustment to a minimum or maximum parking standard may be approved based on a determination by the planning commission that the adjustment is consistent with the purpose of this Code, and the approval criteria can be met.
B. Procedure: A request for a planning commission parking adjustment shall be initiated by a property owner or authorized agent by filing a land use application. The application shall be accompanied by a site plan, drawn to scale, showing the dimensions and arrangement of the proposed development and parking plan, the extent of the adjustment requested along with findings for each applicable approval criteria. A request for a parking adjustment shall be processed as a Type III application as set forth in Chapter 17.50.
C. Approval criteria for the adjustment are as follows:
1. Documentation: The applicant shall document that the individual project will require an amount of parking that is different from that required after all applicable reductions have been taken.
2. Parking analysis for surrounding uses and on-street parking availability: The applicant must show that there is a continued fifteen percent parking vacancy in the area adjacent to the use during peak parking periods and that the applicant has permission to occupy this area to serve the use pursuant to the procedures set forth by the community development director.
a. For the purposes of demonstrating the availability of on street parking as defined in [Section] 17.52.020.B.3., the applicant shall undertake a parking study during time periods specified by the community development director. The time periods shall include those during which the highest parking demand is anticipated by the proposed use. Multiple observations during multiple days shall be required. Distances are to be calculated as traversed by a pedestrian that utilizes sidewalks and legal crosswalks or an alternative manner as accepted by the community development director.
b. The onsite parking requirements may be reduced based on the parking vacancy identified in the parking study. The amount of the reduction in onsite parking shall be calculated as follows:
i. Vacant on-street parking spaces within three hundred feet of the site will reduce onsite parking requirements by 0.5 parking spaces; and
ii. Vacant on-street parking spaces between three hundred and six hundred feet of the [site] will reduce onsite parking requirements by 0.2 parking spaces.
3. Function and Use of Site: The applicant shall demonstrate that modifying the amount of required parking spaces will not significantly impact the use or function of the site and/or adjacent sites.
4. Compatibility: The proposal is compatible with the character, scale and existing or planned uses of the surrounding neighborhood.

5. Safety: The proposal does not significantly impact the safety of adjacent properties and rights-of-way.
6. Services: The proposal will not create a significant impact to public services, including fire and emergency services.

Applicant's Response: A planning adjustment is not being sought as part of this application.

17.52.020 - Number of automobile spaces required.
A. The number of parking spaces shall comply with the minimum and maximum standards listed in Table 17.52.020. The parking requirements are based on spaces per one thousand square feet net leasable area unless otherwise stated.
1. Multiple Uses. In the event several uses occupy a single structure or parcel of land, the total requirements for off-street parking shall be the sum of the requirements of the several uses computed separately.

Applicant's Response: Not applicable. The proposed use is for an Emergency Service (Fire Station).

2. Requirements for types of buildings and uses not specifically listed herein shall be determined by the community development director, based upon the requirements of comparable uses listed.

Applicant's Response: As mentioned in the pre-application conference notes, current Oregon City Title 17 code does not include automobile parking standards for fire stations. Staff indicated, the application would need to provide information identifying how the off-street parking is calculated using parking requirements for our use adopted by other nearby jurisdictions. After reviewing nearby jurisdiction (City of Portland, City of Salem, Clackamas County, West Linn, Tualatin), only the City of Salem lists Emergency Services as a type of use with specific parking standards. See table below per City of Salem SRC Chapter 806 for Minimum and Maximum parking standards.

Table 806-1: Minimum Off-Street Parking		
Use	**Minimum Number of Spaces Required** (1)	**Limitations & Qualifications**
Governmental Maintenance Services and Construction	The greater of the following: 0.75 per employee; or 1 per 5,000 sq. ft. (Less than 50,000 sq. ft.) 1 per 10,000 sq. ft. (50,000 to 100,000 sq. ft.) 1 per 15,000 sq. ft. (Greater than 100,000 sq. ft.)	
Public Safety		
Emergency Services	1 per employee, plus 1 additional space per ambulance	Applicable to ambulance stations.
	1 per 500 sq. ft.	Applicable to all other Emergency Services.

(d) Maximum Off-Street Parking. Unless otherwise provided under the UDC, off-street parking shall not exceed the amounts set forth in Table 806-2.

TABLE 806-2
MAXIMUM OFF-STREET PARKING

Table 806-2: Maximum Off-Street Parking	
Minimum Number of Off-Street Parking Spaces Required *(From Table 806-1)*	**Maximum Number of Off-Street Parking Spaces Allowed**
20 Spaces or Less	2.5 times minimum number of spaces required.
More than 20 Spaces	1.75 times minimum number of spaces required.

The total square footage is 12,300 square feet, which includes 4,200 square feet of apparatus bay (fire trucks). In calculating the minimum and maximum parking for the proposed fire station, the apparatus bay square footage was not included. The following table summarizes the proposed off-street parking.

Area (Square Feet)	Minimum Required	Maximum Allowed	Proposed
8,100 Square Feet	16	40	22

The proposed number of parking spaces provide the fire station the exact amount of spaces needed to serve the limited public use and most importantly, each shift for staff and emergency services.

Where calculation in accordance with the above list results in a fractional space, any fraction less than one-half shall be disregarded and any fraction of one-half or more shall require one space.

Applicant's Response: All fractions in calculations were rounded in accordance to 17.52.020.

4. The minimum required parking spaces shall be available for the parking of operable passenger automobiles of residents, customers, patrons and employees only, and shall not be used for storage of vehicles or materials or for the parking of vehicles used in conducting the business or use.

Applicant's Response: Proposed parking are available for operable passenger automobiles of employees and public.

5. A change in use within an existing habitable building located in the MUD Design District or the Willamette Falls Downtown District is exempt from additional parking requirements. Additions to an existing building and new construction are required to meet the minimum parking requirements for the areas as specified in Table 17.52.020 for the increased square footage.

Applicant's Response: Not applicable. The proposed use is for an Emergency Service (Fire Station).

B. Parking requirements can be met either onsite, or offsite by meeting the following conditions:
1. Mixed Uses. If more than one type of land use occupies a single structure or parcel of land, the total requirements for off-street automobile parking shall be the sum of the requirements for all uses, unless it can be shown that the peak parking demands are actually less (e.g. the uses operate on different days or

at different times of the day). In that case, the total requirements shall be reduced accordingly, up to a maximum reduction of fifty percent, as determined by the community development director.

Applicant's Response: Not applicable. The proposed use is for an Emergency Service (Fire Station).

2. Shared Parking. Required parking facilities for two or more uses, structures, or parcels of land may be satisfied by the same parking facilities used jointly, to the extent that the owners or operators show that the need for parking facilities does not materially overlay (e.g., uses primarily of a daytime versus nighttime nature), that the shared parking facility is within one thousand feet of the potential uses, and provided that the right of joint use is evidenced by a recorded deed, lease, contract, or similar written instrument authorizing the joint use.

Applicant's Response: Not applicable. No shared parking between uses, structures or parcels proposed.

3. On-Street Parking. On-street parking may be counted toward the minimum standards when it is on the street face abutting the subject land use. An on-street parking space must not obstruct a required clear vision area and it shall not violate any law or street standard. On-street parking for commercial uses shall conform to the following standards:
a. Dimensions. The following constitutes one on-street parking space:
1. Parallel parking, each [twenty-two] feet of uninterrupted and available curb;
2. [Forty-five/sixty] degree diagonal, each with [fifteen] feet of curb;
3. Ninety degree (perpendicular) parking, each with [twelve] feet of curb.
4. Public Use Required for Credit. On-street parking spaces counted toward meeting the parking requirements of a specific use may not be used exclusively by that use, but shall be available for general public use at all times. Signs or other actions that limit general public use of on-street spaces are prohibited.

Applicant's Response: Existing on-street parking is not being counted toward the minimum parking standard.

C. Reduction of the Number of Automobile Spaces Required. The required number of parking stalls may be reduced in the Downtown Parking Overlay District: Fifty percent reduction in the minimum number of spaces required is allowed prior to seeking further reductions in [sub]sections 2. and 3. below:
1. Transit Oriented Development. For projects not located within the Downtown Parking Overlay District, the community development director may reduce the required number of parking stalls up to twenty-five percent when it is determined that a project in a commercial center (sixty thousand square feet or greater of retail or office use measured cumulatively within a five hundred-foot radius) or multi-family development with over eighty units, is adjacent to or within one thousand three hundred twenty feet of an existing or planned public transit street and is within one thousand three hundred twenty feet of the opposite use (commercial center or multi-family development with over eighty units).
2. Reduction in Parking for Tree Preservation. The community development director may grant an adjustment to any standard of this requirement provided that the adjustment preserves a regulated tree or grove so that the reduction in the amount of required pavement can help preserve existing healthy trees in an undisturbed, natural condition. The amount of reduction must take into consideration any unique site conditions and the impact of the reduction on parking needs for the use, and must be approved by the community development director. This reduction is discretionary.

3. Transportation Demand Management. The community development director may reduce the required number of parking stalls up to twenty-five percent when a parking-traffic study prepared by a traffic engineer demonstrates:
a. Alternative modes of transportation, including transit, bicycles, and walking, and/or special characteristics of the customer, client, employee or resident population will reduce expected vehicle use and parking space demand for this development, as compared to standard Institute of Transportation Engineers vehicle trip generation rates and further that the transportation demand management program promotes or achieves parking utilization lower than minimum city parking requirements.
b. Transportation demand management (TDM) program has been developed for approval by, and is approved by the city engineer. The plan will contain strategies for reducing vehicle use and parking demand generated by the development and will be measured annually. If, at the annual assessment, the city determines the plan is not successful, the plan may be revised. If the city determines that no good-faith effort has been made to implement the plan, the city may take enforcement actions.

Applicant's Response: The applicant is not proposing any reduction in the amount of required parking.

17.52.030 - Standards for automobile parking.
A. Access. Ingress and egress locations on public thoroughfares shall be located in the interests of public traffic safety. Groups of more than four parking spaces shall be so located and served by driveways so that their use will require no backing movements or other maneuvering within a street right-of-way other than an alley. No driveway with a slope of greater than fifteen percent shall be permitted without approval of the city engineer.

Applicant's Response: The existing ingress and egress driveway along Molalla Avenue meets all maneuvering standards and does not have a slope greater than 15%.

B. Surfacing. Required off-street parking spaces and access aisles shall have paved surfaces adequately maintained. The use of pervious asphalt/concrete and alternative designs that reduce storm water runoff and improve water quality pursuant to the city's stormwater and low impact development design standards are encouraged.

Applicant's Response: All proposed off-street parking spaces and access aisles will be paved with asphalt/concrete.

C. Drainage. Drainage shall be designed in accordance with the requirements of Chapter 13.12 and the city public works stormwater and grading design standards.

Applicant's Response: Drainage has been designed in accordance with Chapter 13.12 and grading standards.

D. Dimensional Standards.
1. Requirements for parking developed at varying angles are according to the table included in this section. A parking space shall not be less than seven feet in height when within a building or structure, and shall have access by an all-weather surface to a street or alley. Parking stalls in compliance with the American with Disabilities Act may vary in size in order to comply with the building division requirements. Up to thirty-five percent of the minimum required parking may be compact, while the remaining required parking stalls are designed to standard dimensions. The community development director may approve alternative

dimensions for parking stalls in excess of the minimum requirement which comply with the intent of this chapter.

2. Alternative parking/plan. Any applicant may propose an alternative parking plan. Such plans are often proposed to address physically constrained or smaller sites, however innovative designs for larger sites may also be considered. In such situations, the community development director may approve an alternative parking lot plan with variations to parking dimensions of this section. The alternative shall be consistent with the intent of this chapter and shall create a safe space for automobiles and pedestrians while providing landscaping to the quantity and quality found within parking lot landscaping requirements.

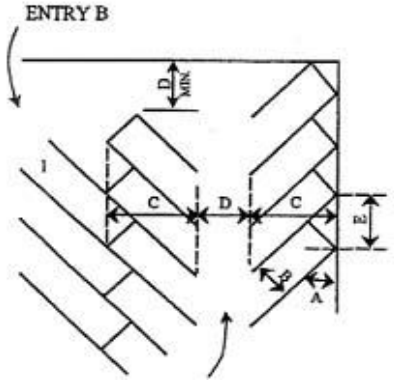
PARKING STANDARD

PARKING ANGLE SPACE DIMENSIONS

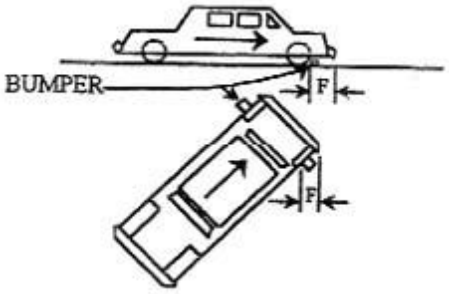
A Parking Angle		*B Stall Width*	*C Stall to Curb*	*D Aisle Width*	*E Curb Length*	*F Overhang*
0 degrees		*8.5*	*9.0*	*12*	*20*	*0*
30 degrees	*Standard* *Compact*	*9'* *8'*	*17.3'* *14.9'*	*11'* *11'*	*18'* *16'*	
45 degrees	*Standard* *Compact*	*8.5* *8.5*	*19.8'* *17.0'*	*13'* *13'*	*12.7'* *11.3'*	*1.4*
60 degrees	*Standard* *Compact*	*9'* *8'*	*21'* *17.9'*	*18'* *16'*	*10.4'* *9.2'*	*1.7*
90 degrees	*Standard* *Compact*	*9'* *8'*	*19.0'* *16.0'*	*24'* *22'*	*9'* *8'*	*1.5*

All dimensions are to the nearest tenth of a foot.

L. TYPICAL PARKING LAYOUT



M. ENTRY *A*



NOTE: SPACE 1 CONTINGENT UPON ENTRY B
OVERHANG
NOTE: Overhang dimensions are intended to indicate possible location from parking area edge for location of bumpers.

Applicant's Response: Proposed parking meets all dimensional standards.

E. Carpool and Vanpool Parking. New developments with seventy-five or more parking spaces, and new hospitals, government offices, group homes, nursing and retirement homes, schools and transit park-and-ride facilities with fifty or more parking spaces, shall identify the spaces available for employee, student and commuter parking and designate at least five percent, but not fewer than two, of those spaces for exclusive carpool and vanpool parking. Carpool and vanpool parking spaces shall be located closer to the main employee, student or commuter entrance than all other employee, student or commuter parking spaces with the exception of ADA accessible parking spaces. The carpool/vanpool spaces shall be clearly marked "Reserved - Carpool/Vanpool Only."

Applicant's Response: Not applicable. The proposed number of parking spaces is under 75.

17.52.040 - Bicycle parking standards.
A. Purpose-Applicability. To encourage bicycle transportation to help reduce principal reliance on the automobile, and to ensure bicycle safety and security, bicycle parking shall be provided in conjunction with all uses other than single-family dwellings or duplexes.

Applicant's Response: The proposed development is for a new fire station structure and site improvements. Therefore, Chapter 17.52.040 is applicable.

B. Number of Bicycle Spaces Required. For any use not specifically mentioned in Table A, the bicycle parking requirements shall be the same as the use which, as determined by the community development director, is most similar to the use not specifically mentioned. Calculation of the number of bicycle parking spaces required shall be determined in the manner established in Section 17.52.020 for determining automobile parking space requirements. Modifications to bicycle parking requirements may be made through the site plan and design, conditional use, or master plan review process.
*TABLE A Required Bicycle Parking Spaces**
Where two options for a requirement are provided, the option resulting in more bicycle parking applies. Where a calculation results in a fraction, the result is rounded up to the nearest whole number.

USE	*MINIMUM BICYCLE PARKING*	*MINIMUM BICYCLE PARKING - COVERED - The following percentage*

		of bicycle parking is required to be covered
Multi-family (three or more units)	*1 per 10 units (minimum of 2)*	*50% (minimum of 1)*
Institutional		
Correctional institution	*1 per 15 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Nursing home or care facility	*1 per 30 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Hospital	*1 per 20 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Park-and-ride lot	*1 per 5 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Transit center	*1 per 5 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Parks and open space	*1 per 10 auto spaces (minimum of 2)*	*0%*
Public parking lots	*1 per 10 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Automobile parking structures	*1 per 10 auto spaces (minimum of 4)*	*80% (minimum of 2)*
Religious institutions, movie theater, auditorium or meeting room	*1 per 10 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Libraries, museums	*1 per 5 auto spaces (minimum of 2)*	*30% (minimum of 1)*

Preschool, nursery, kindergarten	*2 per classroom (minimum of 2)*	*50% (minimum of 1)*
Elementary	*4 per classroom (minimum of 2)*	*50% (minimum of 1)*
Junior high and High school	*2 per classroom (minimum of 2)*	*50% (minimum of 2)*
College, business/commercial schools	*2 per classroom (minimum of 2)*	*50% (minimum of 1)*
Swimming pools, gymnasiums, ball courts	*1 per 10 auto spaces (minimum of 2)*	*30% (minimum of 1)*
Retail stores and shopping centers	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 2)*
Retail stores handling exclusively bulky merchandise such as automobile, boat or trailer sales or rental	*1 per 40 auto spaces (minimum of 2)*	*0%*
Bank, office	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Medical and dental clinic	*1 per 20 auto spaces (minimum of 2)*	*50% (minimum of 1)*
Eating and drinking establishment	*1 per 20 auto spaces (minimum of 2)*	*0%*
Gasoline service station	*1 per 10 auto spaces (minimum of 2)*	*0%*

* *Covered bicycle parking is not required for developments with two or fewer stalls.*

Applicant's Response: As mentioned in the pre-application conference notes, current Oregon City Title 17 code does not include bicycle parking standards for fire stations. Staff indicated, the application would need to provide information identifying how the bicycle parking is calculated using parking requirements for our use adopted by other nearby jurisdictions. After reviewing nearby jurisdiction (City of Portland, City of Salem, Clackamas County, West Linn, Tualatin), only the City of Salem lists

Emergency Services as a type of use with specific parking standards. See table below per City of Salem SRC Chapter 806 for Minimum and Maximum bicycle parking standards.

Table 806-8: Minimum Bicycle Parking		
Public Safety		
Emergency Services	None	Applicable to ambulance stations.
	1 per 5,000 sq. ft.	Applicable to all other Emergency Services.
Detention Facilities	1 per 50 beds.	
Military Installations	1 per 5,000 sq. ft.	

The total square footage is 12,300 square feet, which includes 4,200 square feet of apparatus bay (fire trucks). In calculating the minimum and maximum bicycle parking for the proposed fire station, the apparatus bay square footage was not included. The following table summarizes the proposed off-street parking.

Area (Square Feet)	Minimum Required	Proposed
8,100 Square Feet	2	2

C. Security of Bicycle Parking. Bicycle parking facilities shall be secured. Acceptable secured bicycle parking area shall be in the form of a lockable enclosure onsite, secure room in a building onsite, a covered or uncovered rack onsite, bicycle parking within the adjacent right-of-way or another form of secure parking where the bicycle can be stored, as approved by the decision maker. All bicycle racks and lockers shall be securely anchored to the ground or to a structure. Bicycle racks shall be designed so that bicycles may be securely locked to them without undue inconvenience and, when in the right-of-way shall comply with clearance and ADA requirements.

Applicant's Response: Proposed bicycle rack will be securely anchored.

D. Bicycle parking facilities shall offer security in the form of either a lockable enclosure or a stationary rack to which the bicycle can be locked. All bicycle racks and lockers shall be securely anchored to the ground or to a structure. Bicycle racks shall be designed so that bicycles may be securely locked to them without undue inconvenience.
Location of Bicycle Parking:
1. Bicycle parking shall be located on-site, in one or more convenient, secure and accessible location. The city engineer and the community development Director may permit the bicycle parking to be provided within the right-of-way provided adequate clear zone and ADA requirements are met. If sites have more than one building, bicycle parking shall be distributed as appropriate to serve all buildings. If a building has two or more main building entrances, the review authority may require bicycle parking to be distributed to serve all main building entrances, as it deems appropriate.

Applicant's Response: Proposed bicycle rack is located on site and in a secure accessible location.

2. Bicycle parking areas shall be clearly marked or visible from on-site buildings or the street. If a bicycle parking area is not plainly visible from the street or main building entrance, a sign must be posted

indicating the location of the bicycle parking area. Indoor bicycle parking areas shall not require stairs to access the space unless approved by the community development director.

Applicant's Response: Two bicycle parking spaces will be provided along the scored concrete pedestrian walkway adjacent to the public parking stalls. This location is plainly visible from Molalla Avenue

3. All bicycle parking areas shall be located to avoid conflicts with pedestrian and motor vehicle movement.
a. Bicycle parking areas shall be separated from motor vehicle parking and maneuvering areas and from arterial streets by a barrier or a minimum of five feet.
b. Bicycle parking areas shall not obstruct pedestrian walkways; provided, however, that the review authority may allow bicycle parking in the right-of-way where this does not conflict with pedestrian accessibility.

Applicant's Response: Proposed bicycle parking area is separated from the vehicle parking drive aisle a distance of 5'-0" and the public parking space by a 5'-0" wide landscape bed. The bicycle parking area does not obstruct the pedestrian walkways.

4. Accessibility.
a. Outdoor bicycle areas shall be connected to main building entrances by pedestrian accessible walkways.
b. Outdoor bicycle parking areas shall have direct access to a right-of-way.
c. Outdoor bicycle parking should be no farther from the main building entrance than the distance to the closest vehicle space, or fifty feet, whichever is less, unless otherwise determined by the community development director, city engineer, or planning commission.

Applicant's Response: The proposed bicycle parking area is west of the public parking stalls, which is 50'-0" from the main entrance. This location provides the greatest amount of area for accessibility and visibility while still providing a save and direct connection to the pedestrian plaza and building entry.

17.52.060 - Parking lot landscaping.
Purpose. The purpose of this code section includes the following:
1. To enhance and soften the appearance of parking lots;
2. To limit the visual impact of parking lots from sidewalks, streets and particularly from residential areas;
3. To shade and cool parking areas;
4. To reduce air and water pollution;
5. To reduce storm water impacts and improve water quality; and
6. To establish parking lots that are more inviting to pedestrians and bicyclists.

Applicant's Response: Proposed parking lot landscaping meets the required standards in 17.52.060

A. Development Standards.
1. The landscaping shall be located in defined landscaped areas that are uniformly distributed throughout the parking or loading area.

Applicant's Response: Proposed landscaping is uniformly distributed and defined. Landscape areas are proposed along the perimeter of the parking lot and within islands between parking spaces.

2. All areas in a parking lot not used for parking, maneuvering, or circulation shall be landscaped.

Applicant's Response: Proposed landscaping meets this requirement.

3. Parking lot trees shall be a mix of deciduous shade trees and coniferous trees. The trees shall be evenly distributed throughout the parking lot as both interior and perimeter landscaping to provide shade.

Applicant's Response: A mix of deciduous shade trees and coniferous trees will be selected from the Oregon City Street Tree List and based on the individual conditions of the proposed locations. Proposed landscaping meets this requirement.

4. Required landscaping trees shall be of a minimum two-inch minimum caliper size (though it may not be standard for some tree types to be distinguished by caliper), planted according to American Nurseryman Standards, and selected from the Oregon City Street Tree List;

Applicant's Response: Proposed landscaping meets this requirement.

5. Landscaped areas shall include irrigation systems unless an alternate plan is submitted, and approved by the community development director, that can demonstrate adequate maintenance;

Applicant's Response: All planting areas shall be irrigated with a permanent below-ground automatic irrigation system providing 100% head-to-head spray coverage or 100% coverage with a subsurface drip irrigation system.

6. All plant materials, including trees, shrubbery and ground cover should be selected for their appropriateness to the site, drought tolerance, year-round greenery and coverage and staggered flowering periods. Species found on the Oregon City Native Plant List are strongly encouraged and species found on the Oregon City Nuisance Plant List are prohibited.

Applicant's Response: A palette of plants comprised of a mix of vertical and horizontal elements which include trees, shrubs, and groundcovers have been selected that are hardy to the Pacific Northwest and low maintenance. Plants are spaced so that 100% of the Landscape area will be covered within 3 years.

7. The landscaping in parking areas shall not obstruct lines of sight for safe traffic operation and shall comply with all requirements of Chapter 10.32, Traffic Sight Obstructions.

Applicant's Response: A mix of shrubs and groundcovers will be selected so as to not inhibit safe traffic operation or obstruct traffic sight lines.

8. Landscaping shall incorporate design standards in accordance with Chapter 13.12, Stormwater Management.

Applicant's Response: The three individual stormwater facilities areas will be planted with vegetation based on the hydrology, soils, plant materials, and maintenance of each facility. Plant quantities and, sizes, and design of the stormwater facilities will adhere to the standards set by the Oregon City Stormwater and Grading Design Standards.

B. Perimeter Parking Lot Landscaping and Parking Lot Entryway/Right-of-Way Screening. Parking lots shall include a five-foot wide landscaped buffer where the parking lot abuts the right-of-way and/or adjoining properties. In order to provide connectivity between non-single-family sites, the community development director may approve an interruption in the perimeter parking lot landscaping for a single driveway where the parking lot abuts property designated as multi-family, commercial or industrial. Shared driveways and parking aisles that straddle a lot line do not need to meet perimeter landscaping requirements.
1. The perimeter parking lot are[a] shall include:
a. Trees spaced a maximum of thirty-five feet apart (minimum of one tree on either side of the entryway is required). When the parking lot is adjacent to a public right-of-way, the parking lot trees shall be offset from the street trees;

Applicant's Response: Proposed landscaping meets this requirement. Landscape buffers along the perimeter of the parking lot areas meet or exceed the 5-foot minimum. The 5-foot buffer will be planted with an evergreen hedge and trees spaced at thirty-five feet on center.

b. Ground cover, such as wild flowers, spaced a maximum of 16-inches on center covering one hundred percent of the exposed ground within three years. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees; and

Applicant's Response: Proposed landscaping meets this requirement. A palette of plants comprised of a mix of vertical and horizontal elements which include trees, shrubs, and groundcovers have been selected that are hardy to the Pacific Northwest and low maintenance. Plants are spaced so that 100% of the Landscape area will be covered within 3 years.

c. An evergreen hedge screen of thirty to forty-two inches high or shrubs spaced no more than four feet apart on average. The hedge/shrubs shall be parallel to and not nearer than two feet from the right-of-way line. The required screening shall be designed to allow for free access to the site and sidewalk by pedestrians. Visual breaks, no more than five feet in width, shall be provided every thirty feet within evergreen hedges abutting public right-of-ways.

Applicant's Response: Proposed landscaping meets this requirement.

C. Parking Area/Building Buffer. Parking areas shall be separated from the exterior wall of a structure, exclusive of pedestrian entranceways or loading areas, by one of the following:
1. Minimum five-foot wide landscaped planter strip (excluding areas for pedestrian connection) abutting either side of a parking lot sidewalk with:

Applicant's Response: A five-foot wide landscaped planter stripped is provided between the building and the parking stalls on the east and west side of the building. Stormwater Planters on the east and west sides of the building further buffer the parking spaces from the building entrances.

a. Trees spaced a maximum of thirty-five feet apart;

Applicant's Response: Proposed landscaping meets this requirement.

b. Ground cover such as wild flowers, spaced a maximum of sixteen-inches on center covering one hundred percent of the exposed ground within three years. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees; and

Applicant's Response: Proposed landscaping meets this requirement. A palette of plants comprised of a mix of vertical and horizontal elements which include trees, shrubs, and groundcovers have been selected that are hardy to the Pacific Northwest and low maintenance. Plants are spaced so that 100% of the Landscape area will be covered within 3 years.

c. An evergreen hedge of thirty to forty-two inches or shrubs placed no more than four feet apart on average; or

Applicant's Response: An evergreen hedge of thirty to forty-two inches is proposed along the north, south, and east property lines of the site, providing a screen from the proposed parking to the adjacent properties.

2. Seven-foot sidewalks with shade trees spaced a maximum of thirty-five feet apart in three-foot by five-foot tree wells.

Applicant's Response: Proposed landscaping will meet the requirements of C.1 a-c as described above.

D. Interior Parking Lot Landscaping. Surface parking lots shall have a minimum ten percent of the interior of the gross area of the parking lot devoted to landscaping to improve the water quality, reduce storm water runoff, and provide pavement shade. Interior parking lot landscaping shall not be counted toward the fifteen percent minimum total site landscaping required by Section 17.62.050(1) unless otherwise permitted by the dimensional standards of the underlying zone district. Pedestrian walkways or any impervious surface in the landscaped areas are not to be counted in the percentage. Interior parking lot landscaping shall include:

Applicant's Response: The gross area of the parking lot is 10,236 square feet and 1,041 square feet of interior landscape is provided, fulfilling the 10% requirement of interior landscaping. Dimensional standards set forth in the underlying zone district (General Commercial) allow for interior parking lot landscape to be counted toward the 15% minimum.

a. A minimum of one tree per six parking spaces.

Applicant's Response: Four trees are provided for the twenty-two parking spaces.

b. Ground cover, such as wild flowers, spaced a maximum of sixteen-inches on center covering one hundred percent of the exposed ground within three years. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees.

Applicant's Response: Proposed landscaping meets this requirement. A palette of plants comprised of a mix of vertical and horizontal elements which include trees, shrubs, and groundcovers have been selected that are hardy to the Pacific Northwest and low maintenance. Plants are spaced so that 100% of the Landscape area will be covered within 3 years.

c. Shrubs spaced no more than four feet apart on average.

Applicant's Response: Proposed landscaping meets this requirement.

d. No more than eight contiguous parking spaces shall be created without providing an interior landscape strip between them. Landscape strips shall be provided between rows of parking shall be a minimum of six feet in width and a minimum of ten feet in length.

Applicant's Response: Proposed parking spaces do not exceed more than 8 contiguous parking spaces and are provided with landscape strips 6-feet in width.

e. Pedestrian walkways shall have shade trees spaced a maximum of every thirty-five feet in a minimum three-foot by five-foot tree wells; or Trees spaced every thirty-five feet, shrubs spaced no more than four feet apart on average, and ground cover covering one hundred percent of the exposed ground. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees.

Applicant's Response: Proposed landscaping meets this requirement.

E. Installation.
1. All landscaping shall be installed according to accepted planting procedures, according to American Nurseryman Standards.
2. The site, soils and proposed irrigation systems shall be appropriate for the healthy and long-term maintenance of the proposed plant species.
3. Certificates of occupancy shall not be issued unless the landscaping requirements have been met or other arrangements have been made and approved by the city, such as the posting of a surety.

Applicant's Response: Proposed landscaping installation and systems meet these requirements.

17.52.070 - Alternative landscaping plan.
Any applicant may propose an alternative landscaping plan. Such plans are often proposed to address physically constrained or smaller sites, however innovative designs for larger sites may also be considered. Alternative plans may include the use of low impact development techniques and minimized landscaping requirements. In such situations, the community development director may approve variations to the landscaping standards of section 17.52.060.
A. General Review Standard. The alternative shall be meet or exceed the intent of this chapter and shall create a safe space for automobiles and pedestrians. The alternative landscaping plan shall be prepared by a licensed landscape architect.
B. Credit for Pervious/Low Impact Development. The community development director may count up to fifty percent of the square footage of any pervious hardscaped landscape material within a parking lot that is designed and approved pursuant to the city's adopted stormwater and low impact development design standards toward minimum landscaping requirements for the site. (This includes porous pavement detention, open celled block pavers, porous asphalt, porous concrete pavement, porous turf, porous gravel, etc).

Applicant's Response: Not applicable. An alternate landscape plan is not proposed.

17.52.080 - Maintenance.
The owner, tenant and their agent, if any, shall be jointly and severally responsible for the maintenance of the site including but not limited to the off-street parking and loading spaces, bicycle parking and all landscaping which shall be maintained in good condition so as to present a healthy, neat and orderly appearance and shall be kept free from refuse and debris.
All plant growth in interior landscaped areas shall be controlled by pruning, trimming, or otherwise so that:

a. It will not interfere with the maintenance or repair of any public utility;
b. It will not restrict pedestrian or vehicular access; and
c. It will not constitute a traffic hazard due to reduced visibility.

Applicant's Response: The owner will maintain landscaping and abide by these requirements.

17.52.090 - Loading areas.
A. Purpose.
1. The purpose of this section is to provide adequate loading areas for commercial, office, retail and industrial uses that do not interfere with the operation of adjacent streets.

Applicant's Response: Informational only. No response

B. Applicability.
1. Section 17.52.090 applies to uses that are expected to have service or delivery truck visits with a forty-foot or longer wheelbase, at a frequency of one or more vehicles per week. The city engineer and decision maker shall determine through site plan and design review the number, size, and location of required loading areas, if any.

Applicant's Response: Not Applicable. The proposed fire station use will not have service or delivery trucks visit the site that meet the delivery truck standards or frequency noted above.

C. Standards.
1. The off-street loading space shall be large enough to accommodate the largest vehicle that is expected to serve the use without obstructing vehicles or pedestrian traffic on adjacent streets and driveways. Applicants are advised to provide complete and accurate information about the potential need for loading spaces because the city engineer or decision maker may restrict the use of other public right-of-way to ensure efficient loading areas and reduce interference with other uses.

Applicant's Response: Not Applicable. Refer to response in Section 17.52.090-B.1.

2. Where parking areas are prohibited between a building and the street, loading areas are also prohibited.

Applicant's Response: Not Applicable. Refer to response in Section 17.52.090-B.1.

3. The city engineer and decision maker, through site plan and design review, may approve a loading area adjacent to or within a street right-of-way when all of the following loading and unloading operations conditions are met:
a. Short in duration (i.e., less than one hour);
b. Infrequent (less than three operations daily between 5:00 a.m. and 12:00 a.m. or all operations between 12:00 a.m. and 5:00 a.m. at a location that is not adjacent to a residential zone);
c. Does not obstruct traffic during peak traffic hours;
d. Does not interfere with emergency response services; and
e. Is acceptable to the applicable roadway authority.

Applicant's Response: Not Applicable. Refer to response in Section 17.52.090-B.1.

CHAPTER 13.12 - STORMWATER CONVEYANCE, QUANTITY AND QUALITY

13.12.050 Pursuant to each of the subsections below, proposed activities may be required to meet the performance standards for stormwater conveyance, stormwater quantity or stormwater quality.
13.12.050.A. Stormwater Conveyance. The stormwater conveyance requirements of this chapter shall apply to all stormwater systems constructed with any development activity, except as follows:

1. *The conveyance facilities are located entirely on one privately owned parcel;*
2. *The conveyance facilities are privately maintained; and*
3. *The conveyance facilities receive no stormwater runoff from outside the parcel's property limits.*

Those facilities exempted from the stormwater conveyance requirements by the above subsection will remain subject to the requirements of the Oregon Uniform Plumbing Code. Those exempted facilities shall be reviewed by the building official.

Applicant's Response: All stormwater conveyance facilities are located entirely on the privately-owned parcel, are privately maintained and receive no stormwater runoff from outside the parcel's property limits. Operations and Maintenance document will be provided.

13.12.050.B. Stormwater Quantity Control. The stormwater quantity control requirements of this chapter shall apply to the following proposed activities, uses or developments:

1. *Activities located wholly or partially within water quality resource areas pursuant to Chapter 17.49 that will result in the creation of more than five hundred square feet of impervious surface within the WQRA or will disturb more than one thousand square feet of existing impervious surface within the WQRA as part of a commercial or industrial redevelopment project. These square footage measurements will be considered cumulative for any given seven-year period;*
2. *Activities that create more than two thousand square feet of impervious surface, cumulated over any given seven year period; or*
3. *Redevelopment of a commercial or industrial land use that will disturb more than five thousand square feet of existing impervious surface. This five thousand square foot measurement cumulates over any given seven year period;*
4. *An exemption to the stormwater quantity control requirements of this chapter will be granted in the following circumstances:*
    a. *The development site discharges to a stormwater quantity control facility approved by the city engineer to receive the developed site runoff after verification that the facility is adequately sized to receive the additional stormwater, or,*
    b. *The development site discharges to one of the following receiving bodies of water: Willamette River, Clackamas River or Abernethy Creek; and either lies within the one hundred year floodplain or is up to ten feet above the design flood elevation as defined in Chapter 17.42*

Applicant's Response: The resulting activities will create approximately 43,356 square feet of impervious surface. All impervious surfaces will be routed to water quality and flow control facilities (detention pond) in accordance with the City's Stormwater and Grading Design Standards. A preliminary storm report will be provided.

13.12.050.C. Stormwater Quality Control. The stormwater quality control requirements of this chapter shall apply to the following proposed activities, uses or developments:

1. *Category A. Activities subject to general water quality requirements of this chapter:*
   a. *The construction of four or more single-family residences;*
   b. *Activities located wholly or partially within water quality resource areas pursuant to Chapter 17.49 that will result in the creation of more than five hundred square feet of impervious surface within the WQRA or will disturb more than one thousand square feet of existing impervious surface within the WQRA as part of a commercial or industrial redevelopment project. These square footage measurements will be considered cumulative for any given seven year period; or*
   c. *Activities that create more than eight thousand square feet of new impervious surface for other than a single-family residential development. This eight thousand square foot measurement will be considered cumulative for any given seven year period;*
   d. *An exemption to the stormwater quantity control requirements of this subsection will be granted if the development site discharges to a stormwater quality control facility approved by the city engineer to receive the developed site runoff after verification that the facility is adequately sized to receive the additional stormwater.*
2. *Category B. Uses Requiring Additional Management Practices. In addition to any other applicable requirements of this chapter, the following uses are subject to additional management practices as contained in the Public Works Stormwater and Grading Design Standards:*
   a. *Fuel dispensing facilities;*
   b. *Bulk petroleum storage in multiple stationary tanks;*
   c. *Solid waste storage areas for commercial, industrial or multi-family uses;*
   d. *Loading and unloading docks for commercial or industrial uses; or*
   e. *Covered vehicle parking for commercial or industrial uses.*
3. *Category C. Clackamas River Watershed. In addition to any other applicable requirements of this chapter, any development that creates new waste discharges and whose stormwater runoff may directly or indirectly flow into the Clackamas River is subject to additional requirements associated with Oregon Administrative Rules (OAR) 340-41-470 (Thee Basin Rule).*

Applicant's Response: The proposed development meets the activities of Category 'A.c.'

13.12.090 Approval criteria for engineered drainage plans and drainage report.
An engineered drainage plan and/or drainage report shall be approved only upon making the following findings:

A. The plan and report demonstrate how the proposed development and stormwater management facilities will accomplish the purpose statements of this chapter;

B. The plan and report meet the requirements of the Public Works Stormwater and Grading Design Standards adopted by resolution under Section 13.12.020

C. Unless otherwise exempted by Section 13.12.050(B), the plan and report includes adequate stormwater quantity control facilities, so that when the proposed land development activity takes place, peak rates and volumes of runoff:
   1. Do not exceed the capacity of receiving drainage conveyance facilities;
   2. Do not increase the potential for streambank erosion; and
   3. Do not add volume to an off-site closed depression without providing for mitigation.

D. Unless otherwise exempted by Section 13.12.050(C), the proposed development includes:
   1. Adequate stormwater quality control facilities, so that when the proposed land development activity takes place, the temperature and overall pollution level of stormwater runoff is no greater

than the water entering. When no water enters a project, then stormwater runoff shall be compared to rain samples; and

2. Stormwater quality control facilities which:

a. Are in compliance with applicable National Pollutant Discharge Elimination System (NPDES) requirements;

b. Minimize the deterioration of existing watercourses, culverts, bridges, dams and other structures; and

c. Minimize any increase in nonpoint source pollution.

E. The storm drainage design within the proposed development includes provisions to adequately control runoff from all public and private streets and roof, footing, and area drains and ensures future extension of the current drainage system.

F. Streambank erosion protection is provided where stormwater, directly or indirectly, discharges to open channels or streams. The postdevelopment peak stormwater discharge rate from a development site for the two year, twenty-four hour duration storm event shall not exceed fifty percent of the two year, twenty-four hour predevelopment peak runoff rate.

G. Specific operation and maintenance measures are proposed that ensure that the proposed stormwater quantity control facilities will be properly operated and maintained.

Applicant's Response: See the Operation and Maintenance plan provided.

CHAPTER 12.04 - STREETS SIDEWALKS AND PUBLIC PLACES

12.04.003 - Applicability.

A. Compliance with this chapter is required for all land divisions, site plan and design review, master plan, detailed development plan and conditional use applications and all public improvements.

B. Compliance with this chapter is also required for new construction or additions which exceed fifty percent of the existing square footage, of all single and two-family dwellings. All applicable single and two-family dwellings shall provide any necessary dedications, easements or agreements as identified in the transportation system plan and this chapter. In addition, the frontage of the site shall comply with the following prioritized standards identified in this chapter:

1. Improve street pavement, construct curbs, gutters, sidewalks and planter strips; and

2. Plant street trees.

The cost of compliance with the standards identified in 12.04.003.B.1 and 12.04.003.B.2 is limited to ten percent of the total construction costs. The value of the alterations and improvements as determined by the community development director is based on the entire project and not individual building permits. It is the responsibility of the applicant to submit to the community development director the value of the required improvements. Additional costs may be required to comply with other applicable requirements associated with the proposal such as access or landscaping requirements.

Applicant's Response: The proposed development requires a site plan and design review. Therefore, this chapter is applicable.

12.04.005 - Jurisdiction and management of the public rights-of-way.

A. The city has jurisdiction and exercises regulatory management over all public rights-of-way within the city under authority of the City Charter and state law by issuing separate public works right-of-way permits or permits as part of issued public infrastructure construction plans. No work in the public right-of-way shall be done without the proper permit. Some public rights-of-way within the city are regulated by the

State of Oregon Department of Transportation (ODOT) or Clackamas County and as such, any work in these streets shall conform to their respective permitting requirements.
B. Public rights-of-way include, but are not limited to, streets, roads, highways, bridges, alleys, sidewalks, trails, paths, public easements and all other public ways or areas, including the subsurface under and air space over these areas.
C. The city has jurisdiction and exercises regulatory management over each public right-of-way whether the city has a fee, easement, or other legal interest in the right-of-way. The city has jurisdiction and regulatory management of each right-of-way whether the legal interest in the right-of-way was obtained by grant, dedication, prescription, reservation, condemnation, annexation, foreclosure or other means.
D. No person may occupy or encroach on a public right-of-way without the permission of the city. The city grants permission to use rights-of-way by franchises, licenses and permits.
E. The exercise of jurisdiction and regulatory management of a public right-of-way by the city is not official acceptance of the right-of-way, and does not obligate the city to maintain or repair any part of the right-of-way.

Applicant's Response: Informational only. No response.

12.04.007 - Modifications.
The review body may consider modification of this standard resulting from constitutional limitations restricting the city's ability to require the dedication of property or for any other reason, based upon the criteria listed below and other criteria identified in the standard to be modified. All modifications shall be processed through a Type II Land Use application and may require additional evidence from a transportation engineer or others to verify compliance. Compliance with the following criteria is required:
A. The modification meets the intent of the standard;
B. The modification provides safe and efficient movement of pedestrians, motor vehicles, bicyclists and freight;
C. The modification is consistent with an adopted plan; and
D. The modification is complementary with a surrounding street design; or, in the alternative;
E. If a modification is requested for constitutional reasons, the applicant shall demonstrate the constitutional provision or provisions to be avoided by the modification and propose a modification that complies with the state or federal constitution. The city shall be under no obligation to grant a modification in excess of that which is necessary to meet its constitutional obligations.

Applicant's Response: No modifications are proposed.

12.04.010 - Construction specifications—Improved streets.
All sidewalks hereafter constructed in the city on improved streets shall be constructed to city standards and widths required in the Oregon City Transportation System Plan. The curb shall be constructed at the same time as the construction of the sidewalk and shall be located as provided in the ordinance authorizing the improvement of said street next proceeding unless otherwise ordered by the city commission. Both sidewalks and curbs are to be constructed according to plans and specifications provided by the city engineer.

Applicant's Response: Molalla Avenue is fully improved. No improvements are proposed.

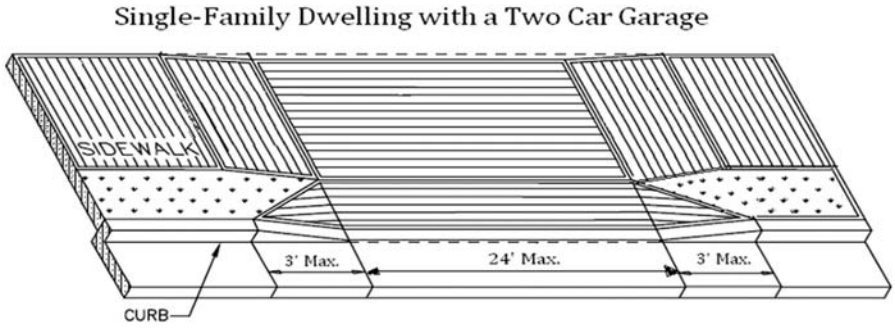
12.04.020 - Construction specifications—Unimproved streets.
Sidewalks constructed on unimproved streets shall be constructed of concrete according to lines and grades established by the city engineer and approved by the city commission. On unimproved streets curbs do not have to be constructed at the same time as the sidewalk.

Applicant's Response: Not Applicable. Molalla Avenue is fully improved.

12.04.025 - Street design—Driveway curb cuts.
A. One driveway shall be allowed per frontage. In no case shall more than two driveways be allowed on any single or two-family residential property with multiple frontages.
B. With the exception of the limitations identified in 12.04.025.C, all driveway curb cuts shall be limited to the following dimensions.

Property Use	*Minimum Driveway Width at sidewalk or property line*	*Maximum Driveway Width at sidewalk or property line*
Single or two-family dwelling with one car garage/parking space	*10 feet*	*12 feet*
Single or two-family dwelling with two car garage/parking space	*12 feet*	*24 feet*
Single or two-family dwelling with three or more car garages/parking space	*18 feet*	*30 feet*
Nonresidential or multi-family residential driveway access	*15 feet*	*40 feet*

The driveway width abutting the street pavement may be extended three feet on either side of the driveway to accommodate turn movements. Driveways may be widened onsite in locations other than where the driveway meets sidewalk or property line (for example between the property line and the entrance to a garage).
Figure 12.04.025: Example Driveway Curb Cut



Applicant's Response: The subject property is served by one access driveway off Molalla Avenue. The current width is approximately 80-feet. The proposed development will keep the driveway's location and width the same, as it is extremely important to have the most unobstructed, safe, and efficient route of travel for the fire apparatus vehicles to ingress and egress the site.

C. The decision maker shall be authorized through a Type II process, unless another procedure applicable to the proposal applies, to minimize the number and size of curb cuts (including driveways) as far as practicable for any of the following purposes:
1. To provide adequate space for on-street parking;
2. To facilitate street tree planting requirements;
3. To assure pedestrian and vehicular safety by limiting vehicular access points; and
4. To assure that adequate sight distance requirements are met.
a. Where the decision maker determines any of these situations exist or may occur due to the approval of a proposed development for non-residential uses or attached or multi-family housing, a shared driveway shall be required and limited to twenty-four feet in width adjacent to the sidewalk or property line and may extend to a maximum of thirty feet abutting the street pavement to facilitate turning movements.
b. Where the decision maker determines any of these situations exist or may occur due to approval of a proposed development for detached housing within the "R-5" Single-Family Dwelling District or "R-3.5" Dwelling District, driveway curb cuts shall be limited to twelve feet in width adjacent to the sidewalk or property line and may extend to a maximum of eighteen feet abutting the street pavement to facilitate turning movements.

Applicant's Response: Not applicable. No new driveway curb cuts are proposed.

D. For all driveways, the following standards apply.
1. Each new or redeveloped curb cut shall have an approved concrete approach or asphalted street connection where there is no concrete curb and a minimum hard surface for at least ten feet and preferably twenty feet back into the lot as measured from the current edge of street pavement to provide for controlling gravel tracking onto the public street. The hard surface may be concrete, asphalt, or other surface approved by the city engineer.
2. Driving vehicles, trailers, boats, or other wheeled objects across a sidewalk or roadside planter strip at a location other than an approved permanent or city-approved temporary driveway approach is prohibited. Damages caused by such action shall be corrected by the adjoining property owner.
3. Placing soil, gravel, wood, or other material in the gutter or space next to the curb of a public street with the intention of using it as a permanent or temporary driveway is prohibited. Damages caused by such action shall be corrected by the adjoining property owner.
4. Any driveway built within public street or alley right-of-way shall be built and permitted per city requirements as approved by the city engineer.

Applicant's Response: No changes to the existing driveway are proposed for this project.

E. Exceptions. The public works director reserves the right to waive this standard, if it is determined through a Type II decision including written findings that it is in the best interest of the public to do so.

Applicant's Response: The proposed development requires a site plan and design review and Conditional Use Permit.

12.04.030 - Maintenance and repair.
The owner of land abutting the street where a sidewalk has been constructed shall be responsible for maintaining said sidewalk and abutting curb, if any, in good repair.

Applicant's Response: The property owner will maintain the sidewalk.

12.04.031 - Liability for sidewalk injuries.
A. The owner or occupant of real property responsible for maintaining the adjacent sidewalk shall be liable to any person injured because of negligence of such owner or occupant in failing to maintain the sidewalk in good condition.
B. If the city is required to pay damages for an injury to persons or property caused by the failure of a person to perform the duty that this ordinance imposes, the person shall compensate the city for the amount of the damages paid. The city may maintain an action in a court of competent jurisdiction to enforce this section.

Applicant's Response: Informational only. No response.

12.04.032 - Required sidewalk repair.
A. When the public works director determines that repair of a sidewalk is necessary he or she shall issue a notice to the owner of property adjacent to the sidewalk.
B. The notice shall require the owner of the property adjacent to the defective sidewalk to complete the repair of the sidewalk within ninety days after the service of notice. The notice shall also state that if the repair is not made by the owner, the city may do the work and the cost of the work shall be assessed against the property adjacent to the sidewalk.
C. The public works director shall cause a copy of the notice to be served personally upon the owner of the property adjacent to the defective sidewalk, or the notice may be served by registered or certified mail, return receipt requested. If after diligent search the owner is not discovered, the public works director shall cause a copy of the notice to be posted in a conspicuous place on the property, and such posting shall have the same effect as service of notice by mail or by personal service upon the owner of the property.
D. The person serving the notice shall file with the city recorder a statement stating the time, place and manner of service or notice.

Applicant's Response: Informational only. No response.

12.04.033 - City may do work.
If repair of the sidewalk is not completed within ninety days after the service of notice, the public works director shall carry out the needed work on the sidewalk. Upon completion of the work, the public works director shall submit an itemized statement of the cost of the work to the finance director. The city may, at its discretion, construct, repair or maintain sidewalks deemed to be in disrepair by the public works director for the health, safety and general welfare of the residents of the city.

Applicant's Response: Informational only. No response.

12.04.034 - Assessment of costs.
Upon receipt of the report, the finance director shall assess the cost of the sidewalk work against the property adjacent to the sidewalk. The assessment shall be a lien against the property and may be collected in the same manner as is provided for in the collection of street improvement assessment.

Applicant's Response: Informational only. No response.

12.04.040 - Streets—Enforcement.
Any person whose duty it is to maintain and repair any sidewalk, as provided by this chapter, and who fails to do so shall be subject to the enforcement procedures of Chapters 1.16, 1.20 and 1.24. Failure to comply

with the provisions of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Applicant's Response: Informational only. No response.

12.04.045 - Reserved.
Editor's note— Ord. No. 13-1003, § 1, Exhibit 1, adopted July 17, 2013, repealed § 12.04.045 in its entirety. Former § 12.04.045 pertained to "Street Design—Constrained local streets and/or rights-of-way." See Prior Code Cross-Reference Table and Code Comparative Table and Disposition List for derivation.

Applicant's Response: Informational only. No response.

12.04.050 - Retaining walls—Required.
Every owner of a lot within the city, abutting upon an improved street, where the surface of the lot or tract of land is above the surface of the improved street and where the soil or earth from the lot, or tract of land is liable to, or does slide or fall into the street or upon the sidewalk, or both, shall build a retaining wall, the outer side of which shall be on the line separating the lot, or tract of land from the improved street, and the wall shall be so constructed as to prevent the soil or earth from the lot or tract of land from falling or sliding into the street or upon the sidewalk, or both, and the owner of any such property shall keep the wall in good repair.

Applicant's Response: Grading of the site with shallow slopes will not allow soil to slide or fall into the street.

12.04.060 - Retaining walls—Maintenance.
When a retaining wall is necessary to keep the earth from falling or sliding onto the sidewalk or into a public street and the property owner or person in charge of that property fails or refuses to build such a wall, such shall be deemed a nuisance. The violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Applicant's Response: No retaining walls are necessary along the sidewalk. Site has been graded with shallow slopes to prevent sliding.

12.04.070 - Removal of sliding dirt.
It shall be the duty of the owner of any property as mentioned in Section 12.04.050, and in case the owner is a nonresident, then the agent or other person in charge of the same, to remove from the street or sidewalk or both as the case may be, any and all earth or dirt falling on or sliding into or upon the same from the property, and to build and maintain in order at all times, the retaining wall as herein required; and upon the failure, neglect or refusal of the land owner, the agent or person in charge of the same to clean away such earth or dirt, falling or sliding from the property into the street or upon the sidewalk, or both, or to build the retaining wall, shall be deemed guilty of a misdemeanor.

Applicant's Response: Informational only. No response.

12.04.080 - Excavations—Permit required.
It shall be unlawful for any person to dig up, break, excavate, disturb, dig under or undermine any public street or alley, or any part thereof or any macadam, gravel, or other street pavement or improvement without first applying for and obtaining from the engineer a written permit so to do.

Applicant's Response: A permit will be obtained to allow for connection of the onsite storm water system to the existing stormwater system located within Molalla Avenue.

12.04.090 - Excavations—Permit restrictions.
The permit shall designate the portion of the street to be so taken up or disturbed, together with the purpose for making the excavation, the number of days in which the work shall be done, and the trench or excavation to be refilled and such other restrictions as may be deemed of public necessity or benefit.

Applicant's Response: Informational only. No response.

12.04.095 - Reserved.
Editor's note— Ord. No. 13-1003, § 1, Exhibit 1, adopted July 17, 2013, repealed § 12.04.095 in its entirety. Former § 12.04.095 pertained to "Street Design—Curb Cuts." See Prior Code Cross-Reference Table and Code Comparative Table and Disposition List for derivation.

Applicant's Response: Informational only. No response.

12.04.100 - Excavations—Restoration of pavement.
Whenever any excavation shall have been made in any pavement or other street improvement on any street or alley in the city for any purpose whatsoever under the permit granted by the engineer, it shall be the duty of the person making the excavation to restore the pavement in accordance with the City of Oregon City Public Works Pavement Cut Standard in effect at the time a right-of-way permit application is filed. The city commission may adopt and modify the City of Oregon City Public Works Pavement Cut Standards by resolution as necessary to implement the requirements of this chapter.

Applicant's Response: If pavement is removed to make the connection to the existing stormwater system, it will be restored per the city of Oregon City requirements.

12.04.110 - Excavations—Nuisance—Penalty.
Any excavation in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Applicant's Response: Informational only. No response.

12.04.120 - Obstructions—Permit required.
A. Permanent Obstructions. It is unlawful for any person to place, put or maintain any obstruction, other than a temporary obstruction, as defined in subsection B. of this section, in any public street or alley in the city, without obtaining approval for a right-of-way permit from the commission by passage of a resolution.
1. The city engineer shall provide applicants with an application form outlining the minimum submittal requirements.
2. The applicant shall submit at least the following information in the permitting process in order to allow the commission to adequately consider whether to allow the placement of an obstruction and whether any conditions may be attached:
a. Site plan showing right-of-way, utilities, driveways as directed by staff;
b. Sight distance per Chapter 10.32, Traffic Sight Obstructions;
c. Traffic control plan including parking per Manual on Uniform Traffic Control Devices (MUTCD);
d. Alternative routes if necessary;

e. Minimizing obstruction area; and
f. Hold harmless/maintenance agreement.
3. If the commission adopts a resolution allowing the placement of a permanent obstruction in the right-of-way, the city engineer shall issue a right-of-way permit with any conditions deemed necessary by the commission.
B. Temporary Obstructions.
1. A "temporary obstruction" is defined as an object placed in a public street, road or alley for a period of not more than sixty consecutive days. A "temporary obstruction" includes, but is not limited to, moving containers and debris dumpsters.
2. The city engineer, or designee, is authorized to grant a permit for a temporary obstruction.
3. The city engineer shall provide applicants with an application form outlining the minimum submittal requirements.
4. The applicant shall submit, and the city engineer, or designee, shall consider, at least the following items in the permitting process. Additional information may be required in the discretion of the city engineer:
a. Site plan showing right-of-way, utilities, driveways as directed by staff;
b. Sight distance per Chapter 10.32, Traffic Sight Obstructions;
c. Traffic control plan including parking per Manual on Uniform Traffic Control Devices (MUTCD);
d. Alternative routes if necessary;
e. Minimizing obstruction area; and
f. Hold harmless/maintenance agreement.
5. In determining whether to issue a right-of-way permit to allow a temporary obstruction, the city engineer may issue such a permit only after finding that the following criteria have been satisfied:
a. The obstruction will not unreasonably impair the safety of people using the right-of-way and nearby residents;
b. The obstruction will not unreasonably hinder the efficiency of traffic affected by the obstruction;
c. No alternative locations are available that would not require use of the public right-of-way; and
d. Any other factor that the city engineer deems relevant.
6. The permittee shall post a weatherproof copy of the temporary obstruction permit in plain view from the right-of-way.
C. Fees. The fee for obtaining a right-of-way permit for either a permanent obstruction or a temporary obstruction shall be set by resolution of the commission.

Applicant's Response: No permanent or temporary obstructions are planned for this project.

12.04.130 - Obstructions—Sidewalk sales.
A. It is unlawful for any person to use the public sidewalks of the city for the purpose of packing, unpacking or storage of goods or merchandise or for the display of goods or merchandise for sale. It is permissible to use the public sidewalks for the process of expeditiously loading and unloading goods and merchandise.
B. The city commission may, in its discretion, designate certain areas of the city to permit the display and sale of goods or merchandise on the public sidewalks under such conditions as may be provided.

Applicant's Response: Informational only. No response.

12.04.140 - Obstructions—Nuisance—Penalty.
Any act or omission in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Applicant's Response: Informational only. No response.

12.04.150 - Street and alley vacations—Cost.
At the time of filing a petition for vacation of a street, alley or any part thereof, a fee as established by city commission resolution shall be paid to the city.

Applicant's Response: No street or alley vacations are proposed as part of this project.

12.04.160 - Street vacations—Restrictions.
The commission, upon hearing such petition, may grant the same in whole or in part, or may deny the same in whole or in part, or may grant the same with such reservations as would appear to be for the public interest, including reservations pertaining to the maintenance and use of underground public utilities in the portion vacated.

Applicant's Response: Informational only. No response.

12.04.170 - Street design—Purpose and general provisions.
All development shall be in conformance with the policies and design standards established by this chapter and with applicable standards in the city's public facility master plan and city design standards and specifications. In reviewing applications for development, the city engineer shall take into consideration any approved development and the remaining development potential of adjacent properties. All street, water, sanitary sewer, storm drainage and utility plans associated with any development must be reviewed and approved by the city engineer prior to construction. All streets, driveways or storm drainage connections to another jurisdiction's facility or right-of-way must be reviewed by the appropriate jurisdiction as a condition of the preliminary plat and when required by law or intergovernmental agreement shall be approved by the appropriate jurisdiction.

Applicant's Response: No offsite utility extensions or roadway extensions are proposed as part of this project.

12.04.175 - Street design—Generally.
The location, width and grade of street shall be considered in relation to: existing and planned streets, topographical conditions, public convenience and safety for all modes of travel, existing and identified future transit routes and pedestrian/bicycle accessways, overlay districts, and the proposed use of land to be served by the streets. The street system shall assure an adequate traffic circulation system with intersection angles, grades, tangents and curves appropriate for the traffic to be carried considering the terrain. To the extent possible, proposed streets shall connect to all existing or approved stub streets that abut the development site. The arrangement of streets shall either:
A. Provide for the continuation or appropriate projection of existing principal streets in the surrounding area and on adjacent parcels or conform to a plan for the area approved or adopted by the city to meet a particular situation where topographical or other conditions make continuance or conformance to existing streets impractical;
B. Where necessary to give access to or permit a satisfactory future development of adjoining land, streets shall be extended to the boundary of the development and the resulting dead-end street (stub) may be approved with a temporary turnaround as approved by the city engineer. Notification that the street is planned for future extension shall be posted on the stub street until the street is extended and shall inform the public that the dead-end street may be extended in the future. Access control in accordance with [Chapter] 12.04 shall be required to preserve the objectives of street extensions.

Applicant's Response: No new streets are proposed as part of this project.

12.04.180 - Street design.
All development regulated by this chapter shall provide street improvements in compliance with the standards in Figure 12.04.180 depending on the street classification set forth in the Transportation System Plan and the Comprehensive Plan designation of the adjacent property, unless an alternative plan has been adopted. The standards provided below are maximum design standards and may be reduced with an alternative street design which may be approved based on the modification criteria in [Section] 12.04.007. The steps for reducing the maximum design below are found in the Transportation System Plan.
Table 12.04.180 Street Design
To read the table below, select the road classification as identified in the Transportation System Plan and the Comprehensive Plan designation of the adjacent properties to find the maximum design standards for the road cross section. If the Comprehensive Plan designation on either side of the street differs, the wider right-of-way standard shall apply.

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Minor Arterial	MixedUse, Commercial or Public/Quasi Public	116 ft.	94 ft.	0.5 ft.	10.5ft.sidewalk including 5 ft. x 5 ft. tree wells		6 ft.	8 ft.	(5) 12 ft. Lanes	6 ft.
	Industrial	118 ft.	86 ft.	0.5 ft.	5 ft.	10.5 ft.	6 ft.	7 ft.	(5) 12 ft. Lanes	N/A
	Residential	100 ft.	68 ft.	0.5 ft.	5 ft.	10.5 ft.	6 ft.	7 ft.	(3) 12 ft. Lanes	6 ft.

Road Classification	Comprehensive Plan Designation	Right-of-Way Width	Pavement Width	Public Access	Sidewalk	Landscape Strip	Bike Lane	Street Parking	Travel Lanes	Median
Local	MixedUse, Commercial or Public/Quasi Public	62 ft.	40 ft.	0.5 ft.	10.5 ft. sidewalk including 5 ft. x 5 ft. tree wells		N/A	8 ft.	(2) 12 ft. Lanes	N/A
	Industrial	60 ft.	38 ft.	0.5 ft.	5 ft.	5.5 ft.	(2) 19 ft. Shared Space			N/A
	Residential	54 ft.	32 ft.	0.5 ft.	5 ft.	5.5 ft.	(2) 16 ft. Shared Space			N/A

1. Pavement width includes, bike lane, street parking, travel lanes and median.

2. Public access, sidewalks, landscape strips, bike lanes and on-street parking are required on both sides of the street in all designations. The right-of-way width and pavement widths identified above include the total street section.
3. A 0.5 foot curb is included in landscape strip or sidewalk width.
4. Travel lanes may be through lanes or turn lanes.
5. The 0.5 foot public access provides access to adjacent public improvements.
6. Alleys shall have a minimum right-of-way width of twenty feet and a minimum pavement width of sixteen feet. If alleys are provided, garage access shall be provided from the alley.

Applicant's Response: No new streets are proposed as part of this project.

12.04.185 - Street design—Access control.
A. A street which is dedicated to end at the boundary of the development or in the case of half-streets dedicated along a boundary shall have an access control granted to the city as a city controlled plat restriction for the purposes of controlling ingress and egress to the property adjacent to the end of the dedicated street. The access control restriction shall exist until such time as a public street is created, by dedication and accepted, extending the street to the adjacent property.
B. The city may grant a permit for the adjoining owner to access through the access control.
C. The plat shall contain the following access control language or similar on the face of the map at the end of each street for which access control is required: "Access Control (See plat restrictions)."
D. Said plats shall also contain the following plat restriction note(s): "Access to (name of street or tract) from adjoining tracts (name of deed document number[s]) shall be controlled by the City of Oregon City by the recording of this plat, as shown. These access controls shall be automatically terminated upon the acceptance of a public road dedication or the recording of a plat extending the street to adjacent property that would access through those Access Controls."

Applicant's Response: No new streets are proposed as part of this project.

12.04.190 - Street design—Alignment.
The centerline of streets shall be:
A. Aligned with existing streets by continuation of the centerlines; or
B. Offset from the centerline by no more than five (5) feet, provided appropriate mitigation, in the judgment of the city engineer, is provided to ensure that the offset intersection will not pose a safety hazard.

Applicant's Response: No new streets are proposed as part of this project.

12.04.194 - Traffic sight obstructions.
All new streets shall comply with the Traffic Sight Obstructions in Chapter 10.32.

Applicant's Response: No new streets are proposed as part of this project.

12.04.195 - Spacing standards.
A. All new streets shall be designed as local streets unless otherwise designated as arterials and collectors in Figure 8 in the transportation system plan. The maximum block spacing between streets is five hundred thirty feet and the minimum block spacing between streets is one hundred fifty feet as measured between the right-of-way centerlines. If the maximum block size is exceeded, pedestrian accessways must be provided every three hundred thirty feet. The spacing standards within this section do not apply to alleys.

B. All new development and redevelopment shall meet the minimum driveway spacing standards identified in Table 12.04.195.B.

Table 12.04.195.B Minimum Driveway Spacing Standards		
Street Functional Classification	*Minimum Driveway Spacing Standards*	*Distance*
Major Arterial Streets	*Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings*	*175 ft.*
Minor Arterial Streets	*Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings*	*175 ft.*
Collector Streets	*Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings*	*100 ft.*
Local Streets	*Minimum distance from a street corner to a driveway for all uses and Minimum distance between driveways for uses other than single and two-family dwellings*	*25 ft.*

The distance from a street corner to a driveway is measured along the right-of-way from the edge of the intersection right-of-way to the nearest portion of the driveway and the distance between driveways is measured at the nearest portions of the driveway at the right-of-way.

Applicant's Response: No new streets or driveways are proposed as part of this project.

12.04.199 - Pedestrian and bicycle accessways.
Pedestrian/bicycle accessways are intended to provide direct, safe and convenient connections between residential areas, retail and office areas, institutional facilities, industrial parks, transit streets, neighborhood activity centers, rights-of-way, and pedestrian/bicycle accessways which minimize out-of-direction travel, and transit-orientated developments where public street connections for automobiles, bicycles and pedestrians are unavailable. Pedestrian/bicycle accessways are appropriate in areas where public street options are unavailable, impractical or inappropriate. Pedestrian and bicycle accessways are required through private property or as right-of-way connecting development to the right-of-way at intervals not exceeding three hundred thirty feet of frontage; or where the lack of street continuity creates inconvenient or out of direction travel patterns for local pedestrian or bicycle trips.
A. Entry points shall align with pedestrian crossing points along adjacent streets and with adjacent street intersections.

Applicant's Response: No new accessways are proposed as part of this project.

B. Accessways shall be free of horizontal obstructions and have a nine-foot, six-inch high vertical clearance to accommodate bicyclists. To safely accommodate both pedestrians and bicycles, accessway right-of-way widths shall be as follows:
1. Accessways shall have a fifteen-foot-wide right-of-way with a seven-foot wide paved surface between a five-foot planter strip and a three-foot planter strip.
2. If an accessway also provides secondary fire access, the right-of-way width shall be at least twenty-three feet wide with a fifteen-foot paved surface a five-foot planter strip and a three-foot planter strip.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

C. Accessways shall be direct with at least one end point of the accessway always visible from any point along the accessway. On-street parking shall be prohibited within fifteen feet of the intersection of the accessway with public streets to preserve safe sight distance and promote safety.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

D. To enhance pedestrian and bicycle safety, accessways shall be lighted with pedestrian-scale lighting. Accessway lighting shall be to a minimum level of one-half-foot-candles, a one and one-half foot-candle average, and a maximum to minimum ratio of seven-to-one and shall be oriented not to shine upon adjacent properties. Street lighting shall be provided at both entrances.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

E. Accessways shall comply with Americans with Disabilities Act (ADA).

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

F. The planter strips on either side of the accessway shall be landscaped along adjacent property by installation of the following:
1. Within the three-foot planter strip, an evergreen hedge screen of thirty to forty-two inches high or shrubs spaced no more than four feet apart on average;
2. Ground cover covering one hundred percent of the exposed ground. No bark mulch shall be allowed except under the canopy of shrubs and within two feet of the base of trees;
3. Within the five-foot planter strip, two-inch minimum caliper trees with a maximum of thirty-five feet of separation between the trees to increase the tree canopy over the accessway;
4. In satisfying the requirements of this section, evergreen plant materials that grow over forty-two inches in height shall be avoided. All plant materials shall be selected from the Oregon City Native Plant List.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

G. Accessways shall be designed to prohibit unauthorized motorized traffic. Curbs and removable, lockable bollards are suggested mechanisms to achieve this.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

H. Accessway surfaces shall be paved with all-weather materials as approved by the city. Pervious materials are encouraged. Accessway surfaces shall be designed to drain stormwater runoff to the side or sides of the accessway. Minimum cross slope shall be two percent.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

I. In parks, greenways or other natural resource areas, accessways may be approved with a five-foot wide gravel path with wooden, brick or concrete edgings.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

J. The community development director may approve an alternative accessway design due to existing site constraints through the modification process set forth in Section 12.04.007.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

K. Ownership, liability and maintenance of accessways. To ensure that all pedestrian/bicycle accessways will be adequately maintained over time, the hearings body shall require one of the following:
1. Dedicate the accessways to the public as public right-of-way prior to the final approval of the development; or
2. The developer incorporates the accessway into a recorded easement or tract that specifically requires the property owner and future property owners to provide for the ownership, liability and maintenance of the accessway.

Applicant's Response: Not applicable. No new accessways are proposed as part of this project.

12.04.200 - Reserved.
Editor's note— Ord. No. 13-1003, § 1, Exhibit 1, adopted July 17, 2013, repealed § 12.04.200 in its entirety. Former § 12.04.200 pertained to "Street Design—Constrained local streets and/or rights-of-way." See Prior Code Cross-Reference Table and Code Comparative Table and Disposition List for derivation.

12.04.205 - Mobility standards.
Development shall demonstrate compliance with intersection mobility standards. When evaluating the performance of the transportation system, the City of Oregon City requires all intersections, except for the facilities identified in subsection D below, to be maintained at or below the following mobility standards during the two-hour peak operating conditions. The first hour has the highest weekday traffic volumes and the second hour is the next highest hour before or after the first hour. Except as provided otherwise below, this may require the installation of mobility improvements as set forth in the transportation system plan or as otherwise identified by the city transportation engineer.
A. For intersections within the regional center, the following mobility standards apply:
1. During the first hour, a maximum v/c ratio of 1.10 shall be maintained. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.
2. During the second hour, a maximum v/c ratio of 0.99 shall be maintained at signalized intersections. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.
3. Intersections located on the Regional Center boundary shall be considered within the Regional Center.
B. For intersections outside of the Regional Center but designated on the Arterial and Throughway Network, as defined in the Regional Transportation Plan, the following mobility standards apply:

1. During the first hour, a maximum v/c ratio of 0.99 shall be maintained. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.
2. During the second hour, a maximum v/c ratio of 0.99 shall be maintained at signalized intersections. For signalized intersections, this standard applies to the intersection as a whole. For unsignalized intersections, this standard applies to movements on the major street. There is no performance standard for the minor street approaches.
C. For intersections outside the boundaries of the Regional Center and not designated on the Arterial and Throughway Network, as defined in the Regional Transportation Plan, the following mobility standards apply:
1. For signalized intersections:
a. During the first hour, LOS "D" or better will be required for the intersection as a whole and no approach operating at worse than LOS "E" and a v/c ratio not higher than 1.0 for the sum of the critical movements.
b. During the second hour, LOS "D" or better will be required for the intersection as a whole and no approach operating at worse than LOS "E" and a v/c ratio not higher than 1.0 for the sum of the critical movements.
2. For unsignalized intersections outside of the boundaries of the Regional Center:
a. For unsignalized intersections, during the peak hour, all movements serving more than twenty vehicles shall be maintained at LOS "E" or better. LOS "F" will be tolerated at movements serving no more than twenty vehicles during the peak hour.
D. Until the city adopts new performance measures that identify alternative mobility targets, the city shall exempt proposed development that is permitted, either conditionally, outright, or through detailed development master plan approval, from compliance with the above-referenced mobility standards for the following state-owned facilities:
I-205/OR 99E Interchange
I-205/OR 213 Interchange
OR 213/Beavercreek Road
State intersections located within or on the Regional Center Boundaries
1. In the case of conceptual development approval for a master plan that impacts the above references intersections:
a. The form of mitigation will be determined at the time of the detailed development plan review for subsequent phases utilizing the Code in place at the time the detailed development plan is submitted; and
b. Only those trips approved by a detailed development plan review are vested.
2. Development which does not comply with the mobility standards for the intersections identified in [Section] 12.04.205.D shall provide for the improvements identified in the Transportation System Plan (TSP) in an effort to improve intersection mobility as necessary to offset the impact caused by development. Where required by other provisions of the Code, the applicant shall provide a traffic impact study that includes an assessment of the development's impact on the intersections identified in this exemption and shall construct the intersection improvements listed in the TSP or required by the Code.

Applicant's Response: No new intersections are proposed as part of this project.

12.04.210 - Street design—Intersection angles.
Except where topography requires a lesser angle, streets shall be laid out to intersect at angles as near as possible to right angles. In no case shall the acute angles be less than eighty degrees unless there is a special intersection design. An arterial or collector street intersecting with another street shall have at least one hundred feet of tangent adjacent to the intersection unless topography requires a lesser distance. Other streets, except alleys, shall have at least fifty feet of tangent adjacent to the intersection unless

topography requires a lesser distance. All street intersections shall be provided with a minimum curb return radius of twenty-five feet for local streets. Larger radii shall be required for higher street classifications as determined by the city engineer. Additional right-of-way shall be required to accommodate curb returns and sidewalks at intersections. Ordinarily, intersections should not have more than two streets at any one point.

Applicant's Response: Not applicable. No new intersections are proposed as part of this project.

12.04.215 - Street design—Off-site street improvements.
During consideration of the preliminary plan for a development, the decision maker shall determine whether existing streets impacted by, adjacent to, or abutting the development meet the city's applicable planned minimum design or dimensional requirements. Where such streets fail to meet these requirements, the decision-maker shall require the applicant to make proportional improvements sufficient to achieve conformance with minimum applicable design standards required to serve the proposed development.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

12.04.220 - Street design—Half street.
Half streets, while generally not acceptable, may be approved where essential to the development, when in conformance with all other applicable requirements, and where it will not create a safety hazard. When approving half streets, the decision maker must first determine that it will be practical to require the dedication of the other half of the street when the adjoining property is divided or developed. Where the decision maker approves a half street, the applicant must construct an additional ten feet of pavement width so as to make the half street safe and usable until such time as the other half is constructed. Whenever a half street is adjacent to property capable of being divided or developed, the other half of the street shall be provided and improved when that adjacent property divides or develops. Access control may be required to preserve the objectives of half streets.
When the remainder of an existing half-street improvement is made it shall include the following items: dedication of required right-of-way, construction of the remaining portion of the street including pavement, curb and gutter, landscape strip, sidewalk, street trees, lighting and other improvements as required for that particular street. It shall also include at a minimum the pavement replacement to the centerline of the street. Any damage to the existing street shall be repaired in accordance with the city's "Moratorium Pavement Cut Standard" or as approved by the city engineer.

Applicant's Response: Not applicable. No new half-streets are proposed as part of this project.

12.04.225 - Street design—Cul-de-sacs and dead-end streets.
The city discourages the use of cul-de-sacs and permanent dead-end streets except where construction of a through street is found by the decision maker to be impracticable due to topography or some significant physical constraint such as geologic hazards, wetland, natural or historic resource areas, dedicated open space, existing development patterns, arterial access restrictions or similar situation as determined by the community development director. When permitted, access from new cul-de-sacs and permanent dead-end streets shall be limited to a maximum of twenty-five dwelling units and a maximum street length of two hundred feet, as measured from the right-of-way line of the nearest intersecting street to the back of the cul-de-sac curb face. In addition, cul-de-sacs and dead end roads shall include pedestrian/bicycle accessways as required in this chapter. This section is not intended to preclude the use of curvilinear eyebrow widening of a street where needed.

Where approved, cul-de-sacs shall have sufficient radius to provide adequate turn-around for emergency vehicles in accordance with fire district and city adopted street standards. Permanent dead-end streets other than cul-de-sacs shall provide public street right-of-way/easements sufficient to provide turn-around space with appropriate no-parking signs or markings for waste disposal, sweepers, and other long vehicles in the form of a hammerhead or other design to be approved by the decision maker. Driveways shall be encouraged off the turnaround to provide for additional on-street parking space.

Applicant's Response: Not applicable. No new cul-de-sacs or dead-end streets are proposed as part of this project.

12.04.230 - Street design—Street names.
Except for extensions of existing streets, no street name shall be used which will duplicate or be confused with the name of an existing street. Street names shall conform to the established standards in the city and shall be subject to the approval of the city.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

12.04.235 - Street design—Grades and curves.
Grades and center line radii shall conform to the standards in the city's street design standards and specifications.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

12.04.240 - Street design—Development abutting arterial or collector street.
Where development abuts or contains an existing or proposed arterial or collector street, the decision maker may require: access control; screen planting or wall contained in an easement or otherwise protected by a restrictive covenant in a form acceptable to the decision maker along the rear or side property line; or such other treatment it deems necessary to adequately protect residential properties or afford separation of through and local traffic. Reverse frontage lots with suitable depth may also be considered an option for residential property that has arterial frontage. Where access for development abuts and connects for vehicular access to another jurisdiction's facility then authorization by that jurisdiction may be required.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

12.04.245 - Street design—Pedestrian and bicycle safety.
Where deemed necessary to ensure public safety, reduce traffic hazards and promote the welfare of pedestrians, bicyclists and residents of the subject area, the decision maker may require that local streets be so designed as to discourage their use by nonlocal automobile traffic.
All crosswalks shall include a large vegetative or sidewalk area which extends into the street pavement as far as practicable to provide safer pedestrian crossing opportunities. These curb extensions can increase the visibility of pedestrians and provide a shorter crosswalk distance as well as encourage motorists to drive slower. The decision maker may approve an alternative design that achieves the same standard for constrained sites or where deemed unnecessary by the city engineer.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

12.04.255 - Street design—Alleys.
Public alleys shall be provided in the following districts R-5, R-3.5, R-2, MUC-1, MUC-2 and NC zones unless other permanent provisions for private access to off-street parking and loading facilities are approved by the decision maker. The corners of alley intersections shall have a radius of not less than ten feet.

Applicant's Response: Not applicable. No new alleys are proposed as part of this project.

12.04.260 - Street design—Transit.
Streets shall be designed and laid out in a manner that promotes pedestrian and bicycle circulation. The applicant shall coordinate with transit agencies where the application impacts transit streets as identified in [Section] 17.04.1310. Pedestrian/bicycle access ways shall be provided as necessary in Chapter 12.04 to minimize the travel distance to transit streets and stops and neighborhood activity centers. The decision maker may require provisions, including easements, for transit facilities along transit streets where a need for bus stops, bus pullouts or other transit facilities within or adjacent to the development has been identified.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

12.04.265 - Street design—Planter strips.
All development shall include vegetative planter strips that are five feet in width or larger and located adjacent to the curb. This requirement may be waived or modified if the decision maker finds it is not practicable. The decision maker may permit constrained sites to place street trees on the abutting private property within ten feet of the public right-of-way if a covenant is recorded on the title of the property identifying the tree as a city street tree which is maintained by the property owner. Development proposed along a collector, minor arterial, or major arterial street may use tree wells with root barriers located near the curb within a wider sidewalk in lieu of a planter strip, in which case each tree shall have a protected area to ensure proper root growth and reduce potential damage to sidewalks, curbs and gutters.
To promote and maintain the community tree canopy adjacent to public streets, trees shall be selected and planted in planter strips in accordance with Chapter 12.08, Street Trees. Individual abutting lot owners shall be legally responsible for maintaining healthy and attractive trees and vegetation in the planter strip. If a homeowners' association is created as part of the development, the association may assume the maintenance obligation through a legally binding mechanism, e.g., deed restrictions, maintenance agreement, etc., which shall be reviewed and approved by the city attorney. Failure to properly maintain trees and vegetation in a planter strip shall be a violation of this code and enforceable as a civil infraction.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

12.04.270 - Standard construction specifications.
The workmanship and materials for any work performed under permits issued per this chapter shall be in accordance with the edition of the "Oregon Standard Specifications for Construction" as prepared by the Oregon Department of Transportation (ODOT) and the Oregon Chapter of American Public Works Association (APWA) and as modified and adopted by the city in accordance with this ordinance, in effect at the time of application. The exception to this requirement is where this chapter and the Public Works Street Design Drawings provide other design details, in which case the requirements of this chapter and the Public Works Street Design Drawings shall be complied with. In the case of work within ODOT or Clackamas County rights-of-way, work shall be in conformance with their respective construction standards.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

12.04.280 - Violation—Penalty.
Any act or omission in violation of this chapter shall be deemed a nuisance. Violation of any provision of this chapter is subject to the code enforcement procedures of Chapters 1.16, 1.20 and 1.24.

Applicant's Response: Not applicable. No new streets are proposed as part of this project.

Chapter 12.08 - PUBLIC AND STREET TREES[2]

12.08.010 - Purpose.
The purpose of this chapter is to:
A. Develop tree-lined streets to protect the living quality and beautify the city;
B. Establish physical separation between pedestrians and vehicular traffic;
C. Create opportunities for solar shading;
D. Improve air quality; and
E. Increase the community tree canopy and resource.

Applicant's Response: Informational only. No response.

12.08.015 - Street tree planting and maintenance requirements.
All new construction or major redevelopment shall provide street trees adjacent to all street frontages. Species of trees shall be selected based upon vision clearance requirements, but shall in all cases be selected from the Oregon City Street Tree List or be approved by a certified arborist. If a setback sidewalk has already been constructed or the Development Services determines that the forthcoming street design shall include a setback sidewalk, then all street trees shall be installed with a planting strip. If existing street design includes a curb-tight sidewalk, then all street trees shall be placed within the front yard setback, exclusive of any utility easement.

Applicant's Response: Existing street trees are located on each side of the existing driveway curb-cut. To better improve the vision clearance for emergency vehicles egressing from the site, the existing street tree just south of the driveway will be trimmed/pruned.

A. One street tree shall be planted for every thirty-five feet of property frontage. The tree spacing shall be evenly distributed throughout the total development frontage. The community development director may approve an alternative street tree plan if site or other constraints prevent meeting the placement of one street tree per thirty-five feet of property frontage.

Applicant's Response: The existing street frontage is approximately 186-feet. The existing driveway width is approximately 80-feet. Existing street trees are located on each side of the driveway meeting the spacing standard along the subject property frontage.

B. The following clearance distances shall be maintained when planting trees:
1. Fifteen feet from streetlights;
2. Five feet from fire hydrants;
3. Twenty feet from intersections;
4. A minimum of five feet (at mature height) below power lines.

Applicant's Response: Not applicable. No new street trees are proposed.

C. All trees shall be a minimum of two inches in caliper at six inches above the root crown and installed to city specifications.

Applicant's Response: Not applicable. No new street trees are proposed.

D. All established trees shall be pruned tight to the trunk to a height that provides adequate clearance for street cleaning equipment and ensures ADA complaint clearance for pedestrians.

Applicant's Response: Not applicable. No new street trees are proposed.

12.08.020 - Street tree species selection.
The community development director may specify the species of street trees required to be planted if there is an established planting scheme adjacent to a lot frontage, if there are obstructions in the planting strip, or if overhead power lines are present.

Applicant's Response: Not applicable. No new street trees are proposed.

12.08.025 - General tree maintenance.
Abutting property owners shall be responsible for the maintenance of street trees and planting strips. Topping of trees is permitted only under recommendation of a certified arborist, or other qualified professional, if required by city staff. Trees shall be trimmed appropriately. Maintenance shall include trimming to remove dead branches, dangerous limbs and to maintain a minimum seven-foot clearance above all sidewalks and ten-foot clearance above the street. Planter strips shall be kept clear of weeds, obstructing vegetation and trash.

Applicant's Response: The owner will maintain landscaping and abide by these requirements.

12.08.030 - Public property tree maintenance.
The city shall have the right to plant, prune, maintain and remove trees, plants and shrubs in all public rights-of-way and public grounds, as may be necessary to ensure public safety or to preserve and enhance the symmetry or other desirable characteristics of such public areas. The natural resources committee may recommend to the community development director the removal of any tree or part thereof which is in an unsafe condition, or which by reason of its nature is injurious to above or below-ground public utilities or other public improvements.

Applicant's Response: The owner recognizes the city has the right to plant, prune, maintain and remove trees in all public ways to ensure public safety.

12.08.035 - Public tree removal.
Existing street trees shall be retained and protected during construction unless removal is specified as part of a land use approval or in conjunction with a public facilities construction project, as approved by the community development director. A diseased or hazardous street tree, as determined by a registered arborist and verified by the City, may be removed if replaced. A non-diseased, non-hazardous street tree that is removed shall be replaced in accordance with the Table 12.08.035.
All new street trees will have a minimum two-inch caliper trunk measured six inches above the root crown. The community development director may approve off-site installation of replacement trees where

necessary due to planting constraints. The community development director may additionally allow a fee in-lieu of planting the tree(s) to be placed into a city fund dedicated to planting trees in Oregon City in accordance with Oregon City Municipal Code 12.08.
Table 12.08.035

Replacement Schedule for Trees Determined to be Dead, Diseased or Hazardous by a Certified Arborist		*Replacement Schedule for Trees Not Determined to be Dead, Diseased or Hazardous by a Certified Arborist*	
Diameter of tree to be Removed (Inches of diameter at 4-ft height)	*Number of Replacement Trees to be Planted*	*Diameter of tree to be Removed (Inches of diameter at 4-ft height)*	*Number of Replacement Trees to be Planted*
Any Diameter	*1 Tree*	*Less than 6"*	*1 Tree*
		6" to 12"	*2 Trees*
		13" to 18"	*3 Trees*
		19" to 24"	*4 Trees*
		25" to 30"	*5 Trees*
		31" and over	*8 Trees*

Applicant's Response: No existing street trees are proposed to be removed.

12.08.040 - Heritage Trees and Groves.
A. Purpose. Certain trees, because of their age, species, natural resource value, ecological or historical association, are of special importance to the city. These trees may live on private or public property.
1. The purpose of this chapter is to recognize, foster appreciation and provide for voluntary protection of Heritage Trees.
2. In particular, the following trees are shall be considered significant, and therefore eligible for heritage tree nomination in Oregon City, if they meet the minimum size requirements of the table below:
Tree Eligibility based on Size

Species	*Common Name*	*Size (d.b.h)*
Quercus garrayana	*Oregon white oak*	*8"*
Pseudotsuga menziesii	*Douglas-fir*	*18"*
Thuja plicata	*Western red cedar*	*12"*
Pinus ponderosa	*Ponderosa pine*	*12"*
Taxus brevifolia	*Western yew*	*6"*

Other deciduous and horticultural tree species		*20"*
Other evergreen and conifer trees		*18"*

Applicant's Response: Not applicable. There are no Heritage or Groves on the subject property.

B. Recommendation.
1. Any citizen may recommend tree(s) to be designated as a Heritage Tree or Grove. If the proposed Heritage Tree or Grove is located on property other than city property or public right-of-way under city jurisdiction, the recommendation shall be submitted by the property owner or accompanied by the property owner's written consent. If the proposed Heritage Tree or Grove is located on city property or public right-of-way under city jurisdiction, the recommendation shall be submitted to the community development director; if the recommendation is consented to by the city, the community development director shall submit the recommendation to the city commission.
2. Recommendation shall be made on such form as required by the community development director. The recommendation form shall include a narrative explaining why the tree qualifies for Heritage Tree or Grove status pursuant to the definition in subsection 1. and the written consent of the property owner as described in subsection 1., of this section.

Applicant's Response: Informational only. No response.

C. Review Process.
1. The city commission shall review all Heritage Trees and Grove recommendations at a public meeting. Notice of the meeting shall be provided to the recommending applicant, the property owner (unless the recommended tree or grove is located on public right-of-way under city jurisdiction, in which event notice shall be given to the community development director), the chair of any recognized neighborhood association in which the tree or grove is located, and the parks and recreation advisory committee (PRAC), if applicable.
2. Staff shall prepare a report for the city commission analyzing whether the tree or grove complies with the requirements for designation.
3. After considering the staff report and any testimony by interested persons, the city commission shall vote on the recommendation.
4. Following approval by the city commission:
a. If the tree or grove is located on private property, the designation shall be complete upon the property owner's execution of a covenant running with the land suitable for recordation by the city. The covenant shall describe the subject property, generally describe the location of the heritage tree or grove, and covenant that the tree or grove is protected as a "Heritage Tree" or "Heritage Grove" by the City of Oregon City and is therefore subject to special protection as provided in this Title.
b. If the tree or grove is located on public right-of-way, the designation shall be complete upon the Staff's listing of the tree or grove on the city Heritage Tree and Grove records.
c. If the tree or grove is located on the public right-of-way, the city shall condition any future property owner-requested vacation of the public right-of-way upon the execution of a covenant in accordance with subsection a., above, which shall be recorded by the city upon the vacation of the right-of-way.

Applicant's Response: Not applicable. There are no Heritage or Groves on the subject property.

D. Criteria.

1. The city commission may designate a tree or grove as a Heritage Tree or Heritage Grove if the commission determines that the following criteria are met:
a. The tree or grove is of landmark importance to the City of Oregon City due to age, size, species, horticultural quality or historic importance; or

Applicant's Response: Not applicable. There are no Heritage or Groves on the subject property.

b. It is listed as a State Heritage Tree, as designated by the state division of forest resources; or

Applicant's Response: Not applicable. There are no Heritage or Groves on the subject property.

c. It is a rare species, or provides a habitat for rare species of plants, animals or birds; and

Applicant's Response: Not applicable. There are no Heritage or Groves on the subject property.

d. The tree is not irreparably damaged, diseased, hazardous or unsafe, or the applicant is willing to have the tree treated by an arborist and the treatment will alleviate the damage, disease or hazard;

Applicant's Response: Not applicable. There are no Heritage or Groves on the subject property.

E. Protection of Heritage Trees and Groves.
1. No Heritage Tree or Grove may be removed, topped, or otherwise altered unless permitted by this section.
2. An application to remove a Heritage Tree or Grove shall demonstrate that the burden imposed on the property owner, or, if the tree is located within the public right-of-way under city jurisdiction, then the burden imposed on the city by the continued presence of the tree outweighs the public benefit provided by the tree. For the purposes of making this determination, the following tree impacts shall not be considered unreasonable burdens on the property owner, or if appropriate, the city:
a. View obstruction;
b. Routine pruning, leaf raking and other maintenance activities; and
c. Infrastructure impacts or tree hazards that can be controlled or avoided by appropriate pruning or maintenance.
3. Unless the tree is permitted to be removed due to poor health or hazard pursuant to Section 12.08.042, the applicant shall be required to mitigate for the loss of the tree pursuant to Table 12.08.042.
4. Any person who removes a Heritage Tree or Grove in violation of this chapter shall be subject to the penalties provided in this chapter.

Applicant's Response: Not applicable. There are no Heritage or Groves on the subject property.

F. Recognition of Heritage Trees and Groves.
1. A Heritage Tree plaque may be designed and furnished by the city to the property owner, or if the tree is in the public right-of-way, to the appropriate city official, of a designated Heritage Tree or Grove. The city may charge a fee to cover the costs of the providing the plaque. The plaque shall be posted at a location at or near the tree or grove and, if feasible, visible from a public right-of-way.
2. The community development director shall maintain a list and map of designated Heritage Trees and Groves.
G. Removal of Heritage Tree or Grove Designation.

1. A Heritage Tree or Grove may be removed from designation if it dies or is removed pursuant to this chapter. If removed from private property, the city shall record a document extinguishing the covenant.

Applicant's Response: Not applicable. There are no Heritage or Groves on the subject property.

12.08.045 - Gifts and funding.
The City of Oregon City may accept gifts, which are specifically designated for the purpose of planting or maintaining trees within the city. the community development director may allow a fee in-lieu of planting the tree(s) to be placed into a city fund dedicated to planting trees in Oregon City. The community development director may determine the type, caliper and species of the trees purchased with the fund. The cost of each tree may be adjusted annually based upon current market prices for materials and labor as calculated by the community development director. A separate fund shall be established and maintained for revenues and expenditures created by activities specified in this chapter. The natural resources committee shall have authority on behalf of the city to seek grants and alternative funding for tree projects. Funds from such grant awards shall be administered by the city pursuant to this section.

Applicant's Response: Not applicable. No new public or street trees are proposed.

12.08.050 - Violation—Penalty.
The violation of any provision of this chapter shall be constitute a civil infraction, subject to code enforcement procedures of Chapter 1.16 and/or Chapter 1.20.

Applicant's Response: Informational only. No response.

CHAPTER 15.48 - GRADING, FILLING AND EXCAVATING

15.48.030 Applicability—Grading permit required.
A. A city-issued grading permit shall be required before the commencement of any of the following filling or grading activities:
1. Grading activities in excess of ten cubic yards of earth;
2. Grading activities which may result in the diversion of existing drainage courses, both natural and man-made, from their natural point of entry or exit from the grading site;
3. Grading and paving activities resulting in the creation of impervious surfaces greater than two thousand square feet or more in area;
4. Any excavation beyond the limits of a basement or footing excavation, having an unsupported soil height greater than five feet after the completion of such a structure; or
5. Grading activities involving the clearing or disturbance of one-half acres (twenty-one thousand seven hundred eighty square feet) or more of land.

Applicant's Response: A grading permit will be obtained prior to any grading activity onsite since the grading activity at the site will create impervious areas greater than two thousand square feet and disturb more than one-half acre.

15.48.090 Submittal requirements.
An engineered grading plan or an abbreviated grading plan shall be prepared in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards whenever a city approved grading permit is required. In addition, a geotechnical engineering report and/or residential lot grading plan may be required pursuant to the criteria listed below.

A. Abbreviated Grading Plan. The city shall allow the applicant to submit an abbreviated grading plan in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards if the following criteria are met:
1. No portion of the proposed site is within the flood management area overlay district pursuant to Chapter 17.42, the unstable soils and hillside constraints overlay district pursuant to Chapter 17.44, or a water quality resource area pursuant to Chapter 17.49; and
2. The proposed filling or grading activity does not involve more than fifty cubic yards of earth.
B. Engineered Grading Plan. The city shall require an engineered grading plan in compliance with the submittal requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer if the proposed activities do not qualify for abbreviated grading plan.
C. Geotechnical Engineering Report. The city shall require a geotechnical engineering report in compliance with the minimum report requirements of the Public Works Stormwater and Grading Design the following site conditions may exist in the development area:
1. When any publicly maintained facility (structure, street, pond, utility, park, etc.) will be supported by any engineered fill;
2. When an embankment for a stormwater pond is created by the placement of fill;
3. When, by excavation, the soils remaining in place are greater than three feet high and less than twenty feet wide.
D .Residential Lot Grading Plan. The city shall require a residential lot grading plan in compliance with the minimum report requirements of the Public Works Stormwater and Grading Design Standards to be prepared by a professional engineer for all land divisions creating new residential building lots or where a public improvement project is required to provide access to an existing residential lot.

Applicant's Response: Clackamas Fire District #1 has obtained a geotechnical report prepared by Carlson Geotechnical and is included in the Appendix of this application. An engineered grading plan will be prepared in compliance with the requirements of the Public Works Stormwater and Grading Design Standards to obtain a grading permit prior to the commencement of construction.

CHAPTER 17.47 - EROSION AND SEDIMENT CONTROL

17.47.070 Erosion and sediment control plans.
A. An application for an erosion and sediment control permit shall include an erosion and sediment control plan, which contains methods and interim measures to be used during and following construction to prevent or control erosion prepared in compliance with City of Oregon City public works standards for erosion and sediment control. These standards are incorporated herein and made a part of this title and are on file in the office of the city recorder.

Applicant's Response: An engineered grading plan and erosion and sediment control plan has been prepared and is included as part of this application submittal for preliminary review. Final grading and excavation information will be updated and submitted as part of the formal building permit submittal. An NPDES (1200-c) application/permit with the State of Oregon DEQ will be applied and obtained prior to construction.

CHAPTER 17.41 - TREE PROTECTION STANDARDS

17.41.020 - Tree protection—Applicability.
1. Applications for development subject to Chapters 16.08 or 16.12 (Subdivision or Minor Partition) or Chapter 17.62 (Site Plan and Design Review) shall demonstrate compliance with these standards as part of the review proceedings for those developments.
2. For public capital improvement projects, the city engineer shall demonstrate compliance with these standards pursuant to a Type II process.
3. Tree canopy removal greater than twenty-five percent on sites greater than twenty-five percent slope, unless exempted under Section 17.41.040, shall be subject to these standards.
4. A heritage tree or grove which has been designated pursuant to the procedures ofChapter 12.08.050 shall be subject to the standards of this section.

17.41.030 - Tree protection—Conflicting code provisions.
Except as otherwise specified in this section, where these standards conflict with adopted city development codes or policies, the provision which provides the greater protection for regulated trees or groves, as defined in Section 17.04, shall govern.

Applicant's Response: The proposed development is subject to a Site Plan and Design Review. Therefore, this criterion is applicable.

17.41.040 - Same—Exemptions.
These regulations are not intended to regulate normal cutting, pruning and maintenance of trees on private property except where trees are located on lots that are undergoing development review or are otherwise protected within the Natural Resource Overlay District (NROD) of section 17.49. These standards are not intended to regulate farm and forest practices as those practices are defined under ORS 30.930. Farm or forest resources. An applicant for development may claim exemption from compliance with these standards if the development site containing the regulated grove or trees was a designated farm or forest use, tree farm, Christmas tree plantation, or other approved timber use within one year prior to development application. "Forest practices" and "forestlands" as used in this subsection shall have the meaning as set out in ORS 30.930. The community development director has the authority to modify or waive compliance in this case.

Applicant's Response: No exemptions are being sought as part of this application.

17.41.050 - Same—Compliance options.
Applicants for review shall comply with these requirements through one or a combination of the following procedures:
A. Option 1—Mitigation. Retention and removal of trees, with subsequent mitigation by replanting pursuant to Sections 17.41.060 or 17.41.070. All replanted and saved trees shall be protected by a permanent restrictive covenant or easement approved in form by the city.
B. Option 2—Dedicated Tract. Protection of trees or groves by placement in a tract within a new subdivision or partition plat pursuant to Sections 17.41.080—17.41.100; or
C. Option 3—Restrictive Covenant. Protection of trees or groves by recordation of a permanent restrictive covenant pursuant to Sections 17.41.110—17.41.120; or
D. Option 4—Cash-in-lieu of planting pursuant to Section 17.41.130.

A regulated tree that has been designated for protection pursuant to this section must be retained or permanently protected unless it has been determined by a certified arborist to be diseased or hazardous, pursuant to the following applicable provisions.
The community development director, pursuant to a Type II procedure, may allow a property owner to cut a specific number of trees within a regulated grove if preserving those trees would:
1. Preclude achieving eighty percent of minimum density with reduction of lot size; or
2. Preclude meeting minimum connectivity requirements for subdivisions.

Applicant's Response: The application is using Option 1, mitigation for the trees that need to be removed from the construction zone.

17.41.060 - Tree removal and replanting—Mitigation (Option 1).
A. Applicants for development who select this option shall ensure that all healthy trees shall be preserved outside the construction area as defined in Chapter 17.04to the extent practicable. Compliance with these standards shall be demonstrated in a tree mitigation plan report prepared by a certified arborist, horticulturalist or forester or other environmental professional with experience and academic credentials in forestry or arborculture. At the applicant's expense, the city may require the report to be reviewed by a consulting arborist. The number of replacement trees required on a development site shall be calculated separately from, and in addition to, any public or street trees in the public right-of-way required under section 12.08—Community Forest and Street Trees.
B. The applicant shall determine the number of trees to be mitigated on the site by counting all of the trees six inch DBH (minimum four and one-half feet from the ground) or larger on the entire site and either:
1. Trees that are removed outside of the construction area, shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2; or
2. Diseased or hazardous trees, when the condition is verified by a certified arborist to be consistent with the definition in Section 17.04.1360, may be removed from the tree replacement calculation. Regulated healthy trees that are removed outside of the construction area, shall be replanted with the number of trees specified in Column 1 of Table 17.41.060-1. Regulated healthy trees that are removed within the construction area shall be replanted with the number of replacement trees required in Column 2.
Table 17.41.060-1
Tree Replacement Requirements
All replacement trees shall be either:
Two-inch caliper deciduous, or
Six-foot high conifer

Size of tree removed (DBH)	*Column 1* *Number of trees to be planted. (If removed Outside of construction area)*	*Column 2* *Number of trees to be planted. (If removed Within the construction area)*
6 to 12"	*3*	*1*
13 to 18"	*6*	*2*
19 to 24"	*9*	*3*

25 to 30"	*12*	*4*
31 and over"	*15*	*5*

Steps for calculating the number of replacement trees:
1. Count all trees measuring six inches DBH (minimum four and one-half feet from the ground) or larger on the entire development site.
2. Designate (in certified arborists report) the condition and size (DBH) of all trees pursuant to accepted industry standards.
3. Document any trees that are currently diseased or hazardous.
4. Subtract the number of diseased or hazardous trees in step 3. from the total number of trees on the development site in step 1. The remaining number is the number of healthy trees on the site. Use this number to determine the number of replacement trees in steps 5. through 8.
5. Define the construction area (as defined in Chapter 17.04).
6. Determine the number and diameter of trees to be removed within the construction area. Based on the size of each tree, use Column 2 to determine the number of replacement trees required.
7. Determine the number and diameter of trees to be removed outside of the construction area. Based on the size of each tree, use Column 1 to determine the number of replacement trees required.
8. Determine the total number of replacement trees from steps 6. and 7.

Applicant's Response: A total of 3 trees will be removed within the construction area to accommodate the proposed building and parking lot. The trees to be removed are (1) 30" tree, (1) 16" tree, and (1) 8" tree. Per table 17.41.060-1, 7 new replacement trees are required. 18 new trees are currently proposed, which exceeds the requirement.

17.41.070 - Planting area priority for mitigation (Option 1).
Development applications which opt for removal of trees with subsequent replanting pursuant to section 17.41.050A. shall be required to mitigate for tree cutting by complying with the following priority for replanting standards below:
A. First Priority. Replanting on the development site.
B. Second Priority. Off-site replacement tree planting locations. If the community development director determines that it is not practicable to plant the total number of replacement trees on-site, a suitable off-site planting location for the remainder of the trees may be approved that will reasonably satisfy the objectives of this section. Such locations may include either publicly owned or private land and must be approved by the community development director.

Applicant's Response: All replanting is proposed to take place on the subject property.

17.41.075 - Alternative mitigation plan.
The community development director may, subject to a Type II procedure, approve an alternative mitigation plan that adequately protects habitat pursuant to the standards for the natural resource overlay district alternative mitigation plan, Section 17.49.190.

Applicant's Response: An alternate mitigation plan is not being proposed for the proposed development.

17.41.080 - Tree preservation within subdivisions and partitions—Dedicated tract (Option 2).
A. Applicants for new subdivision and partition plats may delineate and show the regulated trees or groves as either a separate tract or part of a larger tract that meets the requirements of subsection D. of this section.
B. The standards for land divisions subject to this section shall apply in addition to the requirements of the city land division ordinance and zoning ordinance, provided that the minimum lot area, minimum average lot width, and minimum average lot depth standards of the base zone may be superseded in order to allow for a reduction of dimensional standards pursuant to Section 17.41100 below.
C. Prior to preliminary plat approval, the regulated tree or grove area shall be shown either as a separate tract or part of a larger tract that meets the requirements of subsection D. of this section, which shall not be a part of any parcel used for construction of a structure. The size of the tract shall be the minimum necessary as recommended by a consulting arborist to adequately encompass the dripline of the tree, protect the critical root zone and ensure long term survival of the tree or grove.
D. Prior to final plat approval, ownership of the regulated tree or grove tract shall be identified to distinguish it from lots intended for sale. The tract may be identified as any one of the following:
1. Private open space held by the owner or a homeowners association; or
2. For residential land divisions, private open space subject to an easement conveying stormwater and surface water management rights to the city and preventing the owner of the tract from activities and uses inconsistent with the purpose of this document; or
3. At the owners option, public open space where the tract has been dedicated to the city or other governmental unit; or
4. Any other ownership proposed by the owner and approved by the community development director.

Applicant's Response: Not applicable. The proposed development is not within a subdivision or partition.

17.41.090 - Density transfers incentive for tree protection tracts (Option 2).
A. The purpose of this section is to allow dimensional adjustments within a regulated tree protection tract to be transferred outside said tract to the remainder of the site. This provision applies on-site and density shall not be transferred beyond the boundaries of the development site.
B. Development applications for subdivisions and minor partitions that request a density transfer shall:
1. Provide a map showing the net buildable area of the tree protection tract;
2. Provide calculations justifying the requested dimensional adjustments;
3. Demonstrate that the minimum lot size requirements can be met based on an average of all lots created, including the tree protection tract created pursuant toSection 17.41.080;
4. Demonstrate that, with the exception of the tree protection tract created pursuant to Section 17.41.080, no parcels have been created which would be unbuildable in terms of minimum yard setbacks;
5. Meet all other standards of the base zone except as modified in section 17.41.100.
C. The area of land contained in a tree protection tract may be excluded from the calculations for determining compliance with minimum density requirements of the zoning code.

Applicant's Response: Option 2 is not being proposed for this proposed development.

17.41.100 - Permitted modifications to dimensional standards (Option 2 only).
A. An applicant proposing to protect trees in a dedicated tract pursuant to section 17.41.080 may request, and the community development director, pursuant to a Type II procedure, may grant a reduction to, the lot size, width, depth, and setbacks of the underlying zone district in approving a

subdivision or partition if necessary to retain a regulated tree or grove in a tract, as long as the calculation of average lot size, including tree protection tracts, meet the minimum lot size for the zone. The applicant may choose to make the adjustments over as many lots as required. For example, the lot reduction could be spread across all the remaining lots in the proposed subdivision or partition or could be applied to only those needed to incorporate the area of the tree tract.

Table 17.41.100 A
Lot Size Reduction

ZONE	*Min. Lot Size [sq. feet]*	*Min. Lot Width*	*Min. Lot Depth*
R-10	*5,000 sq. feet*	*50'*	*65'*
R-8	*4,000 sq. feet*	*45'*	*60'*
R-6	*3,500 sq. feet*	*35'*	*55'*
R-5	*3,000 sq. feet*	*30'*	*50'*
R-3.5	*1,800 sq. feet*	*20'*	*45'*

Table 17.41.100 B
Reduced Dimensional Standards for Detached Single-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
8,000—9,999 square feet	*15 feet*	*20 feet*	*7/9 feet*	*15 feet*	*40%*
6,000—7,999 square feet	*10 feet*	*15 feet*	*5/7 feet*	*15 feet*	*40%*
4,000—5,999 square feet	*10 feet*	*15 feet*	*5/5 feet*	*10 feet*	*40%*
1,800—3,999 square feet	*5 feet*	*15 feet*	*5/5 feet*	*10 feet*	*55%*

Table 17.41.100 C
Reduced Dimensional Standards for Single-Family Attached or Two-Family Residential Units

Size of Reduced Lot	*Front Yard Setback*	*Rear Yard Setback*	*Side yard Setback*	*Corner Side*	*Lot Coverage*
3,500—7,000 square feet	*10 feet*	*15 feet*	*5/0* feet*	*10 feet*	*40%*

1,800—3,499 square feet	*5 feet*	*15 feet*	*5/0* feet*	*10 feet*	*55%*

**0 foot setback is only allowed on single-family attached units*

Applicant's Response: Option 2 is not being proposed for this proposed development.

17.41.110 - Tree protection by restrictive covenant (Option 3).
Any regulated tree or grove which cannot be protected in a tract pursuant to Section 17.41.080 above shall be protected with a restrictive covenant in a format to be approved by the community development director. Such covenant shall be recorded against the property deed and shall contain provisions to permanently protect the regulated tree or grove unless such tree or grove, as determined by a certified arborist and approved by the community development director, are determined to be diseased or hazardous.

Applicant's Response: Option 3 is not being proposed for this proposed development.

17.41.120 - Permitted adjustments (Option 3 Only).
A. The community development director, pursuant to a Type II procedure, may grant an adjustment to the side, front and rear yard setback standards by up to 50 percent if necessary to retain a Regulated Tree or Grove through a restrictive covenant pursuant to this section. In no case may the side yard setback be reduce less than three feet. The adjustment shall be the minimum necessary to accomplish preservation of trees on the lot and shall not conflict with other conditions imposed on the property.
B. The community development director, pursuant to a Type II procedure, may grant an adjustment to street standards, pursuant to adopted public works standards, in order to preserve a tree. This may include flexibility to redesign sidewalk and planter strip sizes and locations and allow placement of sidewalks and planter strips in an easement within private lots.
C. The community development director, pursuant to a Type II procedure, may allow other adjustments in order to preserve any healthy tree that cannot be moved due to its size, but will contribute to the landscape character of the area and will not present a foreseeable hazard if retained.

Applicant's Response: Option 3 is not being proposed for this proposed development.

17.41.1[25] - Cash-in-lieu of planting (tree bank/fund) (Option 4).
The applicant may choose this option in-lieu-of or in addition to Compliance Options 1 through 3. In this case, the community development director may approve the payment of cash-in-lieu into a dedicated fund for the remainder of trees that cannot be replanted in the manner described above.
A. The cash-in-lieu payment per tree shall be as listed on the adopted fee schedule and shall be adjusted annually based on the Consumer Price Index (Index). The price shall include the cost of materials, transportation and planting.
B. The amount of the cash-in-lieu payment into the tree bank shall be calculated as the difference between the value of the total number of trees an applicant is required to plant, including cost of installation and adjusted for Consumer Price Index, minus the value of the trees actually planted. The value of the trees shall be based on the adopted fee schedule.

Applicant's Response: Option 4 is not being proposed for this proposed development.

17.41.130 - Regulated tree protection procedures during construction.
A. No permit for any grading or construction of public or private improvements may be released prior to verification by the community development director that regulated trees designated for protection or conservation have been protected according to the following standards. No trees designated for removal shall be removed without prior written approval from the community development director.

Applicant's Response: No existing trees will remain in the proposed development. A tree mitigation plan has been submitted as part of this application showing compliance with Chapter 17.41.

B. Tree protection shall be as recommended by a qualified arborist or, as a minimum, to include the following protective measures:
1. Except as otherwise determined by the community development director, all required tree protection measures set forth in this section shall be instituted prior to any development activities, including, but not limited to clearing, grading, excavation or demolition work, and such measures shall be removed only after completion of all construction activity, including necessary landscaping and irrigation installation, and any required plat, tract, conservation easement or restrictive covenant has been recorded.
2. Approved construction fencing, a minimum of four feet tall with steel posts placed no farther than ten feet apart, shall be installed at the edge of the tree protection zone or dripline, whichever is greater. An alternative may be used with the approval of the community development director.
3. Approved signs shall be attached to the fencing stating that inside the fencing is a tree protection zone, not to be disturbed unless prior approval has been obtained from the community development director.
4. No construction activity shall occur within the tree protection zone, including, but not limited to; dumping or storage of materials such as building supplies, soil, waste items; nor passage or parking of vehicles or equipment.
5. The tree protection zone shall remain free of chemically injurious materials and liquids such as paints, thinners, cleaning solutions, petroleum products, and concrete or dry wall excess, construction debris, or run-off.
6. No excavation, trenching, grading, root pruning or other activity shall occur within the tree protection zone unless directed by an arborist present on site and approved by the community development director.
7. No machinery repair or cleaning shall be performed within ten feet of the dripline of any trees identified for protection.
8. Digging a trench for placement of public or private utilities or other structure within the critical root zone of a tree to be protected is prohibited. Boring under or through the tree protection zone may be permitted if approved by the community development director and pursuant to the approved written recommendations and on-site guidance and supervision of a certified arborist.
9. The city may require that a certified arborist be present during any construction or grading activities that may affect the dripline of trees to be protected.
10. The community development director may impose conditions to avoid disturbance to tree roots from grading activities and to protect trees and other significant vegetation identified for retention from harm. Such conditions may include, if necessary, the advisory expertise of a qualified consulting arborist or horticulturist both during and after site preparation, and a special maintenance/management program to provide protection to the resource as recommended by the arborist or horticulturist.

Applicant's Response: No existing trees will remain in the proposed development. A tree mitigation plan has been submitted as part of this application showing compliance with Chapter 17.41.

C. Changes in soil hydrology due to soil compaction and site drainage within tree protection areas shall be avoided. Drainage and grading plans shall include provision to ensure that drainage of the site does not conflict with the standards of this section. Excessive site run-off shall be directed to appropriate storm drainage facilities and away from trees designated for conservation or protection.

Applicant's Response: No existing trees are remaining that would require tree protection. A tree mitigation plan has been submitted as part of this application showing compliance with Chapter 17.41.

CHAPTER 17.50 - ADMINISTRATION AND PROCEDURES

17.50.050 Preapplication Conference
A. Preapplication Conference. Prior to submitting an application for any form of permit, the applicant shall schedule and attend a preapplication conference with City staff to discuss the proposal. To schedule a preapplication conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans. The purpose of the preapplication conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the preapplication conference. Notwithstanding any representations by City staff at a preapplication conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.
B.A preapplication conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant must schedule and attend another conference before the city will accept a permit application. The community development director may waive the preapplication requirement if, in the Director's opinion, the development does not warrant this step. In no case shall a preapplication conference be valid for more than one year.

Applicant's Response: A pre-application conference was held on March 15, 2017 with Hennebery Eddy Architects, Clackamas Fire District and City staff to discuss all relevant review procedures and standards.

17.50.055 Neighborhood Association Meeting
The purpose of the meeting with the recognized neighborhood association is to inform the affected neighborhood association about the proposed development and to receive the preliminary responses and suggestions from the neighborhood association and the member residents.
1. Applicants applying for annexations, zone change, comprehensive plan amendments, conditional use, planning commission variances, subdivision, or site plan and design review (excluding minor site plan and design review), general development master plans or detailed development plans applications shall schedule and attend a meeting with the city-recognized neighborhood association in whose territory the application is proposed. Although not required for other projects than those identified above, a meeting with the neighborhood association is highly recommended.
2. The applicant shall send, by certified mail, return receipt requested letter to the chairperson of the neighborhood association and the citizen involvement committee describing the proposed project. Other communication methods may be used if approved by the neighborhood association.

3. A meeting shall be scheduled within thirty days of the notice. A meeting may be scheduled later than thirty days if by mutual agreement of the applicant and the neighborhood association. If the neighborhood association does not want to, or cannot meet within thirty days, the applicant shall hold their own meeting after six p.m. or on the weekend, with notice to the neighborhood association, citizen involvement committee, and all property owners within three hundred feet. If the applicant holds their own meeting, a copy of the certified letter requesting a neighborhood association meeting shall be required for a complete application. The meeting held by the applicant shall be held within the boundaries of the neighborhood association or in a city facility.
4. If the neighborhood association is not currently recognized by the city, is inactive, or does not exist, the applicant shall request a meeting with the citizen involvement committee.
5. To show compliance with this section, the applicant shall submit a sign-in sheet of meeting attendees, a summary of issues discussed, and letter from the neighborhood association or citizen involvement committee indicating that a neighborhood meeting was held. If the applicant held a separately noticed meeting, the applicant shall submit a copy of the meeting flyer, a sign in sheet of attendees and a summary of issues discussed.

Applicant's Response: The owner has contacted the Neighborhood Association chairperson via electronic mail to setup a Neighborhood Meeting. This meeting will occur on April 28th at 7:00 pm. The applicant will submit meeting notes and attendance sheets from the Gaffney Lane Neighborhood Association prior to the 30-day Administrative completeness review of this application.

CHAPTER 17.54.100 – FENCES, HEDGES AND WALLS

Applicant's Response: The subject property is bounded by an existing chain-link fence along its north, east and south boundaries. The north chain-link fence is 8'-0" tall and straddles the property line. The east chain-link fence is 5'-0" tall and straddles the property line. The south chain-link fence is 5'-0" tall, straddles the property line and terminates at the west end of the existing fire station. In order to maintain security for the staff and rear apparatus area of the site, (2) steel, powder-coated painted fences are proposed to tie into the north and south chain-link fences. The proposed fence at the north side of the building will incorporate a security gate. See Site Plan and Exterior Elevations for location and configuration.

CHAPTER 17.56 – CONDITIONAL USES
17.56.010 - Permit—Authorization—Standards—Conditions.
A conditional use listed in this title may be permitted, enlarged or altered upon authorization of the planning commission in accordance with the standards and procedures of this title. A conditional use permit listed in this section may be permitted, enlarged or altered upon authorization of the planning commission in accordance with the standards and procedures of this section. Any expansion to, alteration of, or accessory use to a conditional use shall require planning commission approval of a modification to the original conditional use permit.

A. The following conditional uses, because of their public convenience and necessity and their effect upon the neighborhood shall be permitted only upon the approval of the planning commission after due notice and public hearing, according to procedure as provided in Chapter 17.50. The planning commission may allow a conditional use, provided that the applicant provides evidence substantiating that all the requirements of this title relative to the proposed use are satisfied, and demonstrates that the proposed use also satisfies the following criteria:
1. The use is listed as a conditional use in the underlying district;

2. The characteristics of the site are suitable for the proposed use considering size, shape, location, topography, existence of improvements and natural features;
3. Development shall demonstrate compliance with Chapter 12.04, Streets, Sidewalks and Public Places;
4. The proposed use will not alter the character of the surrounding area in a manner which substantially limits, impairs or precludes the use of surrounding properties for the primary uses listed in the underlying district;
5. The proposal satisfies the goals and policies of the city comprehensive plan which apply to the proposed use.

Applicant's Response: An Emergency Service Facility (police and fire) is identified as a Conditional use in the underlying C – General Commercial District. When the fire station was built (Unknown year), the current zoning codes where not in place. The existing fire station is considered a legal non-conforming use. Therefore, the proposed demolition and fire station replacement has triggered a review of the current zoning status and compliance with the requirement for a conditional use permit, site and design review, and variance.

B. Permits for conditional uses shall stipulate restrictions or conditions which may include, but are not limited to, a definite time limit to meet such conditions, provisions for a front, side or rear yard greater than the minimum dimensional standards of the zoning ordinance, suitable landscaping, off-street parking, and any other reasonable restriction, condition or safeguard that would uphold the spirit and intent of the zoning ordinance, and mitigate adverse effect upon the neighborhood properties by reason of the use, extension, construction or alteration allowed as set forth in the findings of the planning commission.

Applicant's Response: Clackamas Fire District#1 understands that the Planning Commission may require reasonable restrictions or conditions as part of the public hearing process and conditional use review.

C. Any conditional use shall meet the dimensional standards of the zone in which it is to be located pursuant to subsection B. of this section unless otherwise indicated, as well as the minimum conditions listed below.

Applicant's Response: The C-General Commercial District includes specific dimensional standards for lot size, depth. These standards are addressed in 17.32.050 - Dimensional standards of this narrative.

D. In the case of a use existing prior to the effective date of the ordinance codified in this title and classified in this title as a conditional use, any change of use expansion of lot area or expansion of structure shall conform with the requirements for conditional use.

Applicant's Response: The existing fire station was established on Tax Lot 01601 before the current zoning codes where in place. Clackamas Fire District #1 is submitting a land use application because the proposed replacement fire station triggers the requirement for a conditional use approval.

E. The planning commission may specifically permit, upon approval of a conditional use, further expansion to a specified maximum designated by the planning commission without the need to return for additional review.

Applicant's Response: Clackamas Fire District #1 recognizes upon approval of the conditional use; the planning commission may impose further expansion without the need for additional review.

17.56.020 - Permit—Application.
A. A property owner or authorized agent shall initiate a request for a conditional use by filing an application with the city recorder. The applicant shall submit a site plan, drawn to scale, showing the dimensions and arrangement of the proposed development. The application shall be accompanied by the filing fee listed in Section 17.50.[0]80 to defray the costs of publication, investigation and processing.

Applicant's Response: Clackamas Fire District #1 is initiating the request for a conditional use by filing the appropriate land use application, including site plan and filing fees.

B. Before the planning commission may act on a conditional use application, it shall hold a public hearing thereon, following procedure as established in Chapter 17.50.

Applicant's Response: Clackamas Fire District #1 recognizes that the proposed replacement fire station will be subject to a Type III land use review process, including public notices, and a public hearing before the Oregon City Planning Commission. The relevant procedures established in Chapter 17.50 will be met.

17.56.025 - Minor modifications to legal conditional uses.
Minor modifications to an approved conditional use permit may be permitted. If permitted, the modification shall be reviewed as a minor site plan and design review. A minor modification to an approved conditional use permit is considered one of the following:

A. Modification to a structure for the purpose of enhancing the aesthetics of the building and there is no increase in the interior usable space;

Applicant's Response: The proposed development is considered a major modification and is subject to the Site and Design Review criteria in Chapter 17.62 and are addressed later in this narrative.

B. A maximum addition of up to one thousand square feet to a commercial, office, institutional, public, multi-family, or industrial building provided that the addition is not more than thirty-five percent of the original building square footage; or

Applicant's Response: Not applicable. Refer to response provided for Section 17.56.025.A.

C. Revisions to parking alignment and/or related vehicle circulation patterns.

Applicant's Response: Not applicable. Refer to response provided for Section 17.56.025.A.

17.56.040 - Criteria and standards for conditional uses.
In addition to the standards listed herein in Section 17.56.010, which are to be considered in the approval of all conditional uses and the standards of the zone in which the conditional use is located, the following additional standards shall be applicable:

A. Building Openings. The city may limit or prohibit building openings within fifty feet of residential property in a residential zone if the openings will cause glare, excessive noise or excessive traffic which would adversely affect adjacent residential property as set forth in the findings of the planning commission.

Applicant's Response: Not applicable. The subject property is not within fifty feet of any residential property in a residential zone.

B. Additional Street Right-of-Way. The dedication of additional right-of-way may be required where the city plan indicates need for increased width and where the street is inadequate for its use; or where the nature of the proposed development warrants increased street width.

Applicant's Response: Comments from the City Public Works Development Services Department at the pre-application conference confirm Molalla Avenue has full improvements along the subject property frontage. The existing pedestrian sidewalk is within the subject property; therefore, additional street right-of-way dedication of 0.5 feet behind the sidewalk will be required. The area of right-of-way dedication is shown on the Site Plan C200 and Clackamas Fire District #1 will convey the right-of-way as a condition of land use approval.

C. Public Utility or Communication Facility. Such facilities as a utility substation, water storage tank, radio or television transmitter, tower, tank, power transformer, pumping station and similar structures shall be located, designed and installed with suitable regard for aesthetic values. The base of these facilities shall not be located closer to the property line than a distance equal to the height of the structure. Hydroelectric generation facilities shall not exceed ninety megawatts of generation capacity.

Applicant's Response: Not applicable. The proposed development is for an Emergency Service Facility (Fire Station).

D. Schools. The site must be located to best serve the intended area, must be in conformance with the city plan, must have adequate access, and must be in accordance with appropriate State standards.

Applicant's Response: Not applicable. The proposed development is for an Emergency Service Facility (Fire Station).

E. Helipad Landing Facility. In evaluating a conditional use application for a helipad, the planning commission shall consider such matters as the following:
1. Size of runways and landing areas;
2. Approaches and obstructions within the runways and landing areas;
3. Fencing and/or screening to provide visual and noise buffering and to deflect winds or blast due to aircraft operation;
4. Fire protection measures and equipment;
5. Night illumination adequate for operations, and its effects upon surrounding property;
6. Landing markers;
7. Structural adequacy of runways, pads and other structures;
8. Paving and ground cover materials in relation to noise and down wash.

Applicant's Response: Not applicable. The proposed development is for an Emergency Service Facility (Fire Station).

F. Residential Care Facilities.
1. In addition to the general provisions of Section 17.56.020, any application shall include a description of the proposed use, including the number of residents and the nature of the condition or circumstances for which care, or a planned treatment or training program will be provided, the number of staff and the estimated length of stay per resident and the name of the agency responsible for regulating or sponsoring the use.\

Applicant's Response: Not applicable. The proposed development is for an Emergency Service Facility (Fire Station).

2. Approval of a conditional use application for a residential care facility shall include the following minimum standards where applicable:
a. The proposed facility shall maintain all applicable licenses required by the appropriate agencies for the use described in the application.
b. All residential care facilities shall be subject to design review. Special considerations for this use are:
i. Compatibility in appearance with the surrounding area;
ii. Provisions of usable on-site open space appropriate to the needs of the residents and the nature of the care, treatment or training provided;
iii. Clearly defined property boundaries.

Applicant's Response: Not applicable. The proposed development is for an Emergency Service Facility (Fire Station).

G. Bed and Breakfast Inns. Upon approval of a conditional use application for a bed and breakfast inn, the planning commission shall include the following as additional standards and criteria:
1. The bed and breakfast inn shall maintain all applicable licenses required by governmental agencies for the use described in the application.
2. All bed and breakfast inns shall be subject to design review. Special considerations for this use are:
a. Compatibility of the structure in appearance with the surrounding area;
b. Compatibility of the parking facilities in appearance and circulation of traffic with the surrounding area. Parking facilities shall also comply with Chapter 17.52;
c. Compatibility of the signage in appearance with the surrounding area. Signage shall also comply with Chapter 15.28;
d. The number of rooms to be used as overnight public accommodations shall not exceed four rooms in an underlying residential zone, or seven rooms in an underlying nonresidential zone;
e. The owner/operators shall reside in the bed and breakfast inn, or in a residence adjacent to the bed and breakfast inn.
f. The Planning Commission may allow up to an additional six non-guests to be served along with the guests at a meal.

Applicant's Response: Not applicable. The proposed development is for an Emergency Service Facility (Fire Station).

17.56.060 - Revocation of conditional use permits.
The planning commission or the city commission may initiate administrative action under Chapter 17.50 to revoke any conditional use permit previously issued by the city or, with regard to lands annexed by the city, those such permits issued by the county. The planning commission or, on review, the city commission, may revoke such permit upon determining:

A. One or more conditions attached to the grant of the conditional use permit have not been fulfilled; and

Applicant's Response: City permit records do not indicate any previous conditional use permits associated with the subject property.

B. The unfulfilled condition is substantially related to the issuance of the conditional use permit.

Applicant's Response: City permit records do not indicate any previous conditional use permits associated with the subject property.

17.56.070 - Periodic review of conditional use permits.
A. The city commission may provide for the periodic review of some or all of the conditional use permits previously issued by the city, or, with regard to lands annexed by the city, those such permits issued by the county. In providing for such review, the city commission may designate classes of such previously issued permits for which periodic review shall be undertaken.

Applicant's Response: The owner recognizes the city commission may perform periodic review of some or all of the conditional use permits issued by the City.

B. Such review shall be accomplished as an administrative action under Chapter 17.50 and shall be limited to the question of whether additional conditions should be imposed on a conditional use in the light of changing circumstances and more efficient implementation of the city's comprehensive plan.

Applicant's Response: The owner recognizes is such limited review is undertaken, additional conditions may be imposed considering changing circumstances.

C. Notwithstanding the provisions of Chapter 17.58, any additional conditions shall be met as a requirement for continued operation of the conditional use.
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Applicant's Response: The owner recognizes any additional conditions imposed will need to be met to allow continued operation of the permitted conditional use.

CHAPTER 17.60 - VARIANCE
17.60.030 – Variance

Site Variances from OCMC 17.62.050.2a and 17.62.055.D.1a-i – *Variance of maximum allowed setback from the street for an institutional building, unless elements from 17.62.055d.1a-I are incorporated.*

OCMC 17.62.050
2. Vehicular Access and Connectivity.
a. Parking areas shall be located behind buildings, below buildings, or on one or both sides of buildings.

Applicant's Response: The off-street parking area for the public is proposed to be in front of the building. The parking area will accommodate (3) parking spaces, which includes an accessible parking space. The off-street parking area for the staff will be located behind the building. The proposed site plan is designed to provide the utmost safe environment for access to and from the public way for pedestrians and automobiles, while offering appropriate opportunities for privacy and security transitions from public to private spaces/areas. The parking area in front of the building is designed to blend into the public plaza walk as much as possible. Currently, the existing fire station offers 96 hours of public parking space per day. On average the maximum amount observed is 2-3 hours/day. The building use expects similar public parking use. Onsite circulation keeps the emergency response vehicular traffic separate from the public vehicular traffic as much as possible to ensure safe site circulation and secured staff parking and training area. Locating the public parking area to behind the fire station would greatly burden the safety and security of the firefighters.

OCMC 17.62.055.D.1a-i
5. On sites with one hundred feet or more of frontage at least sixty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line, unless a greater setback is accepted under the provisions of Section 17.62.055D. For sites with less than one hundred feet of street frontage, at least fifty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line unless a greater setback is accepted under the provisions of Section 17.62.055D.

Applicant's Response: The subject property frontage is approximately 186-feet and runs north-south at an obtuse angle from the south property line. The proposed building is oriented perpendicular to the street lot line, thus creating varying setback distances from 112', 126', and 148' along the street frontage. The proposed building front facing facade is 114'-7" wide. The south end (apparatus bay), 67% of this facade is setback between 112' and 126' from the front property, matching the existing fire station setback distance. The north end (Public Entry) of this facade is setback is setback between 126' and 148' from the front property line. In comparison, the existing fire station north end is setback between 147'-0" and 164'-0", thus moving the building closer to the street frontage by an average of 18'-0".
Due to existing site configuration and operational requirements of the 24-hour emergency response, the proposed fire station is set as close as possible to the front property line to maintain operational and emergency response requirements. Each of the fire apparatus vehicles need to be able to utilize the full maneuvering area between the apparatus bay exterior wall and the street to; 1) traverse in a safe and responsive way for emergency responses; 2) Response and turn-out times require fire apparatus vehicles, including a 65-foot ladder truck to fully exit the apparatus bay, stop and then exit out onto Molalla Avenue; 3) The maximum slope the apron can be in in front of the apparatus bay for fire apparatus vehicle maneuvering is 2.5%.

Placing the fire station any closer to the front property line, would greatly jeopardize maneuverability, emergency responses, and generate extensive site grade cuts creating an expenditure that is cost-prohibitive.
The proposed setback would require a total of 22 items be incorporated into the design. The applicant is requesting to use the following elements to help mitigate the larger setback:

- **Tables, benches or other approved seating area:**
  (5) colored precast concrete seats will be provided in the pedestrian plaza area adjacent to the public sidewalk along Molalla Avenue.
- **Cobbled, patterned or paved stone or enhanced concrete:**
  Scored, colored concrete at the pedestrian circulation system/plaza will be utilized to enhance the concrete surface of the pedestrian circulation system/plaza.
- **Pedestrian scale lighting:**
  The use of pedestrian scale lighting (bollards) along the pedestrian circulation system and plaza will be utilized to enhance the pedestrian experience and safety of the site.
- **At least twenty square feet of landscaping or planter boxes for each tenant facade fronting on the activity area.**
  Approximately 3,625 square feet of landscaped area between the building facade and the front property line is proposed.
- **Enhanced landscaping or additional landscaping.**
  The landscape plan has been designed to maximize the visual interest, create a lively atmosphere, while also maintaining operational functions for the fire station emergency services. The landscape design proposed exceeds the minimum site landscape area requirements by 3% (2,006 sf) and the minimum tree planting requirements by 2 (Minimum required = 24, Proposed = 26). The overall design is to not just meet minimum standards but to create a nice landscape for the proposed fire station and along Molalla Avenue.
- **Additional elements incorporated into the design.**
  - Art: The fire district will procure a piece of public art to be incorporated into the pedestrian plaza area, adjacent or near the seating area. Size and type is unknown at this time.
  - Reader Board: A reader board providing community and emergency service information will be incorporated into the monument sign.

Variance may be granted in the event that all of the following conditions are met:
A. That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title;

Applicant's Response: The requested site variances will not impact adjacent properties by reducing light, air, safe access or other desirable or necessary qualities. The current and propose use of the site will remain an emergency use service (Fire Station). The proposed fire station is located very close to its current location, allowing current operational requirements of the 24-hour emergency response to remain intact and provide both efficient and safe vehicular site circulation.
Each of the proposed site elements incorporated into the site provide the desirable and necessary qualities promoting design and neighborhood livability.

B. That the request is the minimum variance that would alleviate the hardship;

Applicant's Response: The variance request to the building setback distance and public parking location is the minimum variance feasible to maintain current emergency operational requirements. Placing the building at the specified 5' setback distance would cause the fire station to be removed from its current location and greatly impact life safety operational requirements for fire apparatus to safely and efficiently travel to a scene of an emergency. While locating the public parking to the rear of the building would jeopardize the security and safety of the fire fighters.

C. Granting the variance will equal or exceed the purpose of the regulation to be modified.

Applicant's Response: The purpose of the 5-foot setback maximum and off-street parking placement is, presumably, to ensure that building placement supports convenient and safe pedestrian access from public streets, and promotes architectural interest and human scale to the street facing facade. As noted above, the proposed site plan configuration is designed to maintain current operational requirements of the 24-hour emergency response while also upholding the utmost safe environment for access to and from the public way for pedestrians and automobiles, while offering appropriate opportunities for privacy and security transitions from public to private spaces/areas. Both the public parking area, pedestrian amenities, and landscape enhancements are meeting the intent of the ordinance.

D. Any impacts resulting from the adjustment are mitigated.

Applicant's Response: The pedestrian plaza and direct connection to the main building entrance along with scaled lighting, additional and enhanced landscape, and building offsets creating portions of the new fire station closer to the street than the existing fire station all serve to mitigate the larger setback from the public street.

E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance.

Applicant's Response: The proposed location of the fire station is the most beneficial area on the subject property that provides the most unobstructed, safe, and efficient route of travel for the fire district to conduct emergency services.

F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Applicant's Response: There does not appear to be any comprehensive plan policies that require a 5-foot maximum setback. The proposed pedestrian plaza, walkway, lighting, vehicular location, and landscape provide the most safe, convenient, and architectural interest. These elements all achieve the same purpose as the ordinance standard.

Building Design Variance from OCMC 17.62.055H.2

H.2 - Variance of Facades greater than one hundred feet in length, measured horizontally, shall incorporate wall plane projections or recesses having a depth of at least three percent of the length of

the facade and extending at least twenty percent of the length of the facade. No uninterrupted length of any facade shall exceed one hundred horizontal feet.

Applicant's Response: The north facade is 138'-10" in length and would require projections or recesses having a depth of 4'-2". The applicant is requesting a variance to the depth of at least 3% of the length of the facade.

Adjacent to the north facade is an on-site storm treatment/retention swale and the main internal driveway aisle used by the fire apparatus and staff vehicles. To minimize the impact the projections would have on the storm treatment/retention swale and driveway aisle, the proposed projection depths are set at a depth of 2'-8". The total length of the proposed projections exceeds the minimum by 40% (83'-0") and have been placed to coincide with the interior bunk rooms.

Variance may be granted in the event that all of the following conditions are met:

A. That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title;

Applicant's Response: The requested variance is building mass size and articulation related and will not impact adjacent properties by reducing light, air, safe access or other desirable or necessary qualities for the applicant or the surrounding neighbors.

B. That the request is the minimum variance that would alleviate the hardship;

Applicant's Response: The requested variance is the minimum variance feasible to maintain site functionality of the required stormwater treatment facility and maintain the minimum width of the internal driveway aisle for fire apparatus vehicles.

C. Granting the variance will equal or exceed the purpose of the regulation to be modified.

Applicant's Response: The purpose of the horizontal mass height and wall plane variations, presumably, to ensure that building masses have variation in size and no wall planes are long and expansive without some variation in wall planes. The proposed wall projections along the north facade provide variation in the wall plane and contribute to the overall architectural interest of the building and human scale.

D. Any impacts resulting from the adjustment are mitigated.

Applicant's Response: The proposed variations have no visual impact on the property for the Applicant or surrounding neighbors because the design and placement of the proposed projections meet the intent of the ordinance by avoiding single, large horizontal masses and incorporating wall articulation and interest.

E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance.

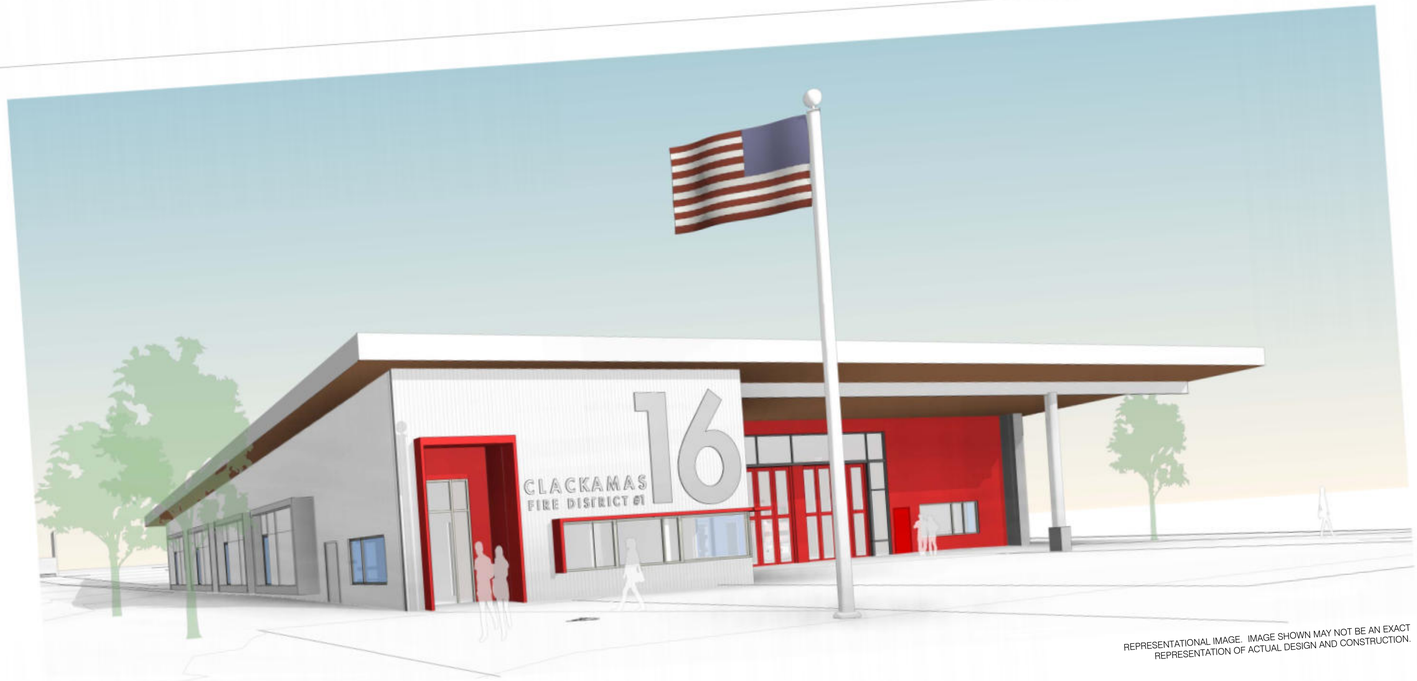
Applicant's Response: The proposed design of the north facade projections has been identified as a reasonable and practical alternative that meets the intent of the ordinance while having minimal impact on site and operational requirements.

F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Applicant's Response: The proposed variations conform to the comprehensive plan by meeting the provisions and intent of the ordinance that promote design integrity and neighborhood livability.

Drawings:

FIRE STATION 16



REPRESENTATIONAL IMAGE. IMAGE SHOWN MAY NOT BE AN EXACT REPRESENTATION OF ACTUAL DESIGN AND CONSTRUCTION.



1 VICINITY MAP
12" = 1'-0"

PROJECT DIRECTORY

CLIENT
CLACKAMAS FIRE DISTRICT #1
11300 SE FULLER ROAD
MILWAUKIE, OR 97222
P: 503.742.2600
CONTACT: RYAN HARI

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PORTLAND, OREGON 97205
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F: 503.227.4920
CONTACT: CAMILLA COK

CONTRACTOR
EMERICK CONSTRUCTION CO.
123 ANY STREET, SUITE 100
7855 SW MOHAWK STREET, TUALATIN OR 97062
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F: 503.771.2933
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CONTACT: ROBERT AMAN

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ALLIANT SYSTEMS
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PORTLAND, OR 97209
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CONTACT: NICK SCOTT

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TEAM ELECTRIC
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F: 503.557.8201
CONTACT: BOB SWANSON

LANDSCAPE
LANGO HANSEN
1100 NW GLISAN ST, #3B
PORTLAND, OR 97209
P: 503.295.2437
CONTACT: KURT LANGO

DRAWING SHEET INDEX

ARCHITECTURAL
A1 SITE PLAN
A2 FLOOR PLAN
A3 EXTERIOR ELEVATIONS

CIVIL
C100 EXISTING CONDITIONS PLAN
C111 EROSION CONTROL PLAN
C200 CIVIL SITE PLAN
C300 GRADING PLAN
C400 UTILITY PLAN

LANDSCAPE
L001 TREE MITIGATION PLAN
L101 LANDSCAPE PLAN

SITE LIGHTING
E1 SITE ILLUMINATION PLAN

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FIRE STATION 16

19340 MOLALLA AVE
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HEA Project no. 16073
Date: APRIL 17, 2017
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Sheet:

COVER

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POLE MOUNTED LIGHT FIXTURE - SA
OR SIMILAR



PEDESTRIAN BOLLARD LIGHT FIXTURE - SB
OR SIMILAR



BUILDING MOUNTED LIGHT FIXTURE - SC
OR SIMILAR



BUILDING MOUNTED LIGHT FIXTURE - SD
OR SIMILAR



CANOPY LIGHT FIXTURE - SE
OR SIMILAR



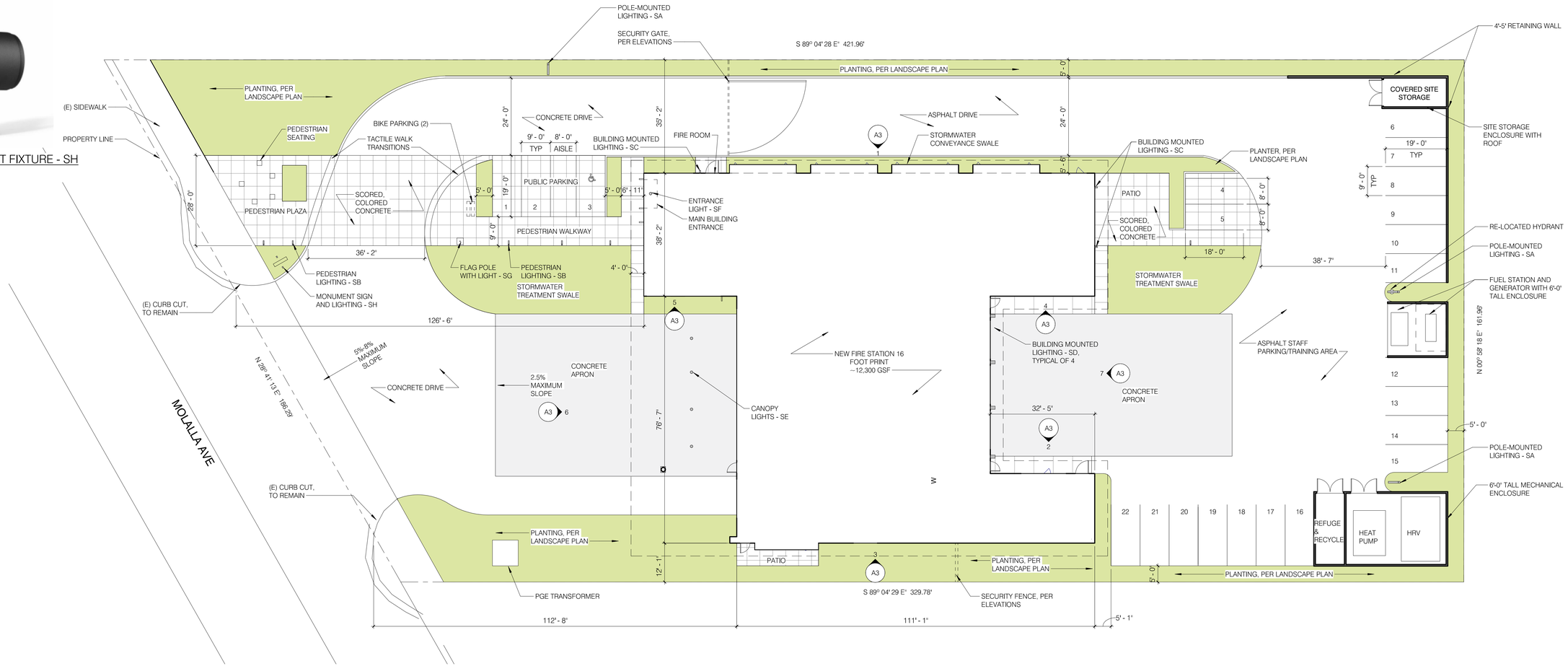
ENTRANCE LIGHT FIXTURE - SF
OR SIMILAR



FLAGPOLE LIGHT FIXTURE - SG



MONUMENT SIGN LIGHT FIXTURE - SH
OR SIMILAR



1 ARCHITECTURAL SITE PLAN
1/16" = 1'-0"

0' 4' 8' 16' 32'

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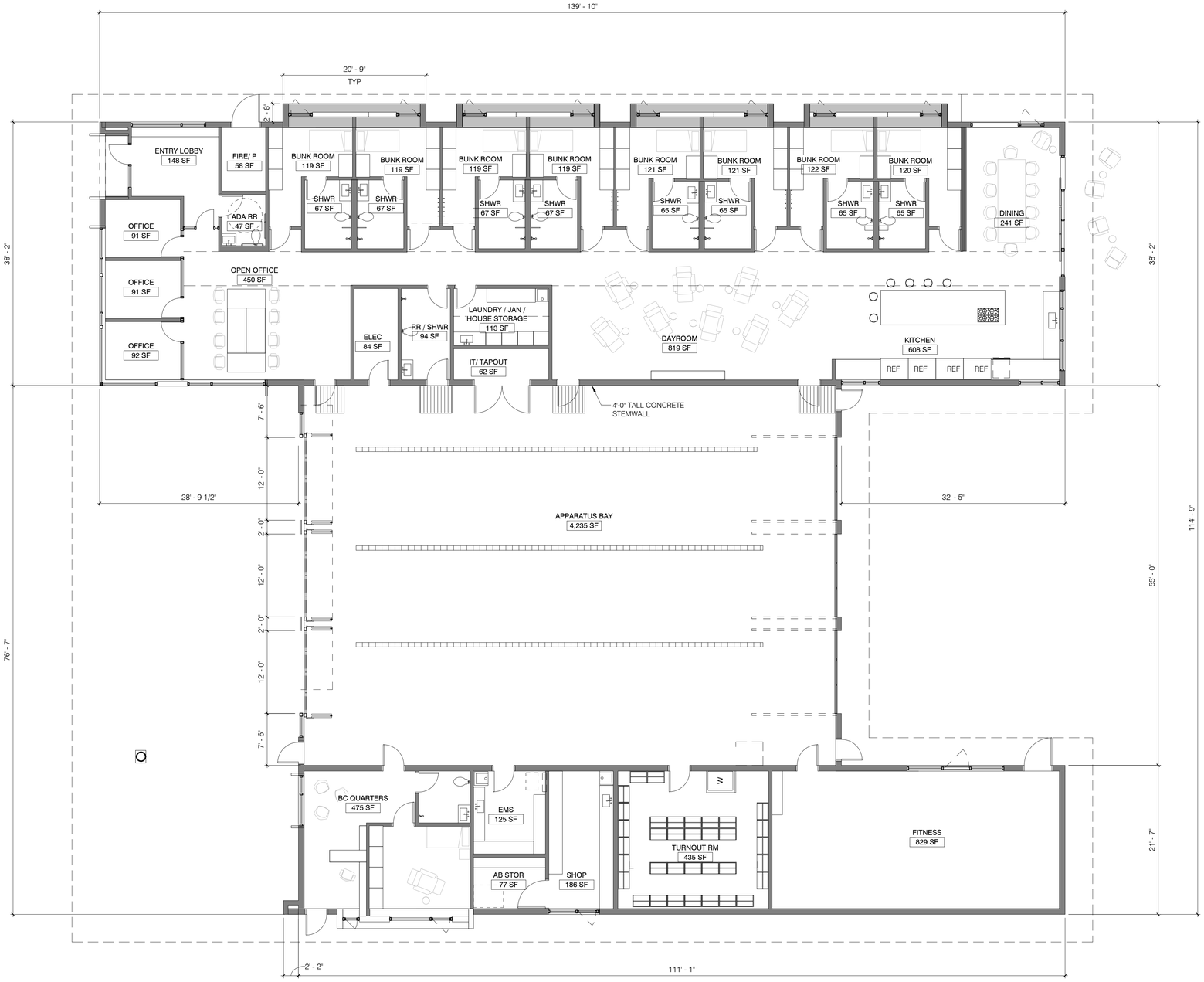
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SETTINGS FOR VIEWING AND PRINTING CONTENT ARE OPTIMIZED WHEN ALL THREE DOTS ARE VISIBLE.
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Black
Dark gray
Light gray



1 ARCHITECTURAL FLOOR PLAN
1/8" = 1'-0"

0' 2' 4' 8' 16'

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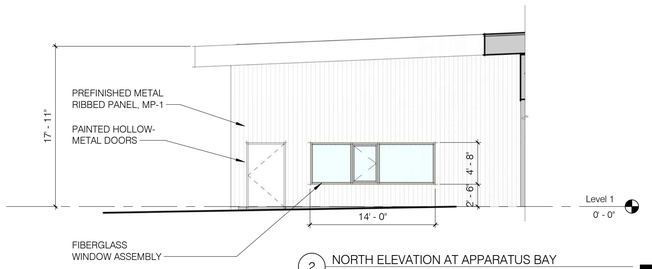
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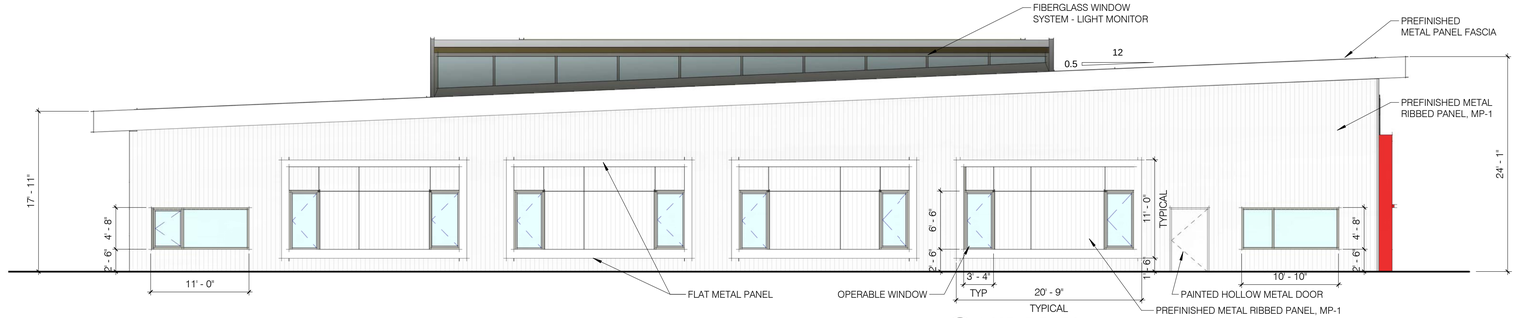
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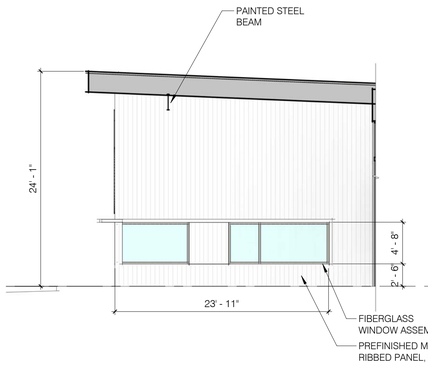
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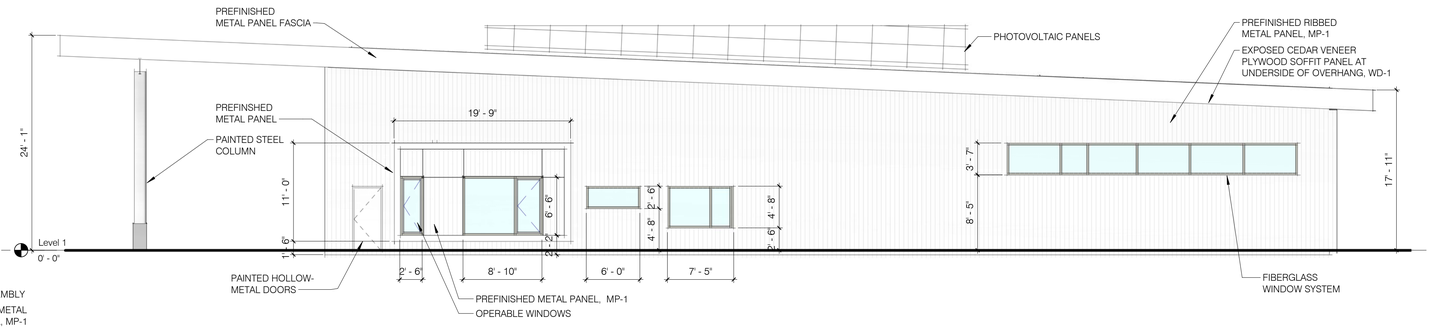
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1/8" = 1'-0"



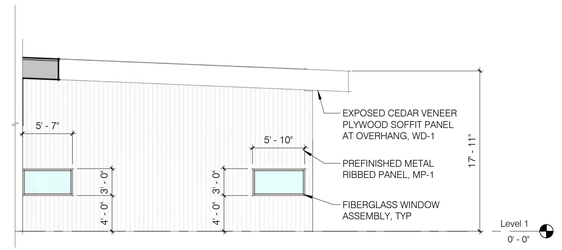
1 NORTH ELEVATION
1/8" = 1'-0"



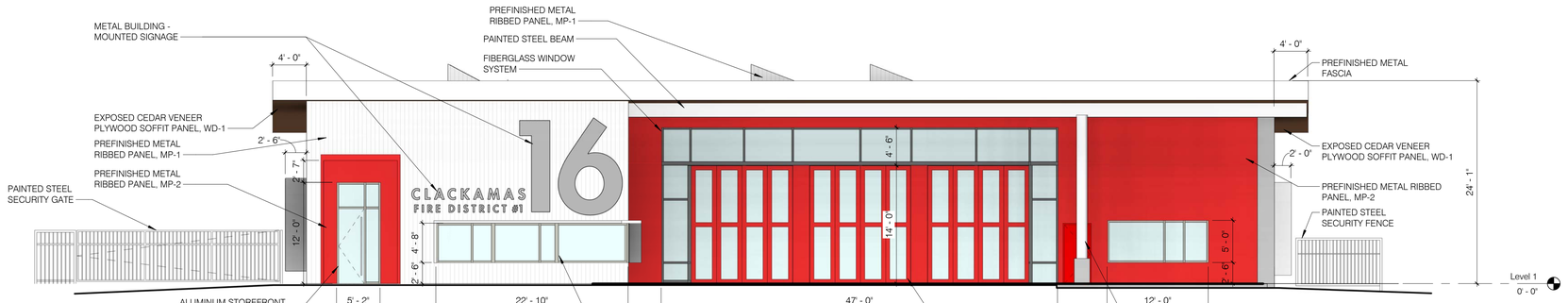
5 SOUTH ELEVATION AT APPARATUS BAY - WEST
1/8" = 1'-0"



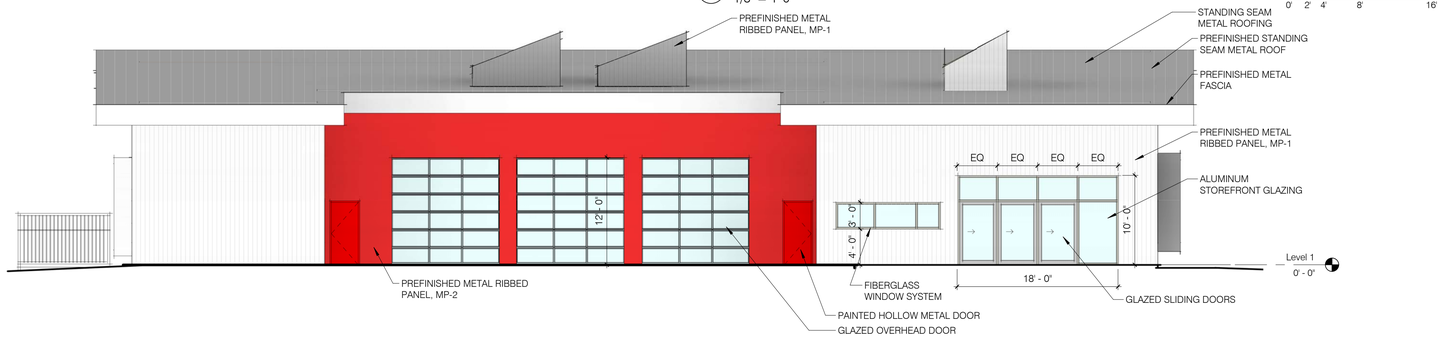
3 SOUTH ELEVATION
1/8" = 1'-0"



4 SOUTH ELEVATION AT APPARATUS BAY - EAST
1/8" = 1'-0"



6 WEST ELEVATION
1/8" = 1'-0"



7 EAST ELEVATION
1/8" = 1'-0"

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Dark 100%
Dark 50%
Light 25%

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CLACKAMAS FIRE DISTRICT #1

FIRE STATION 16

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OREGON CITY, OR

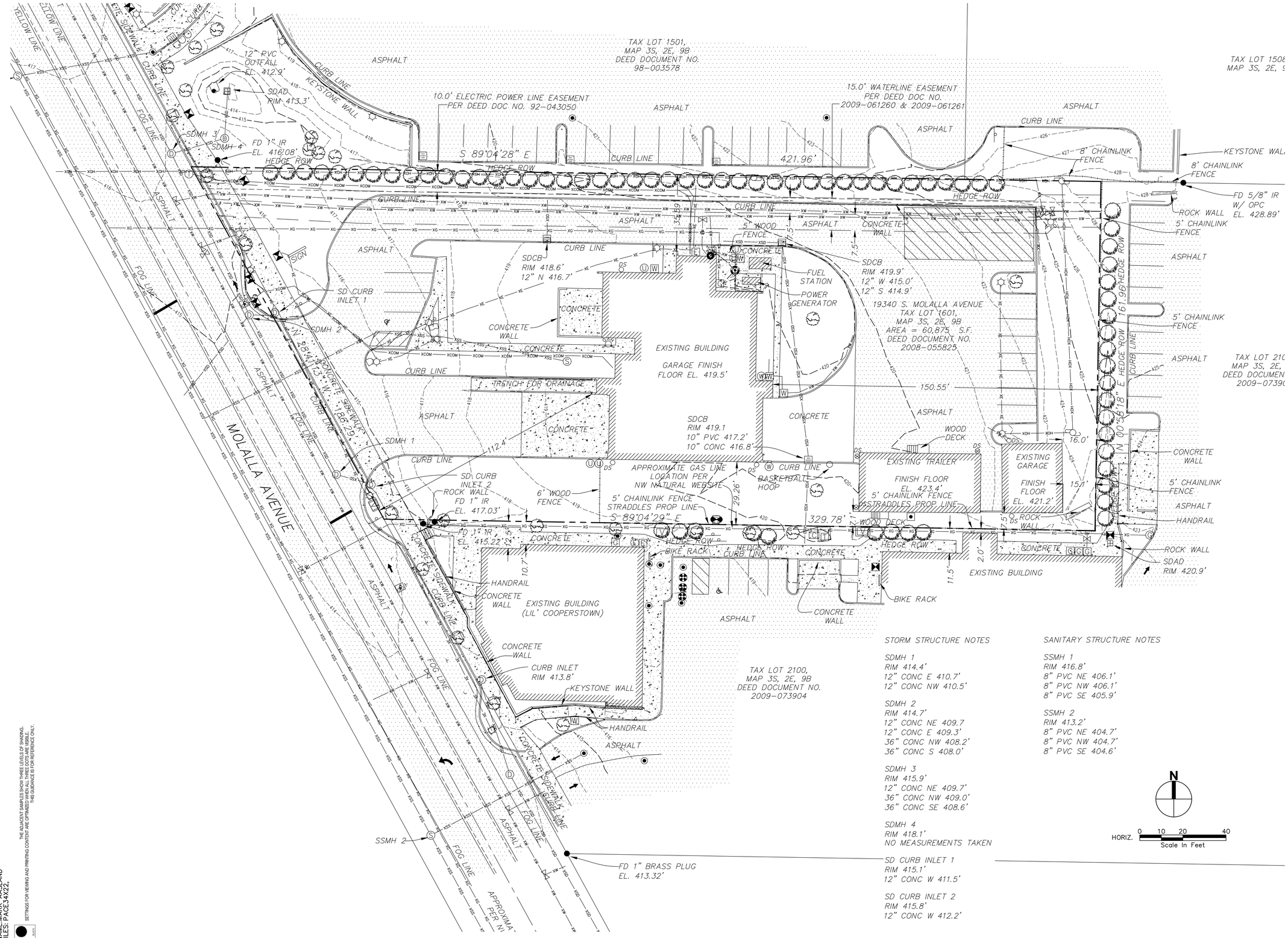
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Checked by: JM
Sheet: EXTERIOR ELEVATIONS

A3

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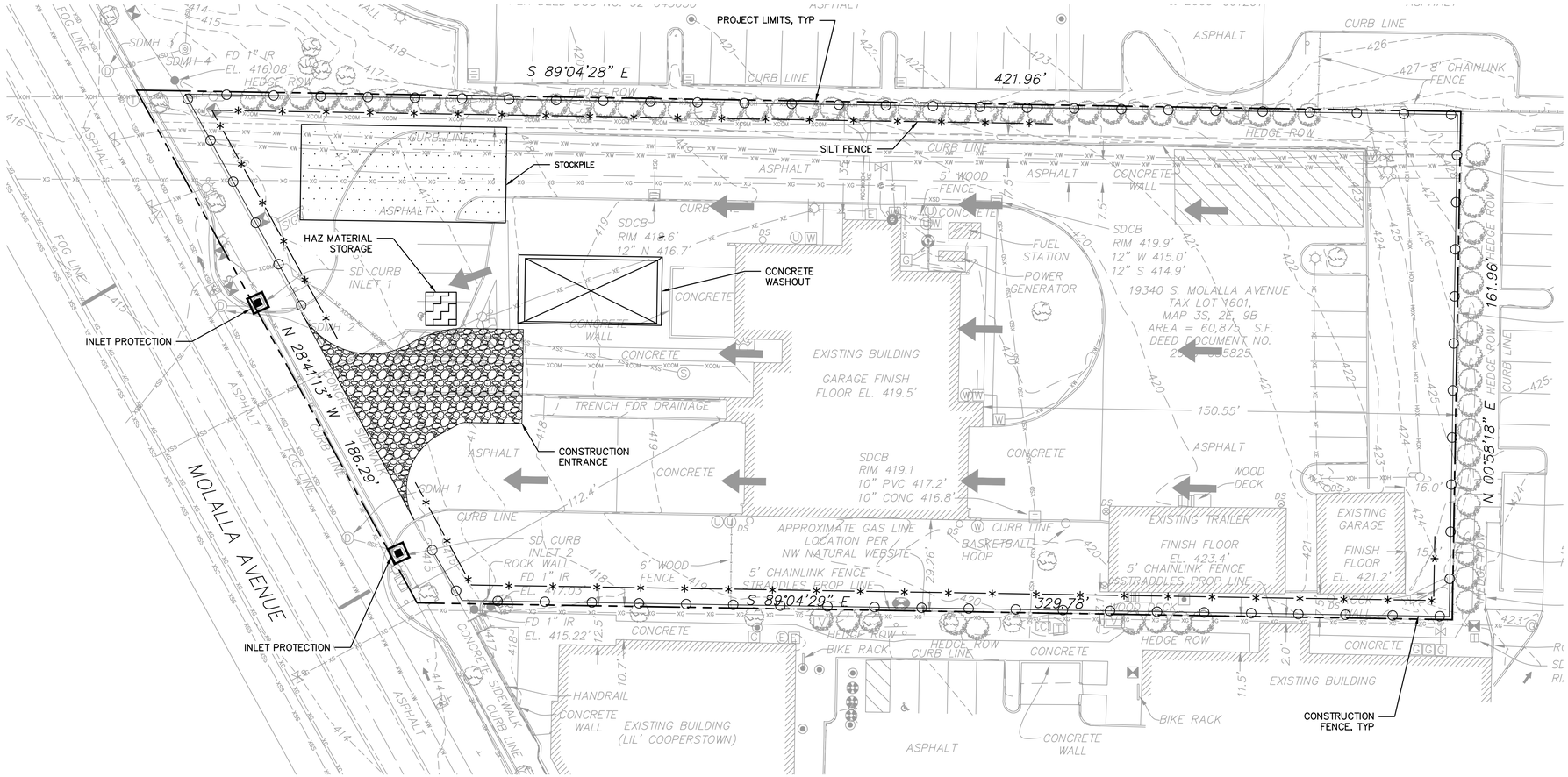
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Sheet: EXISTING CONDITIONS

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N

HORIZ. 0 10 20 40

Scale In Feet

GRADING AND EROSION / SEDIMENT CONTROL LEGEND

- SILT FENCE/ SEDIMENT BARRIER
- CONSTRUCTION FENCE 48" ORANGE OR APPROVED EQUAL
- CHECK DAM
- INLET PROTECTION
- SEDIMENT MATT
- SEEDING AND MULCHING
- SWALE PROTECTION, BIOBAG OR WADDLES
- TEMPORARY SLOPE STABILIZATION MEASURES
- CONCRETE WASH AREA
- OUTLET PROTECTION
- NEW IMPERVIOUS SURFACE
- FLOW DIRECTION
- CONSTRUCTION ENTRANCE
- SEDIMENT TRAP
- STOCKPILES
- HAZARDOUS MATERIAL STORAGE

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LAND USE & DESIGN REVIEW

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EROSION CONTROL PLAN

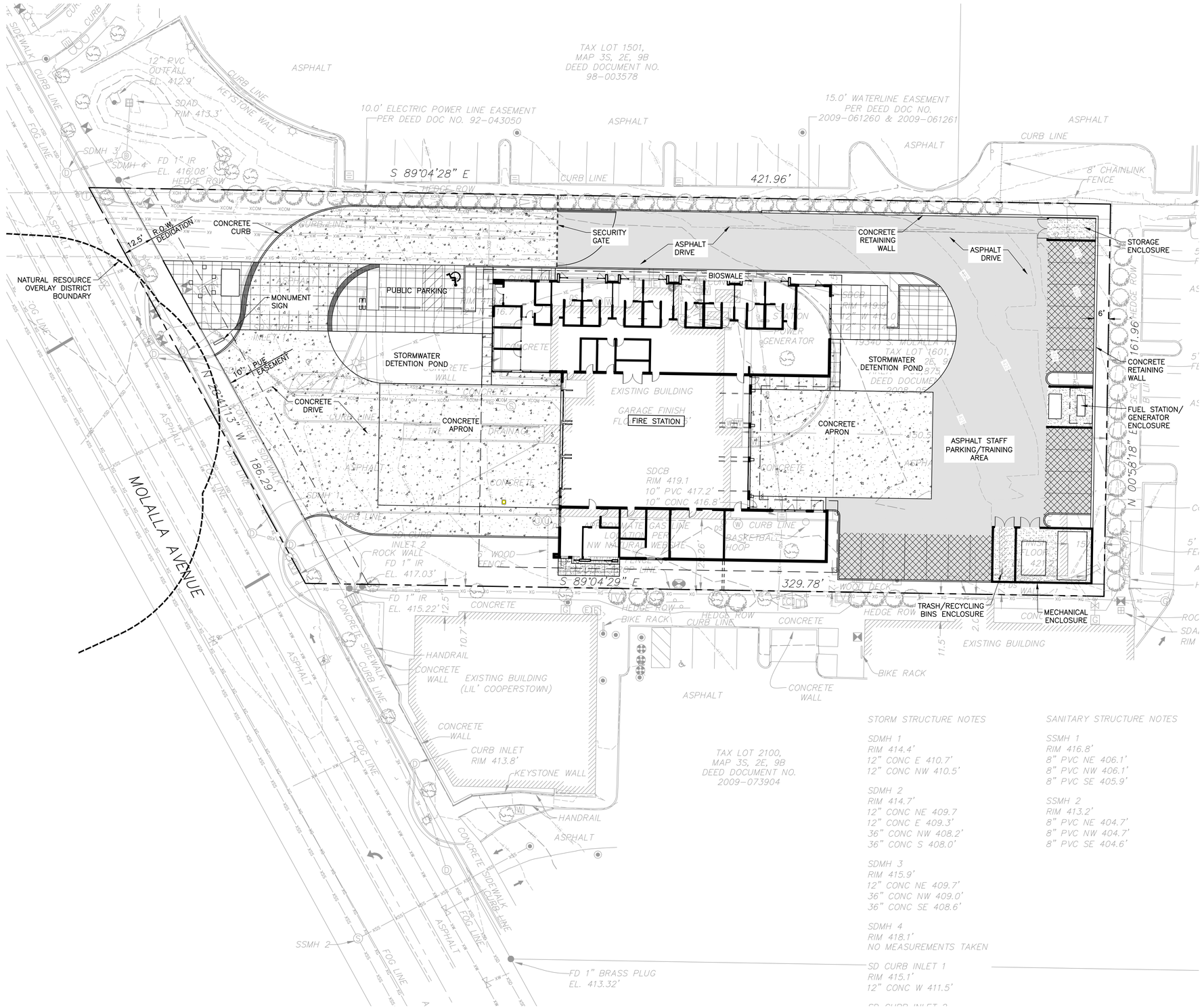
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LEGEND

- LIGHT FLEXIBLE PAVEMENT
- MODERATE FLEXIBLE PAVEMENT
- RIGID PEDESTRIAN PAVEMENT
- CONCRETE APRON
- PEDESTRIAN WALK
- CONCRETE SLAB

STORM STRUCTURE NOTES

SDMH 1
RIM 414.4'
12" CONC E 410.7'
12" CONC NW 410.5'

SDMH 2
RIM 414.7'
12" CONC NE 409.7
12" CONC E 409.3'
36" CONC NW 408.2'
36" CONC S 408.0'

SDMH 3
RIM 415.9'
12" CONC NE 409.7'
36" CONC NW 409.0'
36" CONC SE 408.6'

SDMH 4
RIM 418.1'
NO MEASUREMENTS TAKEN

SD CURB INLET 1
RIM 415.1'
12" CONC W 411.5'

SANITARY STRUCTURE NOTES

SSMH 1
RIM 416.8'
8" PVC NE 406.1'
8" PVC NW 406.1'
8" PVC SE 405.9'

SSMH 2
RIM 413.2'
8" PVC NE 404.7'
8" PVC NW 404.7'
8" PVC SE 404.6'

PROPERTY INFORMATION

ADDRESS:	19340 MOLALLA AVENUE
PROPERTY AREA:	1.34 ACRES (58,538 SQUARE FEET)
TAX LOT:	1601
MAP:	32E098
ZONING:	C (GENERAL COMMERCIAL DISTRICT)
PROPOSED IMPERVIOUS AREA:	45,914 SQUARE FEET (78.4%)
PROPOSED PERVIOUS AREA:	12,624 SQUARE FEET (21.6%)

HORIZ. 0 10 20 40
Scale In Feet

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CLACKAMAS FIRE DISTRICT #1

FIRE STATION 16

19340 MOLALLA AVE
OREGON CITY, OR

HEA Project no. 16073
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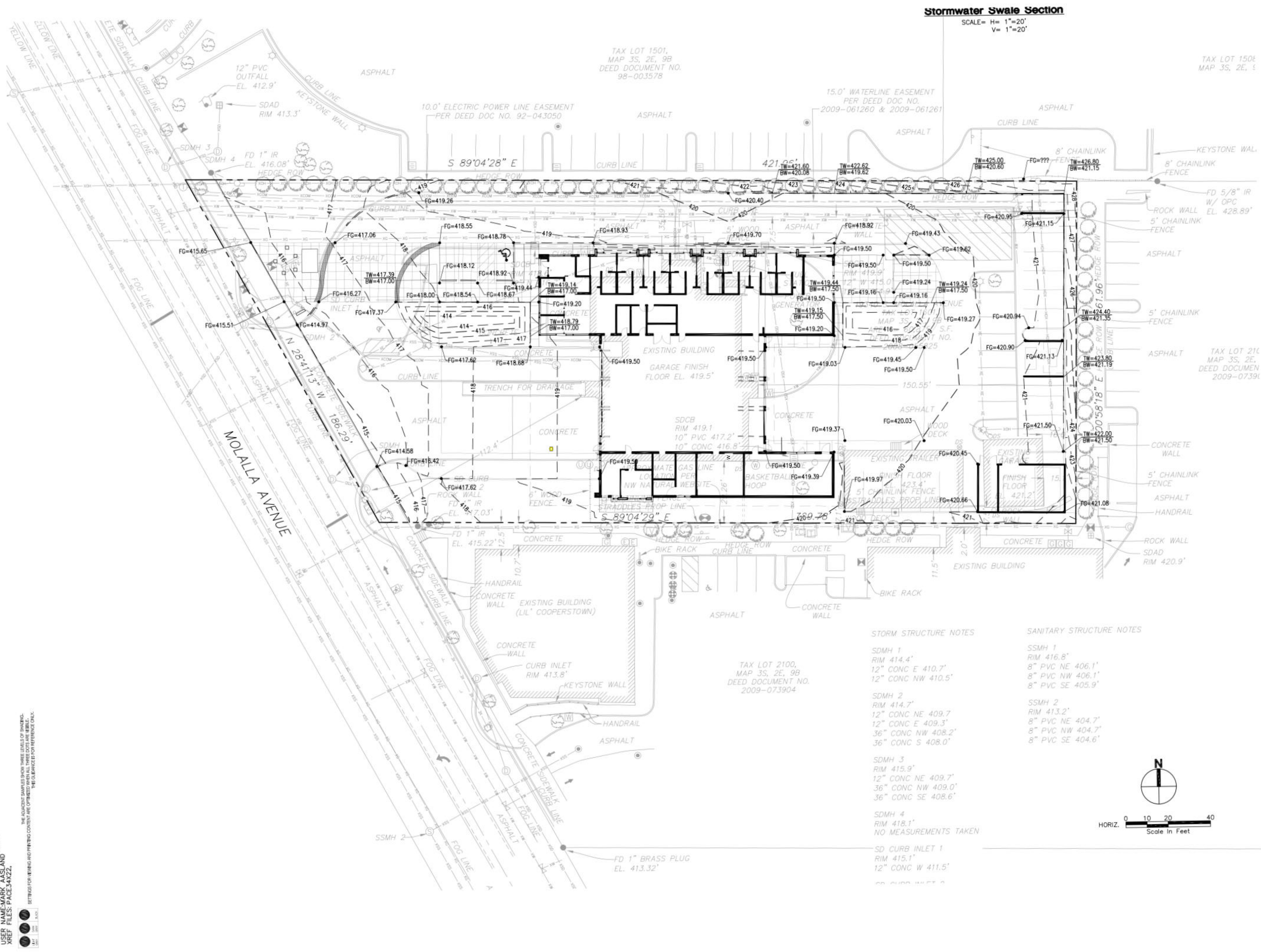
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Stormwater Swale Section

SCALE= H= 1"=20'
V= 1"=20'



STORM STRUCTURE NOTES

SDMH 1
RIM 414.4'
12" CONC E 410.7'
12" CONC NW 410.5'

SDMH 2
RIM 414.7'
12" CONC NE 409.7
12" CONC E 409.3'
36" CONC NW 408.2'
36" CONC S 408.0'

SDMH 3
RIM 415.9'
12" CONC NE 409.7'
36" CONC NW 409.0'
36" CONC SE 408.6'

SDMH 4
RIM 418.1'
NO MEASUREMENTS TAKEN

SD CURB INLET 1
RIM 415.1'
12" CONC W 411.5'

SANITARY STRUCTURE NOTES

SSMH 1
RIM 416.8'
8" PVC NE 406.1'
8" PVC NW 406.1'
8" PVC SE 405.9'

SSMH 2
RIM 413.2'
8" PVC NE 404.7'
8" PVC NW 404.7'
8" PVC SE 404.6'

HORIZ. 0 10 20 40
Scale In Feet

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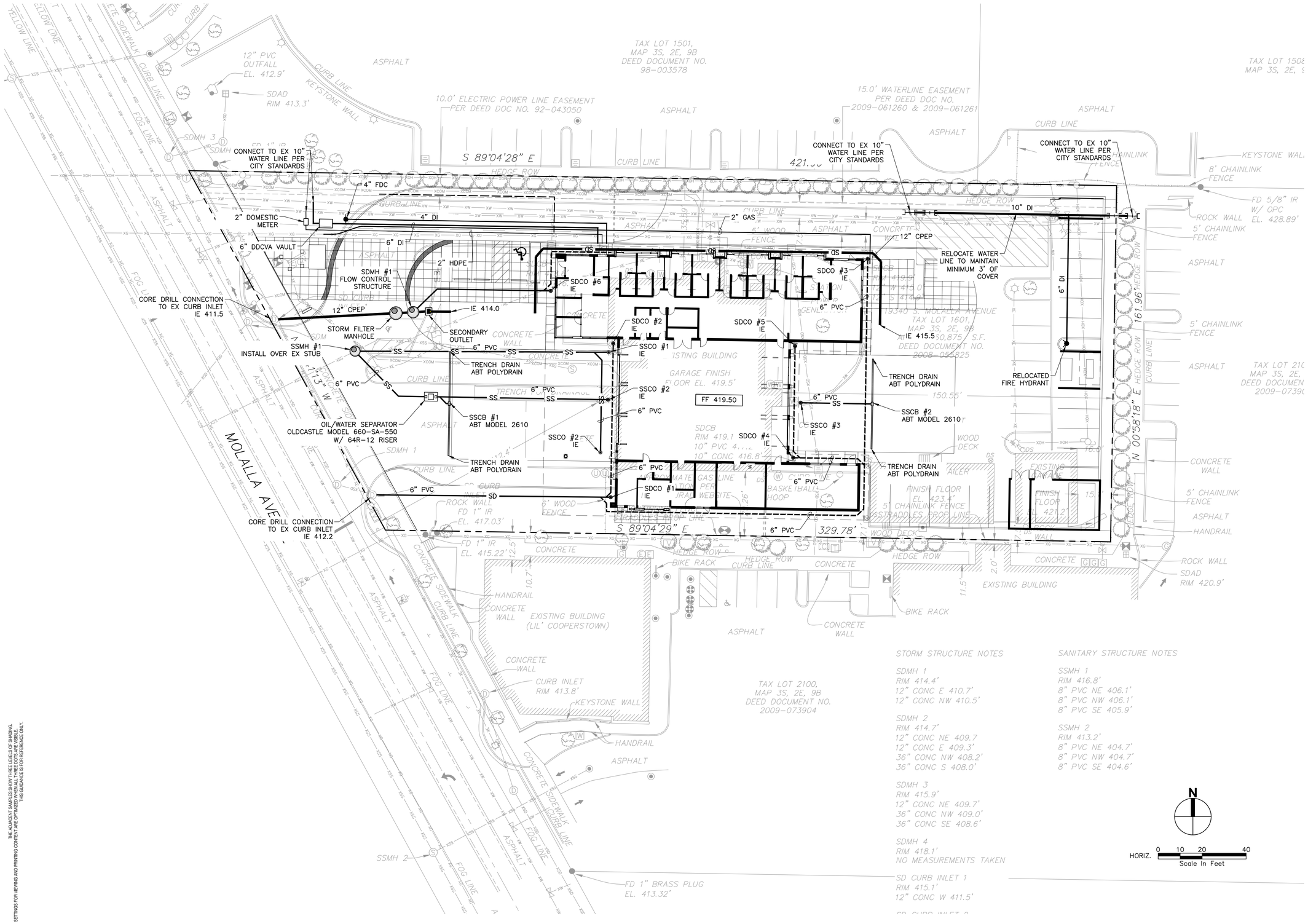
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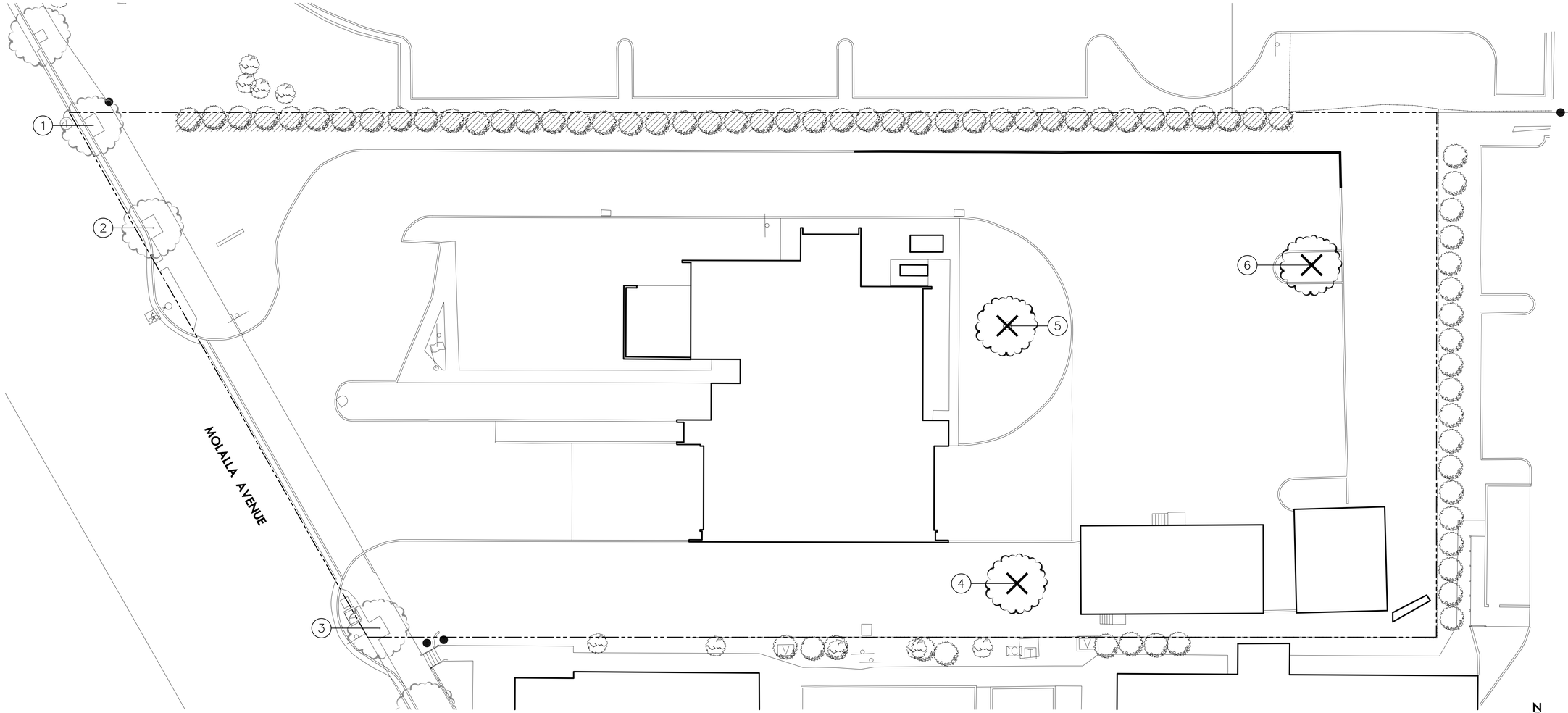
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Sheet: UTILITY PLAN

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1 TREE MITIGATION PLAN

Plan
1"=16'-0"

0 4 8 16 32

N

LEGEND

PROPERTY LINE/RIGHT-OF-WAY

EXISTING DECIDUOUS TREE, TO BE REMOVED

EXISTING DECIDUOUS TREE, TO BE PROTECTED

EXISTING HEDGE, TO BE REMOVED

TREE REMOVAL NOTES:

1. A TOTAL OF (3) EXISTING TREES WILL BE REMOVED WITHIN THE CONSTRUCTION ZONE:
   - (1) 30" TREE
   - (1) 16" TREE
   - (1) 8" TREE

   PER OREGON CITY MUNICIPAL CODE 17.41.060, A MINIMUM OF (7) NEW TREES WILL BE PLANTED.
2. SEE LANDSCAPE PLAN L1.01 FOR REPLACEMENT TREE LOCATIONS.

TREE INVENTORY TABLE

#	TREE SPECIES (Botanical Name – Common Name)	SIZE	STATUS	REQUIRED MITIGATION
1	Ulmus parvifolia – Chinese Elm	2"	TO BE PROTECTED	–
2	Ulmus parvifolia – Chinese Elm	3"	TO BE PROTECTED	–
3	Acer x freemanii – Freeman Maple	6"	TO BE PROTECTED	–
4	Prunus cerasifera – Cherry Plum	8"	TO BE REMOVED	1 TREE
5	Prunus cerasifera – Cherry Plum	30"	TO BE REMOVED	4 TREES
6	Liquidambar styraciflua – Sweet Gum	16"	TO BE REMOVED	2 TREES

lango.hansen LANDSCAPE ARCHITECTS PC
1100 nw glisan #3b portland or 97209

PRELIMINARY, NOT FOR CONSTRUCTION

Hennebery Eddy Architects Inc.
921 SW WASHINGTON STREET SUITE 250
PORTLAND OREGON 97205
503 227 4860 TEL
503 227 4920 FAX
www.henneberyeddy.com

CLACKAMAS FIRE DISTRICT #1

FIRE STATION 16

19340 MOLALLA AVE
OREGON CITY, OR

HEA Project no. 16073
Date: APRIL 17, 2017
LAND USE & DESIGN REVIEW
Revisions:

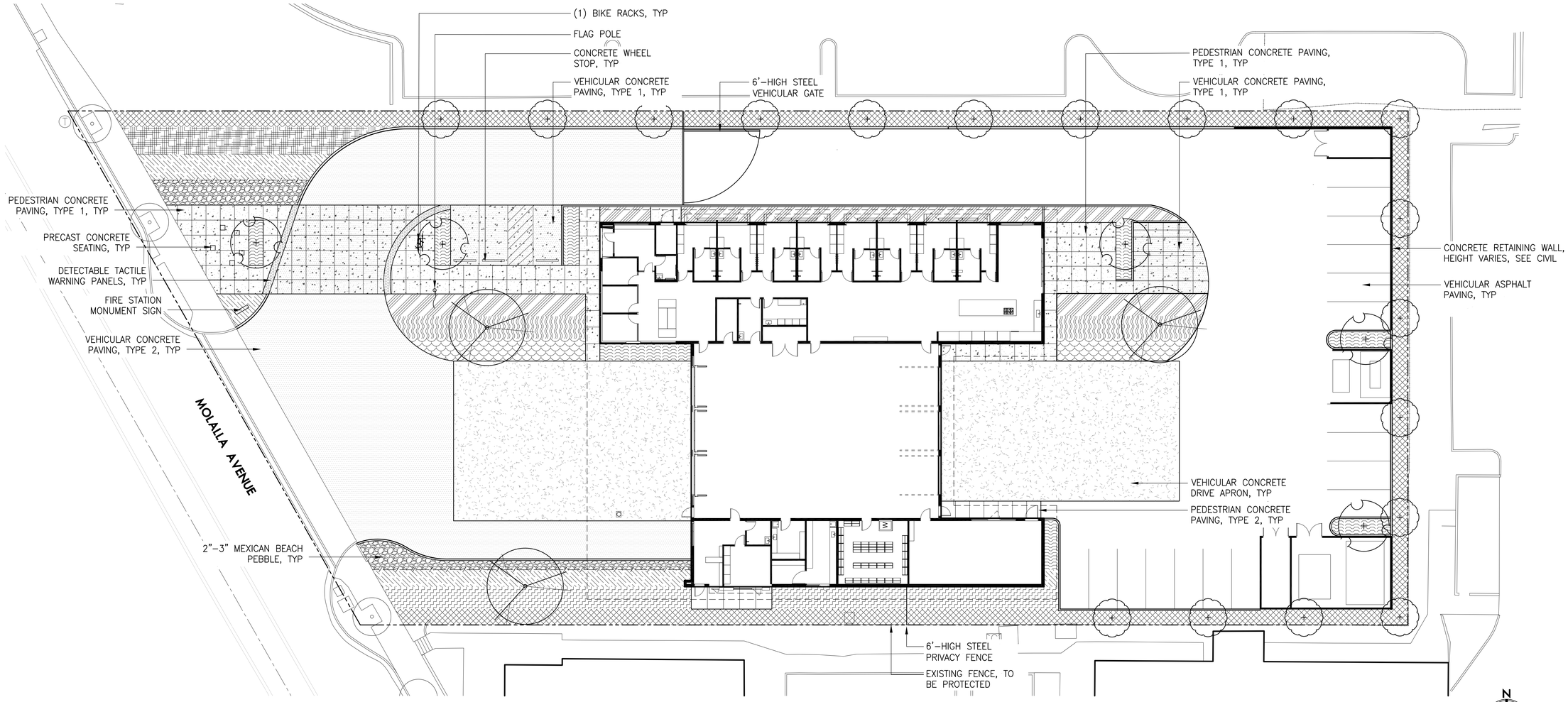
LAND USE & DESIGN REVIEW

Drawn by: Author
Checked by: Checker
Sheet: TREE MITIGATION PLAN

L001

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THE ADJACENT SAMPLES SHOW THREE LEVELS OF SHADING.
THE ACTUAL LEVEL OF SHADING WILL BE DETERMINED BY THE OWNER.
THIS GUIDANCE IS FOR REFERENCE ONLY.
SETTINGS FOR VIEWING AND PRINTING CONTROL AREA OF IMAGES SHOWN ON THIS SHEET
LIGHT 100% DARK 50% BLACK



1 LANDSCAPE PLAN

Plan
1"=16'-0"
0 4 8 16 32

PLANT SCHEDULE

SYMBOL	BOTANICAL NAME	COMMON NAME	SIZE/ CONDITION	SPACING
TREES				
	Acer griseum	Paperbark Maple	7'-HIGH SPECIMEN/B&B	AS SHOWN
	Ginkgo biloba 'Princeton Sentry'	Princeton Sentry Ginkgo	3" CAL. / B&B	AS SHOWN
	Magnolia grandiflora 'Edith Bogue'	Edith Bogue Magnolia	3" CAL. / B&B	AS SHOWN
HEDGE/SCREENING				
	Ilex glabra 'Shamrock'	Shamrock Holly	#5/CONT	30" O.C.
SHRUBS, GRASSES, AND GROUNDCOVER				
	Cistus x hybridus	White Rockrose	#3/CONT	36" O.C.
	Cornus sericea	Red Twig Dogwood	#5/CONT	48" O.C.
	Liriope muscari 'Big Blue'	Big Blue Lilyturf	#1/CONT	12" O.C.
	Nandina domestica 'Moyer's Red'	Heavenly Bamboo	#5/CONT	30" O.C.
STORMWATER PLANTS				
	Carex morrowii 'ice dance'	Ice Dance Sedge	#1/CONT	12" O.C.
	Juncus patens	California Gray Rush	#1/CONT	12" O.C.
	Symphoricarpos albus	Snowberry	#5/CONT	36" O.C.

LEGEND

- PROPERTY LINE/RIGHT-OF-WAY
- BUILDING OVERHANG
- PEDESTRIAN CONCRETE PAVING, TYPE 1: PEWTER COLOR
- PEDESTRIAN CONCRETE PAVING, TYPE 2: NATURAL COLOR
- VEHICULAR CONCRETE DRIVE APRON: NATURAL COLOR
- VEHICULAR CONCRETE PAVING, TYPE 1: PEWTER COLOR
- VEHICULAR CONCRETE PAVING, TYPE 2: NATURAL COLOR
- DETECTABLE TACTILE WARNING PANELS
- 2"-3" MEXICAN BEACH PEBBLE, BLACK
- PRECAST CONCRETE SEATS, RED COLOR
- ¼" STEEL EDGER
- CONCRETE WHEELSTOP
- EXISTING TREE TO REMAIN, PROTECT IN PLACE

ABBREVIATIONS

ARCH	ARCHITECTURAL
CONC	CONCRETE
DWG	DRAWINGS
ELEC	ELECTRICAL
MECH	MECHANICAL
NIC	NOT IN CONTRACT
PA	PLANTING AREA
SIM	SIMILAR
SPECS	SPECIFICATIONS
STRUC	STRUCTURAL
TYP	TYPICAL
W/	WITH

CODE REQUIREMENTS

- A TOTAL OF (3) EXISTING TREES WILL BE REMOVED:
  - (1) 30" TREE
  - (1) 16" TREE
  - (1) 8" TREE

  PER OREGON CITY MUNICIPAL CODE 17.41.060, a MINIMUM OF (7) NEW TREES WILL BE PLANTED.
- TOTAL LANDSCAPE AREA: 11089 SF (18% OF SITE)
- TOTAL INTERIOR PARKING LANDSCAPE AREA: 1013 SF (10% OF PARKING AREA)

NOTES

1. THIS PLAN IS BASED ON A SURVEY BY CENTERLINE CONCEPTS LANDSCAPE SURVEYING INC. DATED 01/19/2017. NOTIFY OWNER'S REPRESENTATIVE OF ANY DISCREPANCIES IDENTIFIED ON SITE RELATED TO SURVEY INFORMATION PRIOR TO INSTALLATION.
2. PROTECT EXISTING VEGETATION TO REMAIN.
3. SEE CIVIL DRAWINGS FOR LOCATION OF UTILITIES.
4. SEE ELECTRICAL DRAWINGS FOR FURTHER INFORMATION REGARDING SITE LIGHTING AND ELECTRIC UTILITIES.
5. SEE CIVIL DRAWINGS FOR ALL VEHICULAR AREA IMPROVEMENTS, INCLUDING PAVING, CURBS, DRIVEWAY APRONS, STRIPING AND SIGNAGE, AS WELL AS ANY VEHICULAR AND PEDESTRIAN PAVING IMPROVEMENTS WITHIN THE RIGHT-OF-WAY.
6. ALL PLANTING AREAS TO BE IRRIGATED WITH PERMANENT, BELOW-GROUND AUTOMATIC IRRIGATION SYSTEM WITH 100% HEAD-TO-HEAD SPRAY COVERAGE.
7. ALL PLANTING AREAS AT GRADE SHALL RECEIVE 18" MIN. IMPORTED TOP SOIL.
8. ALL PLANT MATERIAL SHALL BE NURSERY GROWN, WELL ROOTED, AND WELL BRANCHED. ALL TREES MUST BE FREE OF INSECTS, DISEASES, MECHANICAL INJURY, AND OTHER OBJECTIONABLE FEATURES WHEN PLANTED. ALL PLANT MATERIAL SHALL CONFORM TO "AMERICAN STOCK STANDARDS" LATEST EDITION.
9. ALL PLANT MATERIAL TO BE APPROVED BY LANDSCAPE ARCHITECT PRIOR TO INSTALLATION. SEE SPECIFICATIONS.
10. PLANT SPACING SHALL TAKE PRECEDENCE OVER VALVE BOX LOCATIONS. INSTALLED VALVE BOXES THAT CONFLICT WITH ACCEPTED PLANT LAYOUT SHALL BE MOVED TO POSITION BETWEEN PLANTS.
11. CLEAR PLANT BEDS OF ALL GRAVEL AND DEBRIS PRIOR TO SOIL PREPARATION AND PLANTING, FOR APPROVAL BY LANDSCAPE ARCHITECT.
12. ALL LANDSCAPE AREAS THAT HAVE A SLOPE GREATER THAN 1 VERTICAL FOOT IN 3 HORIZONTAL FEET SHALL RECEIVE JUTE MATTING, SEE SPECIFICATIONS.
13. ALL PARKING LOT AND STREET TREES MUST HAVE 6' CLEAR HEIGHT TO LOWEST BRANCHES.

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THE ADJACENT SWATCHES SHOW THREE LEVELS OF SHADING.
SETTINGS FOR VIEWING AND PRINTING CONTENT ARE APPROXIMATE AND VARY BY MONITOR.
THIS GUIDANCE IS FOR REFERENCE ONLY.

lango.hansen LANDSCAPE ARCHITECTS PC
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CLACKAMAS FIRE DISTRICT #1

FIRE STATION 16

19340 MOLALLA AVE
OREGON CITY, OR

HEA Project no. 16073
Date: APRIL 17, 2017
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Revisions:

LAND USE & DESIGN REVIEW

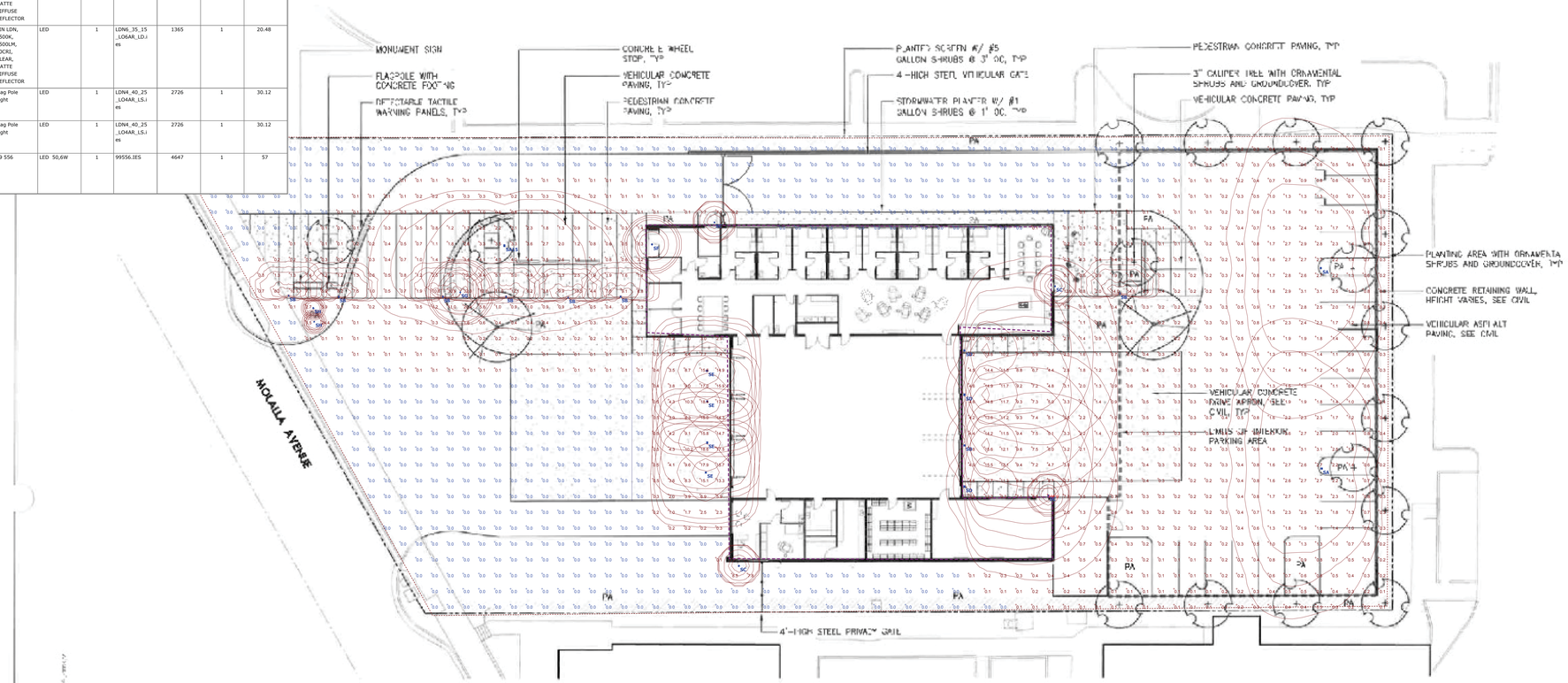
Drawn by: Author
Checked by: Checker
Sheet: LANDSCAPE PLAN

L101

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Schedule

Symbol	Label	Quantity	Manufacturer	Catalog Number	Description	Lamp	Number Lamps	Filename	Lumens Per Lamp	Light Loss Factor	Wattage
	SA	2	BEGA Converted by LUMCat V 06.02.2014 / H.R.		99 556	LED 50,6W	1	99556.IES	4647	1	57
	SB	7	BEGA-US	88 659	CAST ALUMINUM HOUSING, FORMED SEMI-SPECULAR ALUMINUM REFLECTORS , CLEAR PATTERNED GLASS ENCLOSURE.		1	88659.IES	727	1	16
	SC	4	BEGA Converted by LUMCat V 06.07.2016 / H.R.		24582	LED 16,5W	1	24582.ies	1594	1	20
	SH	2	BEGA-US	77 685	5-9/16"DIA. X 5-5/8"H. FLOODLIGHT LUMINAIRE 18 4000K LEDS WITH PURE ANODIZED ALUMINUM REFLECTOR CLEAR TEMPERED GLASS LENS		1	77685.IES	1154	1	20.93
	SD	4	BEGA Converted by LUMCat V 11.05.2015 / H.R.		66451	LED 46,2W	1	66451.ies	4870	1	53
	SE	4	Lithonia Lighting	LDN6SQ 40/40 LS6AR LD	6IN SQUARE LDN, 4000K, 4000LM, MATTE DIFFUSE	LED	1	LDN6SQ_40 _40_LS6AR_ LD.ies	3327	1	46.92
	SE	0	Lithonia Lighting	LDN6SQ 40/40 LS6AR LD	6IN SQUARE LDN, 4000K, 4000LM, MATTE DIFFUSE	LED	1	LDN6SQ_40 _40_LS6AR_ LD.ies	3327	1	46.92
	SF	1	Lithonia Lighting	LDN6SQ 35/15 LO6AR LD	6IN LDN, 3500K, 1500LM, 80CRI, CLEAR, MATTE DIFFUSE REFLECTOR	LED	1	LDN6_35_15 _LO6AR_LD.i es	1365	1	20.48
	SF	0	Lithonia Lighting	LDN6SQ 35/15 LO6AR LD	6IN LDN, 3500K, 1500LM, 80CRI, CLEAR, MATTE DIFFUSE REFLECTOR	LED	1	LDN6_35_15 _LO6AR_LD.i es	1365	1	20.48
	SG	0	Magnifood	II led54	Flag Pole Light	LED	1	LDN4_40_25 _LO4AR_LS.i es	2726	1	30.12
	SG	1	Magnifood	II led54	Flag Pole Light	LED	1	LDN4_40_25 _LO4AR_LS.i es	2726	1	30.12
	SA15	1	BEGA Converted by LUMCat V 06.02.2014 / H.R.		99 556	LED 50,6W	1	99556.IES	4647	1	57



Plan View
Scale - 1" = 15ft

PRELIMINARY. NOT FOR CONSTRUCTION

Hennebery Eddy Architects Inc.

FIRE STATION 16

SITE PHOTOMETRIC PLAN

SCHEMATIC DESIGN

E1.1

Designer

Date
4/7/2017
Scale
Not to Scale
Drawing No.

Summary

APPENDIX

- Preliminary Title Report
- Pre-Application Conference Summary Notes
- Summary of Neighborhood Association Meeting
- Archeological & Cultural Review Letter and Email
- Light Fixture Types
- Site Furnishings
- Materials Board
- Preliminary Stormwater Calculations
- Geotechnical Investigation Report

First American

First American Title Company of Oregon
121 SW Morrison Street, Suite 300
Portland, OR 97204
Phn - (503)222-3651 (800)929-3651
Fax - (877)242-3513

MULTNOMAH COUNTY TITLE UNIT
FAX (877)242-3513

Title Officer: **Dona Cramer**
(503)222-3651
dcramer@firstam.com

LOT BOOK SERVICE

Clackamas Fire District #1
11300 SE Fuller Road
Milwaukie, OR 97222

Order No.: 7019-2657830
May 20, 2016

Attn: Karen Strejc
Phone No.: (503)742-2646 - Fax No.:
Email: Karen.Strejc@ClackamasFire.com

Re:

Fee: $500.00

We have searched our Tract Indices as to the following described property:

The land referred to in this report is described in Exhibit A attached hereto.

and as of May 10, 2016 at 8:00 a.m.

We find that the last deed of record runs to

Clackamas County Fire District #1

We find the following apparent encumbrances prior to the effective date hereof:

1. Easement, including terms and provisions contained therein:

Recording Information:	April 10, 1970 as Fee No. 70006698
In Favor of:	Portland General Electric Company
For:	Distribution line
Affects:	North 5 feet as described therein

2. Covenants, conditions, restrictions and/or easements; but deleting any covenant, condition or restriction indicating a preference, limitation or discrimination based on race, color, religion, sex, handicap, family status, or national origin to the extent such covenants, conditions or restrictions violate Title 42, Section 3604(c), of the United States Codes:
   Recording Information: September 13, 1971 as Fee No. 71022929

   re-recorded February 04, 1977 as Fee No. 77004418

3. Easement, including terms and provisions contained therein:
   Recording Information: July 14, 1992 as Fee No. 92043050
   In Favor of: Portland General Electric Company
   For: Electric power line
   Affects: North 10 feet as described therein

4. Easement, including terms and provisions contained therein:
   Recording Information: August 27, 2009 as Fee No. 2009 061260
   In Favor of: City of Oregon City
   For: construct, reconstruct, operate, and maintain Waterline

5. Easement, including terms and provisions contained therein:
   Recording Information: August 27, 2009 as Fee No. 2009 061261
   In Favor of: City of Oregon City
   For: construct, reconstruct, operate, and maintain Waterline

6. The Effect if any of Boundary Line Agreement and the terms and conditions thereof:
   Between: ICON Construction & Development, LLC, an Oregon limited liability company
   And: Clackamas County Fire District #1
   Recording Information: August 28, 2008 as Fee No. 2008 060448

   NOTE: Said Agreement does not contain a fully executed legal description for the herein described property.

We have also searched our General Index for Judgments and State and Federal Liens against the Grantee(s) named above and find:

NONE

We find the following unpaid taxes and city liens:

1. Subject property is under public ownership and is tax exempt. Any change in ownership before delivery of assessment roll may result in tax liability. Account No. 00869634.

2. City liens, if any, of the City of Oregon City.

THIS IS NOT a title report since no examination has been made of the title to the above described property. Our search for apparent encumbrances was limited to our Tract Indices, and therefore above listings do not include additional matters which might have been disclosed by an examination of the record title. We assume no liability in connection with this Lot Book Service and will not be responsible for errors or omissions therein. The charge for this service will not include supplemental reports, rechecks or other services.

Exhibit "A"

Real property in the County of Clackamas, State of Oregon, described as follows:

Commencing in the center of the Oregon City and Molalla Road (Market Road No. 22, Molalla Highway) at a point 2.60 chains (171.6 feet) East of the Northwest corner of the Robert Caufield D.L.C. in Township 3 South, Range 2 East, Section 8, of the Willamette Meridian; thence South 30° East on the center of said road 172.34 feet to a point; thence East parallel to the North line of Robert Caufield D.L.C. 342.04 feet to a point; thence North 150.00 feet to a point, said point being 9.07 chains (598.50 feet) East of the Northwest corner of the Robert Caufield D.L.C. and on the North line of said D.L.C.; thence West on the North line of said Caufield Claim 426.90 feet to the place of beginning. EXCEPTING THEREFROM that portion lying within the boundaries of public roads.

NOTE: This Legal Description was created prior to January 01, 2008.

First American

First American Title Company of Oregon
121 SW Morrison Street, Suite 300
Portland, OR 97204
Phone: (503)222-3651 / Fax: (877)242-3513

PR: NWEST

Ofc: 7019 (1011)

Final Invoice

To: Clackamas Fire District #1
11300 SE Fuller Road
Milwaukie, OR 97222

Invoice No.: 1011 - 7019134828
Date: 05/20/2016

Our File No.: 7019-2657830
Title Officer: Dona Cramer
Escrow Officer:

Customer ID: 5308864

Attention: Karen Strejc

Your Reference No.:

RE: **Property:**
19340 Molalla Avenue, Oregon City, OR 97045

Liability Amounts
Owners:
Lenders:

Buyers:
Sellers: Clackamas Fire District #1

Description of Charge	Invoice Amount
Report: Lot Book	$500.00

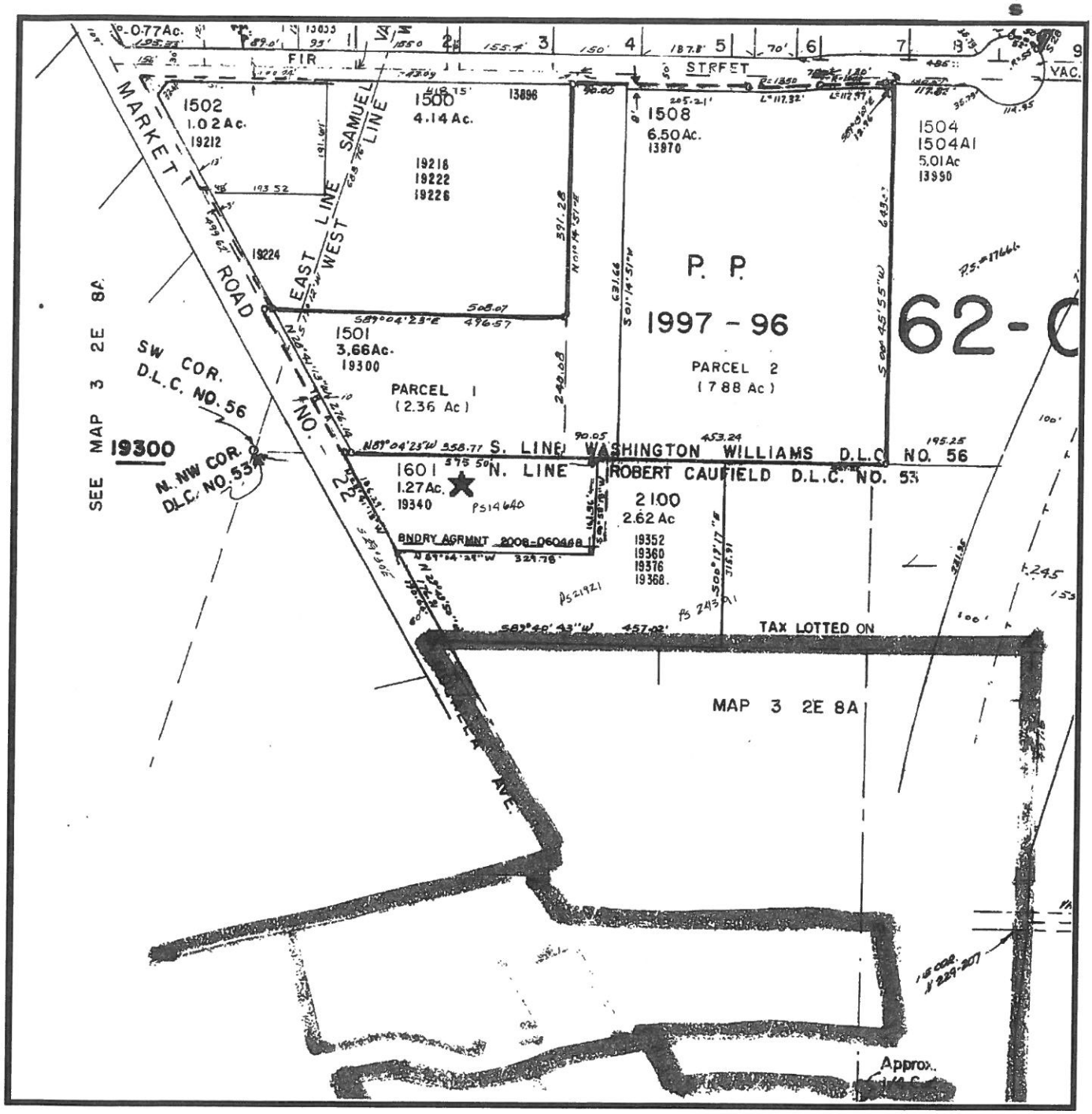
INVOICE TOTAL **$500.00**

Comments:

Thank you for your business!

To assure proper credit, please send a copy of this Invoice and Payment to:
Attention: Accounts Receivable Department
PO Box 31001-2266
Pasadena, CA 91110-2266

Reference Parcel #: 32E09B 01601



First American Title Company of Oregon

Customer Service Department
121 SW Morrison Street Suite 300 Portland, OR 97204
Phone: 503.219.TRIO (8746) Fax: 503.790.7872
Email: cs.portland@firstam.com

THIS MAP IS PROVIDED AS A CONVENIENCE IN LOCATING PROPERTY. FIRST AMERICAN TITLE COMPANY OF OREGON ASSUMES NO LIABILITY FOR ANY VARIATIONS AS MAY BE DISCLOSED BY AN ACTUAL SURVEY

29

1

10
5
10
11

Clackamas County Official Records
Sherry Hall, County Clerk
2008-055825

$36.00

01238026200800558250020028

08/07/2008 10:26:38 AM

D-D Cnt=1 Stn=4 KANNA
$10.00 $10.00 $16.00

RECORDING REQUESTED BY:
Fidelity National Title Company of Oregon

GRANTOR'S NAME:
The City of Oregon City and Oregon City

GRANTEE'S NAME:
Clackamas County Fire District #1

SEND TAX STATEMENTS TO:
Clackamas County Fire District #1
11300 SE Fuller Road
Milwaukie, OR 97222

AFTER RECORDING RETURN TO:
Clackamas County Fire District #1
11300 SE Fuller Road
Milwaukie, OR 97222

Escrow No: 20080009649-FTPOR15

SPACE ABOVE THIS LINE FOR RECORDER'S USE

FIDELITY NATIONAL TITLE CO. 15-2008-9649

BARGAIN AND SALE DEED – STATUTORY FORM
(INDIVIDUAL or CORPORATION)

The City of Oregon City, a municipal corporation, as to Parcel 1, and Oregon City, a municipal corporation of the State of Oregon, as to Parcel 2, Grantor, conveys to

Clackamas County Fire District #1, Grantee, the following described real property, situated in the County of Clackamas, State of Oregon,

Parcel I:

Parcel 1, PARTITION PLAT NO. 2001-032, in the City of Oregon City, Clackamas County, Oregon.

Parcel II:

Commencing in the center of the Oregon City and Molalla Road (Market Road No. 22, Molalla Highway) at a point 2.60 chains (171.6 feet) East of the Northwest corner of the Robert Caufield D.L.C. in Township 3 South, Range 2 East, Section 8, of the Willamette Meridian; thence South 30° East on the center of said road 172.34 feet to a point; thence East parallel to the North line of Robert Caufield D.L.C. 342.04 feet to a point; thence North 150.00 feet to a point, said point being 9.07 chains (598.50 feet) East of the Northwest corner of the Robert Caufield D.L.C. and on the North line of said D.L.C.; thence West on the North line of said Caufield Claim 426.90 feet to the place of beginning. EXCEPTING THEREFROM that portion lying within the boundaries of public roads.

BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON TRANSFERRING FEE TITLE SHOULD INQUIRE ABOUT THE PERSON'S RIGHTS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007. THIS INSTRUMENT DOES NOT ALLOW USE OF THE PROPERTY DESCRIBED IN THIS INSTRUMENT IN VIOLATION OF APPLICABLE LAND USE LAWS AND REGULATIONS. BEFORE SIGNING OR ACCEPTING THIS INSTRUMENT, THE PERSON ACQUIRING FEE TITLE TO THE PROPERTY SHOULD CHECK WITH THE APPROPRIATE CITY OR COUNTY PLANNING DEPARTMENT TO VERIFY THAT THE UNIT OF LAND BEING TRANSFERRED IS A LAWFULLY ESTABLISHED LOT OR PARCEL, AS DEFINED IN ORS 92.010 OR 215.010, TO VERIFY THE APPROVED USES OF THE LOT OR PARCEL, TO DETERMINE ANY LIMITS ON LAWSUITS AGAINST FARMING OR FOREST PRACTICES, AS DEFINED IN ORS 30.930, AND TO INQUIRE ABOUT THE RIGHTS OF NEIGHBORING PROPERTY OWNERS, IF ANY, UNDER ORS 195.300, 195.301 AND 195.305 TO 195.336 AND SECTIONS 5 TO 11, CHAPTER 424, OREGON LAWS 2007.

The true consideration for this conveyance is $1,231,440.00. (See ORS 93.030).

Dated July 25, 2008

The City of Oregon City

BY: _____
Larry Patterson, City Manager

State of OREGON

County of Clackamas

This instrument was acknowledged before me on 8-4, 2008 by Larry Patterson

as City manager of _____.

Carrie Redifer
Notary Public - State of Oregon
My commission expires:

OFFICIAL SEAL
CARRIE REDIFER
NOTARY PUBLIC-OREGON
COMMISSION NO. 399887
MY COMMISSION EXPIRES JANUARY 20, 2010

Pre Application Conference Notes

Clackamas Fire Station (PA 17-08, March 13, 2017)

Please note that the draft pre-application conference notes are based on the applicant's pre-application submittal. A finalized version of the pre-application conference notes that reflects any additional items discussed during the meeting will be provided to the applicant following the meeting.

Proposed Project:

- The applicant proposed to demolish the existing fire station located at 19340 Molalla Avenue and replace with a new facility.

Location:

- 19340 Molalla Ave (Clackamas County Tax Map: 3-2E-09B-01601)

General Information:

- Zoning: "C" General Commercial District. A fire station is identified as a conditional use in OCMC chapter 17.32.030.G.
- Applicable Overlay Districts: Natural Resources Overlay District (NROD). A small portion of the NROD encroaches onto the subject property.
- Transportation System Plan:
  Functional Classification: Molalla Avenue – Major Arterial

- Planning application anticipated:
  - Conditional Use: $3,791
  - Planning Commission Variance (for each variance request): $2,496
  - Transportation Analysis Letter $469
  - NROD Exemption: $421
  - Mailing Labels: $15 or provided by applicant
  - Site Plan and Design Review:

Less than $500,000	$2,068 plus 0.007 x project cost
$500,000 - $3,000,000	$3,445 plus 0.005 x project cost
Over $3,000,000	$11,718 plus 0.003 x project cost
Maximum Fee	$54,964

Timing and Process:

This application is a **Type III** decision process involving a major variance, and site plan and design review. Type III decisions require a minimum of one public hearing before the Planning Commission and involve the greatest amount of discretion and evaluation of subjective approval standards, yet are not required to be heard by the city commission, except upon appeal.

Site Plan and Design Review:

Please identify all proposed development on the site plan including parking, fences, pedestrian amenities, the generator and fuel enclosure, storage enclosure, trash enclosure, etc. Site Plan and Design Review is required to demonstrate compliance with building materials, design standards, etc. The proposal complied with a majority of the standards in the Oregon City Municipal Code. A template with all of the applicable

DRAFT

City of Oregon City | PO Box 3040 | 221 Molalla Avenue, Suite 200 | Oregon City, OR 97045
Ph (503) 722-3789 www.orcity.org

criteria will be provided to you. Elements which do not comply with the code include or could not be identified:

- Standards for automobile parking (OCMC 17.52.030)
- Bicycle parking standards (OCMC 17.52.040) The location, design and security was not identified.
- Parking lot landscaping (OCMC 17.52.060). A plan from a registered landscape architect is required to demonstrate compliance including the location, size and species of plantings in compliance with OCMC 17.52.060. The proposed drawing does not provide a landscaping buffer between the building and the parking lot adjacent to the patio or adjacent to the generator and fuel station enclosure. In addition, the perimeter parking lot landscaping on the north property line does not meet the minimum width of 5 feet.
- Tree protection standards (OCMC 17.41) Documentation on trees was not submitted.
    - Tree removal during the land development process is subject to compliance with tree protection and mitigation standards.
    - Tree removal is subject to OCMC 17.41
    - Tree protection standards are subject to 17.41.130
    - A mitigation plan prepared by a qualified professional is required in accordance with OCMC Chapter 17.41.
- Site coverage and landscaping (OCMC 17.32.050) The calculations were not submitted.
- Various (OCMC 17.62.050.A.1,2,4,6,20,21, 17.62.055.G,H,I
- Lighting (OCMC 17.62.65) A lighting plan was not submitted.
- Refuse and recycling areas (OCMC 17.62.085) The location, size or materials, was not identified on the plans.
- Mechanical equipment (OCMC 17.62.050.A.20) The location, size or materials, was not identified on the plans.
- Building elevations – including materials, transparency, entranceways, orientation, massing, articulation, roof, standards for large retail establishments, etc. The façades and primary entranceways, first floor height, etc. could not be verified. The massing of the sides of the building are not compliant with OCMC 17.62.055.G, H, I and J, other facades were unable to be determined without the building elevation.
- Facades greater than one hundred feet in length, measured horizontally, shall incorporate wall plane projections or recesses having a depth of at least three percent of the length of the facade and extending at least twenty percent of the length of the facade. No uninterrupted length of any facade shall exceed one hundred horizontal feet - OCMC § 17.62.055.H.2.
- Transparent windows or doors facing the street are required. The main front elevation shall provide at least sixty percent windows or transparency at the pedestrian level. Facades on corner lots shall provide at least sixty percent windows or transparency on all corner-side facades. All other side elevations shall provide at least thirty percent transparency. Façade Transparency (OCMC § 17.62.055.I)
- Refuse and recycling enclosures (OCMC 17.62.085)
- Building elevations (OCMC 17.62.055)
- Pedestrian, vehicle and bicycle circulation (OCMC 17.62.050.A.2 and 9). A direct pedestrian accessway from the building to the street which does not cross a drive aisle is required and is not met.
- The location of the structure is too far from Molalla Avenue. (OCMC 17.32.050, 17.62.050.A.2.a, 17.62.055.C.5, 17.62.055.D.1). At least sixty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line, unless a greater setback is accepted under the provisions of Section 17.62.055D. The structure may not exceed more than 5 feet from the front property line unless mitigation is provided per OCMC 17.62.055.D.1. The mitigation measures were not identified. The structure is primary ~113 feet from Molalla Avenue at the buildings furthest point.
- Parking cannot be located in front of the structure (OCMC 17.16.050.A.2.a)

- Parking garage entries shall not dominate the streetscape. They shall be designed and situated to be ancillary to the use and architecture of the ground floor. 17.62.050.A.2.l

As the Code does not include automobile or bicycle parking standards specifically for fire stations, you will have to provide information identifying how you calculated the automobile and bicycle parking. Please provide the parking requirements for your use adopted by other nearby jurisdictions.

Planning Commission Variance:

- A Planning Commission variance is required for each item in the Oregon City Municipal Code which are not met.
- A variance may be granted only in the event that all of the following conditions exist:
  - That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access, or other desirable or necessary qualities otherwise protected by this title;
  - That the request is the minimum variance that would alleviate the hardship;
  - Granting the variance will equal or exceed the purpose of the regulation to be modified;
  - Any impacts resulting from the adjustment are mitigated;
  - No practical alternatives have been identified which would accomplish the same purpose and not require a variance; and
  - The variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Notes:

- A neighborhood meeting is required with the Gaffney Lane neighborhood Association:
  Chair: Amy Willhite, awillhit@yahoo.com
  Secretary/Treasurer: Angela Wright, englishimport@gmail.com
  Meeting Information: January 28, 2016, April 28, 2016 and October 27, 2016
- Notice was provided to the State Historic Preservation Office (SHPO) and all affected tribes per OCMC chapter 17.62.040.H. This notice requirement applies to any project that involves ground disturbance involving movement of native soils.
- Please add a number to each parking stall so that the total number of parking stalls onsite can be easily verified.
- We are happy to have a follow up meeting after this pre-application conference. If additional meetings are required, the applicant will be charged staff time.

Planning Division

Trevor Martin, Planner, reviewed your pre-application for the Planning Division. You may contact Trevor Martin at 503.496.1562 or lterway@orcity.org.

Development Services Division (Utilities/Public Improvements/SDC's etc):

Mario de la Rosa, Development Engineer with the Oregon City Development Services Division reviewed your pre-application.

Building Division:

You may contact Mike Roberts, Building Official at 503.496.1517 or by email at mroberts@orcity.org.

Clackamas Fire District:

Questions can be directed to Mike Boumann, Lieutenant Deputy Fire Marshal of Clackamas Fire District #1. You may contact Mr. Boumann at (503)742-2660 or michaelbou@ccfd1.com.

Oregon City Municipal Code Criteria:

The following chapters of the Oregon City Municipal Code (OCMC) may be applicable to this proposal:

- "C" General Commercial District in chapter 17.32,
- Tree Protection Standards in chapter 17.41,
- Administration and Procedures are set forth in chapter 17.50,
- Off-Street Parking and Loading in chapter 17.52,
- Supplemental Zoning Regulations and Exceptions in chapter 17.54.100,
- Site Plan and Design Review in chapter 17.62.
- Streets, Sidewalks and Public Places in chapter 12.04
- Public and Street Trees in chapter 12.08
- Stormwater Management in chapter 13.12
- Erosion and Sediment Control in chapter 17.47
- Grading, Filling and Excavating in chapter 15.48

A template for your submittal with the applicable criteria will be been emailed by the City.

Pre-application conferences are required by Section 17.50.050 of the City Code, as follows:
A. Preapplication Conference. Prior to submitting an application for any form of permit, the applicant shall schedule and attend a preapplication conference with City staff to discuss the proposal. To schedule a preapplication conference, the applicant shall contact the Planning Division, submit the required materials, and pay the appropriate conference fee. At a minimum, an applicant should submit a short narrative describing the proposal and a proposed site plan, drawn to a scale acceptable to the City, which identifies the proposed land uses, traffic circulation, and public rights-of-way and all other required plans. The purpose of the preapplication conference is to provide an opportunity for staff to provide the applicant with information on the likely impacts, limitations, requirements, approval standards, fees and other information that may affect the proposal. The Planning Division shall provide the applicant(s) with the identity and contact persons for all affected neighborhood associations as well as a written summary of the preapplication conference. Notwithstanding any representations by City staff at a preapplication conference, staff is not authorized to waive any requirements of this code, and any omission or failure by staff to recite to an applicant all relevant applicable land use requirements shall not constitute a waiver by the City of any standard or requirement.
B. A preapplication conference shall be valid for a period of six months from the date it is held. If no application is filed within six months of the conference or meeting, the applicant must schedule and attend another conference before the City will accept a permit application. The community development director may waive the preapplication requirement if, in the Director's opinion, the development does not warrant this step. In no case shall a preapplication conference be valid for more than one year.

NOTICE TO APPLICANT: A property owner may apply for any permit they wish for their property. HOWEVER, THERE ARE NO GUARANTEES THAT ANY APPLICATION WILL BE APPROVED. No decisions are made until all reports and testimony have been submitted. This form will be kept by the Community Development Department. A copy will be given to the applicant. IF the applicant does not submit an application within six (6) months from the Pre-application Conference meeting date, a NEW Pre-Application Conference will be required.

DRAFT

OREGON CITY

Public Works – Development Services

625 Center Street | Oregon City OR 97045
Ph (503) 657-0891 | Fax (503) 657-7829

DEVELOPMENT SERVICES

PRE-APPLICATION MEETING NOTES

Planning Project Number: PA 17-08
Address: 19340 Molalla Avenue, Oregon City, OR 97045
Map Number(s): 3-2E-09B
Tax Lot(s): 01601
Project Name: Fire Station
Meeting Date: March 15, 2017
Reviewer(s): Sang Pau

GENERAL COMMENTS

1. The Applicant is responsible for this project's compliance with applicable Public Works standards, codes and policies.

2. The Applicant shall provide an Erosion Prevention and Sedimentation Control Plan to the City for approval.

ENGINEERING - UTILITIES

Streets

1. Molalla Avenue currently has approximately 64-foot-wide right-of-way (ROW) along the property's frontage, with approximately 26 feet on the subject property's side of the centerline. Molalla Avenue has full improvements along the property's frontage.

2. The existing ADA ramps on the sides of the driveway entrance appear to be adequate. However, the existing ADA ramps will require modification to meet current standards if needed. The pedestrian path across the driveway also appears to be adequate but require modification to meet current standards if needed.

3. The existing street lights and trees along the frontage of the property appears to be adequate.

4. The existing pedestrian sidewalk appears to be within the private property. Therefore, ROW dedication 0.5' behind the existing sidewalk will be required.

5. A 10-foot-wide Public Utility Easement (PUE) will be required to be provided along the frontage.

DRAFT

6. Clackamas county traffic engineer has notified the City that the existing Molalla fire signal does not meet current ODOT/County/MUTCD standards.

   To meet current ODOT/County/MUTCD standards the following upgrades to the Fire Signal will be required. Majority of these requirements are from the ODOT Design Guide for Emergency Signal. Additional upgrades may be required as directed by Clackamas County.

   Molalla Fire Signal Recommendation (Minimum):

   1. Install new 332S Cabinet (Fully loaded to ODOT standards).
   2. Install new Service Base.
   3. Upgrade All Signal Heads to 12" LED Modules
   4. Install Preemption Detector on existing or new detector pedestal pole
   5. Replace existing "FIRE SIGNAL" sign with "EMERGENCY SIGNAL" sign
   6. Install "STOP HERE ON RED" signs near existing stop lines.
   7. Install "EMERGENCY SIGNAL AHEAD" plaque on existing sign posts

   The following is a highlight of ODOT's current standard for emergency traffic signal requirements:

   Fire Signal (Emergency Traffic Signal) Requirements per ODOT Design Manual/MUTCD

   - **Operation:** Preemption with manually input (push button at fire station) or a standard preemption detector unit. County prefers the standard preemption detector.
   - **Controller and Service:** New ODOT style 332S (Stretch) cabinet with Base Mounted Service Cabinet.
   - **Signal Head Type:** At least two Type 2 (12" Red, 12" Yellow, 12" Green) for mainline approach. Either NO signal indication for the emergency access approach or a single circular 12" green signal indication or tattle-tale indicator.
   - **Signs and Pavement Markings:** Advance Warning Signs - Emergency Vehicle Sign (W11-8) with EMERGENCY SIGNAL AHEAD plaque (W11-12p), Overhead mounted sign – EMERGENCY SIGNAL sign (R10-13) between the two signal heads. A STOP HERE ON RED sign (R10-6) shall be mounted near the stop line.

   Pole style and color will be determined by the City of Oregon City. Signal assembly location on the west side will be affected by an upcoming street improvement project for Molalla Avenue. Depending on timing, fee in lieu of signal may be collected for future installation.

DRAFT

OREGON CITY

Public Works – Development Services

625 Center Street | Oregon City OR 97045
Ph (503) 657-0891 | Fax (503) 657-7829

Stormwater

1. The following are General Thresholds for Stormwater and Grading Design Standard, which can be found online at: **http://www.orcity.org/sites/default/files/final_manual_0.pdf**

   A. Development activities that result in **5,000 square feet of new or replaced impervious surface,** cumulative over a 5-year period.

   B. Development activities that will result in the **creation of more than 500 square feet of new impervious surface within a Natural Resource Overlay District (NROD)** (as defined by Oregon City Municipal Code [OCMC] 17.49), cumulative over a 5-year period.

2. The project, as described in the Pre-Application submittal, is subject to the above General Thresholds.

3. As part of the development, the Applicant must submit a completed Site Assessment and Planning Checklist (and other attachments as described in **Section 9.1.1**) as part of the land use application process. At a minimum the application should include the following items from Section 9.1.2 to form the basis for developing the Stormwater Management Plan.
   a. Infiltration test results

   b. Downstream analysis / preliminary drainage report

4. City records show an existing on-site stormwater system discharging to pond on the property northwest of the site. If the storm discharge point remains, the viability of using the existing on-site stormwater system should be evaluated to show that it has enough capacity for the new development. An easement will need to be acquired if none exists.

5. If the project proposes to use a new onsite system that is separated from the existing system, there is a public system in the Molalla frontage that discharges through series of public ponds & culverts on west side of Molalla (Char Diaz Estates subdivision; as-built #10038 can be provided if needed).

Water

1. There is an existing 10-inch water main that runs within the north side of the property which is within a 15 feet wide easement that is offset from the north property line. The domestic water service is connected to this northerly waterman.

2. The applicant is responsible for determining required size of meter to sever the new building.

Sanitary Sewer

3. There is an existing 6-inch service lateral to the site that connects to the existing 8-inch sanitary sewer main located within Molalla Avenue, which is adequate to serve the site.

DRAFT

Other

1. The proposed development does not reside within the Natural Resource Overlay District (NROD) nor the Geologic Hazard area.

DRAFT

Clackamas County Fire District #1
Fire Prevention Office

To: **Diliana Vassileva, Oregon City Planning**

From: **Mike Boumann, Deputy Fire Marshal**, Clackamas County Fire District #1

Date: **3/15/2017**

Re: **Clackamas Fire District #1, Station 16, 19340 Molalla Aveune, Oregon City**

This review is based upon the current version of the Oregon Fire Code (OFC), as adopted by the Oregon State Fire Marshal's Office. The scope of review is typically limited to fire apparatus access and water supply, although the applicant must comply with all applicable OFC requirements.

Please provide: Fire Access & Water Supply Plan

Fire Department Access and Water Supply Submittal Requirements
When required, include the following documents with submittal to the Engineering or Building Department and email digital copies to appropriate Fire District contact.

- Fire Access & Water Supply Plan
- Available Fire Flow
- Fire Flow/Hydrant Worksheet

Fire Access & Water Supply Plan shall contain the following:
The plan shall show fire apparatus access, fire lanes, fire hydrants within 600'of new building, available fire flow, FDC location if applicable, building square footage, height, and type of construction.
Available Fire Flow:
The applicant shall provide fire flow tests per NFPA 291 and shall be no older than 12 months. For review purposes, the available fire flow at 20 psi is required. Work to be completed by experienced and responsible persons and coordinated with the local water authority. *Hydraulic models may be available, contact water authority to verify.
Fire Flow/Hydrant Worksheet:
Excel spreadsheet shall be completed and included with submittal. Form location: http://www.clackamasfire.com/newconstruction.html

Randall Rieks

From: Randall Rieks
Sent: Monday, March 20, 2017 1:22 PM
To: ORSHPO.Clearance@oregon.gov
Subject: Cultural Resource Review
Attachments: 17_0320_Cultural Resource Review.pdf

To whom it may concern,

Attached is a request for a cultural resource review for a proposed new fire station in Clackamas County located at 19340 Molalla Avenue, in Oregon City.
This request is required as part of our Site and Design review application in accordance with City of Oregon City Zoning Title 17.

Thank you
Randall

Randall Rieks
LEED Professional

Hennebery Eddy Architects, Inc.
921 SW WASHINGTON STREET SUITE 250
PORTLAND OREGON 97205
503 227 4860 TEL
971 200 7242 DIRECT
www.henneberyeddy.com



To see how our design process shapes our work, and get a glimpse of what it's like to be part of the Hennebery Eddy team, visit www.henneberyeddy.com

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Replacement Fire Station for
Clackamas Fire District #1
Cultural Resource Review
20 March 2017

Randall Rieks
Hennebery Eddy Architects
921 SW Washington Street, Suite 250
Portland, OR 97205
971.200.7242
rrieks@henneberyeddy.com

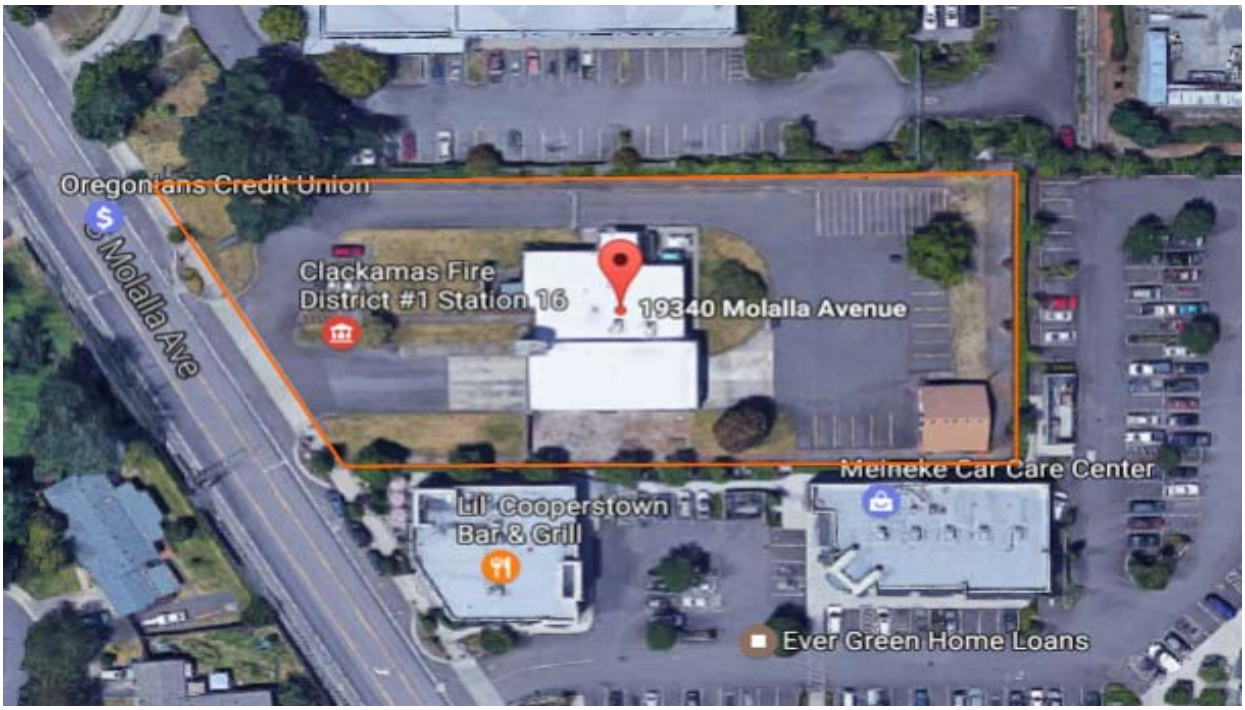
PURPOSE:

The purpose of this review is to provide a cultural resource review in accordance with City of Oregon City Zoning standard 17.62.040.H.1

PROJECT LOCATION & DESCRIPTION

The project site is located in Clackamas County at 19340 Molalla Avenue, in Oregon City. Taxlot Number 3-2E-09B-01601. The site is bordered by Molalla Avenue to the west, and commercial/industrial development to the north, east, and south. The site gently slopes to the west with a total relief of approximately 8 feet. The site is currently occupied by the existing single-story fire station, a storage building, and a temporary modular building. Most the remainder of the site is paved with asphalt concrete parking lot and drive lanes. Vegetation on the site is limited to grasses and landscaped trees in planters on the edges of the parking area.

The development is for a proposed replacement fire station. The new fire station will include a new three (3) bay, double-deep, Apparatus Bay and a new Living Quarters for eight (8) fire crew per shift.



Oregon
Kate Brown, Governor

Parks and Recreation Department
State Historic Preservation Office
725 Summer St NE Ste C
Salem, OR 97301-1266
Phone (503) 986-0690
Fax (503) 986-0793
www.oregonheritage.org

March 14, 2017

Ms. Diliana Vassileva
City of Oregon City Planning
221 Molalla Ave
Ste 200
Oregon City, OR 97045

RE: SHPO Case No. 17-0332
City of Oregon City PA 17-08
Fire station construction
19340 Molalla Avenue (3S 2E 9), Oregon City, Clackamas County

Dear Ms. Vassileva:

Our office recently received a request to review your application for the project referenced above. In checking our statewide archaeological database, it appears that there have been no previous surveys completed near the proposed project area. However, the project area lies within an area generally perceived to have a high probability for possessing archaeological sites and/or buried human remains. In the absence of sufficient knowledge to predict the location of cultural resources within the project area, extreme caution is recommended during project related ground disturbing activities. Under state law (ORS 358.905 and ORS 97.74) archaeological sites, objects and human remains are protected on both state public and private lands in Oregon. If archaeological objects or sites are discovered during construction, all activities should cease immediately until a professional archaeologist can evaluate the discovery. If you have not already done so, be sure to consult with all appropriate Indian tribes regarding your proposed project. If the project has a federal nexus (i.e., federal funding, permitting, or oversight) please coordinate with the appropriate lead federal agency representative regarding compliance with Section 106 of the National Historic Preservation Act (NHPA). If you have any questions about the above comments or would like additional information, please feel free to contact our office at your convenience. In order to help us track your project accurately, please reference the SHPO case number above in all correspondence.

Sincerely,

Dennis Griffin, Ph.D., RPA
State Archaeologist
(503) 986-0674
dennis.griffin@oregon.gov

Randall Rieks

From: Randall Rieks
Sent: Monday, March 20, 2017 3:22 PM
To: thpo@grandronde.org
Subject: Cultural Resource Review
Attachments: 17_0320_Cultural Resource Review-THPO.pdf

Chris / Briece –

Attached is a request for a cultural resource review for a proposed new fire station in Clackamas County located at 19340 Molalla Avenue, in Oregon City.
This request is required as part of our Site and Design review application in accordance with City of Oregon City Zoning Title 17.

If you have any questions regarding the proposed development, please let me know.

Thank you
Randall

Randall Rieks
LEED Professional

Hennebery Eddy Architects, Inc.
921 SW WASHINGTON STREET SUITE 250
PORTLAND OREGON 97205
503 227 4860 TEL
971 200 7242 DIRECT
www.henneberyeddy.com



To see how our design process shapes our work, and get a glimpse of what it's like to be part of the Hennebery Eddy team, visit www.henneberyeddy.com

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Replacement Fire Station for
Clackamas Fire District #1
Cultural Resource Review
20 March 2017

Randall Rieks
Hennebery Eddy Architects
921 SW Washington Street, Suite 250
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rrieks@henneberyeddy.com

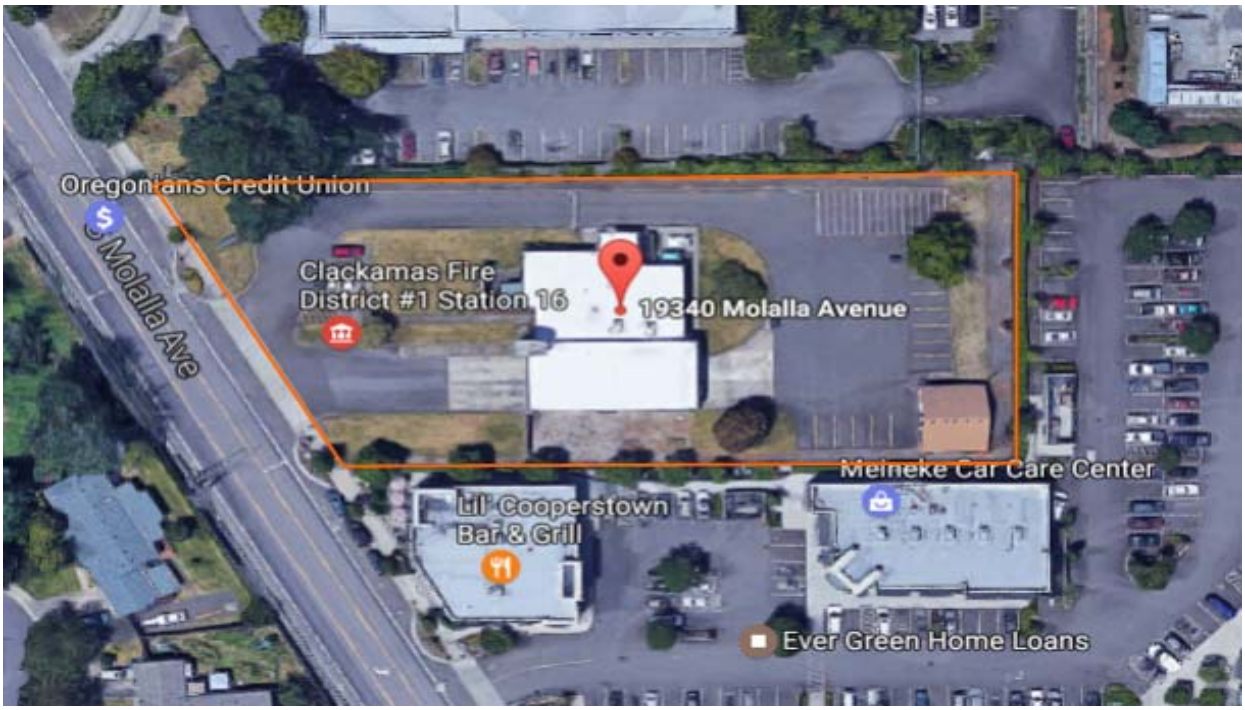
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The development is for a proposed replacement fire station. The new fire station will include a new three (3) bay, double-deep, Apparatus Bay and a new Living Quarters for eight (8) fire crew per shift.



Light Fixture Types:

Project: Fire Station 16 - Revised

Contents - April 17, 2017

Type	Factory	Description
SA	Bega	99556
SAP	Lithonia Lighting	SSS 18 4C T20 BC DDB
SB	Ligman	ULI-10001
SC	Bega	245 82
SD	Bega	66451
SE	Lithonia Lighting	LDN6SQ 40/40 LS6AR LD MVOLT EZ10
SF	Lithonia Lighting	LDN6SQ 40/15 LS6AR LD MVOLT EZ10
SH	Bega	77685

Submitting Agency:	Description: 99556 Project: Fire Station 16 - Revised Notes:	Type:
HARRY L. STEARNS 503-262-2640		SA

LED pole top luminaires with asymmetrical light distribution

Housing: Die-cast aluminum housing and slip fitter. Slip fits 3" O.D. pole top, secures to pole with integrated slip fitter mechanism and single set screw. Die castings are marine grade, copper free (≤ 0.3% copper content) A360.0 aluminum alloy.

Enclosure: Faceplate is hinged; constructed of die-cast aluminum with toolless access latch for easy maintenance. Tempered clear safety glass with a reflector of pure anodized aluminum. Fully shielded light distribution for no trespass above horizontal. Type II wide spread light distribution, optionally available with Type III light distribution, consult factory. Fully gasketed with a molded silicone gasket.

Electrical: 52 W LED luminaire, 58 total system watts, -30° C start temperature. Integral 120 V through 277 V electronic LED driver, 0-10 V dimming. Integral surge protection to protect the luminaire against surges rated up to 10kV. Standard LED color temperature is 4000K with an 85 CRI. Available in 3000K (85 CRI); add suffix K3 to order.

Note: LEDs supplied with luminaire. Due to the dynamic nature of LED technology, LED luminaire data on this sheet is subject to change at the discretion of BEGA-US. For the most current technical data, please refer to www.bega-us.com.

Options: Optionally available with multi-channel photocell receptacle, that provides electrical and mechanical interconnection between photocell and luminaire, specify photo receptacle. The photo receptacle supports ANSI standard dimming photocells and compatible with 0-10V dimming. Ambient temperature must not go below -40°C and must not exceed 85°C.

Finish: All BEGA standard finishes are polyester powder coat with minimum 3 mil thickness. These luminaires are available in four standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

CSA certified to U.S. and Canadian standards for wet locations. Protection class: IP66.

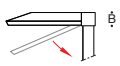
Weight: 10 lbs.

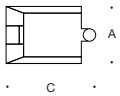
Effective Projected Area (EPA): .32 ft²

Luminaire Lumens: 4206
Tested in accordance with LM-79-08

Type:
BEGA Product:
Project:
Voltage:
Color:
Options:
Modified:







Single LED pole-top luminaires

	Lamp	LEED	A	B	C
99 556	52 W LED	LZ-0	10	2⅜	17⅜

Recommended for use with 20' to 25' poles.

BEGA-US 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 FAX (805) 566-9474 www.bega-us.com
©copyright BEGA-US 2016 Updated 02/16

Submitting Agency:	Description: SSS 18 4C T20 BC DDB	Type:
HARRY L. STEARNS 503-262-2640	Project: Fire Station 16 - Revised	SAP
	Notes:	

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

FEATURES & SPECIFICATIONS

INTENDED USE — Square Straight Steel is a general purpose light pole for up to 39-foot mounting heights. This pole provides a robust yet cost effective option for mounting area lights and floodlights.

CONSTRUCTION — **Pole Shaft:** The pole shaft is of uniform dimension and wall thickness and is made of a weldable-grade, hot-rolled, commercial-quality steel tubing with a minimum yield of 55 KSI (11-gauge, .1196"), or 50 KSI (7-gauge, .1793"). Shaft is one-piece with a full-length longitudinal high-frequency electric resistance weld. Uniformly square in cross-section with flat sides, small corner radii and excellent torsional qualities. Available shaft widths are 4", 5" and 6".

Pole Top: A top cap is provided for all poles that will receive drilling patterns for side-mount luminaire arm assemblies or when ordered with PT option.

Handhole: A reinforced handhole with grounding provision is provided at 18" from the base. Positioning the handhole lower may not be possible and requires engineering review; consult Tech Support-Outdoor for further information. Every handhole includes a cover and cover attachment hardware. The handhole has a nominal dimension of 2.5" x 5".

Base Cover: A durable ABS plastic two-piece full base cover, finished to match the pole, is provided with each pole assembly. Additional base cover options are available upon request.

Anchor Base/ Bolts: Anchor base is fabricated from steel that meets ASTM A36 standards and can be altered to match existing foundations; consult factory for modifications. Anchor bolts are manufactured to ASTM F1554 Standards grade 55, (55 KSI minimum yield strength and tensile strength of 75-95 KSI). Top threaded portion (nominal 12") is hot-dipped galvanized per ASTM A-153.

HARDWARE – All structural fasteners are high-strength galvanized carbon steel. All non-structural fasteners are galvanized or zinc-plated carbon steel or stainless steel.

FINISH – Standard powder-coat finishes include Dark Bronze, White, Black, Medium Bronze and Natural Aluminum colors. Classic finishes include Sandstone, Charcoal Gray, Tennis Green, Bright Red and Steel Blue colors. Architectural Colors and Special Finishes are available by quote and include, but are not limited to Hot-dipped Galvanized, Paint over Hot-dipped Galvanized, RAL Colors, Custom Colors and Extended Warranty Finishes. Factory-applied primer paint finish is available for customer field-paint applications.

WARRANTY — 1-year limited warranty. Complete warranty terms located at: www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

NOTE: Actual performance may differ as a result of end-user environment and application. Specifications subject to change without notice.



Anchor Base Poles

SSS

SQUARE STRAIGHT STEEL

ORDERING INFORMATION Lead times will vary depending on options selected. Consult with your sales representative.

Example: SSS 20 5C DM19 DDB

Series	Nominal fixture mounting height	Nominal shaft base size/wall thickness[1]	Mounting[2]	Options	Finish[10]
SSS	(See technical information table.)	(See technical information table.)	Tenon mounting PT Open top (includes top cap) T20 2-3/8" O.D. (2" NPS) T25 2-7/8" O.D. (2-1/2" NPS) T30 3-1/2" O.D. (3" NPS) T35 4" O.D. (3-1/2" NPS) KAC/KAD/KSE/KSF/KVR/KVF Drill mounting[3] DM19 1 at 90° DM28 2 at 180° DM28 PL 2 at 180° with one side plugged DM29 2 at 90° DM39 3 at 90° DM49 4 at 90° CSX/DSX/AERIS™/OMERO™ Drill mounting[3] DM19AS 1 at 90° DM28AS 2 at 180° DM29AS 2 at 90° DM39AS 3 at 90° DM49AS 4 at 90° AERIS™ Suspend drill mounting[3,4] DM19AST_ 1 at 90° DM28AST_ 2 at 180° DM29AST_ 2 at 90° DM39AST_ 3 at 90° DM49AST_ 4 at 90° OMERO™ Suspend drill mounting[3,4] DM19MRT_ 1 at 90° DM28MRT_ 2 at 180° DM29MRT_ 2 at 90° DM39MRT_ 3 at 90° DM49MRT_ 4 at 90°	Shipped installed L/AB Less anchor bolts VD Vibration damper TP Tamper resistant handhile cover fasteners HAxy Horizontal arm bracket (1 fixture)[5,6] FDLxy Festoon outlet less electrical[5] CPL12/xy 1/2" coupling[5] CPL34/xy 3/4" coupling[5] CPL1/xy 1" coupling[5] NPL12/xy 1/2" threaded nipple[5] NPL34/xy 3/4" threaded nipple[5] NPL1/xy 1" threaded nipple[5] EHHxy Extra handhole[5,7] MAEX Match existiing[8] USPOM United States point of manufacture[9] IC Interior coating[10]	Standard colors DDB Dark bronze DWH White DBL Black DMB Medium bronze DNA Natural aluminum Classic colors DSS Sandstone DGC Charcoal gray DTG Tennis green DBR Bright red DSB Steel blue Architectural Colors and Special Finishes[11] Galvanized, Paint over Galvanized, RAL Colors, Custom Colors and Extended Warranty Finishes available.

See footnotes next page.

Submitting Agency:	Description: SSS 18 4C T20 BC DDB	Type:
HARRY L. STEARNS 503-262-2640	Project: Fire Station 16 - Revised	SAP
	Notes:	

SSS Square Straight Steel Poles

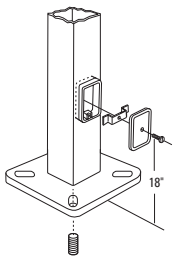
NOTES:

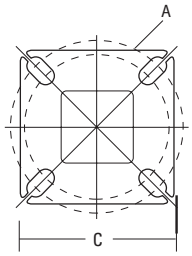
1. Wall thickness will be signified with a "C" (7 Gauge) or a "G" (11-gauge) in nomenclature. "C" - 0.1196" "G" - 0.1793.
2. PT open top poles include top cap. When ordering tenon mounting and drill mounting for the same pole, follow this example: DM28/T20. The combination includes a required extra handhole.
3. The drilling template pattern to be used for a particular luminaire depends on the luminaire that is used. Refer to the Technical Data Section of the Outdoor Binder for Drilling Templates.
   Matrix with Generic Template Link at http://www.acuitybrands.com/-/media/Files/Acuity/Resources/Tools-and-Documents/Pole%20Resources/Pole%20Anchorage/Matrix%20Document/AnchorBoltMatrix.pdf?la=en
4. Insert "1" or "2" to designate fixture size; e.g. DM19AST**2**.
5. Specify location and orientation when ordering option.
   For "x": Specify the height above the base of pole in feet or feet and inches; separate feet and inches with a "-".
   Example: 5ft = 5 and 20ft, 3 in = 20-3
   For "y": Specify orientation from handhole (A,B,C,D)
   Refer to the Handhole Orientation diagram below.
   Example: 1/2" coupling at 5' 8", orientation C:
   SSS 20 5C DM19 CPL12/5-8BC DDB
6. Horizontal arm is 18" x 2-3/8" O.D. tenon standard, with radius curve providing 12" rise and 2-3/8" O.D..
7. Combination of tenon-top and drill mount includes extra handhole.
8. Must add original order number of existing pole(s).
9. Use when mill certifications are required.
10. Provides enhanced corrosion resistance.
11. Additional colors available; see www.lithonia.com/archcolors or Architectural Colors brochure (Form No. 794.3). Available by formal quote only, consult factory for details.

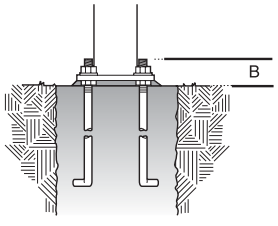
TECHNICAL INFORMATION — EPA (ft²) WITH 3-SECOND GUST PER AASHTO 2013																
Series	Mounting Height (ft)	Shaft Base Size	90 MPH	Max. weight	100 MPH	Max. weight	110 MPH	Max. weight	120 MPH	Max. weight	130 MPH	Max. weight	140 MPH	Max. weight	150 MPH	Max. weight
SSS	10	4C	20	500	16	400	13	325	10.5	263	8.5	213	7	175	6	150
SSS	12	4C	16	400	13	325	10	250	8	200	6.5	163	5	125	4	100
SSS	14	4C	13.5	338	10	250	7.5	188	6	150	4.5	113	3.5	88	2.5	63
SSS	16	4C	10.5	263	7.5	188	5.5	138	4	100	3	75	1.5	38	1	25
SSS	18	4C	8	200	5.5	138	4	100	2.5	63	1.5	38	0.5	13	-	-
SSS	20	4C	6	150	4	100	2.5	63	1	25	-	-	-	-	-	-
SSS	20	5C	10	250	7	175	4.5	113	2.5	63	1	25	-	-	-	-
SSS	20	5G	14	350	10	250	7	175	5	125	3	75	1.5	38	0.5	13
SSS	25	4C	2	50	0.5	13	-	-	-	-	-	-	-	-	-	-
SSS	25	4G	5.5	138	3	75	1.5	38	-	-	-	-	-	-	-	-
SSS	25	5C	4.5	113	2	50	-	-	-	-	-	-	-	-	-	-
SSS	25	5G	7.5	188	4.5	113	2	50	0.5	13	-	-	-	-	-	-
SSS	30	4G	1.5	38	-	-	-	-	-	-	-	-	-	-	-	-
SSS	30	5C	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SSS	30	5G	2.5	63	-	-	-	-	-	-	-	-	-	-	-	-
SSS	30	6G	11	275	6	150	2.5	63	-	-	-	-	-	-	-	-
SSS	35	5G	-	-	-	-	-	-	-	-	-	-	-	-	-	-
SSS	35	6G	4	100	-	-	-	-	-	-	-	-	-	-	-	-
SSS	39	6G	-	-	-	-	-	-	-	-	-	-	-	-	-	-

AASHTO 2013 criteria is the most conservative existing EPA calculation. For poles not showing EPA values under AASHTO 2013, EPA values may exist under commercial criteria. Consult Outdoor Tech support to obtain these values.

BASE DETAIL

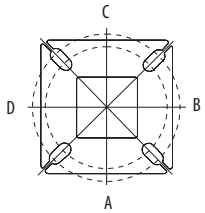






POLE DATA						
Shaft base size	Bolt circle A	Bolt projection B	Base square C	Template description	Anchor bolt description	Anchor bolt and template number
4"C	8" – 9"	2-3/4"–4"	8"	ABTEMPLATE PJ50004	AB18-0	ABSSS-4C
4"G	8" – 9"	2-3/4"–4"	8"	ABTEMPLATE PJ50004	AB30-0	ABSSS-4G
5"	10" – 12"	3-3/8"–4"	11"	ABTEMPLATE PJ50010	AB36-0	ABSSS-5
6"	11" – 13"	3-3/8"–4"	12-1/2"	ABTEMPLATE PJ50011	AB36-0	N/A

HANDHOLE ORIENTATION



Handhole

IMPORTANT INSTALLATION NOTES:

- **Do not** erect poles without having fixtures installed.
- Factory-supplied templates must be used when setting anchor bolts. Lithonia Lighting will not accept claim for incorrect anchorage placement due to failure to use Lithonia Lighting factory templates.
- If poles are stored outside, all protective wrapping must be removed immediately upon delivery to prevent finish damage.
- Lithonia Lighting is not responsible for the foundation design.

IMPORTANT:

• These specifications are intended for general purposes only. Lithonia reserves the right to change material or design, without prior notice, in a continuing effort to upgrade its products.

LITHONIA LIGHTING®
An AcuityBrands Company

POLE-SSS

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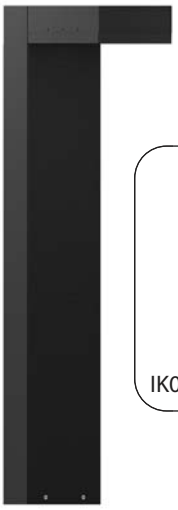
Bollard

ULI-10001

Light Linear PT 1

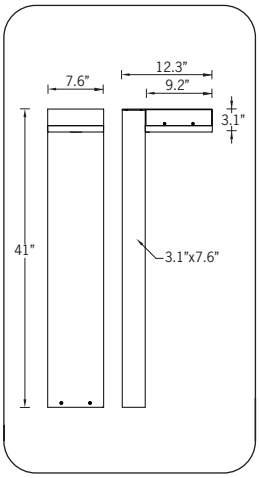
LIGMAN LIGHTING USA

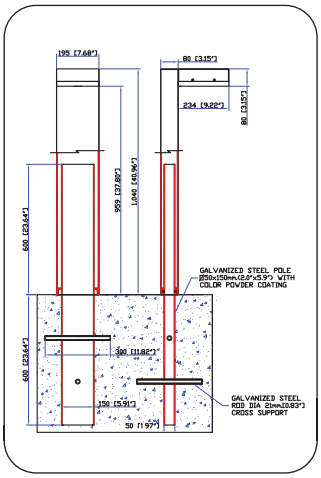
Light Linear PT Bollard is an elegant minimalistic bollard that is suitable for both modern and classic architecture. Ideal for creating visual guidance with exceptional visual comfort. The dual sealed optical chamber with integrated heat sinks houses a range of field interchangeable optically controlled LED's, providing Type II, III, IV & V distribution, as well as variations of this for precise light distribution requirements.
An example of this, is using a combination of Type II and Type IV distribution optics inside the same fixture.
This product range is available in 28w and 55w options, as single & double head styles. Customer specific wattages can be provided, contact the factory for more information.
This luminaire complies to Dark Sky requirements.
The sleek and minimalistic shape provides distinctive lighting effects by night and decorative urban effect during the day.
Suitable for use in pedestrian precincts, building surrounds, shopping centers, squares, parks and parking lots.
This product range is complemented with high performance optics in the area light and wall mounted luminaires, to provide a consistent range of design aesthetics for the project. See website for more information. Bollards can be provided with GFCI boxes positioned to specific heights specified by the customer.
Internal house side shields are available as an option.

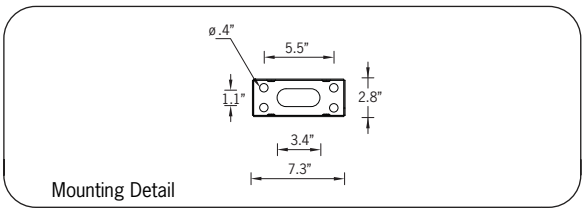


Physical Data

Length • 12.3″
Height • 41″
Weight • 18lbs
IP65 • Suitable For Wet Locations
IK08 • Impact Resistant (Vandal Resistant)







Mounting Detail

Security Bollard:
The Light Linear Bollard is available as a traffic rated security bollard. This optional design includes a 1/4" wall thickness galvanized steel security pole with 2 solid 1" galvanized steel cross support rods that are embedded into concrete.
This security bollard provides restraint of vehicular traffic in unauthorized areas.
Impact calculations shows this bollard will stop a 5,500lb/2.75 tons vehicle, travelling at 30mph.
For additional strength, the galvanized pole can be filled with concrete up to the waterproof driver housing to provide a solid concrete barrier.

SINGLE HEAD CUTSHEETS || ULI-10001 - 28w | ULI-10002 - 55w DOUBLE HEAD CUTSHEETS || ULI-10011 - 2x28w | ULI-10012 - 2x55w

Aluminum
Less than 0.1% copper content – Marine Grade 6060 extruded & LM6 Aluminum High Pressure die casting provides excellent mechanical strength , clean detailed product lines and excellent heat dissipation.

Pre paint
8 step degrease and phosphate process that includes deoxidizing and etching as well as a zinc and nickel phosphate process before product painting.

Memory Retentive -Silicon Gasket.
Provided with special injection molded **"fit for purpose"** long life high temperature **memory retentive silicon gaskets**. Maintains the gaskets exact profile and seal over years of use and compression.

Thermal management.
LM6 Aluminum is used for its **excellent mechanical strength and thermal dissipation properties** in low and high ambient temperatures. The superior thermal heat sink design by Ligman used in conjunction with the driver, controls thermals below critical temperature range to ensure maximum luminous flux output, as well as providing long LED service life and ensuring less than 10% lumen depreciation at 50,000 hours.

Surge Suppression
Standard 10kv surge suppressor provided with all fixtures.

BUG Rating
B1 - U0 - G1

Finishing
All Ligman products go through an extensive finishing process that includes fettling to improve paint adherence.

Paint.
UV Stabilized 4.9Mil thick powder coat paint and baked at 200 Deg C.
This process ensures that Ligman products can withstand harsh environments.
Rated for use in natatoriums.

Hardware.
Provided Hardware is **Marine grade 316 Stainless steel.**

Anti Seize Screw Holes
Tapped holes are infused with a **special anti seize compound** designed to prevent seizure of threaded connections, due to electrolysis from heat, corrosive atmospheres and moisture.

Crystal Clear Low Iron Glass Lens.
Provided with tempered, impact resistant **crystal clear low iron glass** ensuring no green glass tinge.

Optics & LED
Precise optic design provides **exceptional light control and precise distribution of light.**
LED CRI > 80

Lumen - Maintenance Life
L80 /B10 at 50,000 hours (This means that at least 90% of the LED still achieve 80% of their original flux)

Standard Options

Lamp
28w LED

Beam
T2 • Type II Distribution - 1884lm
T3 • Type III Distribution - 1899lm
T4 • Type IV Distribution - 1911lm

LED Color
W27 • 2700K
W30 • 3000K
W40 • 4000K

Finish Color
01 - Black - RAL 9011
02 - Dark Grey - RAL 7043
03 - White - RAL 9003
04 - Metallic Silver - RAL 9006
05 - Matte Silver - RAL 9006
06 - Bronze - RAL 6014
07 - Custom RAL

Options (Consult Factory for Pricing)
GFCI - GFCI Box
WLC - Wireless Lighting Controls
DIM - 0-10v Dimming
HGT- Specify Custom Height
HSS - House Side Shield
SB - Security Bollard

Ordering Example : ULI - 10001 - 28w - T2 - W40 - 02 - 120/277v - Options

	Lamp	Beam	LED Color	Color	Voltage	Options			
ULI	10001	28w LED	T3	2700	1	120/277v			

Beam	
T2	Type II
T3	Type III
T4	Type IV

LED Color	
W27	2700K
W30	3000K
W40	4000K

Color	
01	Black
02	Dark Grey
03	White
04	Metallic Silver
05	Matte Silver
06	Bronze
07	Custom RAL

Voltage
120/277v
Other (Specify)

Options	
GFCI	GFCI Box
HSS	House Side Shield
WLC	Wireless Lighting
DIM	0-10v Dimming
HGT	Custom Height
SB	Security Bollard

PROJECT: DATE: QUANTITY:

TYPE: NOTE:

Ligman Lighting USA reserves the right to change specifications without prior notice, please contact factory for latest information.
Due to the continual improvements in LED technology data and components may change without notice.

Head Office:
7144 NW Progress Ct
Hillsboro, Oregon 97124
Tel: 503-645-0500
Fax: 503-645-8100
www.ligmanlightingusa.com

Intertek

Submitting Agency:	Description: 66451 Project: Fire Station 16 - Revised Notes:	Type:
HARRY L. STEARNS 503-262-2640		SD

LED wall mounted luminaires with asymmetric wide beam distribution

Housing: One piece, die cast aluminum housing with adjustable die cast arm and mounting canopy. Fixture tilt angle is adjustable from 0° to 15°. The mounting canopy is supplied with a round, die cast aluminum rotational plate which allows the housing to be precisely leveled or rotated after installation. Mounting plate attaches directly to a standard 4" octagonal wiring box. Die castings are marine grade, copper free (≤ 0.3% copper content) A360.0 aluminum alloy.

Enclosure: Faceplate is hinged; constructed of die-cast aluminum with toolless access latch for easy maintenance. Tempered clear safety glass, 1/4" thick, with an anti-reflective coating. Optical reflector made of pure anodized aluminum. Fully shielded light distribution for minimal to no trespass above horizontal. Fully gasketed with a molded silicone gasket.

Electrical: 46.2W LED luminaire, 53 total system watts, -30°C start temperature. Integral 120V through 277V electronic LED driver, 0-10V dimming. LED module(s) are available from factory for easy replacement. Standard LED color temperature is 4000K with an 85 CRI. Available in 3000K (85 CRI); add suffix K3 to order.
Note: LEDs supplied with luminaire. Due to the dynamic nature of LED technology, LED luminaire data on this sheet is subject to change at the discretion of BEGA-US. For the most current technical data, please refer to www.bega-us.com.

Finish: All BEGA standard finishes are polyester powder coat with minimum 3 mil thickness. Available in four standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

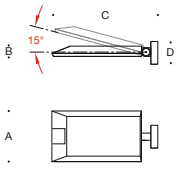
CSA certified to U.S. and Canadian standards for wet locations.
Protection class: IP66.

Weight: 9.3 lbs.

Luminaire Lumens: 4870

Type:
BEGA Product:
Project:
Voltage:
Color:
Options:
Modified:





Asymmetrical wide beam light distribution

	Lamp	A	B	C	D
66451	46.2W LED	10	2⅜	16⅛	5⅛

BEGA-US 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 FAX (805) 566-9474 www.bega-us.com
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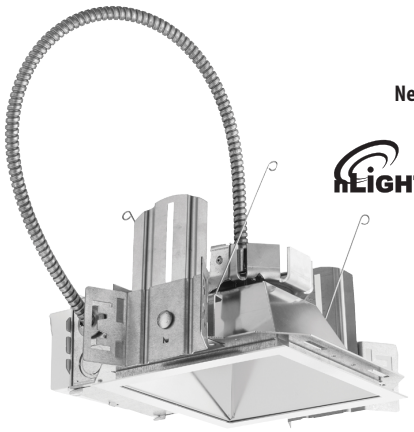
Submitting Agency:	Description: LDN6SQ 40/40 LS6AR LD MVOLT EZ10	Type:
HARRY L. STEARNS 503-262-2640	Project: Fire Station 16 - Revised	SE
	Notes:	

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

LDN6SQ

6" Square Open
Non-IC
New Construction Downlight



FEATURES & SPECIFICATIONS

INTENDED USE — Typical applications include corridors, lobbies, conference rooms and private offices.

CONSTRUCTION — Durable square metal reflectors retained by torsion springs.

Galvanized steel mounting/plaster frame; galvanized steel junction box with bottom-hinged access covers and spring latches.

Vertically adjustable mounting brackets with commercial bar hangers provide 3-3/4" total adjustment.

Two combination 1/2"-3/4" and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out). No. 12 AWG conductors, rated for 90°C.

Accommodates 12"-24" joist spacing.

Passive cooling thermal management for 25°C standard; high ambient (40°C) option available. Light engine and drivers are accessible from above or below ceiling.

Max ceiling thickness 1-1/2".

OPTICS — LEDs are binned to a 3-step SDCM; 80 CRI minimum.

LED light source concealed with diffusing optical lens.

General illumination lighting with 1.0 S/MH and 55° cutoff to source and source image.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes. Also available in white and black painted reflectors.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes.

ELECTRICAL — Multi-volt (120-277V, 50/60Hz) eldoLED 0-10V dimming drivers mounted to junction box, 10% or 1% minimum dimming level available.

0-10V dimming fixture requires two (2) additional low-voltage wires to be pulled.

70% lumen maintenance at 50,000 hours.

LISTINGS — Certified to US and Canadian safety standards. Damp location standard (wet location, covered ceiling optional). ENERGY STAR® certified product.

WARRANTY — 5-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

A+ Capable options indicated by this color background.

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: LDN6SQ 35/15 LS6AR LSS MVOLT EZ1

LDN6SQ						
Series	**Color temperature**	**Lumens[1]**	**Aperture/Trim Color**		**Finish**	
LDN6SQ 6" square	27/ 2700K	05 500 lumens	LS6 Downlight	AR Clear	LSS Semi-specular	
	30/ 3000K	10 1000 lumens	LSW6 Wallwash	WR[2] White	LD Matte diffuse	
	35/ 3500K	15 1500 lumens		BR[2] Black	LS Specular	
	40/ 4000K	20 2000 lumens				
		25 2500 lumens				
		30 3000 lumens				
		40 4000 lumens				
		50 5000 lumens				

Voltage	**Driver**	**Options**		**Options**	
MVOLT Multi-volt	EZ10 eldoLED 10% 0-10V	SF[4]	Single fuse	HAO	High ambient option
120 120V	EZ1 eldoLED 1% 0-10V	TRW[5]	White painted flange	CP	Chicago Plenum
277 277V		TRBL[5]	Black painted flange	WL	Wet location
347[3] 347V		ELR	Batterypack (remote)	RRL___	RELOC®-ready luminaire connectors enable a simple and consistent factory installed option across all ABL luminaire brands. Refer to RRL for complete nomenclature. Available only in RRLA, RRLB, RRLAE, and RRLC12S.
		EL	Batterypack		
		NPS80EZ[6]	nLight® dimming pack controls 0-10V eldoLED drivers.		
		NPS80EZER[6]	nLight® dimming pack controls 0-10V eldoLED drivers. ER controls fixtures on emergency circuit.	USPOM	US point of manufacture

Notes
1. Overall height varies based on lumen package; refer to dimensional chart on page 3.
2. Not available with finishes.
3. Not available with emergency options.
4. 120V only.
5. Available with clear (AR) reflector only.
6. Must specify voltage 120V or 277V.

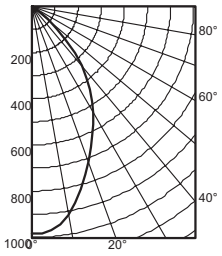
Submitting Agency:	Description:	Type:
HARRY L. STEARNS 503-262-2640	**LDN6SQ 40/40 LS6AR LD MVOLT EZ10** Project: **Fire Station 16 - Revised** Notes:	**SE**

LDN6SQ

PHOTOMETRY

Distribution Curve | **Distribution Data** | **Output Data** | **Coefficient of Utilization** | **Illuminance Data at 30" Above Floor for a Single Luminaire**

LDN6SQ 35/10 LS6AR, input watts: 11.99, delivered lumens: 1064, LM/W = 88.74, spacing criterion at 0= 0.96, test no. ISF 31035P34.



	Ave	Lumens
0	985	
5	974	91
15	819	228
25	617	284
35	439	272
45	210	160
55	19	25
65	2	2
75	1	1
85	0	0
90	0	

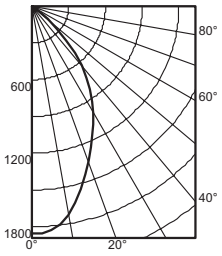
Zone	Lumens	% Lamp
0° - 30°	603.4	56.7
0° - 40°	875.8	82.3
0° - 60°	1060.6	99.7
0° - 90°	1063.4	99.9
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.2	0.0
90° - 180°	0.5	0.1
0° - 180°	1064.0	*100.0

*Efficiency

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	119	119	119	116	116	116	111	111	111
1	110	107	105	108	105	103	104	102	100
2	101	97	93	100	96	92	96	93	90
3	94	88	84	92	87	83	89	85	82
4	87	80	76	85	80	75	83	78	74
5	80	74	69	79	73	69	77	72	68
6	74	68	63	74	67	63	72	67	62
7	69	63	58	69	62	58	67	62	58
8	65	58	54	64	58	53	63	57	53
9	60	54	50	60	54	50	59	53	49
10	57	50	46	56	50	46	55	50	46

		50% beam - 47.3°		10% beam - 86.5°	
Mounting Height	Inital FC Center Beam	Diameter	FC	Diameter	FC
8.0	32.6	4.8	16.3	10.3	3.3
10.0	17.5	6.6	8.8	14.1	1.8
12.0	10.9	8.3	5.5	17.9	1.1
14.0	7.5	10.1	3.7	21.6	0.7
16.0	5.4	11.8	2.7	25.4	0.5

LDN6SQ 35/20 LS6AR, input watts: 23.16, delivered lumens: 2006.1, LM/W = 86.61, spacing criterion at 0= 0.96, test no. ISF 31035P28.



	Ave	Lumens
0	1858	
5	1837	172
15	1544	431
25	1163	535
35	828	514
45	395	301
55	35	47
65	3	4
75	1	1
85	0	0
90	0	

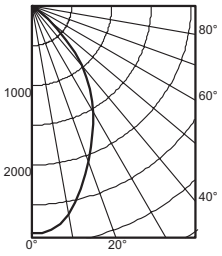
Zone	Lumens	% Lamp
0° - 30°	1137.8	56.7
0° - 40°	1651.4	82.3
0° - 60°	1999.7	99.7
0° - 90°	2005.1	99.9
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.4	0.0
90° - 180°	1.0	0.1
0° - 180°	2006.1	*100.0

*Efficiency

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	119	119	119	116	116	116	111	111	111
1	110	107	105	108	105	103	104	102	100
2	101	97	93	100	96	92	96	93	90
3	94	88	84	92	87	83	89	85	82
4	87	80	76	85	80	75	83	78	74
5	80	74	69	79	73	69	77	72	68
6	74	68	63	74	67	63	72	67	62
7	69	63	58	69	62	58	67	62	58
8	65	58	54	64	58	53	63	57	53
9	60	54	50	60	54	50	59	53	49
10	57	50	46	56	50	46	55	50	46

		50% beam - 47.3°		10% beam - 86.5°	
Mounting Height	Inital FC Center Beam	Diameter	FC	Diameter	FC
8.0	61.4	4.8	30.7	10.3	6.1
10.0	33.0	6.6	16.5	14.1	3.3
12.0	20.6	8.3	10.3	17.9	2.1
14.0	14.0	10.1	7.0	21.6	1.4
16.0	10.2	11.8	5.1	25.4	1.0

LDN6SQ 35/30 LS6AR, input watts: 35.06, delivered lumens: 3088.7, LM/W = 88.09, spacing criterion at 0= 0.96, test no. ISF 31035P25.



	Ave	Lumens
0	2860	
5	2829	264
15	2377	663
25	1790	824
35	1274	791
45	608	464
55	54	72
65	5	6
75	2	2
85	1	1
90	0	

Zone	Lumens	% Lamp
0° - 30°	1751.7	56.7
0° - 40°	2542.5	82.3
0° - 60°	3078.8	99.7
0° - 90°	3087.1	99.9
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.7	0.0
90° - 180°	1.6	0.1
0° - 180°	3088.7	*100.0

*Efficiency

pf	20%								
pc	80%			70%			50%		
pw	50%	30%	10%	50%	30%	10%	50%	30%	10%
0	119	119	119	116	116	116	111	111	111
1	110	107	105	108	105	103	104	102	100
2	101	97	93	100	96	92	96	93	90
3	94	88	84	92	87	83	89	85	82
4	87	80	76	85	80	75	83	78	74
5	80	74	69	79	73	69	77	72	68
6	74	68	63	74	67	63	72	67	62
7	69	63	58	69	62	58	67	62	58
8	65	58	54	64	58	53	63	57	53
9	60	54	50	60	54	50	59	53	49
10	57	50	46	56	50	46	55	50	46

		50% beam - 47.3°		10% beam - 86.5°	
Mounting Height	Inital FC Center Beam	Diameter	FC	Diameter	FC
8.0	94.6	4.8	47.3	10.3	9.5
10.0	50.8	6.6	25.4	14.1	5.1
12.0	31.7	8.3	15.8	17.9	3.2
14.0	21.6	10.1	10.8	21.6	2.2
16.0	15.7	11.8	7.8	25.4	1.6

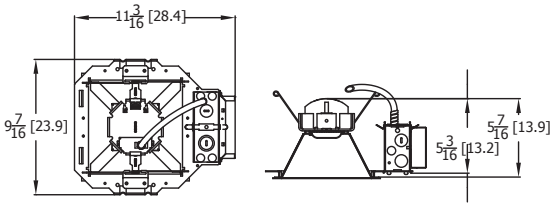
DOWNLIGHTING: One Lithonia Way Conyers, GA 30012 Phone: 800-315-4935 Fax: 770-860-3129 www.lithonia.com
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Submitting Agency:	Description: LDN6SQ 40/40 LS6AR LD MVOLT EZ10	Type:
HARRY L. STEARNS 503-262-2640	Project: Fire Station 16 - Revised	SE
	Notes:	

LDN6SQ

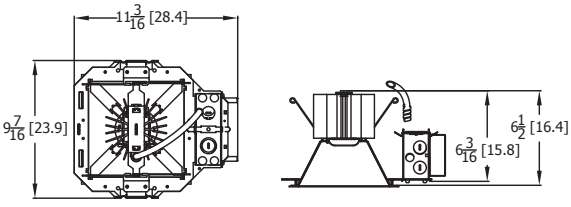
* All dimensions are inches (centimeters) unless otherwise noted.

LDN6SQ 1500 LUMEN



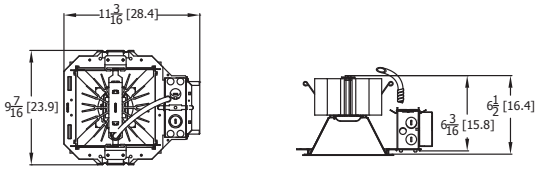
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ 3000 LUMEN



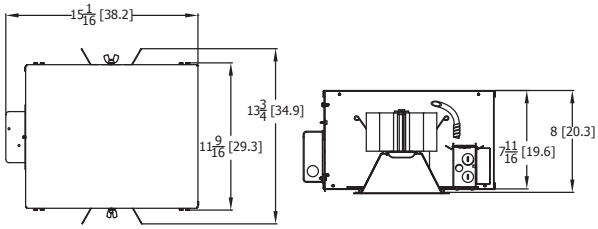
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ 5000 LUMEN



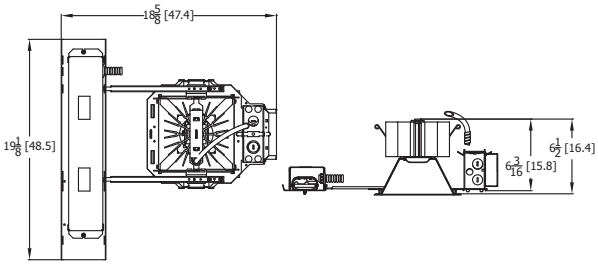
Marked Spacing: 24 x 24 x 10
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ CP



Marked Spacing Above 3000 Lumens: 24 x 24 x 10
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ EL-ELR



Marked Spacing Above 3000 Lumens: 24 x 24 x 10
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ			
Target Lumen	Lumens @ 3500K	Wattage	LPW
500	658.5	7.6	86.6
1000	1064.0	12.0	88.6
1500	1546.0	19.1	80.9
2000	2006.2	23.2	86.4
2500	2553.0	30.2	84.5
3000	3088.7	35.1	87.9
4000	3818.0	46.9	81.4
5000	4738.9	57.3	82.7

EL/ELR AVAILABILITY/COMPATIBILITY - INITIAL LUMENS			
Lumen package	Watts	Initial lumens EL/ELR	Emergency LED driver
600	12	500	PS1050
1000	18	575	PS1050
1500	26	640	PS1050
2000	35	690	PS1050

LUMEN OUTPUT MULTIPLIERS - CCT				
	2700K	3000K	3500K	4000K
80CRI	0.950	0.966	1.000	1.025

LUMEN OUTPUT MULTIPLIERS - FINISH			
	Clear (AR)	White (WR)	Black (BR)
Specular (LS)	1.0	N/A	N/A
Semi-specular (LSS)	0.950	N/A	N/A
Matte diffuse (LD)	0.85	N/A	N/A
Painted	N/A	0.87	0.73

Notes

- Tested in accordance with IESNA LM-79-08.
- Tested to current IES and NEMA standards under stabilized laboratory conditions.
- CRI: 80 typical.

DOWNLIGHTING: One Lithonia Way Conyers, GA 30012 Phone: 800-315-4935 Fax: 770-860-3129 www.lithonia.com

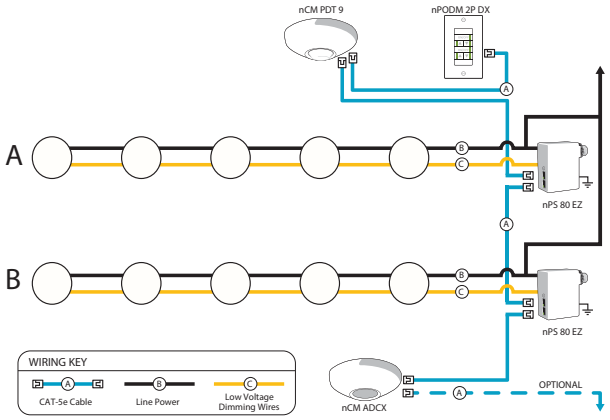
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Submitting Agency:	Description: LDN6SQ 40/40 LS6AR LD MVOLT EZ10	Type:
HARRY L STEARNS 503-262-2640	Project: Fire Station 16 - Revised	SE
	Notes:	

LDN6SQ

ADDITIONAL DATA

COMPATIBLE 0-10V WALL-MOUNT DIMMERS		
MANUFACTURER	PART NO.	POWER BOOSTER AVAILABLE
Lutron®	Diva® DVTV	
	Diva® DVSCTV	
	Nova T® NTFTV	
	Nova® NFTV	
Leviton®	AWSMT-7DW	CN100
	AWSMG-7DW	PE300
	AMRMG-7DW	
	Leviton Centura Fluorescent Control System	
	IllumaTech® IP7 Series	
Synergy®	ISD BC	RDMFC
	SLD LPCS	
	Digital Equinox (DEQ BC)	
Douglas Lighting Controls	WPC-5721	
Entertainment Technology	Tap Glide TG600FAM120 (120V)	
	Tap Glide Heatsink TGH1500FAM120 (120V)	
	Oasis 0A2000FAMU	
Honeywell	EL7315A1019	EL7305A1010 (optional)
	EL7315A1009	
HUNT Dimming	Preset slide: PS-010-IV and PS-010-WH	
	Preset slide: PS-010-3W-IV and PS-010-3W-WH	
	Preset slide, controls FD-010: PS-IFC-010-IV and PS-IFC-010-WH-120/277V	
	Preset slide, controls FD-010: PS-IFC-010-3W-IV and PS-IFC-010-3W-WH-120/277V	
	Remote mounted unit: FD-010	
Lehigh Electronic Products	Solitaire	PBX
PDM Electrical Products	WPC-5721	
Starfield Controls	TR61 with DALI interface port	RT03 DALInet Router
WattStopper®	LS-4 used with LCD-101 and LCD-103	



nLight® Control Accessories:
Order as separate catalog number.
Visit www.sensorswitch.com/nLight for complete listing of nLight controls.

WallPod stations	Model number	Occupancy sensors	Model number
On/Off	nPODM [color]	Small motion 360°, ceiling (PIR / dual tech)	nCM 9 / nCM PDT 9
On/Off & Raise/Lower	nPODM DX [color]	Large motion 360°, ceiling (PIR / dual tech)	nCM 10 / nCM PDT 10
Graphic Touchscreen	nPOD GFX [color]	Wide view (PIR / dual tech)	nWV 16 / nWV PDT 16
Photocell controls	**Model number**	Wall Switch w/ Raise/Lower (PIR / dual tech)	nWSX LV DX / nWSX PDT LV DX
Dimming	nCM ADCX	**Cat-5 cables (plenum rated)**	**Model number**
		10', CAT5 10FT	CAT5 10FT J1
		15', CAT5 15FT	CAT5 15FT J1

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded background*
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

LITHONIA LIGHTING®
An AcuityBrands Company

DOWNLIGHTING: One Lithonia Way Conyers, GA 30012 Phone: 800-315-4935 Fax: 770-860-3129 www.lithonia.com

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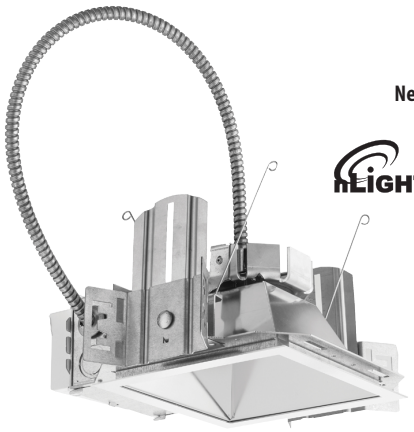
Submitting Agency:	Description: LDN6SQ 40/15 LS6AR LD MVOLT EZ10	Type:
HARRY L. STEARNS 503-262-2640	Project: Fire Station 16 - Revised	SF
	Notes:	

LITHONIA LIGHTING®

Catalog Number	
Notes	
Type	

LDN6SQ

6" Square Open
Non-IC
New Construction Downlight



FEATURES & SPECIFICATIONS

INTENDED USE — Typical applications include corridors, lobbies, conference rooms and private offices.

CONSTRUCTION — Durable square metal reflectors retained by torsion springs.

Galvanized steel mounting/plaster frame; galvanized steel junction box with bottom-hinged access covers and spring latches.

Vertically adjustable mounting brackets with commercial bar hangers provide 3-3/4" total adjustment.

Two combination 1/2"-3/4" and four 1/2" knockouts for straight-through conduit runs. Capacity: 8 (4 in, 4 out). No. 12 AWG conductors, rated for 90°C.

Accommodates 12"-24" joist spacing.

Passive cooling thermal management for 25°C standard; high ambient (40°C) option available. Light engine and drivers are accessible from above or below ceiling.

Max ceiling thickness 1-1/2".

OPTICS — LEDs are binned to a 3-step SDCM; 80 CRI minimum.

LED light source concealed with diffusing optical lens.

General illumination lighting with 1.0 S/MH and 55° cutoff to source and source image.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes. Also available in white and black painted reflectors.

Self-flanged anodized reflectors in specular, semi-specular, or matte diffuse finishes.

ELECTRICAL — Multi-volt (120-277V, 50/60Hz) eldoLED 0-10V dimming drivers mounted to junction box, 10% or 1% minimum dimming level available.

0-10V dimming fixture requires two (2) additional low-voltage wires to be pulled.

70% lumen maintenance at 50,000 hours.

LISTINGS — Certified to US and Canadian safety standards. Damp location standard (wet location, covered ceiling optional). ENERGY STAR® certified product.

WARRANTY — 5-year limited warranty. Complete warranty terms located at www.acuitybrands.com/CustomerResources/Terms_and_conditions.aspx

Note: Actual performance may differ as a result of end-user environment and application.

All values are design or typical values, measured under laboratory conditions at 25 °C.

Specifications subject to change without notice.

A+ Capable options indicated by this color background.

ORDERING INFORMATION

Lead times will vary depending on options selected. Consult with your sales representative.

Example: LDN6SQ 35/15 LS6AR LSS MVOLT EZ1

LDN6SQ									
Series		**Color temperature**		**Lumens**[1]		**Aperture/Trim Color**			**Finish**
LDN6SQ	6" square	27/	2700K	05	500 lumens	LS6	Downlight	AR Clear	LSS Semi-specular
		30/	3000K	10	1000 lumens	LSW6	Wallwash	WR[2] White	LD Matte diffuse
		35/	3500K	15	1500 lumens			BR[2] Black	LS Specular
		40/	4000K	20	2000 lumens				
				25	2500 lumens				
				30	3000 lumens				
				40	4000 lumens				
				50	5000 lumens				

Voltage		**Driver**		**Options**			
MVOLT	Multi-volt	EZ10	eldoLED 10% 0-10V	SF[4]	Single fuse	HAO	High ambient option
120	120V	EZ1	eldoLED 1% 0-10V	TRW[5]	White painted flange	CP	Chicago Plenum
277	277V			TRBL[5]	Black painted flange	WL	Wet location
347[3]	347V			ELR	Batterypack (remote)	RRL___	RELOC®-ready luminaire connectors enable a simple and consistent factory installed option across all ABL luminaire brands. Refer to RRL for complete nomenclature. Available only in RRLA, RRLB, RRLAE, and RRLC12S.
				EL	Batterypack		
				NPS80EZ[6]	nLight® dimming pack controls 0-10V eldoLED drivers.		
				NPS80EZER[6]	nLight® dimming pack controls 0-10V eldoLED drivers. ER controls fixtures on emergency circuit.	USPOM	US point of manufacture

Notes
1. Overall height varies based on lumen package; refer to dimensional chart on page 3.
2. Not available with finishes.
3. Not available with emergency options.
4. 120V only.
5. Available with clear (AR) reflector only.
6. Must specify voltage 120V or 277V.

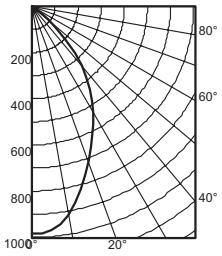
Submitting Agency:	Description:	Type:
HARRY L. STEARNS 503-262-2640	**LDN6SQ 40/15 LS6AR LD MVOLT EZ10** Project: **Fire Station 16 - Revised** Notes:	**SF**

LDN6SQ

PHOTOMETRY

Distribution Curve | **Distribution Data** | **Output Data** | **Coefficient of Utilization** | **Illuminance Data at 30" Above Floor for a Single Luminaire**

LDN6SQ 35/10 LS6AR, input watts: 11.99, delivered lumens: 1064, LM/W = 88.74, spacing criterion at 0= 0.96, test no. ISF 31035P34.



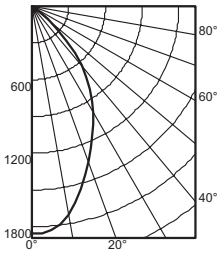
	Ave	Lumens
0	985	
5	974	91
15	819	228
25	617	284
35	439	272
45	210	160
55	19	25
65	2	2
75	1	1
85	0	0
90	0	

Zone	Lumens	% Lamp
0° - 30°	603.4	56.7
0° - 40°	875.8	82.3
0° - 60°	1060.6	99.7
0° - 90°	1063.4	99.9
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.2	0.0
90° - 180°	0.5	0.1
0° - 180°	1064.0	*100.0
	*Efficiency	

pf	80%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw									
0	119	119	119	116	116	116	111	111	111
1	110	107	105	108	105	103	104	102	100
2	101	97	93	100	96	92	96	93	90
3	94	88	84	92	87	83	89	85	82
4	87	80	76	85	80	75	83	78	74
5	80	74	69	79	73	69	77	72	68
6	74	68	63	74	67	63	72	67	62
7	69	63	58	69	62	58	67	62	58
8	65	58	54	64	58	53	63	57	53
9	60	54	50	60	54	50	59	53	49
10	57	50	46	56	50	46	55	50	46

Mounting Height	Inital FC Center Beam	50% beam - 47.3° Diameter	50% beam - 47.3° FC	10% beam - 86.5° Diameter	10% beam - 86.5° FC
8.0	32.6	4.8	16.3	10.3	3.3
10.0	17.5	6.6	8.8	14.1	1.8
12.0	10.9	8.3	5.5	17.9	1.1
14.0	7.5	10.1	3.7	21.6	0.7
16.0	5.4	11.8	2.7	25.4	0.5

LDN6SQ 35/20 LS6AR, input watts: 23.16, delivered lumens: 2006.1, LM/W = 86.61, spacing criterion at 0= 0.96, test no. ISF 31035P28.



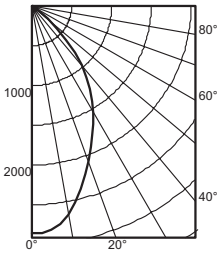
	Ave	Lumens
0	1858	
5	1837	172
15	1544	431
25	1163	535
35	828	514
45	395	301
55	35	47
65	3	4
75	1	1
85	0	0
90	0	

Zone	Lumens	% Lamp
0° - 30°	1137.8	56.7
0° - 40°	1651.4	82.3
0° - 60°	1999.7	99.7
0° - 90°	2005.1	99.9
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.4	0.0
90° - 180°	1.0	0.1
0° - 180°	2006.1	*100.0
	*Efficiency	

pf	80%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw									
0	119	119	119	116	116	116	111	111	111
1	110	107	105	108	105	103	104	102	100
2	101	97	93	100	96	92	96	93	90
3	94	88	84	92	87	83	89	85	82
4	87	80	76	85	80	75	83	78	74
5	80	74	69	79	73	69	77	72	68
6	74	68	63	74	67	63	72	67	62
7	69	63	58	69	62	58	67	62	58
8	65	58	54	64	58	53	63	57	53
9	60	54	50	60	54	50	59	53	49
10	57	50	46	56	50	46	55	50	46

Mounting Height	Inital FC Center Beam	50% beam - 47.3° Diameter	50% beam - 47.3° FC	10% beam - 86.5° Diameter	10% beam - 86.5° FC
8.0	61.4	4.8	30.7	10.3	6.1
10.0	33.0	6.6	16.5	14.1	3.3
12.0	20.6	8.3	10.3	17.9	2.1
14.0	14.0	10.1	7.0	21.6	1.4
16.0	10.2	11.8	5.1	25.4	1.0

LDN6SQ 35/30 LS6AR, input watts: 35.06, delivered lumens: 3088.7, LM/W = 88.09, spacing criterion at 0= 0.96, test no. ISF 31035P25.



	Ave	Lumens
0	2860	
5	2829	264
15	2377	663
25	1790	824
35	1274	791
45	608	464
55	54	72
65	5	6
75	2	2
85	1	1
90	0	

Zone	Lumens	% Lamp
0° - 30°	1751.7	56.7
0° - 40°	2542.5	82.3
0° - 60°	3078.8	99.7
0° - 90°	3087.1	99.9
90° - 120°	0.0	0.0
90° - 130°	0.0	0.0
90° - 150°	0.7	0.0
90° - 180°	1.6	0.1
0° - 180°	3088.7	*100.0
	*Efficiency	

pf	80%			70%			50%		
pc	50%	30%	10%	50%	30%	10%	50%	30%	10%
pw									
0	119	119	119	116	116	116	111	111	111
1	110	107	105	108	105	103	104	102	100
2	101	97	93	100	96	92	96	93	90
3	94	88	84	92	87	83	89	85	82
4	87	80	76	85	80	75	83	78	74
5	80	74	69	79	73	69	77	72	68
6	74	68	63	74	67	63	72	67	62
7	69	63	58	69	62	58	67	62	58
8	65	58	54	64	58	53	63	57	53
9	60	54	50	60	54	50	59	53	49
10	57	50	46	56	50	46	55	50	46

Mounting Height	Inital FC Center Beam	50% beam - 47.3° Diameter	50% beam - 47.3° FC	10% beam - 86.5° Diameter	10% beam - 86.5° FC
8.0	94.6	4.8	47.3	10.3	9.5
10.0	50.8	6.6	25.4	14.1	5.1
12.0	31.7	8.3	15.8	17.9	3.2
14.0	21.6	10.1	10.8	21.6	2.2
16.0	15.7	11.8	7.8	25.4	1.6

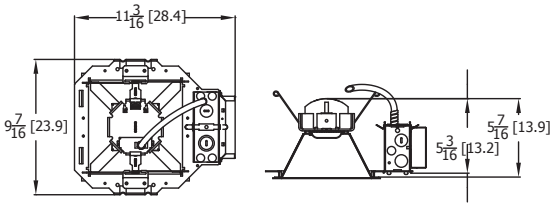
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Submitting Agency:	Description: LDN6SQ 40/15 LS6AR LD MVOLT EZ10	Type:
HARRY L. STEARNS 503-262-2640	Project: Fire Station 16 - Revised	SF
	Notes:	

LDN6SQ

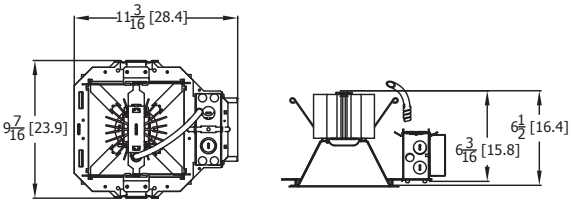
* All dimensions are inches (centimeters) unless otherwise noted.

LDN6SQ 1500 LUMEN



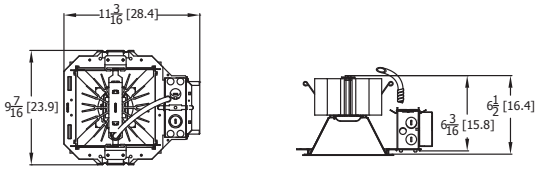
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ 3000 LUMEN



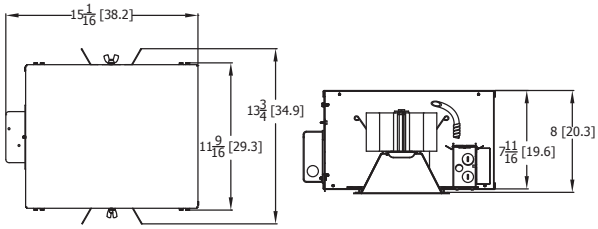
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ 5000 LUMEN



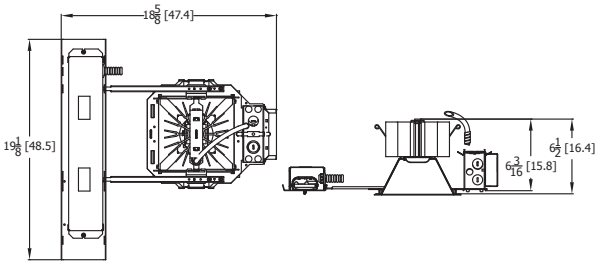
Marked Spacing: 24 x 24 x 10
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ CP



Marked Spacing Above 3000 Lumens: 24 x 24 x 10
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ EL-ELR



Marked Spacing Above 3000 Lumens: 24 x 24 x 10
Aperture: 6-1/4 (15.9) Square
Ceiling Opening: 7-1/8 (18.1) Square
Overlap trim: 7-1/2 (19.1) Square

LDN6SQ			
Target Lumen	Lumens @ 3500K	Wattage	LPW
500	658.5	7.6	86.6
1000	1064.0	12.0	88.6
1500	1546.0	19.1	80.9
2000	2006.2	23.2	86.4
2500	2553.0	30.2	84.5
3000	3088.7	35.1	87.9
4000	3818.0	46.9	81.4
5000	4738.9	57.3	82.7

EL/ELR AVAILABILITY/COMPATIBILITY - INITIAL LUMENS			
Lumen package	Watts	Initial lumens EL/ELR	Emergency LED driver
600	12	500	PS1050
1000	18	575	PS1050
1500	26	640	PS1050
2000	35	690	PS1050

LUMEN OUTPUT MULTIPLIERS - CCT				
	2700K	3000K	3500K	4000K
80CRI	0.950	0.966	1.000	1.025

LUMEN OUTPUT MULTIPLIERS - FINISH			
	Clear (AR)	White (WR)	Black (BR)
Specular (LS)	1.0	N/A	N/A
Semi-specular (LSS)	0.950	N/A	N/A
Matte diffuse (LD)	0.85	N/A	N/A
Painted	N/A	0.87	0.73

Notes

- Tested in accordance with IESNA LM-79-08.
- Tested to current IES and NEMA standards under stabilized laboratory conditions.
- CRI: 80 typical.

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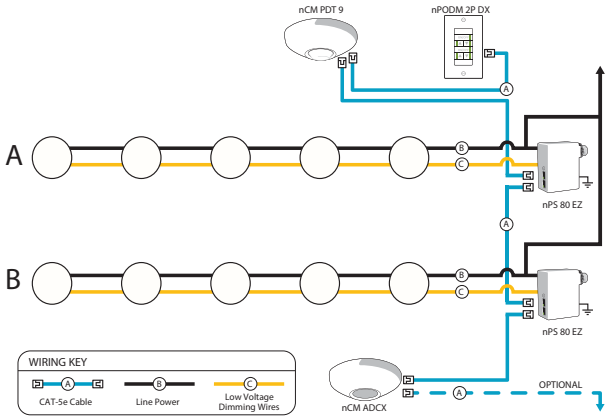
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Submitting Agency:	Description: LDN6SQ 40/15 LS6AR LD MVOLT EZ10 Project: Fire Station 16 - Revised Notes:	Type: SF
HARRY L. STEARNS 503-262-2640		

LDN6SQ

ADDITIONAL DATA

COMPATIBLE 0-10V WALL-MOUNT DIMMERS		
MANUFACTURER	PART NO.	POWER BOOSTER AVAILABLE
Lutron®	Diva® DVTV	
	Diva® DVSCTV	
	Nova T® NTFTV	
	Nova® NFTV	
Leviton®	AWSMT-7DW	CN100
	AWSMG-7DW	PE300
	AMRMG-7DW	
	Leviton Centura Fluorescent Control System	
	IllumaTech® IP7 Series	
Synergy®	ISD BC	RDMFC
	SLD LPCS	
	Digital Equinox (DEQ BC)	
Douglas Lighting Controls	WPC-5721	
Entertainment Technology	Tap Glide TG600FAM120 (120V)	
	Tap Glide Heatsink TGH1500FAM120 (120V)	
	Oasis 0A2000FAMU	
Honeywell	EL7315A1019	EL7305A1010 (optional)
	EL7315A1009	
HUNT Dimming	Preset slide: PS-010-IV and PS-010-WH	
	Preset slide: PS-010-3W-IV and PS-010-3W-WH	
	Preset slide, controls FD-010: PS-IFC-010-IV and PS-IFC-010-WH-120/277V	
	Preset slide, controls FD-010: PS-IFC-010-3W-IV and PS-IFC-010-3W-WH-120/277V	
	Remote mounted unit: FD-010	
Lehigh Electronic Products	Solitaire	PBX
PDM Electrical Products	WPC-5721	
Starfield Controls	TR61 with DALI interface port	RT03 DALInet Router
WattStopper®	LS-4 used with LCD-101 and LCD-103	



nLight® Control Accessories:
Order as separate catalog number.
Visit www.sensorswitch.com/nLight for complete listing of nLight controls.

WallPod stations	Model number	Occupancy sensors	Model number
On/Off	nPODM [color]	Small motion 360°, ceiling (PIR / dual tech)	nCM 9 / nCM PDT 9
On/Off & Raise/Lower	nPODM DX [color]	Large motion 360°, ceiling (PIR / dual tech)	nCM 10 / nCM PDT 10
Graphic Touchscreen	nPOD GFX [color]	Wide view (PIR / dual tech)	nWV 16 / nWV PDT 16
Photocell controls	**Model number**	Wall Switch w/ Raise/Lower (PIR / dual tech)	nWSX LV DX / nWSX PDT LV DX
Dimming	nCM ADCX	**Cat-5 cables (plenum rated)**	**Model number**
		10', CAT5 10FT	CAT5 10FT J1
		15', CAT5 15FT	CAT5 15FT J1

A+ Capable Luminaire

This item is an A+ capable luminaire, which has been designed and tested to provide consistent color appearance and out-of-the-box control compatibility with simple commissioning.

- All configurations of this luminaire meet the Acuity Brands' specification for chromatic consistency
- This luminaire is part of an A+ Certified solution for nLight® control networks when ordered with drivers marked by a shaded background*
- This luminaire is part of an A+ Certified solution for nLight control networks, providing advanced control functionality at the luminaire level, when selection includes driver and control options marked by a shaded background*

To learn more about A+, visit www.acuitybrands.com/aplus.

*See ordering tree for details

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Submitting Agency:	Description: 77685 Project: Fire Station 16 - Revised Notes:	Type: SH
HARRY L. STEARNS 503-262-2640		

Compact floodlight

Housing: Luminaire constructed of a one piece die-cast aluminum housing. LED module paired with inner reverse-tapered casting to provide maximum heat transfer to outer housing. Die castings are marine grade, copper free (≤ 0.3% copper content) A360.0 aluminum alloy.

Enclosure: Optical system consists of a reflector of pure anodized aluminum. The lens and optical assembly are secured by a die cast aluminum trim ring using (3) stainless steel captive fasteners.

Mounting: Provided with a ½" I.P.S. stainless steel nipple for direct attachment to cast boxes or other accessories.

Electrical: 19.6 W LED luminaire, 21.2 total system watts, -30° C start temperature. Integral 120 V - 277 V electronic LED driver, 0-10V dimming. 6.5W low power option available, non dimming. The LED module and driver are mounted on a removable inner assembly for easy replacement. Standard LED color temperature is 4000K with an 85 CRI. Available in 3000K (85 CRI); add suffix K3 to order.
Note: Due to the dynamic nature of LED technology, LED luminaire data in this catalog is subject to change at the discretion of BEGA-US. For the most current technical data, please refer to www.bega-us.com.

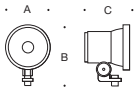
Finish: All BEGA standard finishes are polyester powder coat with minimum 3 mil thickness. These luminaires are available in four standard BEGA colors: Black (BLK); White (WHT); Bronze (BRZ); Silver (SLV). To specify, add appropriate suffix to catalog number. Custom colors supplied on special order.

CSA certified to U.S. and Canadian standards for wet locations. Protection class IP65.

Weight: 4.0 lbs.

Luminaire Lumens: 1158
Tested in accordance with LM-79-08

Type:
BEGA Product:
Project:
Voltage:
Color:
Options:
Modified:





Compact floodlight · **wide beam**

	Lamp	β	A	B	C
77685	19.6 W LED	41°	5½	8	5½

Accessories: **70055** **70756**

Exchangeable lenses — flat beam — 180° glare shield — β = Beam angle

BEGA-US 1000 BEGA Way, Carpinteria, CA 93013 (805) 684-0533 FAX (805) 566-9474 www.bega-us.com
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Site Furnishings:

landscapeforms®

BOLA®

Product Data Sheet



An artful solution for bicycle storage and security that meets Association of Pedestrian and Bicycle and Professionals (APBP) recommendations. Bola's understated design doesn't conflict with other site elements. An artful solution for bicycle storage and security that meets Association of Pedestrian and Bicycle and Professionals (APBP) recommendations. Bola's understated design doesn't conflict with other site elements.

Bike Rack

- Capacity: 2 bikes
- Bike racks made of 1.5" o.d., .120" wall stainless steel tubing, with a #4 satin electropolish finish on bare stainless steel.
- Bola is also available in powdercoated steel.
- Bola must be embedded.
- Bola an secure two bicycles parked parallel to the rack.
- The bicycles can be headed in opposite directions, or in the same direction. The rack provides two- point contact to prevent the bicycle from tipping over.
- A standard D-shaped bike lock can secure both a wheel and the frame.

	STYLE	DEPTH	WIDTH	HEIGHT	PRODUCT WEIGHT
	Bola	1.5"	28.25"	32"	13 lb

Finishes

- All metal parts are finished with Landscape Forms' proprietary Pangard II® polyester powdercoat, a hard yet flexible finish that resists rusting, chipping, peeling and fading.
- Call for standard color chart.

To Specify

- Select bike rack style. Specify powdercoat color or stainless steel.

Designed by Brian Kane, IDSA
All Landscape Forms bike racks meet guidelines established by the Association of Pedestrian and Bicycle Professionals.

Visit our landscapeforms.com for more information. Specifications are subject to change without notice.
Landscape Forms supports the Landscape Architecture Foundation at the Second Century level.
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EXTERIOR MATERIALS

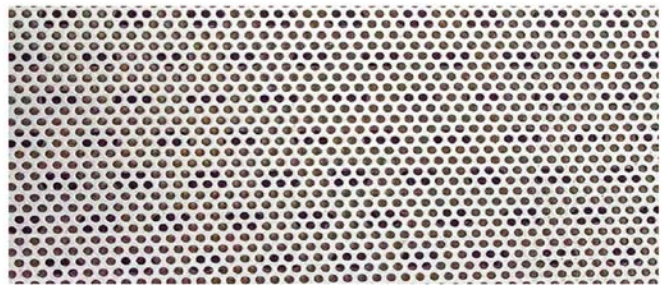
MP- 1 A:
VERTICAL BOX RIBBED METAL PANEL - LIGHT GRAY OR WHITE





EXAMPLE OF RIB PROFILE

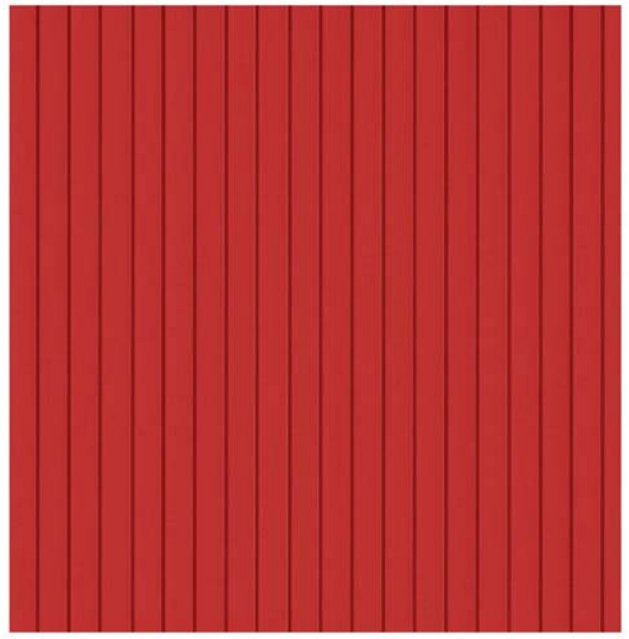
MP-1 B: PERFORATED RIBBED METAL PANEL, AT ALL SITE ENCLOSURES



BUILDING PERSPECTIVE



MP-2:
ACCENT VERTICAL BOX
RIBBED METAL PANEL - RED



WD-1: WOOD VENEER
SOFFIT PANEL



FIBERGLASS AND ALUMINUM
STOREFRONT GLAZING



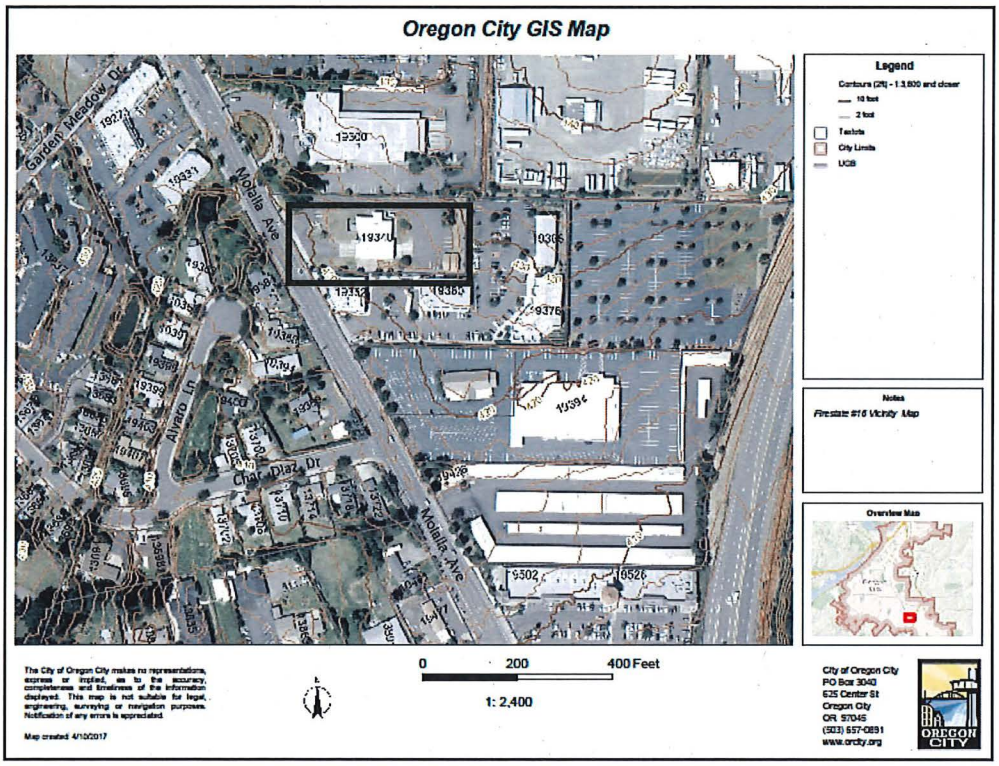


APPARATUS BAY DOORS

Preliminary Stormwater Calculations:

Preliminary
HYDROLOGY REPORT
FOR
Clackamas Fire District #1

Fire Station #16,
19340 Molalla Ave, Oregon City, Oregon



Vicinity Map

Prepared for:
Clackamas Fire District #1
11300 SE Fuller Road
Milwaukie, Oregon 97222
Ph: (503) 742-2600

Prepared by:
David Poulson, P.E.
PACE Engineers, Inc.
5000 Meadow Road, Ste 345
Lake Oswego, Oregon 97035
Ph: (503) 597-3222

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Appendix A
Exhibits (1-8)
HydroCad 25 and 100 year Report

Appendix B
Geotechnical Report

Appendix C
Rough Draft of O & M
Stormwater System Operations and Maintenance Plan

Appendix D
Composite Map (11X17)
Detention Plan Map (11X17)
Rain Data
FIRM Map

1.0 STORMWATER CERTIFICATE and STATEMENT

I hereby certify that this Stormwater Management Report for "Fire Station #16" has been prepared by me or under by supervision and meets minimum standards of the City of Oregon City and normal standards of engineering practice. I hereby acknowledge and agree that the jurisdiction does not and will not assume liability for the sufficiency, suitability, or performance of the drainage facilities designed by me.

David Poulson, P.E.
PACE Engineers, Inc.
5000 Meadows Road, STE 345
Lake Oswego, OR 97035

2.0 *Purpose*

The purpose of this report represents the storm water analysis for construction of Fire Station #16. The basis of the analysis is to demonstrate the compliance with the City of Oregon City's and State of Oregon's regulation and engineering standards. The proposed re-development of Fire Station #16 is located within Clackamas County, Oregon.

3.0 *Project Location and Description*

Existing Condition:
The proposed project is located within the City of Oregon City and is a 1.4 acre site located on Molalla Avenue. The owner has dedicated 0.06 acres to the City for public improvement, therefore the residual is 1.34 acres. The project site is specifically identified as tax lot 1601 of the Clackamas County Tax Map T3S R2E 09B (**Exhibit 4**) and zoned C- General Commercial District by the City of Oregon City's land use ordinance. The subject property is approximately 390 feet north of Char Diaz Dr. and just south of the existing U.S. Postal Office. The development proposes to tear down the existing fire station and build a one story structure with associated parking. The proposed building will be developed as a replacement for the existing fire station. The demolition and construction will be phased. The initial phase will be the demolition of the existing building leaving all in-ground structures in place. The construction phase will incorporate the new building, stormwater structures, asphalt, foundation, concrete slabs, sidewalks, landscaping and utilities. The new building will incorporate a slab-on-grade floor and no below-grade levels are planned. The new building will have a footprint of 12,000 square-feet. There will be a new concrete retaining wall constructed along the eastern end and wrapping around the north edge of the site approximately 140 feet in length. The construction of the wall will require cut up to about 6.5 feet in depth on the eastern portion of the site, with minimal grading to be performed on the western portion of the site.

Soils:
According to the geotechnical report from Carlson Geotechnical, there were eight borings performed on February 9th and 10th, 2017. The site soils consists of Organic Clay Topsoil Fill, Clay Topsoil, Sandy Fat Clay, Clayey Sand, and Basalt Bedrock.

As shown on the included Drainage Basin (Appendix D) the site is located within the "Caufield" drainage basin. From the attached Soil Survey Map and the Soils Features for Clackamas County, it can be shown that the soils are the Bornstedt variant (8B) (**Exhibit 5**). According to Carlson Geotechnical, "the site is underlain by Pliocene-Pleistocene age Boring Lavas (basalts)." The soil is classified as hydrologic group "D" which correlates to a curve number for pre and post development pervious areas of 86. A curve number of 98 will be used for all impervious areas – see the SCS Curve Number (**Appendix D**). The property is located in the Middle Willamette Watershed.

Topography:
The site topography ranges from 2-5% with a low elevation of 415 feet in the southwest corner of the site and a high elevation of 428 feet in the northeast corner. The vegetation on the site are landscaped areas with trees in planters and grass.

Stormwater drainage:
According to the Oregon City's Stormwater preliminary drainage report "City records show an existing on-site stormwater system discharging to a pond on the property northwest of the site. If the storm discharge point remains the same, the viability of using the exiting on-site stormwater system for the new development must be evaluated. An easement will need to be acquired if none exists." If this pipe to offsite pond in the northwest corner is connected, this will be discontinued. At this point, it is unclear where all the existing onsite stormwater drainage piping discharges to, although ultimately discharging off-site through a public storm catchbasin to the detention pond. (**Appendix D**).

Groundwater:
The groundwater levels in the area appear to vary with surface elevations. There are sections where the groundwater is perched and found from approximately 5 to 20 feet bgs. Due to seasonal and annual variations in precipitation, the groundwater may fluctuate due to seasonal and annual variations (See **Appendix B** for Geotechnical Report).

Floodplain:
There are no flood plains within the project site as shown on the Flood Insurance Rate Map (FIRM) produced by the Federal Emergency Management Agency (FEMA) (**Appendix D**).

Downstream Analysis:
The site will utilize onsite stormwater management and will not require downstream analysis.

Offsite Analysis:
This stormwater system will not discharge offsite and not impact offsite property.

4.0 *Hydrology/Hydraulic Methodology*

Water Quality

In Accordance with the City of Oregon City's Water Quality Requirements: "Water quality facilities shall be designed to capture and treat 80 percent of the average annual runoff volume to the MEP with the goal if 70 percent total unsuspended volume removed. The treatment volume equates to a **water quality design storm of 1.0 inch over 24 hours"**.

The required water quality treatment is due to the following impervious surfaces; pavement, sidewalks, concrete walkways and building, all of which contribute to the runoff to the surface water system. The BMP sizing tool will address the water quality requirements. The site stormwater runoff will be treated and detained using a combined approach. The proposed stormwater design will incorporate two detention ponds which will be treated through a Contech water quality manhole. There will be stormwater detention ponds north of both of the proposed concrete aprons. There is a proposed bio swale located on the north side of the building, which will pre-treat the sheetflow coming from this area (See Detention Plan Sheet).

The stormwater will be released from the west pond through a water quality flow control structure and then be conveyed to existing stormwater pond. The two detention ponds have been designed to detain the water generated by a 25-year storm event in pre-developed conditions, in accordance with the City of Oregon City's Code. Refer to **Appendix A** for Water Quality Calculations and Contech Detail Plan (**Appendix C**).

Detention

The project is proposing no additional square footage of impervious surface. The additional impervious area is in the form of pavement, sidewalks and new building. The City of Oregon City requires the project to detain stormwater to pre-development stage, where it is assumed to be forested. We are proposing the use of two stormwater detention ponds. Pond 1 on the Western portion, has approximately 2307 s.f. of storage. On the Eastern portion, Pond 2 has an approximate total of 623 s.f. of storage, while the bioswale on the north side of the building is not being used for storage. The site was analyzed for the 25 and 100-year storm events. We will be controlling to the pre-developed 25-year event. The water quality flow control manhole downstream of the Ponds will restrict the outlet flows for the corresponding storm events by means of its standpipe with offices. The detention system has been designed to hold 0.5' of dead storage, in accordance with the City of Oregon City's code. We are detaining a combination of sheet flow from driveway, parking, sidewalk, and roof areas into Area A with an approximate total treated area of 7,512 s.f.. For Area B, will be detaining a combination of parking and drive for a total treated area of 36,175 s.f. For Area C, the 3,445 s.f. of sheetflow will be conveyed to the bio-swale for pre-treatment and then routed to Pond 1 for detention. On the western portion of the parcel - Area D consists of 11,406 s.f. of sheet flow, which will not be detained or treated, due to site constraints. The stormwater detention system has been designed for the 1.3 acres, providing 2,929 cf of detention storage. For the pre-devolved 25-year storm, we are required to detain to 0.60 cfs. We are detaining to 0.60 cfs. Thus, the site has been designed to detain to meet the City of Oregon City's Standards.

To begin the detention analysis the time of concentration, Tc, is needed for the developed and predeveloped conditions. The time of concentration for the predeveloped condition on site is 30 minutes. The developed time of concentration on site is 4.86 minutes for an added factor of safety. Please refer to the time of concentration exhibits.

Using the impervious areas, soils conditions, Tc's, and precipitation it was possible to generate hydrographs using the Santa Barbara Urban Hydrograph method (**Appendix A**).

Through the use of catch basins, underground detention, the requirements for water quality and detention have been met as shown in attached calculations.

Conveyance

A conveyance system includes all portions of the surface water system, either natural or manmade, that transport storm and surface water runoff. The purpose of the conveyance system is to drain surface water from properties, up to a specific design flow, so as to provide protection of property and the environment form flooding and erosion. The conveyance system is designed to transport water flowing onto the site from upstream areas and the runoff produced on-site.

The proposed on-site conveyance system for the Fire Station #16 consists of a series of manholes, catch basins, underground pipes, and above ground detention system (2 ponds) and bio-swale, as shown on the Detention Site Plan (**Appendix D**). The runoff will be discharged to the existing drainage system in Molalla Avenue (**Exhibit 8**).

5.0 Regulatory Design Criteria

The required stormwater quantity management criteria are summarized below.
The allowable stormwater discharge rate for the following design storms is as follows:

- The stormwater discharge for 25-year, 24- hour duration design storm event for the post developed condition will not exceed of the calculated discharge of the pre-development peak stormwater runoff rate for the 25 year storm event.
- The stormwater discharge for 100-year, 24- hour duration design storm event for the post developed condition has been evaluated to be conveyed hydraulically without flooding risk to the Fire Station.

The design storms are based on the standard SCS Type 1A rainfall distribution with a 24- hour distribution and a total depth 4.0" (25-year), and 4.5" (100-year).

6.0 Stormwater Quality Management Criteria

The required stormwater quality management criteria are summarized below:

Ownership and Maintenance
Water quality for the development will be installed as a privately maintained system. The system will treat storm water from private building site areas and for public roadways. Accordingly, the developer will provide the City of Oregon City an access easement to maintain these private

storm water quality facilities should it become necessary. Otherwise the operation and ownership of storm water quality facilities will be the responsibility of the developer. An operations and management manual for the storm water facilities will be provide to the City during final engineering design and before the issuance of building permits (**Appendix C**).

7.0 Methodology

- Drainage at existing site: Currently, all site storm water drainage discharges off-site through public catch basins and transmission storm piping to the storm pipe system.

- Infiltration test results indicate the type of soils and perched water table make infiltration onsite impracticable (see GeoTechnical report **Appendix B**).

- All stormwater runoff will be discharged through the detention ponds and for water quality manhole. Stormwater that falls within the public ROW of Molalla Avenue will sheet flow to existing public inlet structures.

8.0 Analysis

- Design Assumptions:

a. Design Storms Used – 25 and 100 year SCS Type 1A storm (4.00 and 4.50 in/24 hrs., respectively).

b. Computation Methods – Santa Barbara Urban Hydrograph for runoff. Manning's equation used for Sheet flow/Asphalt is 0.015 and for pipe 0.011.

c. Software Used - HydroCAD 10.00-16 s/n 05225 - 2015 HydroCAD Software Solutions LLC. (See Appendix for HydroCAD Output)

d. Specific Parameters set in HydroCAD
   i. Curve number used:
   CN of 98 for post-development conditions and a CN of 86 for pre-developed conditions.
   ii. Time of concentration (Tc) for all post-development hydrologic calculations is 5 minutes.

- Site Constraints:
Geotechnical considerations according to Carlson Geotechnical – "The presence of potentially expansive fat clays at the proposed foundation and pavement subgrade depth, the presence of relatively shallow groundwater level at the site, the presence of near-surface, moisture-sensitive soils that are susceptible to disturbance during wet weather, this includes both sandy fat clay (CH) as well as the clayey sand (SC). The site will be designed to meet these site constrains.

Table 1.0 Catchment and Facility Summary

Catchment or Facility ID	IA Type (roof, road)	Impervious Area (s.f.)	Ownership (private / public)	Size (sf or ac)	CN
Pond 1	roof, road, sidewalk	7,512	Private	622	98
Pond 2	roof, road, sidewalk	36,175	Private	2300	98
Bio-Swale	road	3,445	Private	576	98

9.0 Storm Water Standards

The site is subject to the rules and regulations of the City of Oregon City, Clackamas County, Oregon. Storm water quality is required for all new or redeveloped impervious surfaces exceeding 5000 SF. Pollution reduction and flow control requirements must be met using vegetated facilities to the maximum extent feasible. Infiltration testing onsite has been very poor for infiltration, therefore offsite discharge of stormwater is anticipated.

Based on our analysis, the following constraints have been identified (See 8.0 Analysis).Therefore, detention is required. The actual calculations and analysis can be found in HydroCAD Report.

10.0 Summary Hydrology

The onsite storm system consists of conveyance pipes, stormwater detention ponds and a bioswale. The conveyance pipes carry runoff from the roof drains, sidewalks, parking and driveways to the 2 ponds (**Appendix D**) and leaving site through a water quality manhole to the public conveyance system.

The following table shows the runoff quantities and water surface elevations generated for the 25-year and 100–year storm as calculated by HydroCAD using the Santa Barbara Urban Hydrograph methodology. Input and results appear in **Appendix A**.

Table 2.0 – Summary of Stormwater Detention Flow Rates

Design Storm	Pre-Developed Conditions	Release Rate **With** the Proposed Stormwater Detention Facilities – Post Development
25-year	0.60	0.60
100-year	0.72	0.63

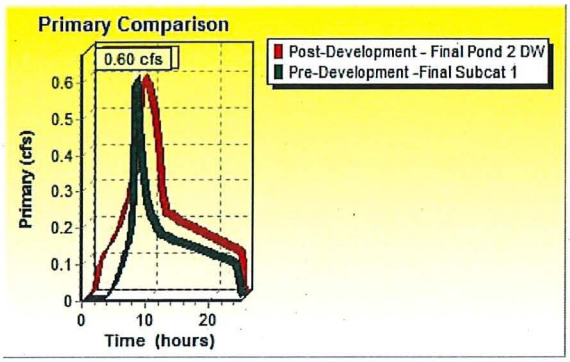


Table 3.0 – Pre-developed Flow Rates

Pre-Development Flow Rates

Facility ID	25-yr	100 yr	CN	Tc
	Pre Development	Pre Development	Pre 86	Pre 30 min
Inflow Area	1.34 ac	1.34 ac		
Runoff Volume (af)	0.284	0.335		
Runoff Depth	>2.54"	>3.0"		
Outflow cfs	0.60	0.72		

Table 4.0 – Post Construction Flow Rates

Post Construction Flow Rates

Facility ID	25 yr	100 yr	CN	Tc
	Post Development	Post Development	Post 98	Post 4.8 min
Inflow Area	1.34 ac	1.34 ac		
Peak Elevation	416.53	416.78		
Storage (cf)	1,432	1,781		
Inflow (cfs)	1.14	1.30		
Outflow (cfs)	0.60	0.63		

11.0 Engineering Conclusions

The use of infiltration is impracticable for this site given the Geotechnical Report attached, therefore the stormwater must be detained and treated as per the City's requirements. Using the above described BMP's, the site fully complies with the performance hierarchy criteria described the City's Stormwater Management Manual.

12.0 Stormwater Facility Details and Exhibits

- See Appendix D

13.0 Draft Operations and Maintenance Plan and O&M

- See Appendix D

14.0 Design Parameters

a. The 24 hour standard SCS Type 1A storm was used to determine runoff from the site. The 24 hour rainfall amounts are: (Ref Oregon Climatic Service) (**Appendix D**).

Table 4.0 – 24 hr Rain Data for Zone 8

WQ	24-Hr
2 yr	2.80 in
10 yr	3.45 in
25 yr	4.00 in
100 yr	4.50 in

b. **Exhibit 5** includes the soil data information from the Soil Survey of Clackamas County. The following soil types are present on the site and are used to determine hydrologic runoff CN numbers.

Table 5.0 – Summary of Soils Data

Map Symbol	Soil Name and Map Symbol	Hydrologic Group
8B	Bornstedt variant	D

15.0 Calculation Methodology

a. *Storm Event Runoff.* The Santa Barbara Urban Hydrograph methodology is used to calculate developed runoff hydrographs based on hydraulic parameters developed from the topography, soils information, survey and design information. HydroCad 10.00, a computer software hydrology program is used to complete the calculations and provide graphical outputs.

The developed conditions model is shown in Exhibit 10, page 17. Utilizing SBUH methodology, total runoff for the 25 and 100 year storm was calculated and conveyed to the 2 detention ponds and a water quality manhole.

16.0 References

City of Oregon City, Clackamas County, Oregon (August 2016)

USDA-SCS *Soil Survey of Clackamas County Area, Oregon,* Version 13, Sept 18, 2015.

Hydro Cad 10.00, Hydrology Modeling Software, ©2015, HydroCad Software Solutions LLC

National Oceanic Atmospheric Administration 24 hour Isopluvial, 2-100 year maps, NOAA Atlas 2, Vol X.

APPENDIX A

Exhibit 1 – Vicinity Map
Proposed Fire Station # 16
19340 Molalla Avenue
Oregon City, Oregon

Oregon City GIS Map



Legend

Contours (2ft) - 1:3,600 and closer

- 10 foot
- 2 foot
- Taxlots
- City Limits
- UGB

Notes

Firestate #16 Vicinity Map

Overview Map



0 200 400 Feet

1: 2,400

N

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Exhibit 2 – USGS Map

Oregon City Quadrangle

USGS
science for a changing world

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

The National Map
US Topo

OREGON CITY QUADRANGLE
OREGON-CLACKAMAS CO.
7.5-MINUTE SERIES



Produced by the United States Geological Survey
North American Datum of 1983 (NAD83)
World Geodetic System of 1984 (WGS84). Projection and 1 000-meter grid: Universal Transverse Mercator, Zone 10T
10 000-foot ticks: Oregon Coordinate System of 1983 (north zone)

This map is not a legal document. Boundaries may be generalized for this map scale. Private lands within government reservations may not be shown. Obtain permission before entering private lands.

Imagery.....NAIP, October 2014
Roads..... U.S. Census Bureau, 2015 - 2016
Names.....GNIS, 2016
Hydrography.....National Hydrography Dataset, 2014
Contours.....National Elevation Dataset, 2009
Boundaries.....Multiple sources; see metadata file 1972 - 2016
Public Land Survey System.....BLM, 2016
Wetlands.....FWS National Wetlands Inventory 1977 - 2014

UTM GRID AND 2017 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET
MN 15° 21' 273 MILS
GN 0° 19' 6 MILS

U.S. National Grid
100,000-m Square ID
ER
Grid Zone Designation
10T

SCALE 1:24 000
1 0.5 0 KILOMETERS 1 2
1000 500 0 METERS 1000 2000
1 0.5 0 1
MILES
1000 0 1000 2000 3000 4000 5000 6000 7000 8000 9000 10000
FEET

CONTOUR INTERVAL 10 FEET
NORTH AMERICAN VERTICAL DATUM OF 1988

This map was produced to conform with the National Geospatial Program US Topo Product Standard, 2011.
A metadata file associated with this product is draft version 0.6.19



QUADRANGLE LOCATION

ROAD CLASSIFICATION
Expressway
Secondary Hwy
Ramp
Local Connector
Local Road
4WD
Interstate Route
US Route
State Route

1	2	3
4		5
6	7	8

1 Lake Oswego
2 Gladstone
3 Damascus
4 Canby
5 Redland
6 Yoder
7 Molalla
8 Colton
ADJOINING QUADRANGLES

OREGON CITY, OR
2017

USGS-NGA REF NO. USGSX24K711129

Exhibit 3 – 2016 Aerial Photo Map

Oregon City GIS Map



Legend

- Taxlots
- City Limits
- UGB

Notes

Firestate #16 Site Map

Overview Map



0 200 400 Feet

1: 2,400

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Exhibit 4 – Tax Map

T3S, R2E, Sec 09, TL 1601, WM

This map was prepared for assessment purpose only.

NW1/4 SEC. 9 T.3S. R.2E. W.M.
CLACKAMAS COUNTY
1"= 200'

3 2E 9B

D.L.C.'S
ROBERT CAUFIELD NO. 53
WASHINGTON WILLIAMS NO. 56
J.G. SWAFFORD UNRECORDED

CANCELLED
590 290 201 204
890 801 300 205
1503 306 206
100 490 260
202 200 270
303 1602 280 1600
304 1801 301 1700
305 1901 302 1800
1505 1100 600 1800EI
401 1507 1204 1900
203 701 1500AI
501 2000 897
2001
1301
501
1701
1201EI

13800 | 14100 | 19000 | 19300

SEE MAP 3 2E 4C

BEAVERCREEK RD.

MARKET ROAD NO. 1

HAPPELAME RD.

P. PLAT 2008-072

SW. COR. SWAFFORD UNREC.
NW. COR. D.L.C. NO. 56

SEE MAP 3 2E 5D

PARCEL 5
PARCEL 4
PARCEL 3
PARCEL 1
PARCEL 2

FIR ST.

HWY 213

SEE MAP 3 2E 9A

3 2E 9BA

END

FIR STREET

VANCE W. WILLIAMS D.L.C. NO. 56

CLACKAMAS ACREAGE TRACTS NO. 3

EAST LINE SAMUEL WEST LINE

MARKET ROAD NO. 1

SW COR. D.L.C. NO. 56

N. NW COR. D.L.C. NO. 53

SEE MAP 3 2E 8A

S. LINE WASHINGTON WILLIAMS D.L.C. NO. 56

N. LINE ROBERT CAUFIELD D.L.C. NO. 53

TAX LOTTED ON MAP 3 2E 8A

TAX LOTTED ON MAP 3 2E 09C
(PT. 3 2E 09C TAX LOT 800)

MONTAVILLA AVE.

TRAILS

STATE OF OREGON
Letter 8-11-86

SEE MAP 3 2E 9C

Approx. C1/4 Cor.

S.E. COR. DLC 44

P. P. 1997 - 96

62-02

P. P. 2004-029

1000 1000AI 2.40Ac. 13823 13825 13929
900 3.02Ac. 13983 900MI
1101 4.77Ac. 13895
1202 0.74Ac.
1201 0.80Ac.
1203 0.68Ac. 13821
1200 0.27Ac. 13833
1400 0.77Ac. 19170 19172
1401 0.54Ac.
1300 0.26Ac. 19138
1302 0.36Ac. 19134
1303 19136 .53Ac.
1502 1.02Ac. 19212
1500 4.14Ac. 13896 19216 19222 19226
1501 3.66Ac. 19300 PARCEL 1 (2.36 Ac.)
1508 6.50Ac. 13970
1504 1504AI 5.01Ac. 13950
1506 15.29 Ac.
1601 1.27Ac. 19340
2100 2.62Ac. 19352 19360 19376 19368
2001
807 1.30Ac. 14178
808 14164 1.31Ac.
805
804
700 14151
307 0.98Ac.
800 1.73Ac. 14188 14001
806 0.85Ac. 14210
809 1.05Ac. 14214
500 500MI 14192
400 400AI 2.13Ac.

BNDRY AGRMNT 2008-060498

3 2E 9B

Exhibit 5 – Soils Survey Map

Map Unit 8B – Bornstedt silt loam, 0-8 percent slopes

Soil Map—Clackamas County Area, Oregon
(19340 Molalla Ave, Oregon City, Oregon)



Map Scale: 1:891 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Clackamas County Area, Oregon
Survey Area Data: Version 11, Sep 16, 2016

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

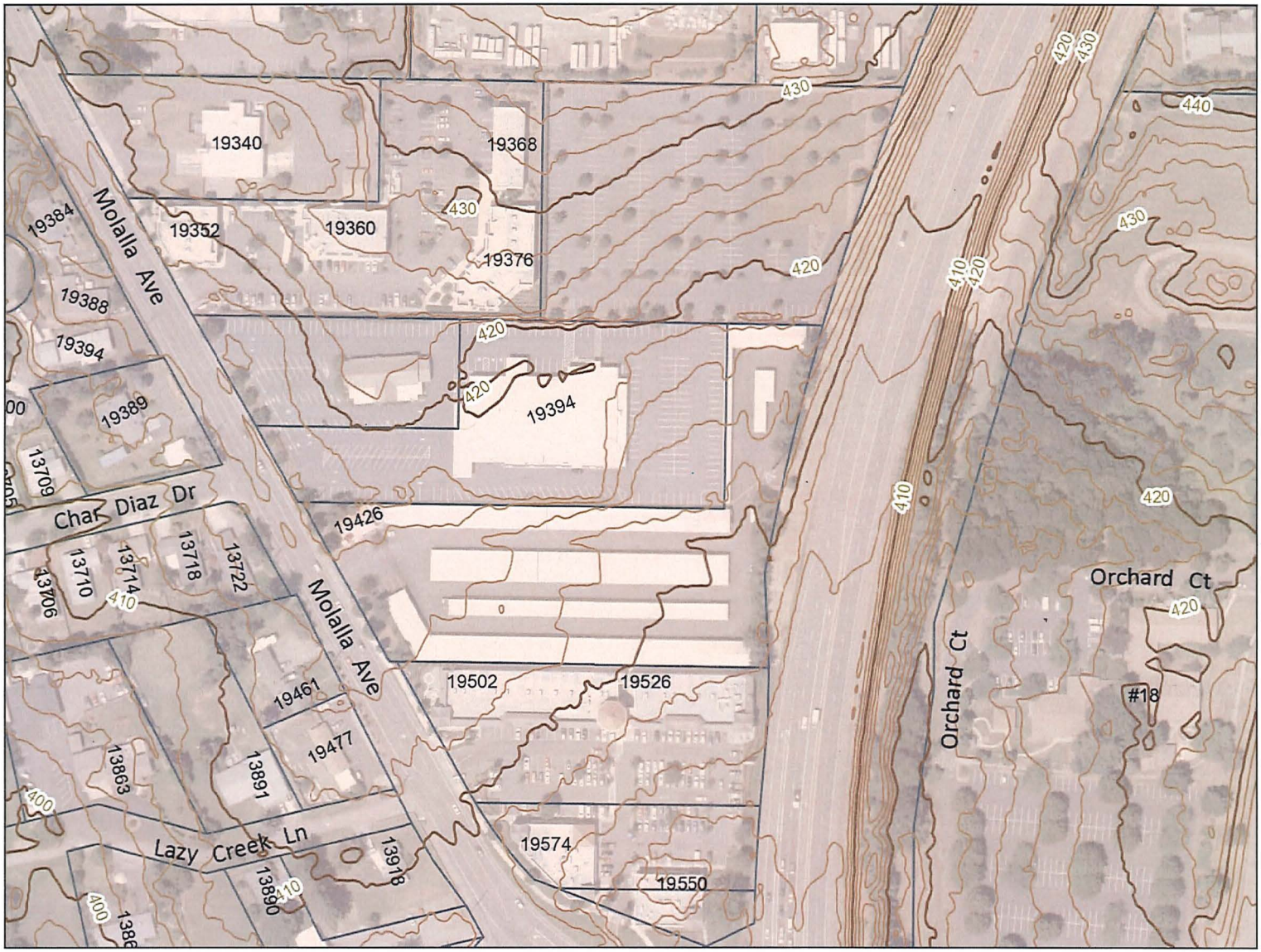
Date(s) aerial images were photographed: Jul 26, 2014—Sep 5, 2014

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Clackamas County Area, Oregon (OR610)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
8B	Bornstedt silt loam, 0 to 8 percent slopes	2.8	100.0%
Totals for Area of Interest		**2.8**	**100.0%**

Oregon City GIS Map



Legend

Contours (2ft) - 1:3,600 and closer

- 10 foot
- 2 foot

Taxlots

Soils (Perc Test)

- Cat 1 - Perc Test Req
- Cat 2 - Med Perc
- Cat 3 - Marginal Perc

City Limits

UGB

Notes

Firestate #16 Soils Perc Test Map

Overview Map



0 200 400 Feet

1: 2,400

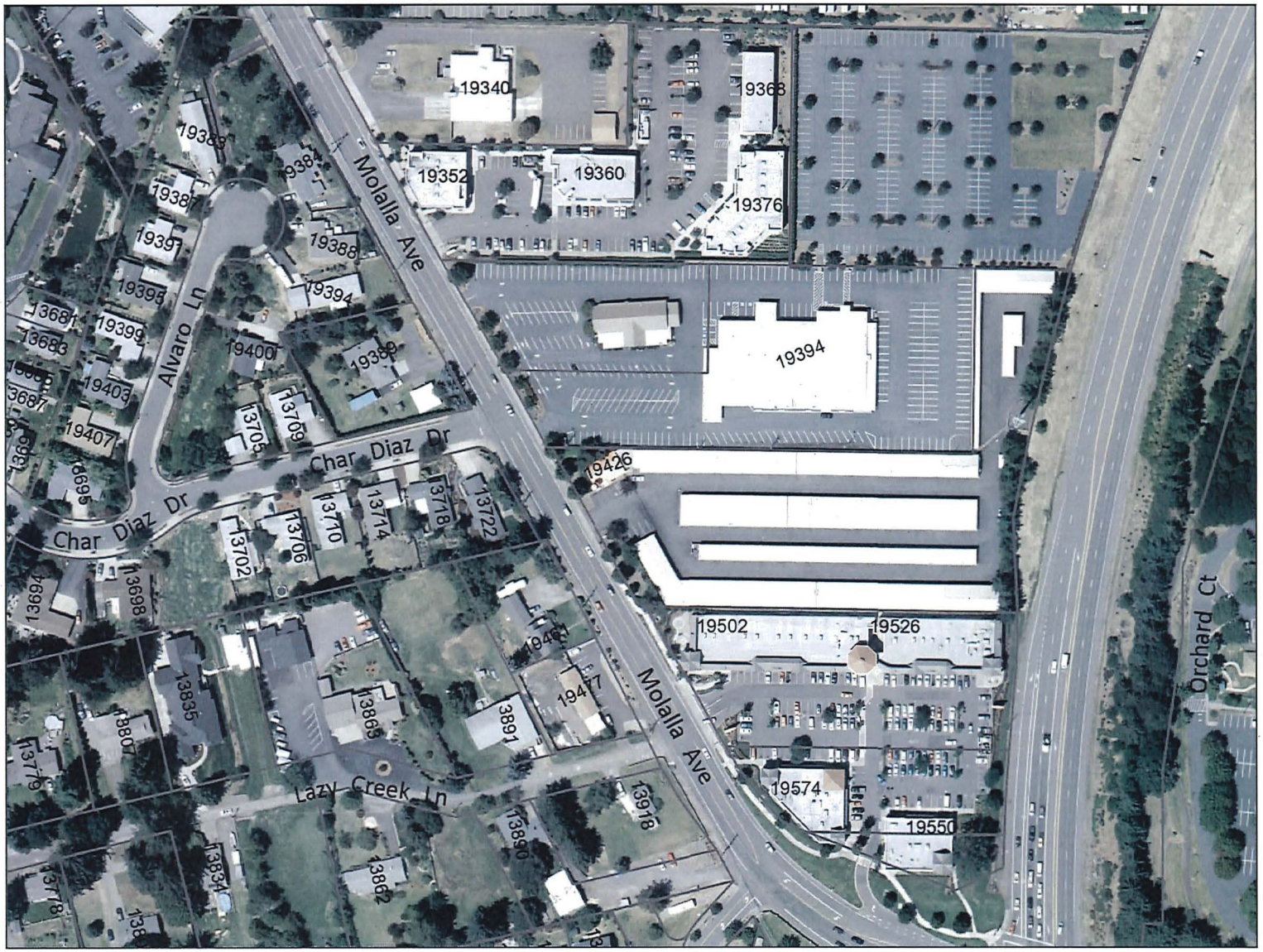
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Exhibit 6 – Flood Map

Oregon City GIS Map



Legend

- Taxlots
- 1996 Flood Inundation
- FEMA 2008 - Base Flood Elevation
- FEMA 2008 - Floodway
- FEMA 2008 - 100 yr Floodplain
- FEMA 2008 - 500 yr Floodplain
- City Limits
- UGB

Notes

Firestate #16 Flood Map

Overview Map



0 200 400 Feet

1: 2,400

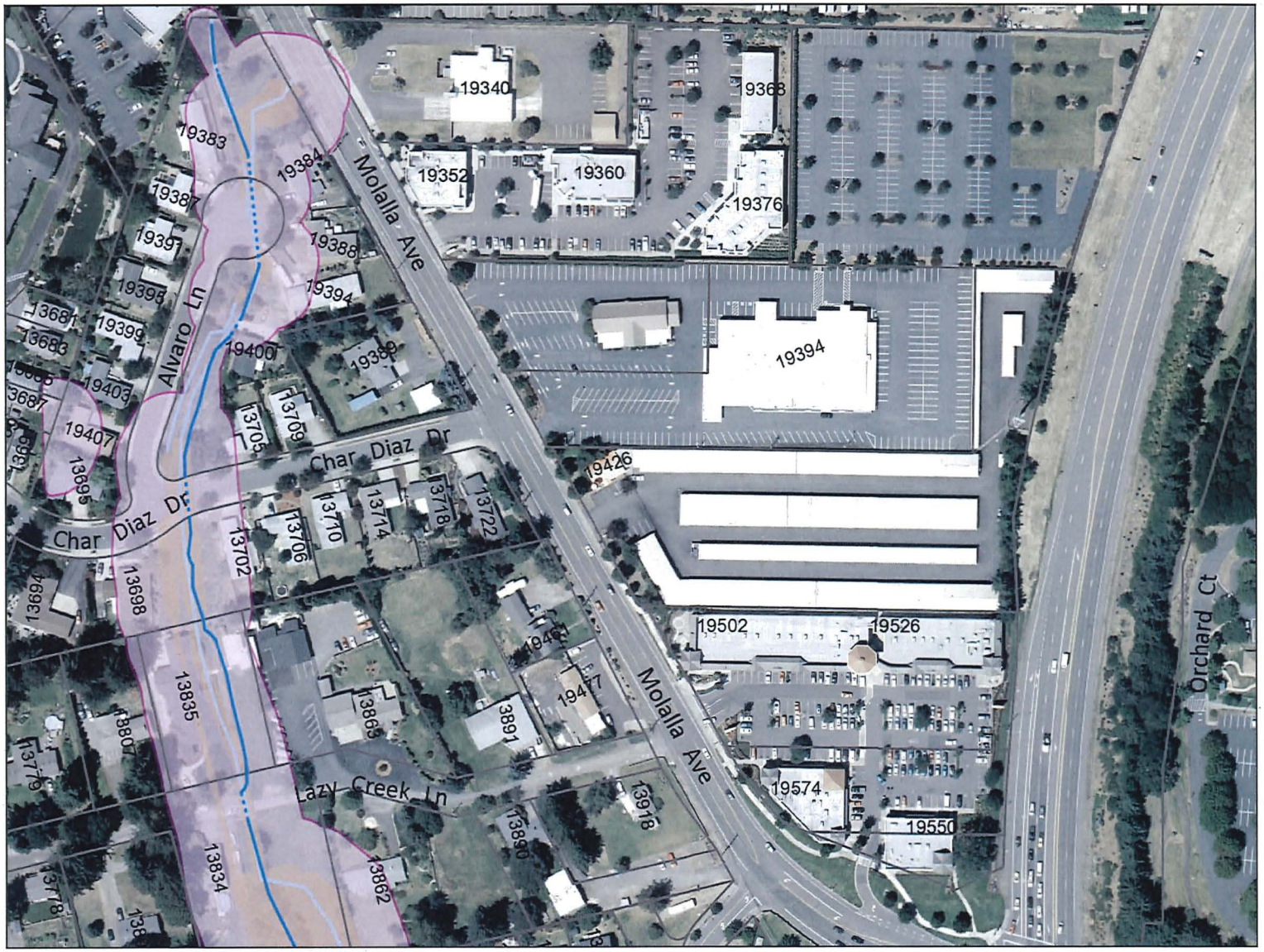
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Exhibit 7 – Natural Overlay Map

Oregon City GIS Map



Legend

- Streams
  - Above Ground
  - Below Ground
- Taxlots
- NROD - Natural Resource Overlay Dist
- Title 3 - Streams
- Title 3 - Wetlands
- City Limits
- UGB

Notes

Firestate #16 Nat. Resources Overlay Map

Overview Map



0 200 400 Feet

1: 2,400

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Exhibit 8– Existing Utilities Map

Oregon City GIS Map



Legend

Contours (2ft) - 1:3,600 and closer
- 10 foot
- 2 foot

Taxlots

Water Hydrants

Water Pipes (City Owned)

Sewer Structures (City Owned)

Sewer Pipes (City Owned)
- Gravity Line
- Force Main
- Outfall

Storm Structures (City Owned)
- Manhole
- Inlet
- Outlet

Storm Conduits (City Owned)
- Pipe
- Culvert
- Ditch

Notes

Firestate #16 Existing Utilities Map

Overview Map



0 200 400 Feet

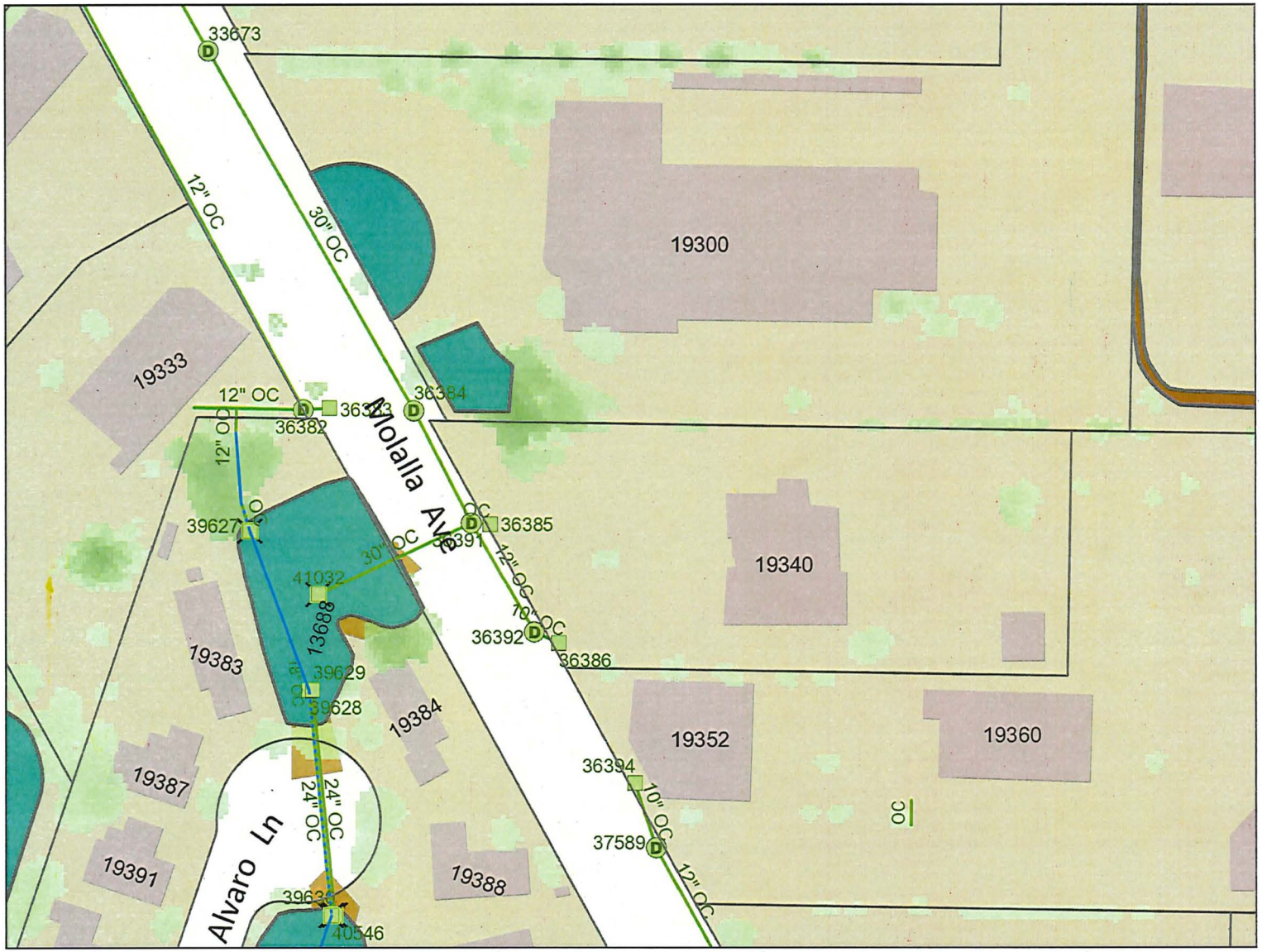
1: 2,400

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Map created 4/10/2017

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Combined



Legend

- Streams
  - Above Ground
  - Below Ground
- Taxlots
- Taxlots (Outside UGB)
- Unimproved ROW
- Storm Structures (City Owned)
  - Manhole
  - Inlet
  - Outlet
- Storm Conduits (City Owned)
  - Pipe
  - Culvert
  - Ditch
  - Detention Tank
- Storm Ponds
  - Pond
  - Swale
  - Man-Made Wetland

Notes

Overview Map



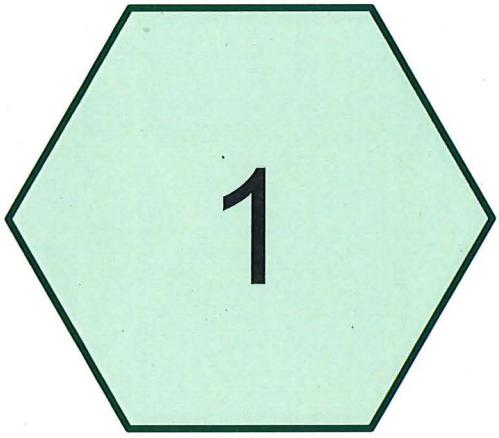
0 100 200 Feet

1: 1,200

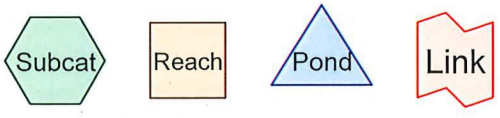
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Map created 3/14/2017

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Fire Station #16
Pre-Dev



Routing Diagram for 16875 Fire Station - Pre-Development -Final
Prepared by Hewlett-Packard Company, Printed 4/14/2017
HydroCAD® 10.00-16 s/n 05225 © 2015 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
1.340	86	Forested (1)
1.340	**86**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
1.340	Other	1
1.340		**TOTAL AREA**

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	1.340	1.340	Forested	1
0.000	**0.000**	**0.000**	**0.000**	**1.340**	**1.340**	**TOTAL AREA**	

Time span=0.00-25.00 hrs, dt=0.03 hrs, 834 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Fire Station #16 Pre-Dev Runoff Area=1.340 ac 0.00% Impervious Runoff Depth>2.54"
Flow Length=200' Slope=0.0200 '/' Tc=30.0 min CN=86/0 Runoff=0.60 cfs 0.284 af

Total Runoff Area = 1.340 ac Runoff Volume = 0.284 af Average Runoff Depth = 2.54"
100.00% Pervious = 1.340 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1: Fire Station #16 Pre-Dev

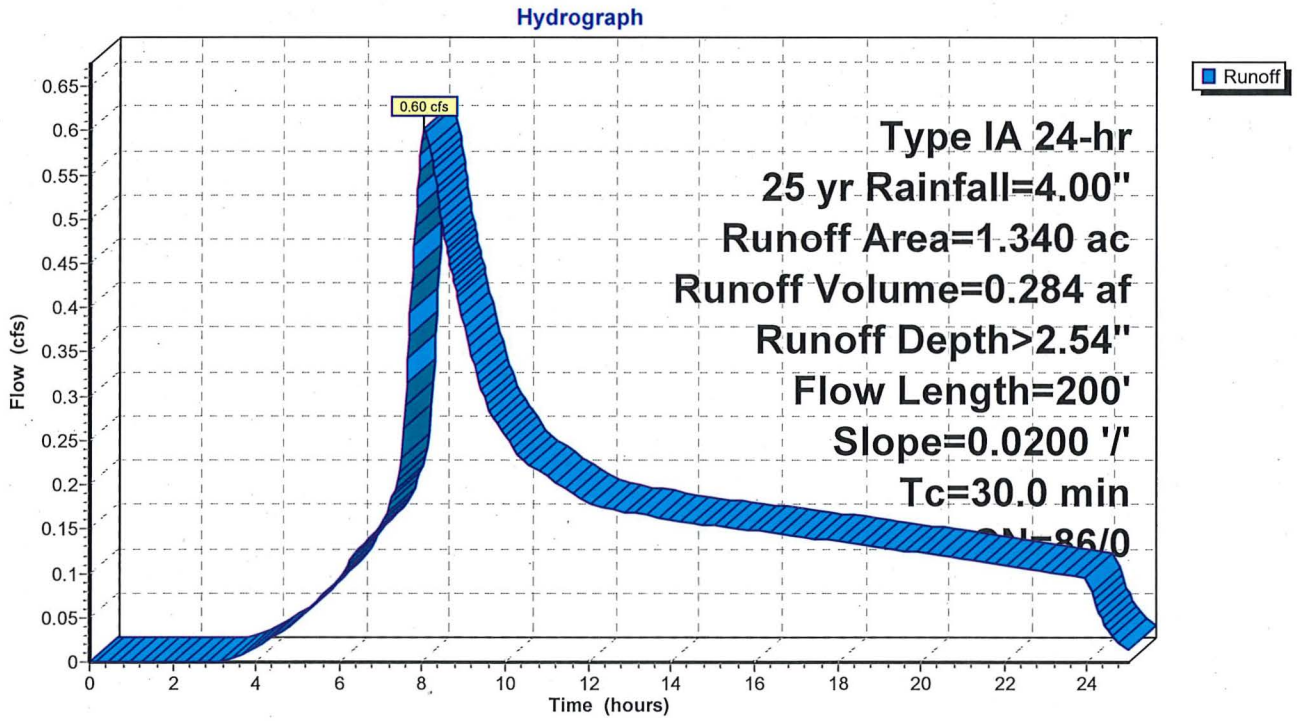
Runoff = 0.60 cfs @ 8.04 hrs, Volume= 0.284 af, Depth> 2.54"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.99 hrs, dt= 0.03 hrs
Type IA 24-hr 25 yr Rainfall=4.00"

	Area (ac)	CN	Description
*	1.340	86	Forested
	1.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0	200	0.0200	0.11		**Sheet Flow, Sheet** n= 0.280 P2= 2.80"

Subcatchment 1: Fire Station #16 Pre-Dev



Time span=0.00-25.00 hrs, dt=0.03 hrs, 834 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Fire Station #16 Pre-Dev Runoff Area=1.340 ac 0.00% Impervious Runoff Depth>3.00"
Flow Length=200' Slope=0.0200 '/' Tc=30.0 min CN=86/0 Runoff=0.72 cfs 0.335 af

Total Runoff Area = 1.340 ac Runoff Volume = 0.335 af Average Runoff Depth = 3.00"
100.00% Pervious = 1.340 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1: Fire Station #16 Pre-Dev

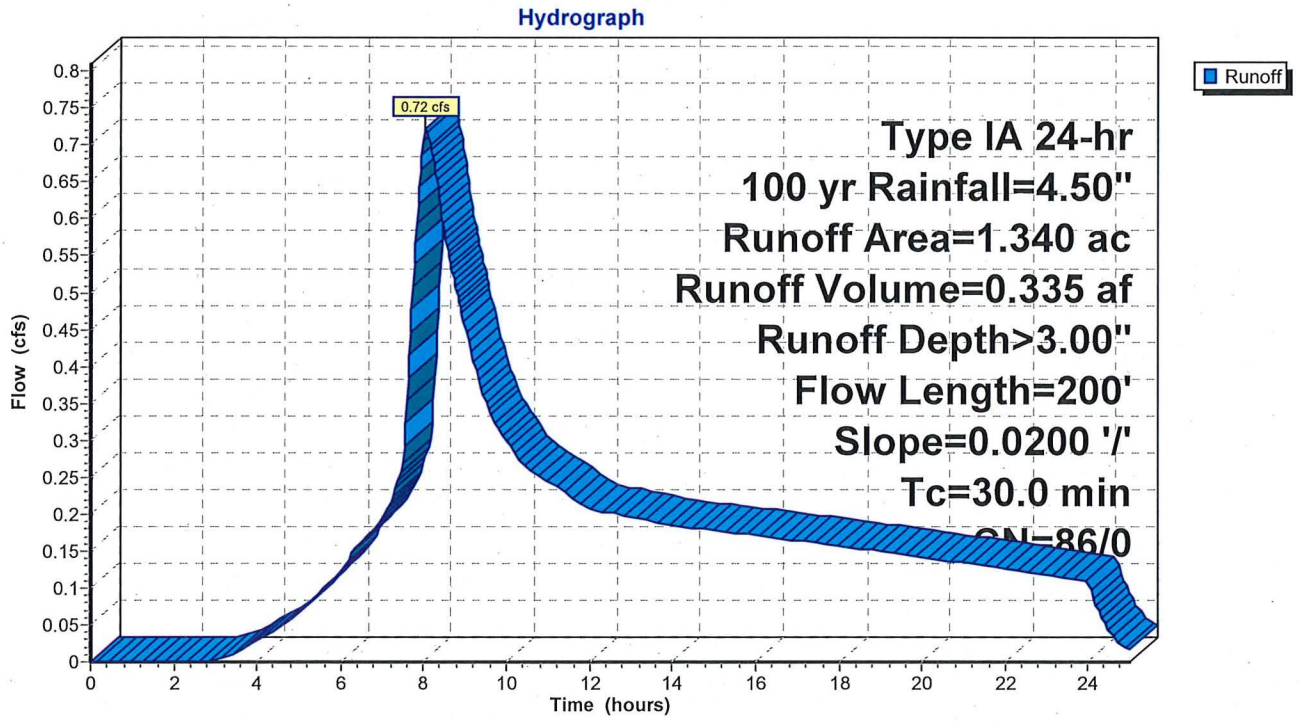
Runoff = 0.72 cfs @ 8.04 hrs, Volume= 0.335 af, Depth> 3.00"

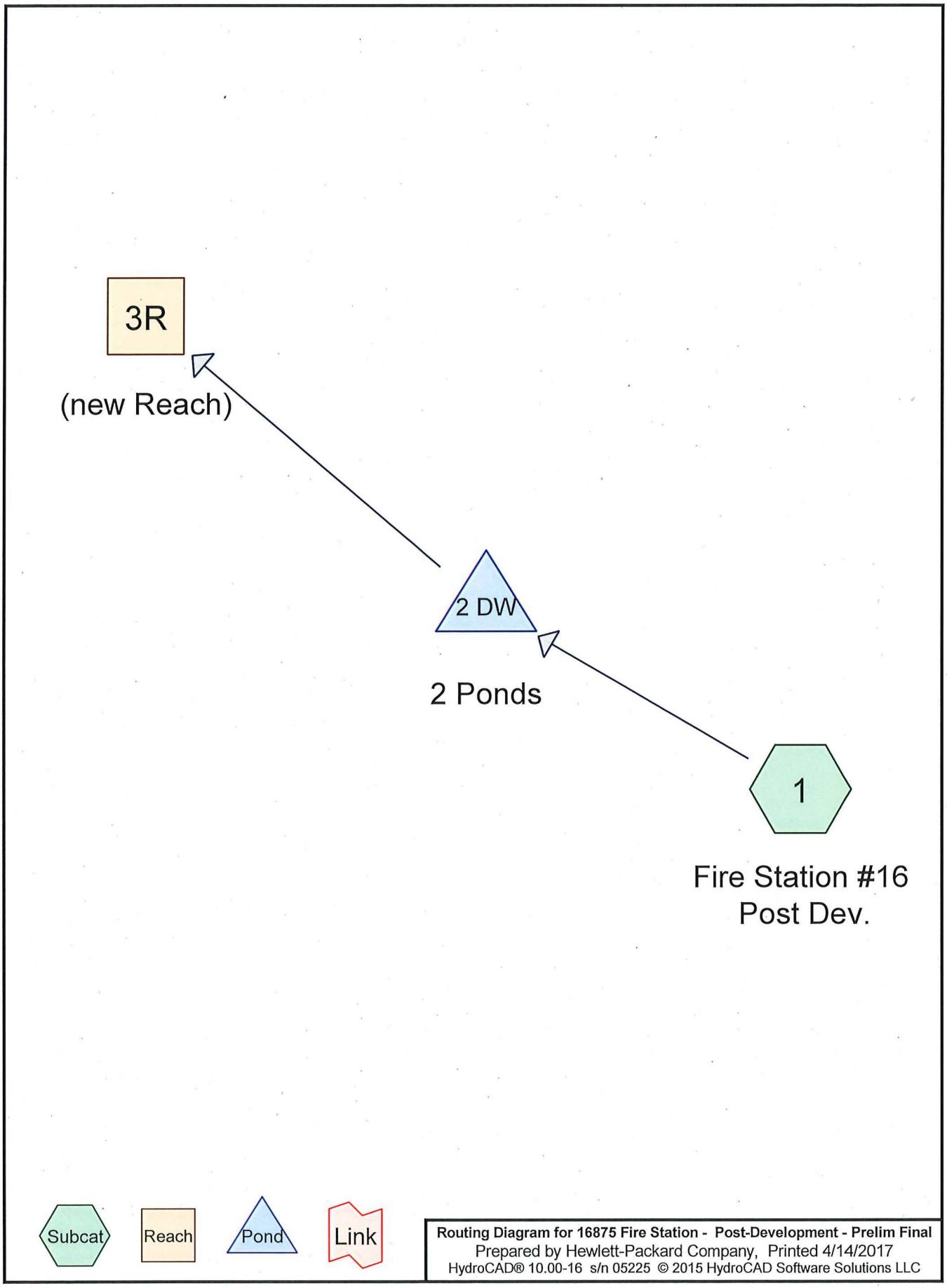
Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.99 hrs, dt= 0.03 hrs
Type IA 24-hr 100 yr Rainfall=4.50"

	Area (ac)	CN	Description
*	1.340	86	Forested
	1.340		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
30.0	200	0.0200	0.11		**Sheet Flow, Sheet** n= 0.280 P2= 2.80"

Subcatchment 1: Fire Station #16 Pre-Dev





Routing Diagram for 16875 Fire Station - Post-Development - Prelim Final
Prepared by Hewlett-Packard Company, Printed 4/14/2017
HydroCAD® 10.00-16 s/n 05225 © 2015 HydroCAD Software Solutions LLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.280	86	20% Landscape (1)
1.060	98	Developed Area - Impervious (1)
1.340	**95**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
1.340	Other	1
1.340		**TOTAL AREA**

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	0.280	0.280	20% Landscape	1
0.000	0.000	0.000	0.000	1.060	1.060	Developed Area - Impervious	1
0.000	**0.000**	**0.000**	**0.000**	**1.340**	**1.340**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	3R	413.50	412.00	100.0	0.0150	0.011	12.0	0.0	0.0

Time span=0.00-25.00 hrs, dt=0.03 hrs, 834 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Fire Station #16 Post Dev. Runoff Area=1.340 ac 79.10% Impervious Runoff Depth=3.41"
Flow Length=350' Slope=0.0200 '/' Tc=5.0 min CN=86/98 Runoff=1.14 cfs 0.381 af

Reach 3R: (new Reach) Avg. Flow Depth=0.23' Max Vel=4.38 fps Inflow=0.60 cfs 0.379 af
12.0" Round Pipe n=0.011 L=100.0' S=0.0150 '/' Capacity=5.16 cfs Outflow=0.60 cfs 0.379 af

Pond 2 DW: 2 Ponds Peak Elev=416.53' Storage=1,432 cf Inflow=1.14 cfs 0.381 af
Outflow=0.60 cfs 0.379 af

Total Runoff Area = 1.340 ac Runoff Volume = 0.381 af Average Runoff Depth = 3.41"
20.90% Pervious = 0.280 ac 79.10% Impervious = 1.060 ac

Summary for Subcatchment 1: Fire Station #16 Post Dev.

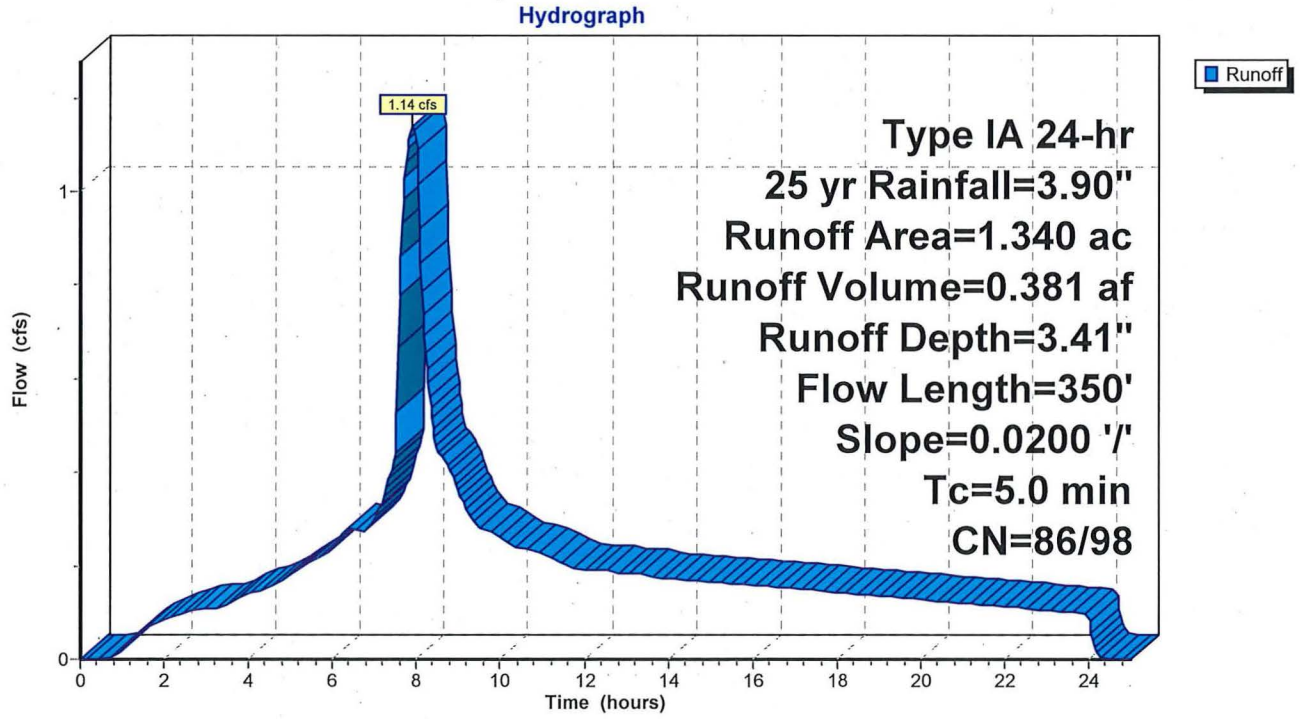
Runoff = 1.14 cfs @ 7.90 hrs, Volume= 0.381 af, Depth= 3.41"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.99 hrs, dt= 0.03 hrs
Type IA 24-hr 25 yr Rainfall=3.90"

	Area (ac)	CN	Description
*	0.280	86	20% Landscape
*	1.060	98	Developed Area - Impervious
	1.340	95	Weighted Average
	0.280		20.90% Pervious Area
	1.060		79.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	250	0.0200	1.21		**Sheet Flow, Sheet-Asphalt** n= 0.015 P2= 2.80"
1.3	100	0.0200	1.29		**Sheet Flow, Pipe** Smooth surfaces n= 0.011 P2= 2.80"
4.8	350	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1: Fire Station #16 Post Dev.



Summary for Reach 3R: (new Reach)

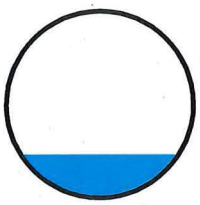
[52] Hint: Inlet/Outlet conditions not evaluated

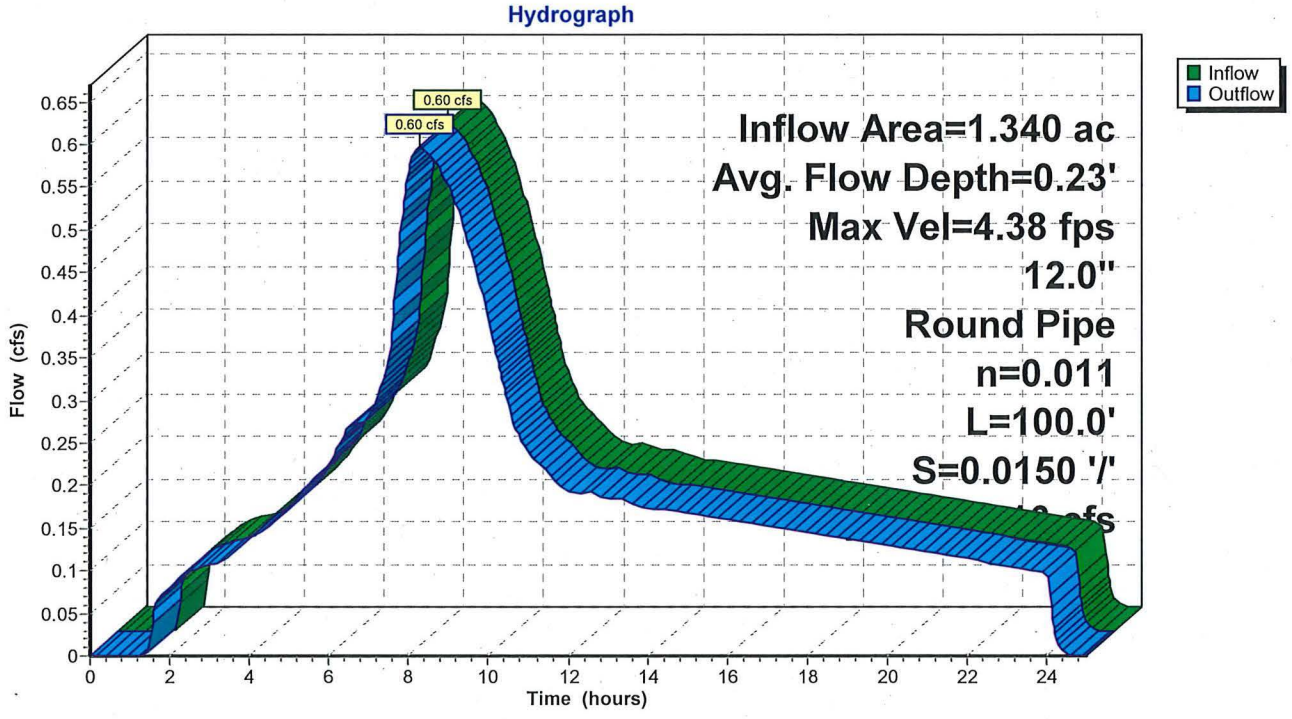
Inflow Area = 1.340 ac, 79.10% Impervious, Inflow Depth = 3.39" for 25 yr event
Inflow = 0.60 cfs @ 8.27 hrs, Volume= 0.379 af
Outflow = 0.60 cfs @ 8.29 hrs, Volume= 0.379 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.99 hrs, dt= 0.03 hrs
Max. Velocity= 4.38 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.02 fps, Avg. Travel Time= 0.6 min

Peak Storage= 14 cf @ 8.28 hrs
Average Depth at Peak Storage= 0.23'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.16 cfs

12.0" Round Pipe
n= 0.011 PVC, smooth interior
Length= 100.0' Slope= 0.0150 '/'
Inlet Invert= 413.50', Outlet Invert= 412.00'





Summary for Pond 2 DW: 2 Ponds

Inflow Area = 1.340 ac, 79.10% Impervious, Inflow Depth = 3.41" for 25 yr event
Inflow = 1.14 cfs @ 7.90 hrs, Volume= 0.381 af
Outflow = 0.60 cfs @ 8.27 hrs, Volume= 0.379 af, Atten= 48%, Lag= 22.7 min
Primary = 0.60 cfs @ 8.27 hrs, Volume= 0.379 af

Routing by Stor-Ind method, Time Span= 0.00-24.99 hrs, dt= 0.03 hrs / 2
Peak Elev= 416.53' @ 8.27 hrs Surf.Area= 1,286 sf Storage= 1,432 cf

Plug-Flow detention time= 18.9 min calculated for 0.379 af (99% of inflow)
Center-of-Mass det. time= 14.5 min (690.4 - 676.0)

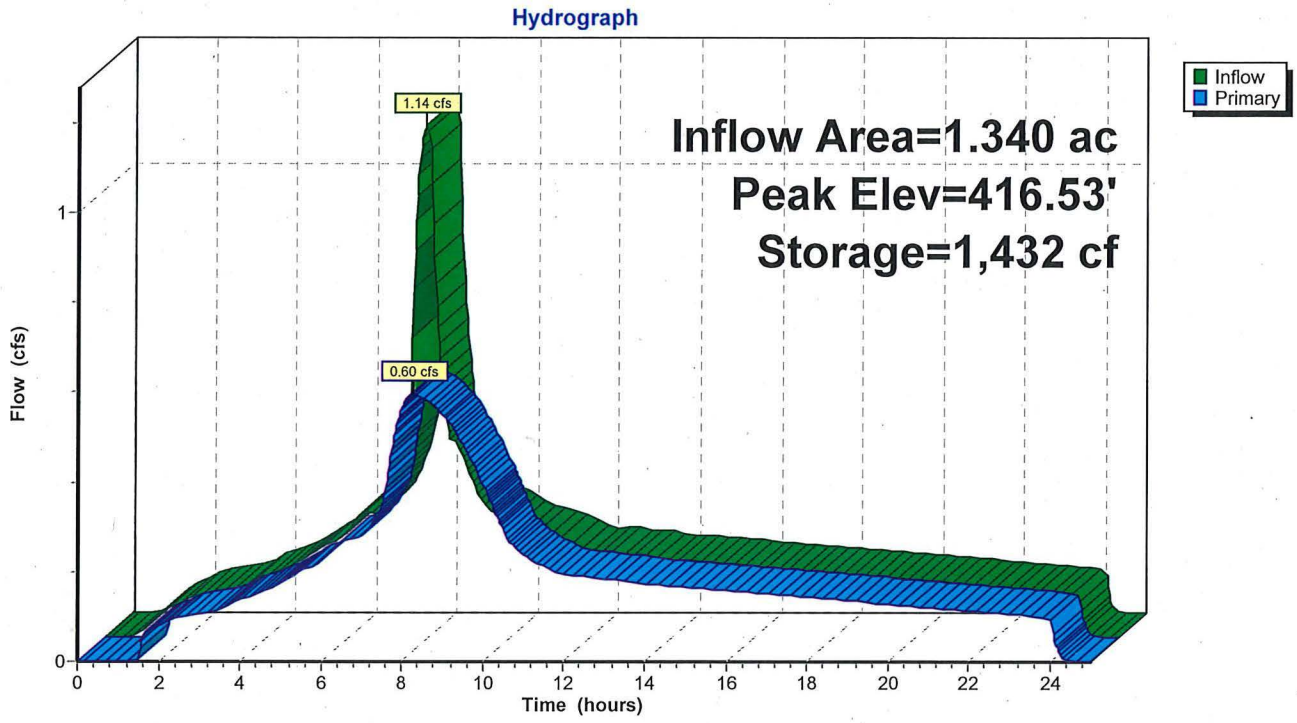
Volume	Invert	Avail.Storage	Storage Description
#1	413.00'	2,958 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
413.00	6	0	0
414.00	59	33	33
415.00	335	197	230
416.00	913	624	854
417.00	1,623	1,268	2,122
418.00	50	837	2,958

Device	Routing	Invert	Outlet Devices
#1	Primary	414.50'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	417.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.60 cfs @ 8.27 hrs HW=416.53' (Free Discharge)
└─**1=Orifice/Grate** (Orifice Controls 0.60 cfs @ 6.85 fps)
└─**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2 DW: 2 Ponds



Time span=0.00-25.00 hrs, dt=0.03 hrs, 834 points
Runoff by SBUH method, Split Pervious/Imperv.
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment 1: Fire Station #16 Post Dev. Runoff Area=1.340 ac 79.10% Impervious Runoff Depth=3.90"
Flow Length=350' Slope=0.0200 '/' Tc=5.0 min CN=86/98 Runoff=1.30 cfs 0.436 af

Reach 3R: (new Reach) Avg. Flow Depth=0.24' Max Vel=4.46 fps Inflow=0.63 cfs 0.434 af
12.0" Round Pipe n=0.011 L=100.0' S=0.0150 '/' Capacity=5.16 cfs Outflow=0.63 cfs 0.434 af

Pond 2 DW: 2 Ponds Peak Elev=416.78' Storage=1,781 cf Inflow=1.30 cfs 0.436 af
Outflow=0.63 cfs 0.434 af

Total Runoff Area = 1.340 ac Runoff Volume = 0.436 af Average Runoff Depth = 3.90"
20.90% Pervious = 0.280 ac 79.10% Impervious = 1.060 ac

Summary for Subcatchment 1: Fire Station #16 Post Dev.

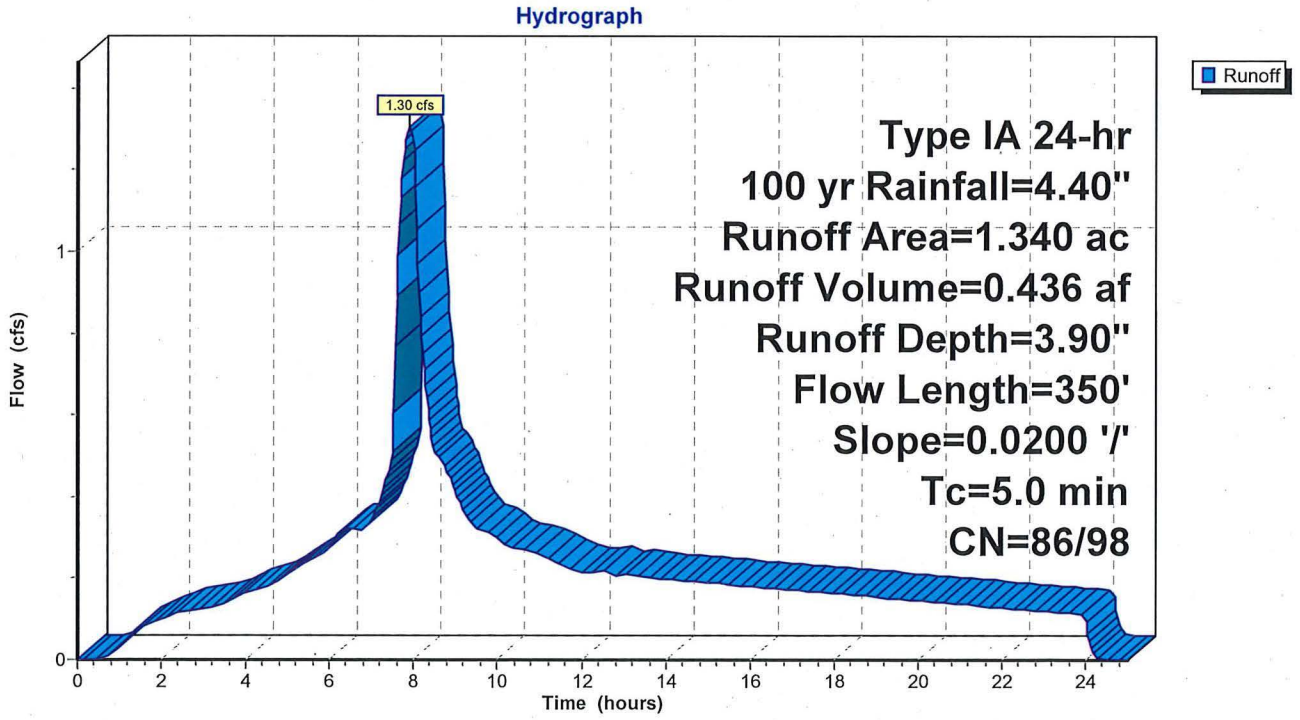
Runoff = 1.30 cfs @ 7.89 hrs, Volume= 0.436 af, Depth= 3.90"

Runoff by SBUH method, Split Pervious/Imperv., Time Span= 0.00-24.99 hrs, dt= 0.03 hrs
Type IA 24-hr 100 yr Rainfall=4.40"

	Area (ac)	CN	Description
*	0.280	86	20% Landscape
*	1.060	98	Developed Area - Impervious
	1.340	95	Weighted Average
	0.280		20.90% Pervious Area
	1.060		79.10% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.5	250	0.0200	1.21		**Sheet Flow, Sheet-Asphalt** n= 0.015 P2= 2.80"
1.3	100	0.0200	1.29		**Sheet Flow, Pipe** Smooth surfaces n= 0.011 P2= 2.80"
4.8	350	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1: Fire Station #16 Post Dev.



Summary for Reach 3R: (new Reach)

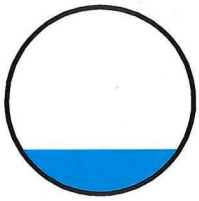
[52] Hint: Inlet/Outlet conditions not evaluated

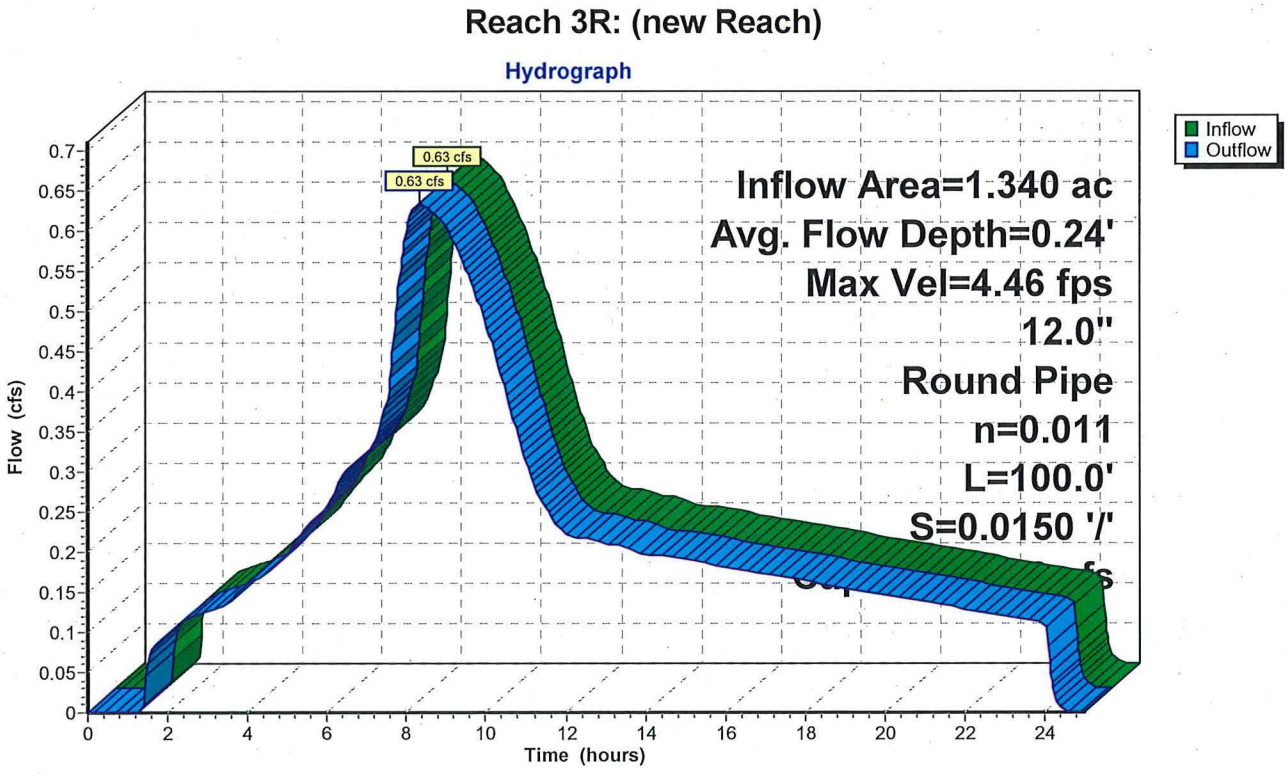
Inflow Area = 1.340 ac, 79.10% Impervious, Inflow Depth = 3.88" for 100 yr event
Inflow = 0.63 cfs @ 8.32 hrs, Volume= 0.434 af
Outflow = 0.63 cfs @ 8.33 hrs, Volume= 0.434 af, Atten= 0%, Lag= 0.7 min

Routing by Stor-Ind+Trans method, Time Span= 0.00-24.99 hrs, dt= 0.03 hrs
Max. Velocity= 4.46 fps, Min. Travel Time= 0.4 min
Avg. Velocity = 3.14 fps, Avg. Travel Time= 0.5 min

Peak Storage= 14 cf @ 8.32 hrs
Average Depth at Peak Storage= 0.24'
Bank-Full Depth= 1.00' Flow Area= 0.8 sf, Capacity= 5.16 cfs

12.0" Round Pipe
n= 0.011 PVC, smooth interior
Length= 100.0' Slope= 0.0150 '/'
Inlet Invert= 413.50', Outlet Invert= 412.00'





Summary for Pond 2 DW: 2 Ponds

Inflow Area = 1.340 ac, 79.10% Impervious, Inflow Depth = 3.90" for 100 yr event
Inflow = 1.30 cfs @ 7.89 hrs, Volume= 0.436 af
Outflow = 0.63 cfs @ 8.32 hrs, Volume= 0.434 af, Atten= 51%, Lag= 25.5 min
Primary = 0.63 cfs @ 8.32 hrs, Volume= 0.434 af

Routing by Stor-Ind method, Time Span= 0.00-24.99 hrs, dt= 0.03 hrs / 2
Peak Elev= 416.78' @ 8.32 hrs Surf.Area= 1,467 sf Storage= 1,781 cf

Plug-Flow detention time= 20.4 min calculated for 0.433 af (99% of inflow)
Center-of-Mass det. time= 16.5 min (689.2 - 672.7)

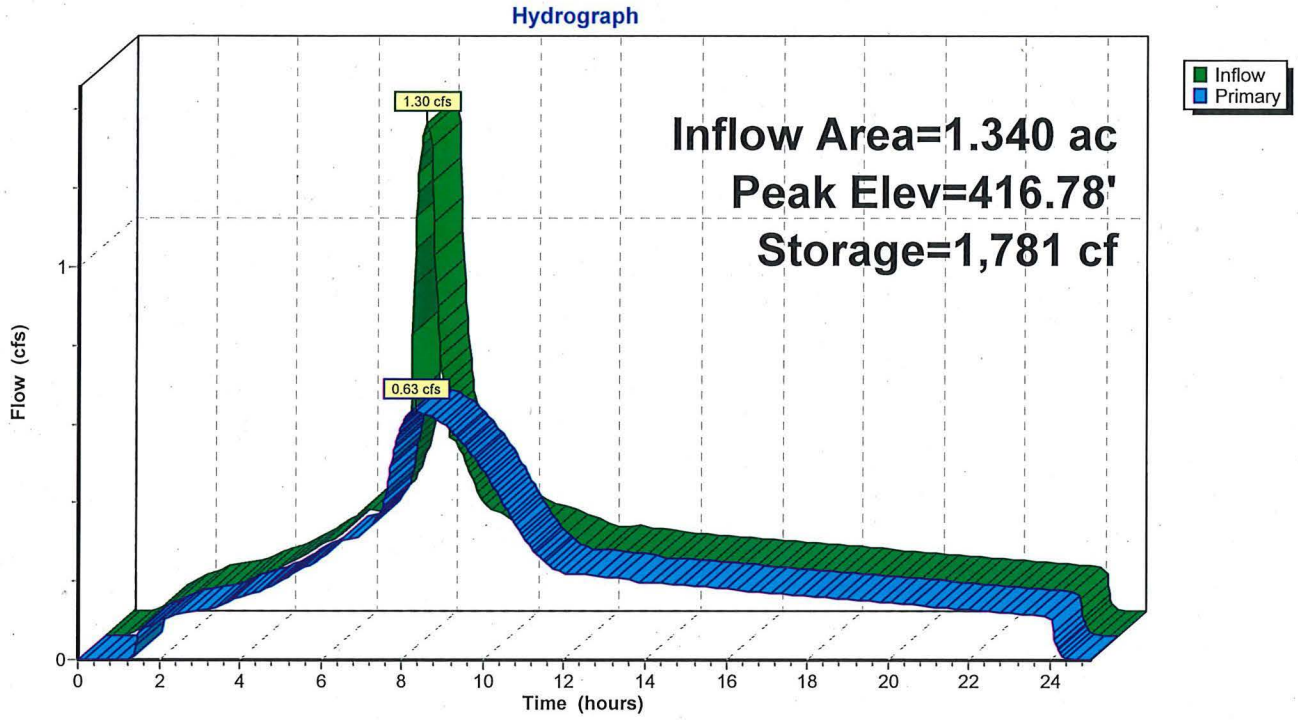
Volume	Invert	Avail.Storage	Storage Description
#1	413.00'	2,958 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
413.00	6	0	0
414.00	59	33	33
415.00	335	197	230
416.00	913	624	854
417.00	1,623	1,268	2,122
418.00	50	837	2,958

Device	Routing	Invert	Outlet Devices
#1	Primary	414.50'	**4.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	417.50'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=0.63 cfs @ 8.32 hrs HW=416.78' (Free Discharge)
↑—**1=Orifice/Grate** (Orifice Controls 0.63 cfs @ 7.27 fps)
└—**2=Orifice/Grate** (Controls 0.00 cfs)

Pond 2 DW: 2 Ponds



APPENDIX B

Carlson Geotechnical

A Division of Carlson Testing, Inc.
Phone: (503) 601-8250
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Bend Office	(541) 330-9155
Eugene Office	(541) 345-0289
Salem Office	(503) 589-1252
Tigard Office	(503) 684-3460

Report of
Geotechnical Investigation &
Site-Specific Seismic Hazards Study
Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

Prepared for

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

February 23, 2017

Carlson Geotechnical

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February 23, 2017

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

Report of
Geotechnical Investigation &
Site-Specific Seismic Hazards Study
Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

Dear Mr. Vallance:

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this report summarizing the results of our geotechnical investigation and site-specific seismic hazard study (SSSHS) for the proposed Fire Station 16 replacement project. The site is located at 19340 Molalla Avenue in Oregon City, Oregon. We performed our work in general accordance with CGT Proposal GP7361R1, dated January 16, 2017. Written authorization for our services was received on July 21, 2016, in the form of Clackamas County Fire District #1 Purchase Order 16-1758.

We appreciate the opportunity to work with you on this project. Please contact us at 503.601.8250 if you have any questions regarding this report.

Respectfully Submitted,
CARLSON GEOTECHNICAL

CERTIFIED OREGON RYAN T. HOUSER E1914 ENGINEERING GEOLOGIST
EXPIRES 12/1/17

Ryan T. Houser, CEG
Senior Engineering Geologist
rhouser@carlsontesting.com

REGISTERED PROFESSIONAL ENGINEER 15764 OREGON January 21, 1992 WILLIAM M. WEYRAUCH
EXPIRES: 6.30.2018

William M. Weyrauch, P.E., G.E.
Senior Geotechnical Engineer
bweyrauch@carlsontesting.com

1.0 INTRODUCTION

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this report summarizing the results of our geotechnical investigation and site-specific seismic hazard study (SSSHS) for the proposed Fire Station 16 replacement project. The site is located at 19340 Molalla Avenue in Oregon City, Oregon, as shown on the attached Figure 1.

1.1 Project Information

CGT developed an understanding of the proposed project based on our review of the Request for Proposals for Geotechnical Services for Fire Station #16 (RFP), issued by Clackamas Fire District #1 on December 30, 2016, and subsequent correspondence with you and the design team. We understand the project is in its design stage, and will include:

- Demolition of the existing fire station building.
- Construction of a new fire station building. A site plan was included with the RFP showing the footprint of the new fire station (Figure 2). The new building will have a footprint similar to the existing approximate 7,000 square-foot building. We understand the new two-story building will incorporate a slab-on-grade floor and no below-grade levels are planned. The project structural engineer, Mr. Robert Aman, P.E., S.E., with Nishkian Dean, provided the following loading information for the proposed building:
  - Maximum continuous wall footing load: 3 kips per lineal foot (klf).
  - Maximum column load: 20 kips.
  - Maximum slab/pavement load: 250 psf (fire trucks).
- Construction of a new retaining wall along the eastern end of the site. The new retaining wall will be up to about 5 feet in height.
- No grading plans have been provided, but we understand that the new fire station will include cuts up to about 5 feet in depth on the eastern portion of the site, with minimal grading to be performed on the western portion of the site.
- The RFP indicated infiltration testing should be performed. Subsequent discussions with the project architect and civil engineer directed the testing be performed at two locations.

1.2 Scope of Work

Our scope of work included the following:

- Contact the Oregon Utilities Notification Center and arrange for a private utility locating contractor to mark the locations of public utilities at the site within a 20-foot radius of our planned explorations.
- Explore subsurface conditions at the site by advancing eight machine-drilled soil borings to depths up to about 25¾ feet below ground surface (bgs) using a track-mounted drill rig provided and operated by our drilling subcontractor. The field exploration is summarized in the attached Appendix A.
- Perform infiltration testing at selected areas on the site. Results of infiltration testing are presented in the attached Appendix B.
- Classify the soils encountered in the borings in general accordance with the Visual-Manual procedure (ASTM D2488).

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- Collect representative disturbed and relatively undisturbed samples of the soils and rock encountered within the explorations in order to perform laboratory testing and to confirm our field classifications.
- Conduct a Site-Specific Seismic Hazards Study (SSSHS) in general accordance with the requirements of Section 1803.3.2 of the 2014 Oregon Structural Specialty Code (OSSC). The results of the SSSHS are presented in the attached Appendix C.
- Provide this written report summarizing the results of our geotechnical investigation, site-specific seismic hazards study, and geotechnical recommendations for the project.

2.0 SITE DESCRIPTION

2.1 Site Geology

Based on available geologic mapping[1] of the area, the site is underlain by Pliocene-Pleistocene age Boring Lavas (basalt). See Section C.2.0 in Appendix C for further discussion.

2.2 Site Surface Conditions

The approximate 1.4-acre site was bordered by Molalla Avenue to the west, and commercial/industrial development to the north, east, and south. The site generally descended gently to the west with a total relief of about 8 feet. The site was occupied by the existing single-story fire station, a storage building, and a temporary modular building. The majority of the remainder of the site was paved with an asphaltic concrete parking lot and drive lanes. Vegetation on the site was limited to grasses and landscaped trees in planters on the edges of the parking area. Photographs taken at the time of our fieldwork are attached as Figure 3.

2.3 Subsurface Conditions

2.3.1 Subsurface Investigation

Our subsurface investigation consisted of the advancement of eight borings (B-1 through B-8) completed on February 9 and 10, 2017. The approximate exploration locations are shown on the Site Plan, attached as Figure 2. In summary, the borings were advanced to depths ranging from about 5 to 25¾ feet bgs. Details regarding the subsurface investigation, logs of the explorations, and laboratory testing performed on selected samples are presented in Appendix A.

2.3.2 Soil

The following describes each of the subsurface materials encountered at the site.

2.3.2.1 Undocumented Fill

Organic Clay Topsoil Fill (OL Fill): Undocumented clay topsoil fill was encountered at the surface of B-2, B-3, and B-7. Undocumented fill refers to materials placed without (available) records of subgrade conditions or evaluation of compaction. The clay topsoil fill was typically dark brown, moist, contained abundant rootlets and trace angular gravel up to about ¾-inch in diameter. The clay topsoil fill extended to depths of about ¼ foot bgs, where encountered.

---

[1] Ma, Madin, Duplantis, and Williams, 2012, Lidar-based Surficial Geologic Map and Database of the Greater Portland, Oregon, Area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington Oregon Department of Geology and Mineral Industries Open-File Report O-12-02.

Asphaltic Concrete Pavement: Asphaltic concrete (AC) pavement was encountered at the surface of boring B-4 and B-6, and was about 3 to 5 inches thick.

Undocumented Poorly Graded Gravel Fill (GP Fill): Undocumented poorly graded gravel fill was encountered underlying the AC in B-4 and B-6, and underlying the clay topsoil fill in B-7. The poorly graded gravel fill was generally dark gray, moist to wet, angular, up to about 1-inch diameter, and extended to depths of about 1 to 2 feet bgs.

2.3.2.2 Topsoil

Clay Topsoil (OL): Clay topsoil was encountered at the surface of borings B-1, B-3, B-5, and B-8, and underlying the undocumented fill in B-7. This soil was typically dark brown, moist, contained abundant rootlets, contained trace roots up to about ¼ inch in diameter, and extended to depths of about ¼- to 2½ feet bgs.

2.3.2.3 Residual Soil

Sandy Fat Clay (CH): Underlying the clay topsoil and undocumented fill in the borings was native sandy fat clay (CH). The sandy fat clay was typically medium stiff to very stiff, reddish brown with gray and black mottling, moist to wet, and exhibited high plasticity. The sand portion of this soil was fine- to medium-grained. A trace of angular gravel up to about 1 inch in diameter was observed within this soil in some of the borings. This soil extended to the full depths explored in B-5 (about 5 feet bgs), and to depths of about 4½ to 9½ feet bgs in the remainder of the borings.

Clayey Sand (SC): Underlying the sandy fat clay soil was clayey sand (SC). This soil was typically loose to very dense, reddish brown with dark red and gray mottling, moist, fine-grained, and contained trace angular gravel. This soil extended to the full depths explored in B-4 (about 14 feet bgs), B-6 (about 16½ feet bgs), B-7 (about 10½ feet bgs), and to depths of about 9 to 20½ feet bgs in the remainder of the borings.

The native sandy fat clay (CH) and clayey sand (SC) soils observed in the explorations and mapped within the area of the project site are consistent with residual soil resulting from the in-place weathering of the underlying basalt bedrock.

2.3.2.4 Bedrock

Basalt Bedrock (RX): Underlying the native residual soils in borings B-1, B-2, B-3, and B-8 was native basalt bedrock. The basalt bedrock was typically hard to very hard (R4-R5), gray with black and white minerals, and slightly weathered to fresh. Practical refusal of the drilling equipment was encountered within the basalt bedrock at depths ranging from about 9 to 20½ feet bgs in the borings. Boring B-5 included coring to approximately 5 feet below the surface of the bedrock. The recovered sample showed a rock quality designation (RQD) of 77% ("Good").

2.3.3 Groundwater

Perched groundwater was encountered within the hollow-stem auger borings at depths ranging from about 5 to 20 feet bgs on February 9 and 10, 2017. The groundwater appears to be perched on the basalt bedrock and low-permeability overlying fat clay soils. We researched available well logs located within

Section 8, Township 3 South, Range 2 East, Willamette Meridian, on the Oregon Water Resources Department (OWRD)[2] website. Our review indicated that groundwater levels in the area varied with surface elevations and generally ranged from about 5 to 30 feet bgs.

It should be noted groundwater levels vary with local topography. In addition, the groundwater levels reported on the OWRD logs often reflect the purpose of the well, so water well logs may only report deeper, confined groundwater, while geotechnical or environmental borings will often report any groundwater encountered, including shallow, unconfined groundwater. Therefore, the levels reported on the OWRD well logs referenced above are considered generally indicative of local water levels and may not reflect actual groundwater levels at the project site.

A depth to groundwater map for the Portland area[3] indicates groundwater is present at depths of about 18 feet bgs in the vicinity of the site. It should be noted that the levels reported by the referenced map are average values for a given location and incorporate a degree of uncertainty. For this location the uncertainty is described as "Moderate". We anticipate that groundwater levels will fluctuate due to seasonal and annual variations in precipitation, changes in site utilization, or other factors. Additionally, the on-site residual soils (CH, SC) are conducive to formation of perched groundwater.

3.0 SITE-SPECIFIC SEISMIC HAZARDS STUDY

3.1 Overview

We performed a Site-Specific Seismic Hazards Study for the site in accordance with Section 1803 of the 2014 Oregon Structural Specialty Code (OSSC). The complete results of our hazards study are presented in the attached Appendix B. The following conclusions highlight the results of our SSSHS:

- We conclude the potential for seismically-induced liquefaction settlement at the site is very low.
- We conclude there is a very low risk of surface rupture from faulting.
- We conclude there is a negligible risk of surface rupture from lateral spread.
- We conclude there is a very low risk of slope instability from a design-level earthquake.
- We conclude there is a negligible risk of tsunami/seiche inundation at this site.

3.2 Seismic Ground Motion Values

Earthquake ground motion parameters for the site were obtained based on the United States Geological Survey (USGS) Seismic Design Values for Buildings - Ground Motion Parameter Calculator[4]. The following table shows the recommended seismic design parameters for the site.

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2 Oregon Water Resources Department, 2017. Well Log Records, *accessed February 2017*, from OWRD web site: http://apps.wrd.state.or.us/apps/gw/well_log/.

3 Snyder, D.T., 2008, Estimated depth to ground water and configuration of the water table in the Portland, Oregon area: U.S. Geological Survey, Scientific Investigations Report SIR-2008-5059, scale 1:60,000.

4 United States Geological Survey, 2017. Seismic Design Parameters determined using:, "U.S. Seismic Design Maps Web Application," *accessed February 2017*, from the USGS website *http://earthquake.usgs.gov*.

Table 1 Seismic Ground Motion Values

Parameter		Value
Mapped Acceleration Parameters	Spectral Acceleration, 0.2 second (S_s)	0.902g
	Spectral Acceleration, 1.0 second (S_1)	0.392g
Coefficients (Site Class D)	Site Coefficient, 0.2 sec. (F_a)	1.139
	Site Coefficient, 1.0 sec. (F_v)	1.616
Adjusted MCE Spectral Response Parameters	MCE Spectral Acceleration, 0.2 sec. (S_{MS})	1.027g
	MCE Spectral Acceleration, 1.0 sec. (S_{M1})	0.633g
Design Spectral Response Accelerations	Design Spectral Acceleration, 0.2 seconds (S_{DS})	0.685g
	Design Spectral Acceleration, 1.0 second (S_{D1})	0.422g

4.0 CONCLUSIONS

Based on the results of our field explorations and analyses, the site may be developed as described in Section 1.1, provided the recommendations presented in this report are incorporated into the design and development. We conclude the primary geotechnical considerations at this site include:

- The presence of potentially expansive fat clay soils at the proposed foundation and pavement subgrade depths.
- The presence of relatively shallow groundwater level at the site.
- The presence of near-surface, moisture-sensitive soils that are susceptible to disturbance during wet weather. This includes both the sandy fat clay (CH) as well as the clayey sand (SC).

These considerations are described in more detail in the following sections.

4.1 Expansion Potential

The primary geotechnical consideration for the project is the presence of high plasticity, fat clay (CH) soils. These soils are highly sensitive to changes in moisture content and have a high potential for exhibiting shrink-swell (expansive-contractive) behavior. Foundations, floor slabs, and pavements founded directly on these soils may be subject to cyclic shrink-swell movements that can result in differential movements and distress. In the absence of additional laboratory testing to evaluate the expansive potential of the onsite, fat clay soils, we recommend measures be taken to protect foundation elements and pavements from the potentially damaging effects of shrink-swell movements. Specific recommendations for foundation, floor slab, and pavement subgrade preparation are presented in Sections 5.6.1, 5.8.1, and 5.9.1, respectively.

4.2 Shallow Groundwater

Perched groundwater was encountered in several of the borings at depths ranging from about 5 to 20 feet bgs, and will likely be encountered during excavation of deeper utility trenches at the site. Specific recommendations for temporary dewatering of trenches and excavations, if required, are provided in Section 5.2.3.

4.3 Subgrade Moisture Sensitivity

The near surface sandy fat clay (CH) soil is susceptible to disturbance during wet weather. Trafficability of this soil may be difficult, and significant damage to the subgrade could occur, if earthwork is undertaken without proper precautions at times when the exposed soils are more than a few percentage points above

5.2 Temporary Excavations

5.2.1 Overview

Conventional earthmoving equipment in proper working condition should be capable of making necessary excavations for the anticipated site cuts as described earlier in this report. While not currently planned, excavations deeper than 10 feet may encounter basalt bedrock, which may require the use of hydraulic hammers and/or other specialized rock excavation equipment.

All excavations should be in accordance with applicable OSHA and state regulations. It is the contractor's responsibility to select the excavation methods, to monitor site excavations for safety, and to provide any shoring required to protect personnel and adjacent improvements. A "competent person", as defined by OR-OSHA, should be on-site during construction in accordance with regulations presented by OR-OSHA. CGT's current role on the project does not include review or oversight of excavation safety.

5.2.2 OSHA Soil Type

For use in the planning and construction of temporary excavations up to 10 feet in depth, an OSHA soil type of "B" can be used for the fine-grained residual soils (CH, SC) encountered near the surface of the site.

5.2.3 Dewatering Considerations (if considered)

As indicated in Section 4.2, groundwater will likely be encountered in excavations extending to depths below about 5 to 10 feet bgs, depending on the time of year earthwork is undertaken. The soils encountered at and below this depth are primarily clayey and have a low rate of transmissivity. Therefore, we would expect slow to moderate seepage to occur during excavation.

Pumping from sumps should be effective in removing groundwater within shallow or localized excavations extending below the groundwater level. Pumping from multiple well points may be required for larger excavations. The sumps or wells should be installed to remove water to a depth of at least 2 feet below the lowest elevation of the excavation, and should be installed and put into operation prior to commencing excavation. The project civil engineer should determine the appropriate size, number, and location of sump pumps or wells, and also evaluate requirements for disposal of the resultant discharge. The sumps or well points could be installed permanently, if desired.

5.2.4 Utility Trenches

In order to minimize the potential for soil expansion after construction, we recommend that excavations into the sandy fat clay be kept open only the minimum amount of time required to complete the work. Extended periods of sidewall or excavation bottom drying should be avoided. Temporary trench cuts should stand near vertical to depths of approximately 4 feet in the native fine-grained residual soil (CH, SC) encountered at the site. Some instability may occur if the side walls are allowed to dry or if seepage occurs. If seepage undermines the stability of the trench, or if sidewall caving is observed during excavation, the sidewalls should be flattened or shored. Depending on the time of year trench excavations occur, trench dewatering may be required in order to maintain dry working conditions, particularly if the invert elevations of the proposed utilities are below the groundwater level. If groundwater is present at the base of utility excavations, we recommend placing trench stabilization material at the base of the excavations. Trench stabilization material should be in conformance with Section 5.4.4.

optimum moisture content. In the event that construction occurs during wet weather, CGT recommends that measures be implemented to protect the fine-grained subgrade in areas of repeated construction traffic. Geotechnical recommendations for wet weather construction are presented in Section 5.3.

5.0 RECOMMENDATIONS

The recommendations presented in this report are based on the information provided to us, results of our field investigation and analyses, laboratory data, and professional judgment. CGT has observed only a small portion of the pertinent subsurface conditions. The recommendations are based on the assumptions that the subsurface conditions do not deviate appreciably from those found during the field investigation. CGT should be consulted for further recommendations if the design of the proposed development changes and/or variations or undesirable geotechnical conditions are encountered during site development.

5.1 Site Preparation

5.1.1 Demolition

Demolition of the existing buildings should include complete removal of all structural elements, including asphalt parking areas, foundations, and concrete slabs. Abandoned buried utilities should similarly be removed or grouted full. Concrete and asphalt debris resulting from demolition may be re-used as structural fill, provided it is processed in accordance with the recommendations presented in Section 5.4.1.1. Alternatively, demolition debris should be hauled off site for disposal.

5.1.2 Site Stripping

Existing vegetation, topsoil, and undocumented fills (OH Fill, GP Fill) should be removed from proposed building and pavement areas, and for a 5-foot-margin around such locations. Based on the results of our field explorations, stripping depths at the site are anticipated to extend to approximately ¼ to 2 feet bgs across the majority of the site. These materials may be deeper or shallower at locations away from our explorations. The geotechnical engineer or his representative should provide recommendations for actual stripping depths based on observations during site stripping. Stripped topsoil and rooted soils should be transported off-site for disposal, or stockpiled for later use in landscaped areas. Asphalt, concrete debris, and undocumented gravel fill (GP Fill) may be stockpiled for later re-use as structural fill, as discussed in Section 5.4.1.1.

5.1.3 Existing Utilities & Below-Grade Structures

All existing utilities at the site should be identified prior to excavation. Abandoned utility lines beneath the new building, pavements, and hardscaping features should be completely removed or grouted full. Soft, loose, or otherwise unsuitable soils encountered in utility trench excavations should be removed and replaced with structural fill in conformance with Section 5.4 this report. Buried structures (i.e. footings, foundation walls, retaining walls, slabs-on-grade, tanks, etc.), if encountered during site development, should be completely removed and replaced with structural fill in conformance with Section 5.4.

5.1.4 Erosion Control

Erosion and sedimentation control measures should be employed in accordance with applicable City, County, and State regulations.

5.4 Structural Fill

The geotechnical engineer should be provided the opportunity to review all materials considered for use as structural fill (prior to placement). Samples of the proposed fill materials should be submitted to the geotechnical engineer a minimum of 2 days prior their use on site.[5] The geotechnical engineer or his representative should be contacted to evaluate compaction of structural fill as the material is being placed. Evaluation of compaction may take the form of in-place density tests and/or proof roll tests with suitable equipment. Structural fill should be evaluated at intervals not exceeding every 2 vertical feet as the fill is being placed.

5.4.1 On-Site Soils – General Use

5.4.1.1 Asphalt & Concrete Debris

Asphalt and concrete debris resulting from the demolition of existing pavements and other features (foundations, floor slabs, sidewalks, etc.) can be re-used as structural fill if processed/crushed into material that is fairly well-graded between coarse and fine. This material should not be used within 12 inches of the foundation, floor slab or pavement base rock section. The processed/crushed concrete and/or asphalt should contain no organic matter, debris, or particles larger than 4 inches in diameter. Moisture conditioning (wetting) should be expected in order to achieve adequate compaction. When used as structural fill, this material should be placed and compacted in general accordance with Section 5.4.2.

5.4.1.2 Residual Soil: Sandy Fat Clay (CH), and Clayey Sand (SC)

CGT recommends against reuse of these soils as structural fill, due to the difficulty in properly moisture conditioning these soils and their high potential for expansion and contraction with changing moisture conditions.

5.4.1.3 Poorly Graded Gravel Fill (GP)

Re-use of the on-site, relatively clean, gravelly fill soils as structural fill is feasible, provided the materials are kept clean of organics, debris, and particles larger than 4 inches in diameter. If reused as structural fill, these materials should be prepared in general accordance with Section 5.4.2.

If the on-site materials cannot be properly moisture-conditioned and/or processed, we recommend using imported granular material for structural fill.

5.4.2 Imported Granular Structural Fill – General Use

Imported granular structural fill should consist of angular pit or quarry run rock, crushed rock, or crushed gravel that is fairly well graded between coarse and fine particle sizes. The granular fill should contain no organic matter, debris, or particles larger than 2 inches, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. The percentage of fines can be increased to 12 percent of the material passing the U.S. Standard No. 200 Sieve if placed during dry weather, and provided the fill material is moisture-conditioned, as necessary, for proper compaction. Imported granular fill material should be compacted to not less than 95 percent of the material's maximum dry density, as determined in general accordance with ASTM D1557 (Modified Proctor). Proper moisture conditioning and the use of vibratory equipment will facilitate compaction of these materials.

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[5] Laboratory testing for moisture density relationship (Proctor) is required. Tests for gradation may be required.

5.2.5 Excavations Near Foundations

Excavations near footings should not extend within a 1½H:1V (horizontal:vertical) plane projected out and down from the outside, bottom edge of the footings. In the event excavation needs to extend below the referenced plane, temporary shoring of the excavation and/or underpinning of the subject footing may be required. The geotechnical engineer should be consulted to review proposed excavation plans for this design case to provide specific recommendations.

5.3 Wet Weather Considerations

For planning purposes, the wet season should be considered to extend from late September to late June. It is our experience that dry weather working conditions should prevail between early July and mid-September. Notwithstanding the above, soil conditions should be evaluated in the field by the geotechnical engineer or his representative at the initial stage of site preparation to determine whether the recommendations within this section should be incorporated into construction.

5.3.1 Overview

Due to the fines content, the residual soil (CH, SC) is susceptible to disturbance during wet weather. Trafficability of these soils may be difficult, and significant damage to subgrade soils could occur, if earthwork is undertaken without proper precautions at times when the exposed soils are more than a few percentage points above optimum moisture content. For wet weather construction, site preparation activities may need to be accomplished using track-mounted equipment, loading removed material onto trucks supported on granular haul roads, or other methods to limit soil disturbance. The geotechnical engineer or his representative should evaluate the subgrade during excavation by probing rather than proof rolling. Soils that have been disturbed during site preparation activities, or soft or loose areas identified during probing, should be over-excavated to firm, stable subgrade, and replaced with imported granular structural fill in conformance with Section 5.4.2.

5.3.2 Geotextile Separation Fabric

CGT recommends that a geotextile separation fabric be placed as a barrier between the prepared subgrade and granular fill/base rock in areas of repeated or heavy construction traffic. The geotextile fabric should meet the requirements presented in the current Oregon Department of Transportation (ODOT) Standard Specification for Construction, Section 02320.

5.3.3 Granular Working Surfaces (Haul Roads & Staging Areas)

Haul roads subjected to repeated heavy, tire-mounted, construction traffic (e.g. dump trucks, concrete trucks, etc.) will require a minimum of 18 inches of imported granular material. For light staging areas, 12 inches of imported granular material should be sufficient. Additional granular material or geo-grid reinforcement may be recommended based on site conditions and/or loading at the time of construction. The imported granular material should be in conformance with Section 5.4.2 and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. The prepared subgrade should be covered with geotextile fabric prior to placement of the imported granular material. The imported granular material should be placed in a single lift (up to 24 inches deep) and compacted using a smooth-drum, non-vibratory roller until well-keyed.

Table 2 Utility Trench Backfill Compaction Recommendations

Backfill Zone	Recommended Minimum Relative Compaction	
	Structural Areas[1]	Landscaping Areas
Pipe Base and Within Pipe Zone	90% ASTM D1557 or pipe manufacturer's recommendation	88% ASTM D1557 or pipe manufacturer's recommendation
Above Pipe Zone	92% ASTM D1557	90% ASTM D1557
Within 3 Feet of Design Subgrade	95% ASTM D1557	90% ASTM D1557

1 Includes proposed building, pavement areas, structural fill areas, exterior hardscaping, etc.

5.5 Permanent Slopes

Permanent cut or fill slopes constructed at the site, if any, should be graded at 2H:1V or flatter. Constructed slopes should be overbuilt by a few feet depending on their size and gradient so that they can be properly compacted prior to being cut to final grade. The surface of all slopes should be protected from erosion by seeding, sodding, or other acceptable means. Adjacent on-site and off-site structures should be located at least 5 feet from the top of slopes.

5.6 Shallow Foundations

5.6.1 Subgrade Preparation

Sandy fat clay (CH) was encountered at the proposed foundation depths in the area of the proposed building and retaining wall, and will be exposed in foundation excavations during construction. Due to its expansive potential, variations in the moisture content of the sandy fat clay (CH) soil should be minimized. This can be accomplished by ensuring that the bearing soils are located a minimum of 3½ feet below the surrounding site grades. In areas where the footings are not at least 3½ feet below the surrounding grades, a minimum of 24 inches of crushed base rock should be placed under the building and retaining wall footings. Combined with the recommended 18-inch footing embedment depth (Section 5.6.2), the crushed rock typically provides sufficient protection from the expansive characteristics of the fat clay (CH) soil left in place. This crushed rock fill should be placed as described in Section 5.4.2 above. Once over excavations are made, the native subgrade soils should not be exposed to periods of wetting or drying, but should be backfilled as soon as possible.

The geotechnical engineer or their representative should be contacted to observe subgrade conditions prior to placement of granular backfill. If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill in conformance with Section 5.4.2. The maximum particle size of over-excavation backfill should be limited to 1½ inches. All granular pads for footings should be constructed a minimum of 6 inches wider on each side of the footing for every vertical foot of over-excavation.

5.6.2 Minimum Footing Width & Embedment

Minimum footing widths should be in conformance with the current OSSC. As a guideline, CGT recommends individual spread footings have a minimum width of 24 inches. We recommend continuous

Granular fill materials with high percentages of particle sizes in excess of 1½ inches are considered non-moisture-density testable materials. As an alternative to conventional density testing, compaction of these materials should be evaluated by proof roll test observation (deflection tests), where accepted by the geotechnical engineer.

5.4.3 Floor Slab Base Rock

Floor slab base rock should consist of well-graded granular material (crushed rock) containing no organic matter or debris, have a maximum particle size of ¾ inch, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. Floor slab base rock should be placed in one lift and compacted to not less than 95 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). We recommend "choking" the surface of the base rock with fine sand just prior to concrete placement. Choking means the voids between the largest aggregate particles are filled with sand, but does not provide a layer of sand above the base rock. Choking the base rock surface reduces the lateral restraint on the bottom of the concrete during curing and therefore reduces the potential for slab cracking.

5.4.4 Pavement Base and Subbase Material

Pavement base material should meet the dense-graded aggregate requirements of the Oregon Department of Transportation - Oregon Standard Specifications for Construction (ODOT OSSC) Section 2630.10. A maximum aggregate size of 2 inches or less is recommended. Pavement subbase material should meet the requirements of imported granular structural fill described in Section 5.4.2.

5.4.5 Trench Base Stabilization Material

If groundwater is present at the base of utility excavations, trench base stabilization material should be placed. Trench base stabilization material should consist of a minimum of 1 foot of well-graded granular material with a maximum particle size of 4 inches and less than 5 percent material passing the U.S. Standard No. 40 Sieve. The material should be free of organic matter and other deleterious material, placed in one lift, and compacted until well-keyed.

5.4.6 Trench Backfill Material

Trench backfill for the utility pipe base and pipe zone should consist of granular material as recommended by the utility pipe manufacturer. In the absence of manufacturer recommendations, the trench backfill above the pipe zone should consist of well-graded granular material containing no organic matter or debris, have a maximum particle size of ¾ inch, and have less than 8 percent material passing the U.S. Standard No. 200 Sieve. As a guideline, trench backfill should be placed in maximum 12-inch-thick lifts. The earthwork contractor may elect to use alternative lift thicknesses based on their experience with specific equipment and fill material conditions during construction in order to achieve the required compaction. The following table presents recommended relative compaction percentages for utility trench backfill.

5.7.2 Wall Drains

We recommend placing a retaining wall drain at the base elevation of the heel of the retaining wall footing. Retaining wall drains should consist of a minimum 4-inch-diameter, perforated, HDPE (High Density Polyethylene) drainpipe wrapped with a non-woven geotextile filter fabric. The drains should be backfilled with a minimum of 2 cubic feet of open graded drain rock per lineal foot of pipe. The drain rock should be encased in a geotextile fabric in order to provide separation from the surrounding soils. Retaining wall drains should be positively sloped and should outlet to a suitable discharge point. The geotechnical engineer or his representative should be contacted to observe the drains prior to backfilling. Roof or area drains should not be tied into retaining wall drains.

5.7.3 Wall Backfill

Retaining walls should be backfilled with imported granular structural fill in conformance with Section 5.4.2 and contain less than 5 percent passing the U.S. Standard No. 200 Sieve. The backfill should be compacted to a minimum of 90 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). When placing fill behind walls, care must be taken to minimize undue lateral loads on the walls. Heavy compaction equipment should be kept at least "H" feet from the back of the walls, where "H" is the height of the wall. Light mechanical or hand tamping equipment should be used for compaction of backfill materials within "H" feet of the back of the walls.

5.7.4 Design Parameters & Limitations

For rigid retaining walls founded, backfilled, and drained as recommended above, the following table presents parameters recommended for design.

Table 3 Design Parameters for Rigid Retaining Walls

Retaining Wall Condition	Modeled Backfill Condition	Static Equivalent Fluid Pressure (S_A)	Seismic Equivalent Fluid Pressure (S_{AE})
Not Restrained from Rotation	Level (i = 0)	34 pcf	46 pcf
Restrained from Rotation	Level (i = 0)	58 pcf	63 pcf

Note 1: Refer to the attached Figure 4 for a graphical representation of static and seismic loading conditions. Seismic component of active thrust acts at 0.6H above the base of the wall.

Note 2: Seismic (dynamic) lateral loads were computed using the Mononobe-Okabe Equation as presented in the 1997 Federal Highway Administration (FHWA) design manual.

The above design recommendations are based on the assumptions that:

(1) The walls consist of concrete cantilevered retaining walls (β = 0 and δ = 24 degrees, see Figure 4).
(2) The walls are 10 feet or less in height.
(3) The backfill is drained and consists of imported granular structural fill (ϕ = 38 degrees).
(4) No line load or point load surcharges are imposed behind the walls.
(5) The grade behind the wall is level, or sloping down and away from the wall, for a distance of 10 feet or more from the wall.
(6) The grade in front of the walls is level or sloping up for a distance of at least 5 feet from the wall.

wall footings have a minimum width of 18 inches. All footings should be founded at least 18 inches below the lowest, permanent adjacent grade to develop lateral capacity and for frost protection.

5.6.3 Bearing Pressure & Settlement

Footings founded as recommended above may be proportioned for a maximum allowable soil bearing pressure of 2,500 pounds per square foot (psf). This bearing pressure is a net bearing pressure, applies to the total of dead and long-term live loads, and may be increased by one-third when considering seismic or wind loads. For foundations founded as recommended above, total settlement of foundations is anticipated to be less than 1 inch. Differential settlements between adjacent columns and/or bearing walls should not exceed ½-inch. If an increased allowable soil bearing pressure is desired, the geotechnical engineer should be consulted.

5.6.4 Lateral Capacity

A maximum passive (equivalent fluid) earth pressure of 250 pounds per cubic foot (pcf) is recommended for design of footings confined by the native soils described above, or imported granular structural fill that is properly placed and compacted during construction. The recommended earth pressure was computed using a factor of safety of 1½, which is appropriate due to the amount of movement required to develop full passive resistance. In order to develop the above capacity, the following should be understood:

1. Concrete must be poured neat in excavations or the foundations must be backfilled with imported granular structural fill,
2. The adjacent grade must be level,
3. The static ground water level must remain below the base of the footings throughout the year.
4. Adjacent floor slabs, pavements, or the upper 12-inch-depth of adjacent, unpaved areas should not be considered when calculating passive resistance.

An ultimate coefficient of friction equal to 0.45 may be used when calculating resistance to sliding for footings founded on a minimum of 6 inches of imported granular structural fill (crushed rock) that is properly placed and compacted during construction.

5.6.5 Subsurface Drainage

Recognizing the predominantly fine-grained soils encountered at this site, placement of foundation drains is recommended at the outside base elevations of perimeter continuous wall footings. Foundation drains should consist of a minimum 4-inch diameter, perforated, PVC drainpipe wrapped with a non-woven geotextile filter fabric. The drains should be backfilled with a minimum of 2 cubic feet of open graded drain rock per lineal foot of pipe. The drain rock should also be encased in a geotextile fabric in order to provide separation from the surrounding soils. Foundation drains should be positively sloped and should outlet to a suitable discharge point. The geotechnical engineer or his representative should observe the drains prior to backfilling. Roof drains should not be tied into foundation drains.

5.7 Rigid Retaining Walls

5.7.1 Footings

Retaining wall footings should be designed and constructed in conformance with the recommendations presented in Section 5.6, as applicable.

Section 1812.3.3 of the 2014 OSSC recommends that a minimum 6-mil polyethylene sheeting (or 3-mil cross-laminated polyethylene sheeting), or equivalent material with equal or greater resistance to puncture, be placed on top of the gas-permeable base rock to act as a soil-gas-retarder. Placement and installation of this sheeting should be in conformance with that indicated in Section 1812.3.3 of the 2014 OSSC.

The geotechnical engineer or his representative should be contacted to observe gas-permeable base rock conditions prior to placement of the soil-gas-retarder.

5.8.3 Design Considerations

For floor slabs constructed as recommended, a modulus of subgrade reaction of 140 pounds per cubic inch (pci) is recommended for the design of the floor slab. Floor slabs constructed as recommended will likely settle less than ½-inch. For general floor slab construction, slabs should be jointed around columns and walls to permit slabs and foundations to settle differentially.

5.8.4 Subgrade Moisture Considerations

Liquid moisture and moisture vapor should be expected at the subgrade surface. The recommended crushed rock base is anticipated to provide protection against liquid moisture. Where moisture vapor emission through the slab must be minimized, e.g. impervious floor coverings, storage of moisture sensitive materials directly on the slab surface, etc., a vapor retarding membrane or vapor barrier below the slab should be considered. Factors such as cost, special considerations for construction, floor coverings, and end use suggest that the decision regarding a vapor retarding membrane or vapor barrier be made by the architect and owner.

If a vapor retarder or vapor barrier is placed below the slab, its location should be based on current American Concrete Institute (ACI) guidelines, ACI 302 Guide for Concrete Floor and Slab Construction. In some cases, this indicates placement of concrete directly on the vapor retarder or barrier. Please note that the placement of concrete directly on impervious membranes increases the risk of plastic shrinkage cracking and slab curling in the concrete. Construction practices to reduce or eliminate such risk, as described in ACI 302, should be employed during concrete placement.

5.9 Pavements

5.9.1 Subgrade Preparation

Satisfactory subgrade support for pavements constructed on grade can be obtained from a minimum of 24 inches of granular structural fill (subbase) placed over the native sandy fat clay (CH). The crushed rock typically provides sufficient protection from the expansive characteristics of the sandy fat clay (CH) soil left in place. This crushed rock fill should be placed as described in Section 5.4.2 above. Once over-excavations are made, the native subgrade soils should not be exposed to periods of wetting or drying, but should be backfilled as soon as possible.

The geotechnical engineer or his representative should observe pavement subgrade soils to evaluate surface consistencies. If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the CGT geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill (subbase) as

Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project vary from these assumptions.

5.8 Interior Floor Slabs

5.8.1 Subgrade Preparation

Satisfactory subgrade support and mitigation of potential expansive soil considerations for slabs constructed on grade, supporting up to 250 psf area loading, can be obtained from a minimum of 24 inches of granular structural fill placed over the native sandy fat clay (CH). The crushed rock typically provides sufficient protection from the expansive characteristics of the sandy fat clay (CH) soil left in place. This crushed rock fill should be placed as described in Section 5.4.2 above. Once over excavations are made, the native subgrade soils should not be exposed to periods of wetting or drying, but should be backfilled as soon as possible.

The geotechnical engineer or his representative should observe floor slab subgrade soils to evaluate surface consistencies. If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the CGT geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill as described in Section 5.4.2.

5.8.2 Crushed Rock Base

Concrete floor slabs should be supported on a minimum 6-inch-thick layer of crushed rock. For interior slabs-on-grade, this base rock may be considered part of the 24 inches of granular structural fill recommended to cover the native sandy fat clay (CH).

5.8.2.1 Floor Slabs in Non-Habitable Areas

Floor slab base rock under slabs in non-habitable areas (i.e., storage areas, exterior slabs, etc.) should consist of well-graded granular material (crushed rock) containing no organic matter or debris, have a maximum particle size of ¾-inch, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. Floor slab base rock should be placed in one lift and compacted to not less than 95 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). We recommend "choking" the surface of the base rock with fine sand just prior to concrete placement. Choking means the voids between the largest aggregate particles are filled with sand, but does not provide a layer of sand above the base rock. Choking the base rock surface reduces the lateral restraint on the bottom of the concrete during curing. Choking the base rock also reduces punctures in vapor retarding membranes due to foot traffic where such membranes are used.

5.8.2.2 Floor Slabs in Habitable Areas

Floor slab base rock in areas where radon gas mitigation is desired (i.e. under floor slabs within work areas and living spaces) should be supported on a minimum 6-inch-thick layer of gas-permeable base rock. The gas-permeable base rock should consist of open-graded crushed rock containing no organic matter or debris, with all material passing through a 2-inch sieve and retained on the ¼-inch sieve, in accordance with Section 1812.3.2, Bullet 1, of the 2014 OSSC.

5.9.3.1 HMAC Analysis Inputs

Table 4 Input Parameters Used in HMAC Pavement Design

Input Parameter	Design Value[1]	Input Parameter		Design Value[1]
Pavement Design Life	20 years	Resilient Modulus[4]	Residual Soil (CH)	4,000 psi
Annual Percent Growth	0 percent		Poorly Graded Gravel or Crushed Aggregate Base	22,500 psi
Serviceability	4.2 initial 2.5 terminal	Structural Coefficient[2]	Crushed Aggregate Base	0.10
Reliability[2]	75 percent		Asphalt	0.42
Standard Deviation[2]	0.49	Vehicle Traffic[5] (range in ESALs)	APAO Level II (Light) – Parking	Up to 50,000
Drainage Factor[3]	1.0		APAO Level III (Low Moderate) – Entrances and Drive Lanes	Up to 100,000

[1] If any of the above parameters are incorrect, please contact us so that we may revise our recommendations, if warranted.
[2] Value based on guidelines presented in Section 5.3 of the 2011 ODOT Pavement Design Guide and APAO manual.
[3] Assumes good drainage away from pavement, base, and subgrade is achieved by proper crowning of subgrades.
[4] Values based on experience with similar soils prepared as recommended in this report.
[5] ESAL = Total 18-Kip equivalent single axle load. Traffic levels taken from Table 3.1 of APAO manual. If an increased traffic load is estimated, please contact us so that we may refine the traffic loading and revise our recommendations, if warranted.

5.9.3.2 PCC Pavements Analysis Inputs

Table 5 Input Parameters Used in PCC Pavement Design

Input Parameter	Design Value[1]	Input Parameter		Design Value[1]
Pavement Design Life	20 years	Modulus of Subgrade Reaction[4]	24 in. of Subbase Granular Fill (e.g., crushed aggregate base, clean sand) [placed on separation fabric over residual soil (CH)]	140 pci
Annual Percent Growth	0 percent			
Serviceability	4.2 initial 2.5 terminal	PCC Parameters[2]	Elastic Modulus	5,000 ksi
Reliability[2]	80 percent		Modulus of Rupture	0.7 ksi
Combined Standard Error[2]	0.49	Vehicle Traffic[5] (range in ESALs)	APAO Level III (Low Moderate) – Entrances and Drive Lanes	Up to 100,000
Drainage Factor[3]	1.0			
Load Transfer Coefficient	3.2			

[1] If any of the above parameters are incorrect, please contact us so that we may revise our recommendations, if warranted.
[2] Value based on guidelines presented in the ODOT Pavement Design Guide.
[3] Assumes good drainage away from pavement, base, and subgrade is achieved by proper crowning of subgrades.
[4] Values based on experience with similar soils prepared as recommended in this report.
[5] ESAL = Total 18-Kip equivalent single axle load. Traffic levels taken from Table 3.1 of APAO manual. If an increased traffic load is estimated, please contact us so that we may refine the traffic loading and revise our recommendations, if warranted.

described in Section 5.4.2. Pavement subgrade surfaces should be crowned (or sloped) for proper drainage in accordance with specifications provided by the project civil engineer.

5.9.2 Traffic Classifications

Recognizing that traffic data has not been provided, CGT has considered two levels of traffic demand for review and design of pavement sections. We modeled the following design cases (traffic levels) developed from the Asphalt Pavement Association of Oregon (APAO):

- *APAO Level II (Light):* This design case considers typical ADTT of 2 to 7 per day over 20 years. Examples under this loading consist of residential streets and parking lots of less than 500 stalls. We anticipate this traffic loading will be appropriate for the proposed passenger vehicle parking stalls.
- *APAO Level III (Low Moderate):* This design case considers typical ADTT of 7 to 14 per day over 20 years. Examples under this loading consist of rural minor collector streets and parking lots of more than 500 stalls. We anticipate this traffic loading will be appropriate for the drive lane, exterior aprons and fire truck parking areas.

We recommend the owner and design team review the traffic levels presented above and select those that most accurately represent anticipated daily truck traffic for select new pavements.

5.9.3 Input Parameters

Designs of the hot mixed asphaltic concrete (HMAC) flexible pavement sections and the rigid Portland cement concrete (PCC) rigid slab section presented below were based on the parameters presented in the following table and design approaches from:

- The American Association of State Highway and Transportation Officials (AASHTO) 1993 "Design of Pavement Structures" manual,
- The Asphalt Pavement Association of Oregon (APAO) 2003 "Asphalt Pavement Design Guide", and
- The Oregon Department of Transportation (ODOT) 2011 "Pavement Design Guide".

If any of the items listed in Table 4 or Table 5 need to be revised, please contact us and we will reassess the pavement design sections presented below.

5.10 Additional Drainage Considerations

Subsurface drains should be connected to the nearest storm drain, on-site infiltration system (to be designed by others) or other suitable discharge point. Paved surfaces and grading near or adjacent to the building should be sloped to drain away from the building. Surface water from paved surfaces and open spaces should be collected and routed to a suitable discharge point. Surface water should not be directed into foundation drains.

6.0 RECOMMENDED ADDITIONAL SERVICES

6.1 Design Review

Geotechnical design review of project plans is of paramount importance. As indicated previously, we recommend the geotechnical engineer be consulted to provide specific geotechnical recommendations for the building foundation system as plans are being developed to provide supplemental recommendations for design and construction.

6.2 Observation of Construction

Satisfactory earthwork, foundation, floor slab, and pavement performance depends to a large degree on the quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during subsurface explorations, and recognition of changed conditions often requires experience. We recommend that qualified personnel visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those observed to date and anticipated in this report. We recommend the geotechnical engineer or their representative attend a pre-construction meeting coordinated by the contractor and/or developer. The project geotechnical engineer or their representative should provide observations and/or testing of at least the following earthwork elements during construction:

- Site Stripping and Demolition
- Subgrade Preparation for Shallow Foundations, Retaining Walls, Structural Fills, Floor Slabs, and Pavements
- Compaction of Structural Fill, Retaining Wall Backfill, and Utility Trench Backfill
- Compaction of Base Rock for Floor Slabs & Pavements
- Compaction of HMAC for Pavements

It is imperative that the owner and/or contractor request earthwork observations and testing at a frequency sufficient to allow the geotechnical engineer to provide a final letter of compliance for the earthwork activities.

7.0 LIMITATIONS

We have prepared this report for use by the owner/developer and other members of the design and construction team for the proposed development. The opinions and recommendations contained within this report are not intended to be, nor should they be construed as a warranty of subsurface conditions, but are forwarded to assist in the planning and design process.

5.9.4 Recommended Minimum Pavement Sections

5.9.4.1 Recommended Minimum Flexible Pavement Sections

The following table presents the minimum flexible pavement sections for the traffic levels indicated in the preceding table, based on the referenced design procedures.

Table 6 Recommended Minimum Flexible Pavement Sections

Material	APAO Traffic Loading	
	Level II	Level III
Asphalt Pavement (inches)	3½	4½
Crushed Aggregate Base (inches)	12	12
Granular Subbase (inches)	24	24
Subgrade Soils	Prepared in accordance with Section 5.9.1.	

Note 1: Thicknesses shown assume dry weather construction. A thicker granular subbase section may be required in wet conditions in order to support construction traffic and protect the subgrade.
Note 2: Thicknesses shown assume subgrade is observed by geotechnical engineer representative prior to placement of separation fabric on fat clay (CH) subgrade.
Note 3: Refer to Section 5.3 for additional discussion.

5.9.4.2 Recommended Minimum Rigid Pavement Sections

The following table presents the minimum rigid pavement sections for the traffic levels indicated in the preceding table, based on the referenced design procedures.

Table 7 Recommended Minimum Rigid Pavement Sections

Material	APAO Traffic Loading
	Level III
PCC Slab (inches)	6
Crushed Aggregate Base (inches)	6
Granular Subbase (inches)	24
Subgrade Soils	Prepared in accordance with Section 5.9.1.

Note 1: Thicknesses shown assume dry weather construction. A thicker granular subbase section may be required in wet conditions in order to support construction traffic and protect the subgrade.
Note 2: Thicknesses shown assume subgrade is observed by geotechnical engineer representative prior to placement of separation fabric on fat clay (CH) subgrade.
Note 3: Refer to Section 5.3 for additional discussion.

5.9.5 Pavement Materials

Asphalt pavement and base course material should conform to the most current State of Oregon, Standard Specifications for Highway Construction. Place aggregate base in one lift, and compact to at least 95 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). HMAC pavement should be compacted to at least 91 percent of the material's theoretical maximum density as determined in general accordance with ASTM D2041 (Rice Specific Gravity).

We have made observations based on our explorations that indicate the soil conditions at only those specific locations and only to the depths penetrated. These observations do not necessarily reflect soil types, strata thickness, or water level variations that may exist between or away from our explorations. If subsurface conditions vary from those encountered in our site explorations, CGT should be alerted to the change in conditions so that we may provide additional geotechnical recommendations, if necessary. Observation by experienced geotechnical personnel should be considered an integral part of the construction process.

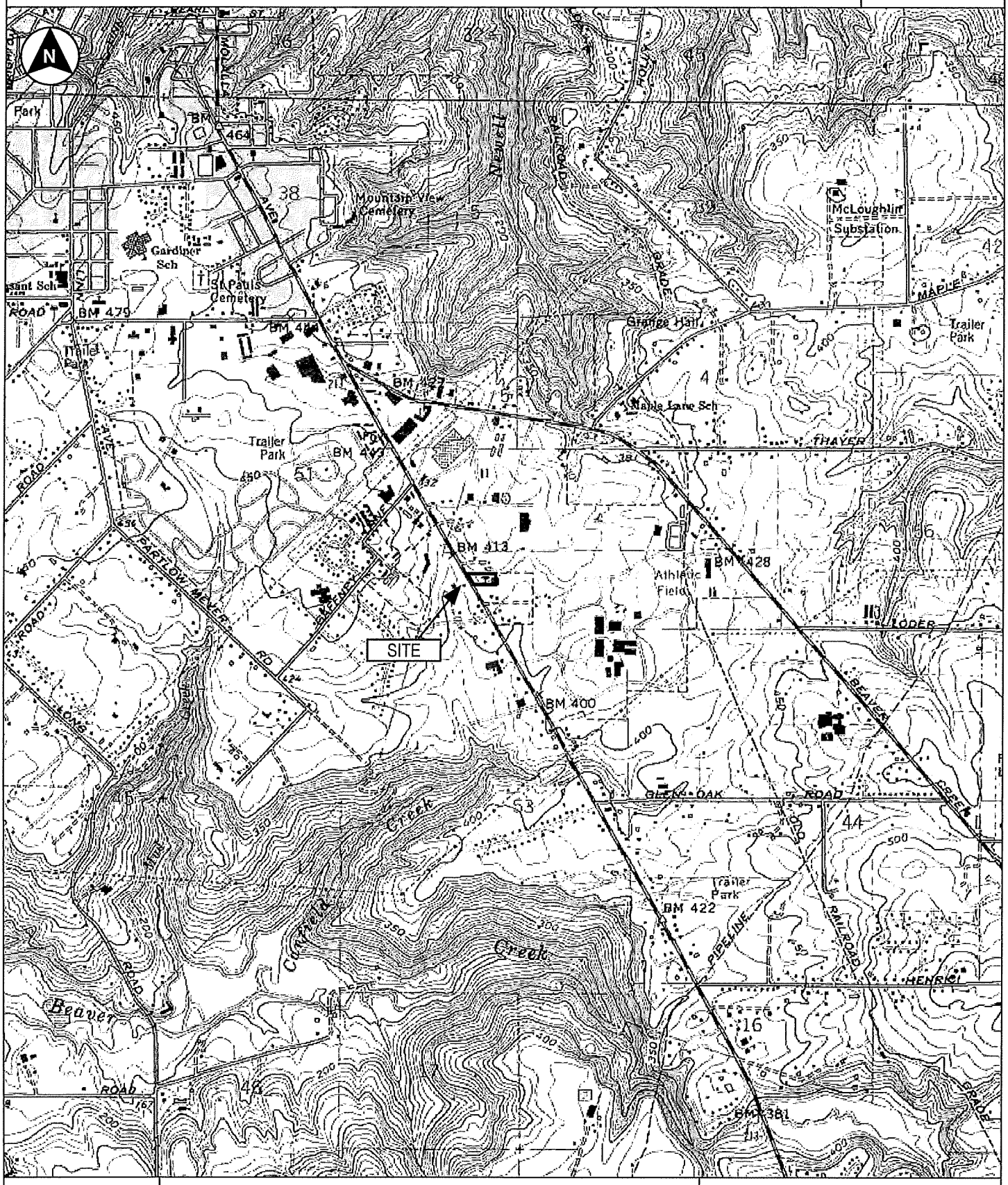
The owner/developer is responsible for ensuring that the project designers and contractors implement our recommendations. When the design has been finalized, prior to releasing bid packets to contractors, we recommend that the design drawings and specifications be reviewed by our firm to see that our recommendations have been interpreted and implemented as intended. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written modification or verification. Design review and construction phase testing and observation services are beyond the scope of our current assignment, but will be provided for an additional fee.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

Geotechnical engineering and the geologic sciences are characterized by a degree of uncertainty. Professional judgments presented in this report are based on our understanding of the proposed construction, familiarity with similar projects in the area, and on general experience. 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 made. This report is subject to review and should not be relied upon after a period of three years.

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FIGURE 1
Site Location



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Map created with TOPO!™, © 2006 National Geographic Holdings
USGS 7.5 Minute Topographic Map Series, Oregon City, Oregon Quadrangle, 1985.

Township 3 South, Range 2 East, Section 8 Willamette Meridian

Latitude: 45.326737° North
Longitude: 122.581892° West

1 Inch = 2,000 feet

0 2000 4000

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Appendix A: Subsurface Investigation and Laboratory Testing

Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

February 23, 2017

Prepared For:

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

Prepared by
Carlson Geotechnical

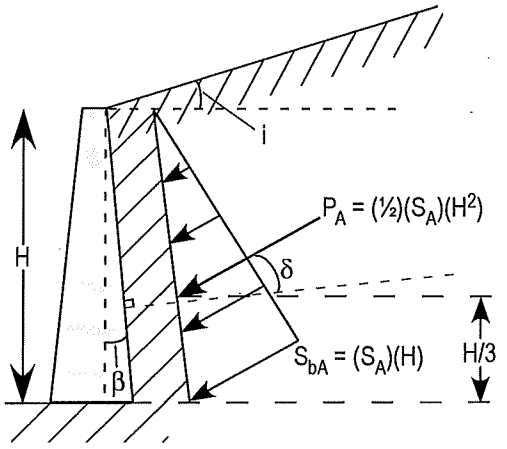
Exploration Key ..... Figure A1
Soil Classification ..... Figure A2
ODOT Rock Classification ..... Figure A3
Boring Logs ..... Figures A4 – A11

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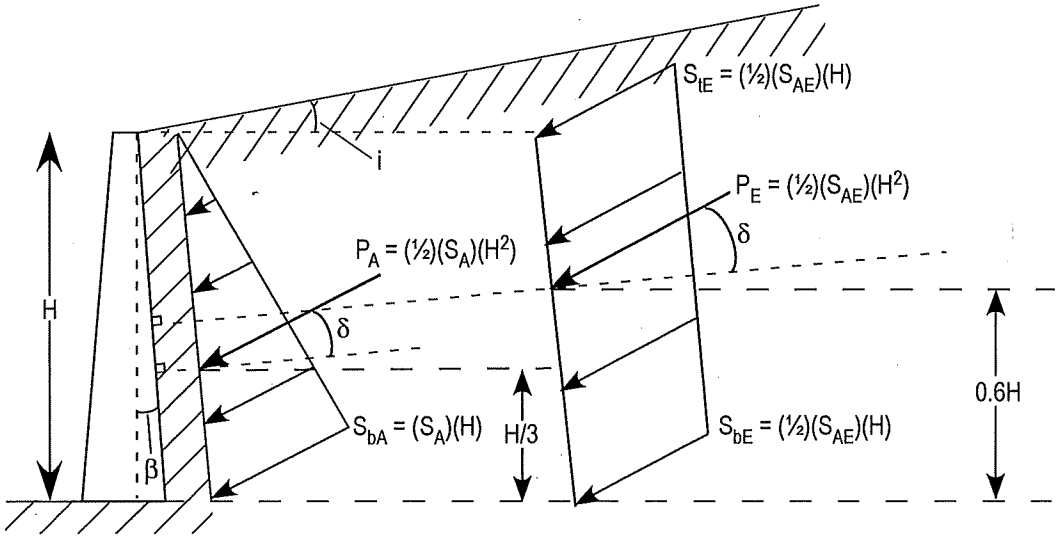
FIGURE 4
Retaining Walls

ACTIVE LATERAL PRESSURE DISTRIBUTION

STATIC LOADING CONDITIONS



SEISMIC LOADING CONDITIONS



LEGEND

P_A = Static active thrust force acting at a triangular distribution on wall (lb/ft^3)

P_E = Dynamic component of active thrust force acting at a uniform distribution on wall (lb/ft)

i = Slope of backfill (degrees)**

S_A = Active (static) component of equivalent fluid pressure (lb/ft^3)*

S_{tE} = Active earth pressure (dynamic) at the top of the wall (lb/ft^3)

S_{bA} = Active earth pressure (static) at the bottom of the wall (lb/ft^3)

ϕ = Internal angle of friction for backfill (degrees)**

δ = Angle from normal of back of wall (degrees). Based on friction developing between wall and backfill**

β = Slope of back of wall (degrees)**

S_{AE} = Dynamic component of equivalent fluid pressure (lb/ft^3)*

S_{bE} = Active earth pressure (dynamic) at bottom of the wall (lb/ft^3)*

*Refer to report text for calculated values **Refer to report text for modeled/assumed values

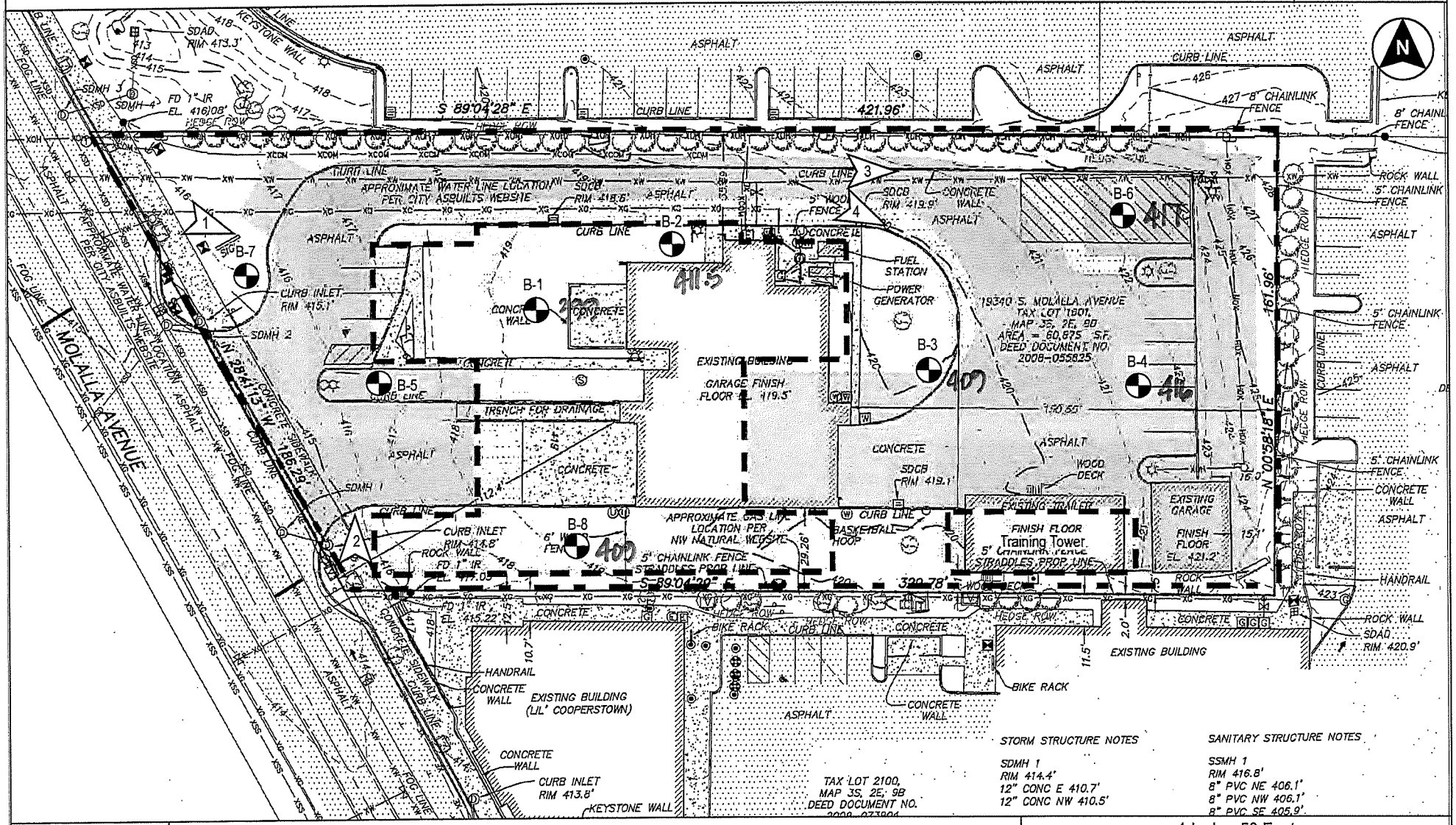
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Notes

1. Uniform pressure distribution of seismic loading is based on empirical evaluations [Sherif et al, 1982 and Whitman, 1990].
2. Placement of seismic resultant force at 0.6H is based on wall behavior and model test results [Whitman, 1990].

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FIGURE 2
Site Plan



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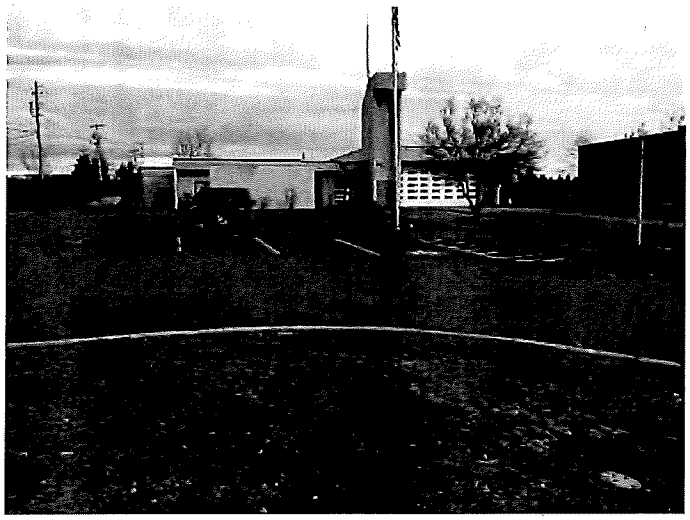
LEGEND

- Property Line
- Proposed Building Locations
- Proposed Parking Area
- Infiltration test boring
- Drilled boring
- 1 Orientation of site photographs shown on Figure 3

1 Inch = 50 Feet

0 50 100

NOTES: Site plan provided by Centerline Concepts Land Surveying, Inc., dated January 25, 2016. All exploration locations are considered approximate.



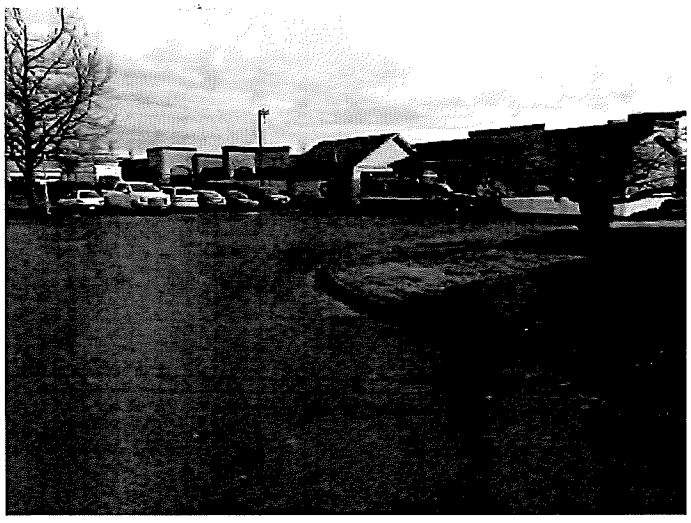
Photograph 1: Existing fire station (to be removed), facing southeast.



Photograph 2: West end of site, facing north.



Photograph 3: North-central portion of site, facing east.



Photograph 4: North-central portion of site, facing southeast.

See Figure 2 for approximate photograph locations and directions. Photographs were taken at the time of our fieldwork.

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FIGURE A1
Exploration Key

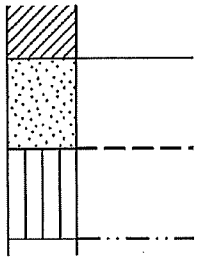
GEOTECHNICAL LABORATORY TESTING

PL — MC — LL	Atterberg limits (plasticity) test results (ASTM D4318): PL = Plastic Limit, LL = Liquid Limit, and MC= Moisture Content (ASTM D2216)
□ FINES CONTENT (%)	Percentage passing the U.S. Standard No. 200 Sieve (ASTM D1140)

SAMPLING

GRAB	Grab sample
SPT	**Standard Penetration Test** (SPT) consists of driving a 2-inch, outside-diameter, split-spoon sampler into the undisturbed formation with repeated blows of a 140-pound, hammer falling a vertical distance of 30 inches (ASTM D1586). The number of blows (N-value) required to drive the sampler the last 12 inches of an 18-inch sample interval is used to characterize the soil consistency or relative density. The drill rig was equipped with an cat-head or automatic hammer to conduct the SPTs. The observed N-values, hammer efficiency, and N_{60} are noted on the boring logs.
MC	**Modified California** sampling consists of 3-inch, outside-diameter, split-spoon sampler (ASTM G3550) driven similarly to the SPT sampling method described above. A sampler diameter correction factor of 0.44 is applied to calculate the equivalent SPT N_{60} value per Lacroix and Horn, 1973.
CORE	**Rock Coring** interval
SH	**Shelby Tube** is a 3-inch, inner-diameter, thin-walled, steel tube push sampler (ASTM D1587) used to collect relatively undisturbed samples of fine-grained soils.
WDCP	**Wildcat Dynamic Cone Penetrometer** (WDCP) test consists of driving 1.1-inch diameter, steel rods with a 1.4-inch diameter, cone tip into the ground using a 35-pound drop hammer with a 15-inch free-fall height. The number of blows required to drive the steel rods is recorded for each 10 centimeters (3.94 inches) of penetration. The blow count for each interval is then converted to the corresponding SPT N_{60} values.
DCP	**Dynamic Cone Penetrometer** (DCP) test consists of driving a 20-millimeter diameter, hardened steel cone on 16-millimeter diameter steel rods into the ground using a 10-kilogram drop hammer with a 460-millimeter free-fall height. The depth of penetration in millimeters is recorded for each drop of the hammer.
POCKET PEN. (tsf)	**Pocket Penetrometer** test is a hand-held instrument that provides an approximation of the unconfined compressive strength in tons per square foot (tsf) of cohesive, fine-grained soils.

CONTACTS



Observed (measured) contact between soil or rock units.

Inferred (approximate) contact between soil or rock units.

Transitional (gradational) contact between soil or rock units.

ADDITIONAL NOTATIONS

Italics	Notes drilling action or digging effort
{ Braces }	Interpretation of material origin/geologic formation (e.g. { Base Rock } or { Columbia River Basalt })

A.1.0 SUBSURFACE INVESTIGATION

Our field investigation consisted of eight borings completed on February 9 and 10, 2017. The approximate exploration locations are shown on the Site Plan, attached to the geotechnical report as Figure 2. The exploration locations shown therein were determined based on measurements from existing site features (buildings, etc.) and should be considered approximate. Surface elevations indicated on the logs were estimated based on the topographic contours as shown on the Site Plan attached to the geotechnical report (Figure 2) and should be considered approximate.

A.1.1 Drilled Borings

The borings (B-1 through B-8) were advanced at the site to depths ranging from about 5 to 25¾ feet bgs using a Diedrich D-50 track-mounted drill rig provided and operated by our subcontractor, Holocene Drilling of Puyallup, Washington. The borings were advanced using the hollow-stem auger drilling technique. Upon completion, the borings were backfilled with granular bentonite and the pavement areas were patched with cold-patch asphalt. Drilling waste (cuttings and drilling fluids) was left onsite in a utility trailer provided by the client.

Standard Penetration Tests (SPTs) were conducted within the borings using a split-spoon sampler in general accordance with American Society for Testing and Materials (ASTM) D1586. The SPTs were conducted at 2½- to 5-foot intervals to the termination depths of the borings. The SPT is described on the attached Exploration Key, Figure A1.

A.1.2 Material Classification & Sampling

Soil samples were obtained at selected intervals in the borings using the referenced split-spoon (SPT) sampler, detailed on Figure A1. A qualified member of CGT's staff collected the samples and logged the soils in general accordance with the Visual-Manual Procedure (ASTM 2488) and ODOT Rock Classification Criteria. An explanation of these classification systems are attached as Figures A2 and A3. The SPT samples were stored in sealable plastic bags and the core sample was placed in a rock core box and transported to our soils laboratory for further examination and testing. Our geotechnical staff visually examined all samples in order to refine the initial field classifications.

A.1.3 Subsurface Conditions

Subsurface conditions are summarized in Section 2.3.2 of the geotechnical report. Detailed logs of the explorations are presented on the attached exploration logs, Figures A4 through A11.

A.1.4 Infiltration Testing

One infiltration test was performed in boring B-5 at a depth of about 5 feet bgs. The results of the infiltration testing are presented in Appendix B.

A.1.5 Laboratory Testing

Laboratory testing was performed on samples collected in the field to refine our initial field classifications and determine in-situ parameters. Laboratory testing included the following:

- Twenty-two moisture content determinations (ASTM D2216).
- Two Atterberg limits (plasticity) tests (ASTM D4318).
- Five percentage-passing the U.S. Standard No. 200 Sieve tests (ASTM D1140).

Results of the laboratory tests are shown on the exploration logs.

Table 22: Scale of Relative Rock Weathering

Designation	Field Identification
Fresh	Crystals are bright. Discontinuities may show some minor surface staining. No discoloration in rock fabric.
Slightly Weathered	Rock mass is generally fresh. Discontinuities are stained and may contain clay. Some discoloration in rock fabric. Decomposition extends up to 1-inch into rock.
Moderately Weathered	Rock mass is decomposed 50% or less. Significant portions of rock show discoloration and weathering effects. Crystals are dull and show visible chemical alteration. Discontinuities are stained and may contain secondary mineral deposits.
Predominantly Weathered	Rock mass is more than 50% decomposed. Rock can be excavated with geologist's pick. All discontinuities exhibit secondary mineralization. Complete discoloration of rock fabric. Surface of core is friable and usually pitted due to washing out of highly altered minerals by drilling water.
Decomposed	Rock mass is completely decomposed. Original rock fabric may be evident. May be reduced to soil with hand pressure.

Table 23: Scale of Relative Rock Hardness

Term	Hardness Designation	Field Identification	Approximate Unconfined Compressive Strength
Extremely Soft	R0	Can be indented with difficulty by thumbnail. May be moldable or friable with finger pressure.	<100 psi
Very Soft	R1	Crumbles under firm blows with point of geology pick. Can be peeled by pocket knife. Scratched with finger nail.	100-1000 psi
Soft	R2	Can be peeled by pocket knife with difficulty. Cannot be scratched with finger nail. Shallow indention made by firm blow of geology pick.	1000-4000 psi
Medium Hard	R3	Can be scratched by knife or pick. specimen can be fractured with a single firm blow of hammer/geology pick.	4000-8000 psi
Hard	R4	Can be scratched with knife or pick only with difficulty. Several hard blows required to fracture specimen.	8000-16000 psi
Very Hard	R5	Cannot be scratched by knife or sharp pick. Specimen requires many blows of hammer to fracture or chip. Hammer rebounds after impact.	>16000 psi

Table 24: Stratification Terms

Term	Characteristics
Laminations	Thin beds (<1cm).
Fissle	Tendency to break along laminations.
Parting	Tendency to break parallel to bedding, any scale.
Foliation	Non-depositional, e.g., segregation and layering of minerals in metamorphic rock.

Tables adapted from the 1987 Soil and Rock Classification Manual, Oregon Department of Transportation.

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FIGURE A2
Soil Classification

Classification of Terms and Content

NAME: Group Name and Symbol
Relative Density or Consistency
Color
Moisture Content
Plasticity
Other Constituents
Other: Grain Shape, Approximate Gradation
Organics, Cement, Structure, Odor, etc.
Geologic Name or Formation

USCS Grain Size

Fines		<#200 (.075 mm)
Sand	Fine Medium Coarse	#200 - #40 (.425 mm) #40 - #10 (2 mm) #10 - #4 (4.75)
Gravel	Fine Coarse	#4 - 0.75 inch 0.75 inch - 3 inches
Cobbles		3 to 12 inches; scattered <15% est. numerous >15% est.
Boulders		> 12 inches

Relative Density or Consistency

Granular Material		Fine-Grained (cohesive) Materials				
SPT N-Value	Density	SPT N-Value	Torvane tsf Shear Strength	Pocket Pen tsf Unconfined	Consistency	Manual Penetration Test
		<2	<0.13	<0.25	Very Soft	Thumb penetrates more than 1 inch
0 - 4	Very Loose	2 - 4	0.13 - 0.25	0.25 - 0.50	Soft	Thumb penetrates about 1 inch
4 - 10	Loose	4 - 8	0.25 - 0.50	0.50 - 1.00	Medium Stiff	Thumb penetrates about ¼ inch
10 - 30	Medium Dense	8 - 15	0.50 - 1.00	1.00 - 2.00	Stiff	Thumb penetrates less than ¼ inch
30 - 50	Dense	15 - 30	1.00 - 2.00	2.00 - 4.00	Very Stiff	Readily indented by thumbnail
>50	Very Dense	>30	>2.00	>4.00	Hard	Difficult to indent by thumbnail

Moisture Content

Dry: Absence of moisture, dusty, dry to the touch
Damp: Some moisture but leaves no moisture on hand
Moist: Leaves moisture on hand
Wet: Visible free water, likely from below water table

	Plasticity	Dry Strength	Dilatancy	Toughness
ML	Non to Low	Non to Low	Slow to Rapid	Low, can't roll
CL	Low to Medium	Medium to High	None to Slow	Medium
MH	Medium to High	Low to Medium	None to Slow	Low to Medium
CH	Medium to High	High to Very High	None	High

Structure

Stratified: Alternating layers of material or color >6 mm thick
Laminated: Alternating layers < 6 mm thick
Fissured: Breaks along definite fracture planes
Slickensided: Striated, polished, or glossy fracture planes
Blocky: Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lenses: Has small pockets of different soils, note thickness
Homogeneous: Same color and appearance throughout

Visual-Manual Classification

Major Divisions			Group Symbols	Typical Names
Coarse Grained Soils: More than 50% retained on No. 200 sieve	Gravels: 50% or more *retained* on the No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel/sand mixtures, little or no fines
			GP	Poorly-graded gravels and gravel/sand mixtures, little or no fines
		Gravels with Fines	GM	Silty gravels, gravel/sand/silt mixtures
			GC	Clayey gravels, gravel/sand/clay mixtures
	Sands: More than 50% *passing* the No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly-graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand/silt mixtures
			SC	Clayey sands, sand/clay mixtures
Fine-Grained Soils: 50% or more Passes No. 200 Sieve	Silt and Clays Low Plasticity Fines		ML	Inorganic silts, rock flour, clayey silts
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic silt and organic silty clays of low plasticity
	Silt and Clays High Plasticity Fines		MH	Inorganic silts, clayey silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck, and other highly organic soils

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ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

Bank fault, Portland Hills fault, Grant Butte fault, Damascus-Tickle Creek fault, Lacamas Lake fault, and the Sandy River fault zone. Details of each of these faults are provided in the following sections. Refer to Table C2 presented in Section C.3.1.4 of this appendix for the approximate distance and direction to these faults from the project site.

C.3.1.1.1 Helvetia fault (USGS 714)

The Helvetia fault is a north-northwest trending structure located on the northeastern margin of the Tualatin Basin. There is no evidence for displacement of late Quaternary deposits along the fault; however, the most recent age of displacement is poorly constrained[8]. Therefore, the fault is considered active, but with a long recurrence interval.

C.3.1.1.2 Beaverton fault zone (USGS 715)

The Beaverton fault zone consists of an east-west striking normal fault that forms the southern margin of the Tualatin basin. This fault offsets Miocene Columbia River Basalt, but is covered by thick sequences of Pliocene to Pleistocene Missoula flood deposits. As a result, no fault scarp is present at the surface, and the Beaverton fault zone is not present on most geologic maps of the area. Yeats and others[9] indicate that the Beaverton Faults displace post-Columbia River Basalt sediments; however, the age and nature of deformation is not known. The Beaverton fault is considered active, but with a long recurrence interval.

C.3.1.1.3 Canby-Molalla fault (USGS 716)

The Canby-Molalla fault is a right-lateral strike-slip fault located within the Willamette Valley. The Canby-Molalla fault appears to offset Missoula flood deposits, and seismic reflection surveys suggest Holocene deformation of sediments. The fault has little geomorphologic expression, but is considered active, with a slip rate of less than 0.2 mm per year.

C.3.1.1.4 Newberg fault (USGS 717)

The Newberg fault is a 5-kilometer-long portion of the Gales Creek-Mount Angel structural zone, which consists of a 73-kilometer-long zone of right-lateral strike-slip faults located within the Willamette Valley. The fault zone offsets Miocene Columbia River basalts, but no unequivocal evidence for Quaternary displacement has been identified. The Newberg fault is recognized in the subsurface by vertical separation of the Columbia River Basalt, and offset seismic reflectors in overlying basin sediments[10,11], with no definitive geomorphologic evidence of faulting. The majority of the fault trace is covered with Holocene alluvium, which may have buried recent deformation. Due to the uncertainty in activity level, the fault has been classified as active.

C.3.1.1.5 Gales Creek fault zone (USGS 718)

The Gales Creek fault zone is a 73-kilometer-long zone of northwest-trending right-lateral strike-slip faults located on the western margin of the Willamette Valley. The fault zone offsets Miocene Columbia River

---

8 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

9 Yeats, R.S., *et al.*, 1996. Tectonics of the Willamette Valley Oregon: in Assessing earthquake hazards and reducing risk in the Pacific Northwest, v. 1: U.S. Geological Survey Professional Paper 1560, p. 183-222, 5 plates, scale 1:100,000.

10 Werner, K.S., Nabelek, J., Yeats, R.S., Malone, S., 1992. The Mount Angel fault: implications of seismic-reflection data and the Woodburn, Oregon, earthquake sequence of August, 1990: Oregon Geology, v. 54, p. 112-117.

11 Yeats, R.S., *et al.*, 1996. Tectonics of the Willamette Valley Oregon: in Assessing earthquake hazards and reducing risk in the Pacific Northwest, v. 1: U.S. Geological Survey Professional Paper 1560, p. 183-222, 5 plates, scale 1:100,000.

C.2.2 Site Geology

Based on available geologic mapping[5] of the area, the site is underlain by Boring Lava basalt. Fresh (un-weathered) Boring Lava is described as light gray, open-textured, olivine basalt with some pyroclastic material of limited extent. A thick residual soil often forms on the Boring Lava, and is the result of in-place weathering of the basalt. Subsurface geology at the site is described in greater detail in Section C.4.1 below.

C.3.0 GROUND MOTION HAZARD ANALYSIS

The geological and geotechnical data developed within the geotechnical report were used to evaluate the ground motion response of the project site to various earthquake sources and events. The ground motion hazard analysis addresses the following seismic hazards for the site in accordance with Section 1803.7 of the OSSC:

- Ground Shaking;
- Liquefaction;
- Lateral Spread;
- Earthquake-induced Landsliding;
- Inundation from Tsunami / Seiche; and
- Surface Rupture due to Fault Displacement.

The analysis was based on procedures presented in Section 1613.3.4 of the 2014 OSSC and Section 11.4 of American Society of Civil Engineers (ASCE) Minimum Design Loads for Buildings and Other Structures (ASCE 7-10), which provides a design response spectrum. A site-specific response analysis could be performed to develop a site-specific design response spectrum at the owner's discretion, if desired, for an additional fee.

C.3.1 Earthquake Sources and Seismicity

The site is located in a tectonically active area that may be affected by crustal earthquakes, large subduction zone earthquakes, or earthquakes caused by faulting within the subducting slab (intraplate earthquakes).

C.3.1.1 Crustal Sources

Crustal earthquakes typically occur at depths ranging from 15 to 40 kilometers bgs[6]. According to the United States Geological Survey Quaternary fault and fold database[7], nearby seismic sources capable of producing damaging earthquakes in this region include Helvetia fault, Beaverton fault zone, Canby-Molalla fault, Newberg fault, Gales Creek fault zone, Mount Angel fault, Bolton fault, Oatfield fault, East

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[5] Ma, Madin, Duplantis, and Williams, 2012, Lidar-based Surficial Geologic Map and Database of the Greater Portland, Oregon, Area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington Oregon Department of Geology and Mineral Industries Open-File Report O-12-02.

[6] Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: unpublished report prepared for Oregon Department of Transportation, Personal Services Contract 11688, January 1995.

[7] U.S. Geological Survey, 2017. Quaternary fault and fold database for the United States, *accessed February 2017*, from USGS web site: http://earthquakes.usgs.gov/regional/qfaults/.

C.1.0 INTRODUCTION

Based on the information provided, we understand the proposed building will be classified as an "Essential Facility" per Oregon Revised Statutes (ORS) 455.447. We also understand the proposed facility is considered a Risk Category IV Structure, and a Site-Specific Seismic Hazards Study (SSSHS) is required for the project in accordance with Section 1803.3.2 of the 2014 Oregon Structural Specialty Code (OSSC). This appendix presents the results of that study.

C.2.0 GEOLOGIC SETTING

C.2.1 Regional Geology

The site is located within the Willamette Valley physiographic province in Oregon City, Oregon. The Willamette Valley is a broad, trough-like lowland defined by uplift and faulting of the Coast and Western Cascade Ranges to the west and east respectively. Approximately 35 million years ago, a large slab of oceanic crust and associated marine sediments accreted onto the margin of North America, which was located in a rough line from southwestern Oregon to the northeastern portion of the state. A portion of this accreted slab became the Willamette Valley, which was still covered by a shallow ocean. Additional accretion, faulting, and folding created the Coast Range to the west. This folding and faulting also raised the Willamette Valley out of the sea. Volcanic activity from the Cascade Range approximately 25 million years ago covered and filled in much of the southern and eastern portions of the early Willamette Valley[1].

Approximately 15 million years ago, these marine sediments were covered by the Columbia River Basalts that flowed down the Columbia River Gorge as far south as Salem. Uplift and tilting of the Oregon Coast Range and the western Cascade Range formed the trough-like character of the Willamette Valley, and folded and faulted the Columbia River Basalts. The ancestral Columbia River deposited sand and gravel in the northern part of the valley near the site. Approximately 1.3 to 2.6 million years ago, a volcanic episode erupted the Boring Lavas in several localized vents, including Mt. Scott, Mt. Sylvania, and Mt. Tabor. Catastrophic glacial floods later flowed into the Willamette Valley approximately 21,000 and 12,000 years ago[2] and deposited fine to coarse-grained sedimentary assemblages (Pleistocene flood deposits) mapped throughout the area[3,4].

---

1 Pacific Northwest Ecosystem Research Consortium, 2002. Willamette River Basin: trajectories of environmental and ecological change, Oregon State University Press.

2 Ma, Madin, Duplantis, and Williams, 2012, Lidar-based Surficial Geologic Map and Database of the Greater Portland, Oregon, Area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington Oregon Department of Geology and Mineral Industries Open-File Report O-12-02.

3 Orr, Elizabeth L., Orr, William N., and Baldwin, Ewart M., 1992, Geology of Oregon, Fourth Edition: Kendall/Hunt Publishing, pp. 203-222.

4 O'Connor, Jim E., et al., 2001, Origin, extent, and thickness of quaternary geologic units in the Willamette Valley, Oregon: US Geological Survey, Professional Paper 1620,52p, 1plate.

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ATTACHMENTS

Regional Seismicity ..... Figure C1

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Appendix C: Site-Specific Seismic Hazards Study

Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

February 23, 2017

Prepared For:

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

Prepared by
Carlson Geotechnical

Table B2 Results of Infiltration Test IT-1

Infiltration Test	Trial	Time Interval (minutes)	Drop in Water Level[1] (inches)	Raw Infiltration Rate (inches per hour)
IT-1	1	20	⅛	⅜
	2	20	0	0
	3	20	0	0
	4	20	⅛	⅜
	5	20	0	0
	6	20	0	0
	7	20	0	0

[1] Measured to nearest ⅛ inch using a measuring tape and top of pipe as a fixed datum.

B.4.0 DISCUSSION

The measured raw (unfactored) infiltration rate for the infiltration test presented above is zero. It is our opinion that this rate is representative of the earthen materials encountered in the borings (clayey sand, sandy fat clay, and basalt bedrock), as evidenced by the presence of perched groundwater at the site.

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FIGURE A5
Boring B-2

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 419 ft **ELEVATION DATUM** Figure 2

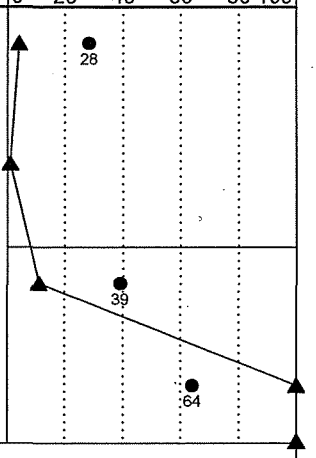
WEATHER Rainy, ~55°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 7.5 ft / El. 411.5 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
		OL Fill	**CLAY TOPSOIL FILL:** Dark brown, moist, abundant rootlets and angular gravel up to ~¾ inch in diameter.		0	SPT 1	89	1-1-2 (3)	4	
			SANDY FAT CLAY: Very soft, reddish brown, moist, high plasticity, fine-grained sand, trace angular gravel up to ~1 inch in diameter.							
415		CH				SPT 2	28	0-0-1 (1)	1	
					5					
			Stiff, reddish brown with light and dark orange and black mottling, below ~5 feet bgs.			SPT 3	100	1-4-5 (9)	11	
				▽						
		SC	**CLAYEY SAND:** Dense to very dense, reddish brown with dark red and gray mottling, moist, fine-grained. Groundwater observed at ~7½ feet bgs.			SPT 4	100	1-50/3"	100	
410		RX	**BASALT:** Hard to very hard (R4-R5), gray with black and white minerals, slightly weathered.			SPT 5	0	50/1"	100	



- Boring terminated at ~9 feet bgs due to practical refusal on bedrock.
- No caving observed.
- Boring backfilled with spoils.

405

400

395

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FIGURE A4

Boring B-1

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 419 ft **ELEVATION DATUM** Figure 2

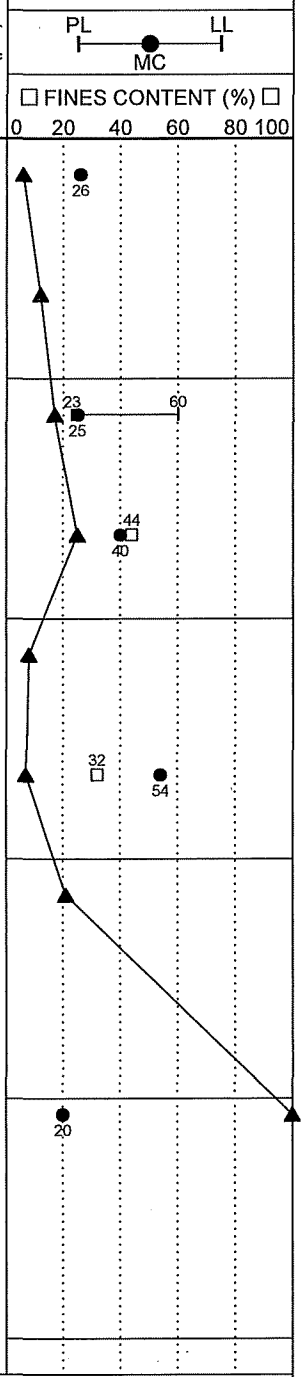
WEATHER Rainy, ~55°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 20.0 ft / El. 399.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
415		OL	**CLAY TOPSOIL:** Dark brown, moist, abundant rootlets and trace roots up to ~¼ inch in diameter.		0	SPT 1	67	1-1-4 (5)	6	
		CH	**SANDY FAT CLAY:** Medium stiff, reddish brown with gray and black mottling, moist, high plasticity, fine-grained sand. Stiff below ~2½ feet bgs.			SPT 2	100	1-3-7 (10)	12	
			Very stiff, with basalt fragments up to ~1½ inches in diameter below ~5 feet bgs.		5	SPT 3	100	2-6-8 (14)	17	
410			**CLAYEY SAND:** Medium dense to loose, reddish brown with dark red and gray mottling, moist, fine-grained.			SPT 4	100	3-14-6 (20)	25	
					10	SPT 5	89	1-2-4 (6)	8	
405		SC				SPT 6	100	1-2-3 (5)	7	
					15	SPT 7	100	4-8-7 (15)	21	
400			Groundwater observed at ~20 feet bgs.	▽	20	SPT 8	100	16-50/2"	100	
		RX	**BASALT:** Hard to very hard (R4-R5), gray with black and white minerals, slightly weathered to fresh.			CORE 9	77 (77)			
395					25					



- Boring terminated at ~25¾ feet bgs.
- No caving observed.
- Boring backfilled with granular bentonite.

CGT BOREHOLE G1704558.GPJ GINT US.GDT 2/22/17

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FIGURE A6
Boring B-3

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 420 ft **ELEVATION DATUM** Figure 2

WEATHER Rainy, ~55°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 11.0 ft / El. 409.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
		OL	**CLAY TOPSOIL:** Dark brown, moist, abundant rootlets.		0					
		CH	**SANDY FAT CLAY:** Medium stiff, reddish brown with black mottling, moist, high plasticity, fine-grained sand.			SPT 1	78	0-1-3 (4)	5	
			Stiff, reddish brown to dark reddish brown with black and slight orange mottling below ~2½ feet bgs.			SPT 2	89	3-3-4 (7)	9	
415					5					
		SC	**CLAYEY SAND:** Loose, reddish brown with gray, black, and light orange mottling, moist, fine-grained.			SPT 3	100	2-3-3 (6)	7	
			Reddish brown with black, gray, and yellow mottling below ~7½ feet bgs.			SPT 4	100	1-2-1 (3)	4	
410					10					
			Very loose below ~10 feet bgs.	▽		SPT 5	100	1-1-1 (2)	3	
			Groundwater observed at ~11 feet bgs.							
		RX	**BASALT:** Hard to very hard (R4-R5), gray with black and white minerals, slightly weathered.							
405			• Boring terminated at ~12½ feet bgs due to practical refusal on bedrock. • No caving observed. • Boring backfilled with granular bentonite.							
400										
395										

▲ SPT N_{60} VALUE ▲

PL — MC — LL

☐ FINES CONTENT (%) ☐

0 20 40 60 80 100

SPT 2: 41

SPT 4: 39, 77, 66

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FIGURE A7

Boring B-4

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 421 ft **ELEVATION DATUM** Figure 2

WEATHER Rainy, ~55°F **SURFACE** Asphaltic Concrete **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 5.0 ft / El. 416.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ / PL LL MC / ☐ FINES CONTENT (%) ☐ 0 20 40 60 80 100
420		AC / GP / Fill	**ASPHALTIC CONCRETE:** Approximately 3 inches thick. **POORLY GRADED GRAVEL FILL:** Dark gray, wet, angular, up to ~1 inch in diameter		0						
		CH	**SANDY FAT CLAY:** Stiff, reddish brown with black mottling, moist to wet, high plasticity, fine-grained sand.			SPT 1	100	3-4-5 (9)	11		
				▽	5						
415			Reddish brown with gray, black, and yellow mottling below ~5 feet bgs. Groundwater observed at ~5 feet bgs.			SPT 2	100	1-3-5 (8)	10		
			CLAYEY SAND: Medium dense to loose, orange to brown, with black and purple mottling, moist to wet, fine-grained.			SPT 3	100	2-3-5 (8)	10		61
					10						
410		SC	Dark red to brown with black and orange mottling below ~10 feet bgs.			SPT 4	100	3-3-6 (9)	12		38 / 61
						SPT 5	100	1-3-4 (7)	9		
405			• Boring terminated at ~14 feet bgs. • No caving observed. • Boring backfilled with granular bentonite and surface restored with fast-setting concrete.								
400											
395											

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FIGURE A9
Boring B-6

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/10/17 **GROUND ELEVATION** 422 ft **ELEVATION DATUM** Figure 2

WEATHER Cloudy, ~50°F **SURFACE** Asphaltic Concrete **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 5.0 ft / El. 417.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
		AC	**ASPHALTIC CONCRETE:** Approximately 5 inches thick.		0					
		GP Fill	**POORLY GRADED GRAVEL FILL:** Dark gray, moist, angular, up to ~1 inch in diameter							
420			**SANDY FAT CLAY:** Stiff, reddish brown, moist, high plasticity, fine-grained sand.			SPT 1	44	5-4-5 (9)	11	
		CH		▽	5					
			Groundwater observed at ~5 feet bgs. Medium stiff below ~5 feet bgs.			SPT 2	67	2-2-4 (6)	7	
415			**CLAYEY SAND:** Loose, reddish brown with purple and black mottling, wet, fine-grained.			SPT 3	100	1-1-3 (4)	5	
					10					
			Reddish brown with black and yellow mottling below ~10 feet bgs,			SPT 4	78	1-1-2 (3)	4	
410		SC								
			Medium dense, reddish brown with black and slight gray mottling, trace subrounded gravel up to ~½ inch in diameter below ~12½ feet bgs.			SPT 5	89	1-9-9 (18)	24	
					15					
						SPT 6	94	1-4-9 (13)	18	
405										
400										
395										

▲ SPT N_{60} VALUE ▲

PL LL MC

☐ FINES CONTENT (%) ☐

0 20 40 60 80 100

65

37

56

- Boring terminated at ~16½ feet bgs.
- No caving observed.
- Boring backfilled with granular bentonite and surface restored with fast-setting concrete.

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FIGURE A8
Boring B-5

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 417 ft **ELEVATION DATUM** Figure 2

WEATHER Cloudy, ~55°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** ---

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ / PL LL MC / ☐ FINES CONTENT (%) ☐ 0 20 40 60 80 100
415		OL	**CLAY TOPSOIL:** Dark brown, moist, abundant rootlets.		0						
		CH	**SANDY FAT CLAY:** Stiff, brown with black mottling, moist, high plasticity, fine-grained sand.								
					5	SPT 1	67	1-4-5 (9)	11		▲ 26 ☐ 52
410											
405											
400											
395											
390											

- Boring terminated at ~5 feet bgs.
- No groundwater or caving observed.
- Infiltration test IT-1 performed at ~5 feet bgs. See Appendix B for test results.
- Boring backfilled with spoils.

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FIGURE A11

Boring B-8

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/10/17 **GROUND ELEVATION** 419 ft **ELEVATION DATUM** Figure 2

WEATHER Cloudy, ~50°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 10.0 ft / El. 409.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
		OL	**CLAY TOPSOIL:** Medium stiff, dark brown, moist, abundant rootlets.		0	SPT 1	44	1-1-3 (4)	5	
415		CH	**SANDY FAT CLAY:** Medium stiff, brown with black and orange mottling, moist, high plasticity, fine-grained sand.			SPT 2	67	1-1-3 (4)	5	
			Stiff, reddish brown with black and yellow mottling below ~5 feet bgs.		5	SPT 3	100	2-5-7 (12)	15	
410		SC	**CLAYEY SAND:** Medium dense, reddish brown with black and gray mottling, wet, fine-grained.			SPT 4	100	1-4-5 (9)	11	
			Groundwater observed at ~10 feet bgs.	▽	10	SPT 5	100	2-5-5 (10)	13	
405			Gray with black and orange mottling below ~12½ feet bgs.			SPT 6	100	2-4-4 (8)	10	
					15	SPT 7	100	4-5-6 (11)	15	
400		RX	**BASALT:** Hard to very hard (R4-R5), gray with black and white minerals, slightly weathered.		20	SPT 8	100	50/3"	100	
395										

▲ SPT N_{60} VALUE ▲

PL — MC — LL

☐ FINES CONTENT (%) ☐

0 20 40 60 80 100

37 55 66 58

- Boring terminated at ~20¼ feet bgs.
- No caving observed.
- Boring backfilled with granular bentonite.

CGT BOREHOLE G1704558.GPJ GINT US.GDT 2/22/17

Carlson Geotechnical
7185 SW Sandburg Street, Suite 200
Tigard, Oregon 97281
(503) 601-8250
www.carlsontesting.com

FIGURE A10
Boring B-7

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/10/17 **GROUND ELEVATION** 416 ft **ELEVATION DATUM** Figure 2

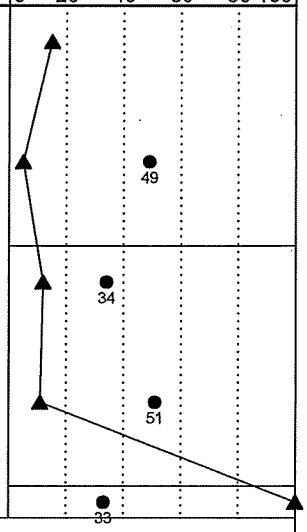
WEATHER Cloudy, ~45°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 10.0 ft / El. 406.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
415		OL Fill	**CLAY TOPSOIL FILL:** Dark brown, moist, abundant rootlets.		0					
		GP FILL	**POORLY GRADED GRAVEL FILL:** Dark gray, moist, angular, up to ~½ inch in diameter.			SPT 1	33	1-6-6 (12)	15	
		OL	**CLAY TOPSOIL:** Stiff, dark brown, moist, abundant rootlets.							
		CH	**SANDY FAT CLAY:** Medium stiff, brown, wet, high plasticity, fine-grained sand, trace subangular gravel up to ~¾ inch in diameter.			SPT 2	100	1-2-2 (4)	5	
					5					
410		CH	Stiff, orange to brown, moist, trace rounded to subrounded gravel up to ~1 inch in diameter below ~5 feet bgs.			SPT 3	100	2-5-5 (10)	12	
			Reddish brown with black and gray mottling below ~7½ feet bgs.			SPT 4	100	1-2-7 (9)	11	
		SC	**CLAYEY SAND:** Very dense, gray with minor black mottling, wet, fine-grained. Groundwater observed at ~10 feet bgs.	▽	10	SPT 5	75	19-50/2"	100	
405										
400										
395										
390										



- Boring terminated at ~10½ feet bgs.
- No caving observed.
- Boring backfilled with granular bentonite.

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Salem Office (503) 589-1252
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Appendix B: Results of Infiltration Testing

Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

February 23, 2017

Prepared For:

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

Prepared by
Carlson Geotechnical

B.1.0 INTRODUCTION

Project architect Ms. Camilla Cok with Hennebery Eddy Architects, Inc., requested infiltration testing at two locations on a site map provided to CGT. Ms. Cok indicated testing should be performed at a depth of 11 feet below existing ground surface (bgs) at the eastern location, and 7 feet bgs at the western location.

Groundwater seepage was encountered at the western location (in boring B-4) at a depth of about 5 feet bgs during drilling. A minimum separation of 5 feet of separation between groundwater and infiltration testing should be maintained, which was not feasible at this location.

Groundwater in the vicinity of the eastern test location (boring B-5) was measured at about 10 feet bgs, so the test depth was adjusted to 5 feet bgs to maintain the required separation distance. The test was performed in a drilled hollow-stem auger boring, designated B-5 on the Site Plan, which is attached to the main report as Figure 2.

B.2.0 TEST PROCEDURE

One infiltration test was performed within a prepared machine-drilled hollow stem auger boring at the site on February 9 and 10, 2017, in general accordance with the Encased Falling Head test method described in Appendix E of the Stormwater Standards, Clackamas County Service District No. 1, dated July 1, 2013. The following table presents the depth of the test and the subsurface material encountered at the test depth.

Table B1 Infiltration Test Depths & Materials

Infiltration Test	Exploration	Test Depth[1] (feet bgs)	Test Elevation[2] (feet)	Subsurface Material at Test Depth	Percent Passing US No. 200 Sieve Results (%)
IT-1	B-5	5	411	Sandy Fat Clay (CH)	52

1 Relative to existing site grades. bgs = below ground surface.

2 Estimated from topographic map provided by Hennebery Eddy Architects, Inc., as shown on Figure 2, Site Plan. Elevations should be considered approximate.

The machine-drilled boring (B-5) was advanced to the test depth on February 9, 2017, using a Deidrich D-50 track-mounted drill rig with 8-inch outside diameter/6-inch inside-diameter hollow stem auger. Once the boring was advanced to the test depth, a garden hose was lowered to the bottom of the boring (i.e., to prevent scouring) and a 12-inch column of water was placed in the boring.

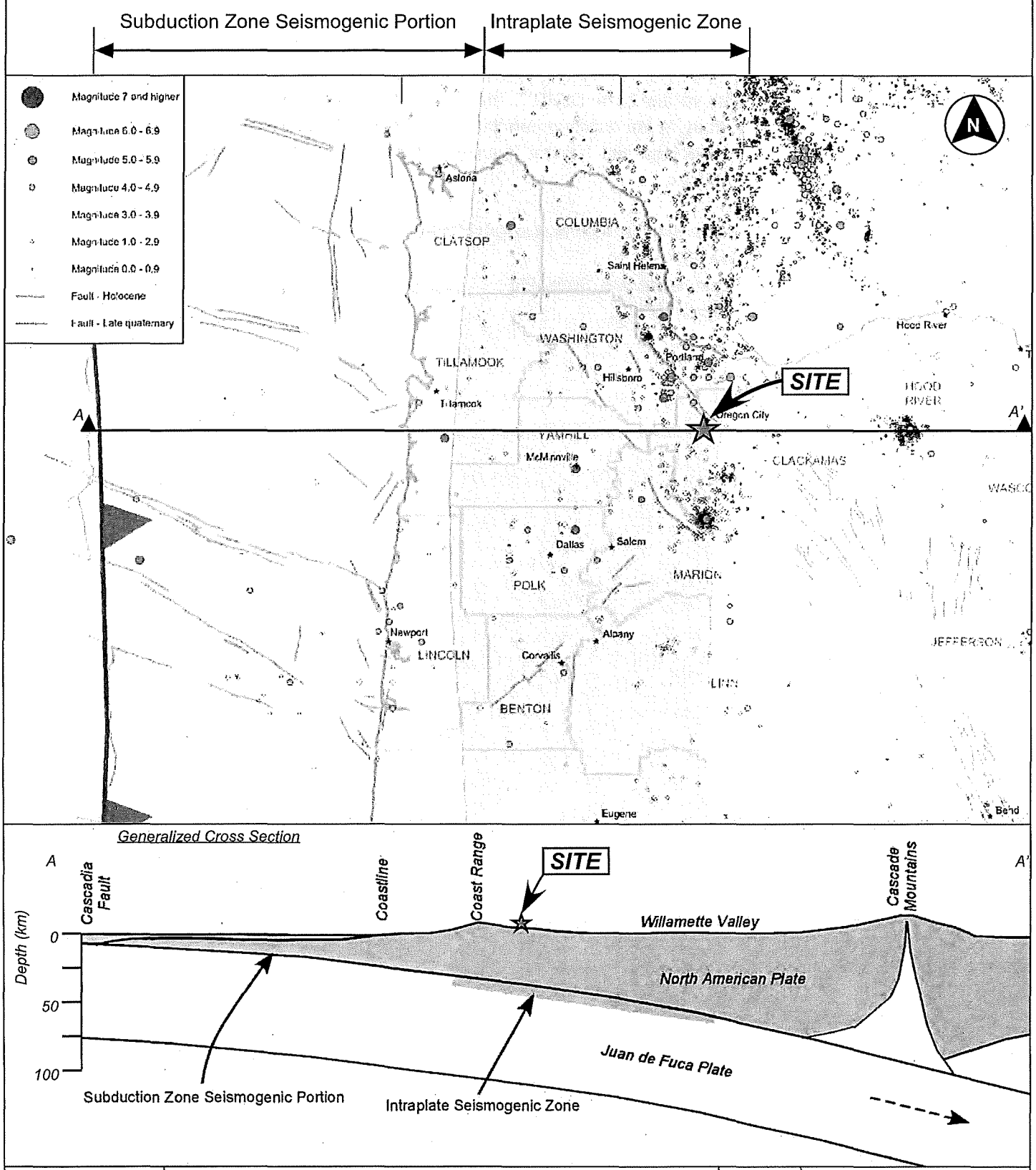
Due to the presence of clay soils at the test depth, the soils were allowed to presoak overnight in accordance with the test method. The water had not completely drained away by the following morning, so testing proceeded upon our arrival. Water level readings were recorded on 20-minute intervals for a period of 2 hours.

B.3.0 TEST RESULTS

The following tables present the raw data and calculated rates of infiltration that we observed from the infiltration tests. Please note the calculated infiltration rates do not include any safety or correction factors.

CFD #1 FIRE STATION 16 - OREGON CITY, OREGON
Project Number G1704558

FIGURE C1
Regional Seismicity



CARLSON GT GEOTECHNICAL 503-601-8250

- McCrory, Blair, Oppenheimer, and Walter, 2004. Depth to the Juan de Fuca slab beneath the Cascadia subduction margin - A 3-D model for storing earthquakes: U.S. Geological Survey Data Series 91.
- Niewendorp, Clark A., and Neuhaus, Mark E. , Map of Selected Earthquakes for Oregon,1841 through 2002 by Oregon Department of Geology and Mineral Industries, OFR O-03-02.

Scale 1 Inch = 50 kilometers

0 50 100

C.7.0 REPORT SUBMITTAL

According to Section 1803.9 of the 2014 OSSC[44], the applicant should submit one copy of the Site-Specific Seismic Hazards Study to the building permit issuing agency (the jurisdiction), and one copy to the Oregon Department of Geology and Mineral Industries (DOGAMI). The DOGAMI report can be submitted to the following address:

DOGAMI – Site Specific Seismic Hazards Study
Administrative Offices
800 NE Oregon Street #28, Suite 965
Portland, Oregon 97232

[44] International Code Council, Inc., 2014. 2014 Oregon Structural Specialty Code. Based on the 2012 International Building Code.

constantly evolving. Current practice to identify non-liquefiable, fine-grained soils is based on plasticity characteristics of the soils, as follows: (1) liquid limit greater than 47 percent, (2) plasticity index greater than 20 percent, and (3) moisture content less than 85 percent of the liquid limit[42].

The Oregon Department of Geology and Mineral Industries' Oregon Statewide Geohazards Viewer[43] shows that the soils at the site and immediate vicinity do not have a potential for seismically-induced liquefaction. This is supported by the earthen materials encountered in the borings (high plasticity clay soils and basalt bedrock). Therefore, we conclude the potential for seismically-induced liquefaction settlement at the site is very low.

C.6.2 Surface Rupture

C.6.2.1 Faulting

As discussed above, the site is situated in a region of the country characterized by extensive faulting and known for seismic activity. However, no known faults are mapped on or immediately adjacent to the site. Therefore, the risk of surface rupture impacting the proposed development at the site due to faulting is considered very low.

C.6.2.2 Lateral Spread

Surface rupture due to lateral spread can occur on sites underlain by liquefiable soils that are located on or immediately adjacent to slopes steeper than about 3 degrees (20H:1V), and/or adjacent to a free face, such as a stream bank or the shore of an open body of water. During lateral spread, the materials overlying the liquefied soils are subject to lateral movement downslope or toward the free face. Recognizing the lack of liquefiable soils, we characterize the risk of surface rupture due to lateral spread as negligible.

C.6.3 Slope Stability

Due to the relatively flat to gently sloping topography on and surrounding the site, we conclude the risk of seismically-induced slope instability is very low.

C.6.4 Tsunami/Seiche Inundation

The site is geographically distant from the Oregon coast and therefore not at risk of inundation from a tsunami occurring in the Pacific Ocean.

The term seiche refers to oscillating standing waves that can produce dramatic changes in water level over relatively short periods of time and can cause inundation of nearby areas. A seiche can be generated in enclosed or partially enclosed bodies of water by atmospheric conditions or seismic activity. The site is not located near any large body of water that could produce a seismically-induced seiche. Accordingly, the hazard associated with seiche inundation at the site is considered negligible.

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[42] Seed, R.B. et al., 2003. Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework. Earthquake Engineering Research Center Report No. EERC 2003-06.

[43] Oregon Department of Geology and Mineral Industries, 2016. Oregon Statewide Geohazards Viewer, *accessed February 2017*, from DOGAMI web site: http://www.oregongeology.org/sub/hazvu/index.htm.

C.5.0 SEISMIC GROUND MOTION VALUES

Earthquake ground motion parameters for the site were obtained based on the United States Geological Survey (USGS) Seismic Design Values for Buildings - Ground Motion Parameter Calculator[41]. The following table shows the recommended seismic design parameters for the site.

Table C4 Seismic Ground Motion Values

	Parameter	Value
Mapped Acceleration Parameters	Spectral Acceleration, 0.2 second (S_s)	0.902g
	Spectral Acceleration, 1.0 second (S_1)	0.392g
Coefficients (Site Class D)	Site Coefficient, 0.2 sec. (F_a)	1.139
	Site Coefficient, 1.0 sec. (F_v)	1.616
Adjusted MCE Spectral Response Parameters	MCE Spectral Acceleration, 0.2 sec. (S_{MS})	1.027g
	MCE Spectral Acceleration, 1.0 sec. (S_{M1})	0.633g
Design Spectral Response Accelerations	Design Spectral Acceleration, 0.2 seconds (S_{DS})	0.685g
	Design Spectral Acceleration, 1.0 second (S_{D1})	0.422g

Based on Section 1613.3.5 of the 2014 OSSC, the site falls into a Seismic Design Category D.

The recommendations presented above were based on design procedures presented in Section 11.4 of ASCE 7-10. A site-specific response analysis could be performed to develop a site-specific design response spectrum at the owner's discretion, if desired, for an additional fee.

C.6.0 SEISMIC HAZARDS

C.6.1 Liquefaction

In general, liquefaction occurs when deposits of loose/soft, saturated, cohesionless soils, generally sands and silts, are subjected to strong earthquake shaking. If these deposits cannot drain quickly enough, pore water pressures can increase, approaching the value of the overburden pressure. The shear strength of a cohesionless soil is directly proportional to the effective stress, which is equal to the difference between the overburden pressure and the pore water pressure. When the pore water pressure increases to the value of the overburden pressure, the shear strength of the soil reduces to zero, and the soil deposit can liquefy. The liquefied soils can undergo rapid consolidation or, if unconfined, can flow as a liquid. Structures supported by the liquefied soils can experience rapid, excessive settlement; shearing, or even catastrophic failure.

The susceptibility of sands, gravels, and sand-gravel mixtures to liquefaction is typically assessed based on penetration resistance, as measured using SPTs, CPTs, or Becker Hammer Penetration tests (BPTs). For fine-grained soils, susceptibility to liquefaction is evaluated based on penetration resistance and plasticity, among other characteristics. Criteria for identifying non-liquefiable, fine-grained soils are

[41] United States Geological Survey, 2017. Seismic Design Parameters determined using:, "U.S. Seismic Design Maps Web Application," *accessed February 2017*, from the USGS website http://earthquake.usgs.gov.

C.4.2 Site Class Determination

The determination of the seismic site class is based on subsurface data in accordance with Chapter 20 of the ASCE 7-10. CGT used Standard Penetration Test (SPT) N-values for determination of the site classification for this project. The SPT subsurface exploration method is described in the geotechnical investigation report. Chapter 20 of ASCE 7-10 requires that the stiffness of the soils (or rock) be measured or reasonably estimated for the upper 100 feet bgs.

Boring B-1 was advanced to a depth of about 25½ feet bgs and terminated in hard basalt bedrock. The basalt bedrock was consistent with the Boring Lava mapped in the area of the site, which is anticipated to extend to depths of several hundred feet bgs. In accordance with Section 20.4.2 of ASCE 7-10, a SPT N-value of 100 was used to represent the refusal conditions (50+ SPT blows for less than 6 inches of penetration) met at the deepest SPT measurement. To satisfy code requirements, we extended this N-value to a depth of 100 feet bgs. The results of the site class calculations are shown in the following table.

Table C3 Calculation for Determination of Site Classification

Bottom Depth (feet)	Soil Type	Field SPT (N_i)	Layer Thickness [d_i] (feet)	d_i/N_i
1.5	CH	5	1.5	0.30
4	CH	10	2.5	0.25
6.5	CH	14	2.5	0.18
9	SC	20	2.5	0.13
11.5	SC	6	2.5	0.42
14	SC	5	2.5	0.50
16.5	SC	15	2.5	0.17
20.5	SC	15	4	0.27
100	RX (Basalt)	100	79.5	0.80
TOTALS			**100.0**	**3.00**

Geometric Mean:
(ASCE 7-10 Section 20.4.2 Equation 40.4.-2)

$$\overline{N} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \frac{d_i}{N_i}} = \mathbf{36.08}$$

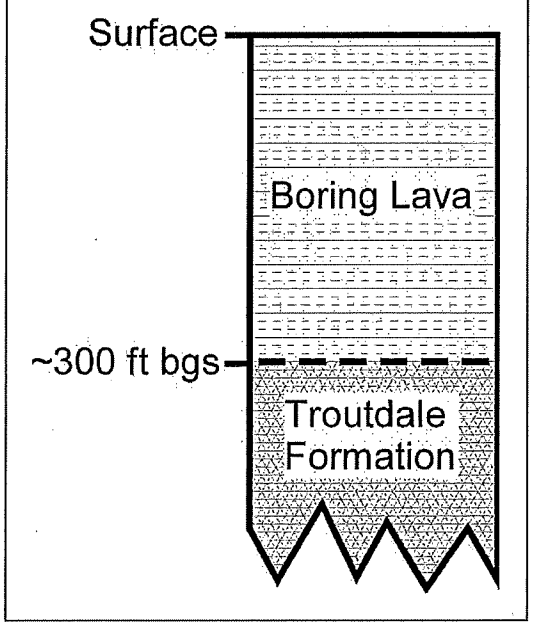
Based on the guidelines presented in Table 20.3-1 in Chapter 20 of the ASCE 7-10, the project site is designated as Site Class D.

C.4.0 SEISMIC SITE CLASS

C.4.1 Geologic Profile

Boring Lava: Based on drilled borings, available geologic mapping of the area[37,38], and review of local water well logs, the site is underlain by Boring Lava. The Boring Lava consists of basalt flows produced by more than 80 volcanic vents located throughout the greater Portland metropolitan area[39]. Eruptions from these vents produced dozens of cinder cones and small shield volcanoes that rise up to about 650 feet above the surrounding landscape. Each volcano or cinder cone was generally formed by a single eruption.

Inset 1: Geologic Profile



The site is mapped within the Basalt of Canemah, which is one of the oldest flows associated with the Boring volcanoes at about 2.4 million years old. This lava flow is described as massive, medium-grained, diktytaxitic olivine basalt. The flow is often deeply weathered forming a thick residual soil consisting of red clay. The Basalt of Canemah has been measured in water wells in the vicinity of the site as 100 to 150 meters thick.

The existing volcanic vents are all considered extinct; however, the Boring Volcanic Field is considered to be potentially active. The most recent eruption associated with the Boring Volcanic Field occurred approximately 57,000 years ago and was located approximately 55 kilometers northeast of the site at Beacon Rock.

Troutdale Formation Sediments: Geologic mapping[40] indicates that the Boring Lava in the project area is underlain by Pliocene Troutdale formation deposits. The Troutdale formation consists of interbedded gravel, sand, and silt, deposited by an ancestral Columbia River and reworked by later streams and rivers. The Troutdale formation deposits are mapped as greater than 1,000 feet thick in the vicinity of the site.

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37 Ma, L., Madin, I.P., Duplantis, S., and Williams, K.J., 2012, Lidar-based surficial geologic map and database of the greater Portland, Oregon, area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries, Open-File Report 0-2012-02, scale 1:8,000.

38 Madin, I.P., 2007, Preliminary geologic map of the Oregon City quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Geological Map Series GMS-119, scale 1:24,000.

39 Allen, John E. (September 1975). "Volcanoes of the Portland Area, Oregon" (PDF). The Ore Bin. Portland, Oregon: State of Oregon Department of Geology and Mineral Industries. 37 (9): 151. Retrieved 2009-06-16.

40 Madin, I.P., 2007, Preliminary geologic map of the Oregon City quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Geological Map Series GMS-119, scale 1:24,000.

Table C2 Fault, Characteristic Earthquake Magnitude, and Distance from Site.

USGS Fault No.	Earthquake Source	Char Mag	Type of Fault	USGS Fault Class[1]	Fault Orientation (strike & dip)	Approximate Earthquake depth (km)	Fault Trace Distance (km) & Direction from Site	Notes
874	Bolton fault	6.19	Reverse	B	N53W 60N	15 to 40 km	4.5 km NNW	2
875	Oatfield fault	6.00	Reverse	A	N41W 70S	15 to 40 km	6 km N	3,4
877	Portland Hills fault	7.05	Reverse	A	N37W 70N	15 to 40 km	6 km NNE	2
879	Damascus-Tickle Creek fault	6.00	Right Lateral Strike Slip	A	N-S 90 (Vertical)	15 to 40 km	7 km NE	3,4
716	Canby-Molalla fault	6.00	Right Lateral Strike Slip	A	N34W 90 (vertical)	15 to 40 km	8 km WSW	3,4
876	East Bank fault	6.00	Reverse	A	N46W 70N	15 to 40 km	14 km NNE	3,4
878	Grant Butte fault	6.21	Normal	A	N90E 60N	15 to 40 km	17 km N	2
715	Beaverton fault zone	6.00	Normal	A	N86E Unknown Dip	15 to 40 km	25 km NW	3,4
OR4	Sandy River fault zone	6.50	Strike-Slip	C	90.00	15 to 40 km	28 km NE	2
873	Mount Angel fault	6.80	Thrust	A	N43E 60 to 70 N	15 to 40 km	29 km SW	2
717 / OR3	Newberg fault	6.85	Right Lateral Strike Slip	A	N42W 90 (vertical)	15 to 40 km	30 km W	2
880	Lacamas Lake fault	6.67	Normal	A	N43W 75S	15 to 40 km	31 km NE	2
714	Helvetia fault	6.40	Normal	A	N26W SW	15 to 40 km	36 km NW	2
718 / OR1	Gales Creek fault zone	6.75	Right Lateral Strike Slip	A	N41W 90 (vertical)	15 to 40 km	40 km W	2
	CSZ - Intraplate	7.00	Normal	A	N30W 10 to 20 E	30 to 60 km	Within seismogenic zone	3
	CSZ	9.0 8.3	Mega-Thrust	A	N30W 10 to 20 E	<30 km	90 km (to east edge of seismogenic zone)	3,5

1 USGS Fault Classes from USGS Earthquake Hazards Program, 2008 National Seismic Hazard Maps
Class A: Fault with convincing evidence of Quaternary activity (ACTIVE)
Class B: Fault that requires further study in order to confidently define their potential as possible sources of earthquake-induced ground motion (POTENTIALLY ACTIVE)
Class C: Fault with insufficient evidence for Quaternary activity (LOW POTENTIAL FOR ACTIVITY)

2 Characteristic earthquake magnitude from USGS Earthquake Hazards Program, 2008 National Seismic Hazard Maps – Fault Parameters

3 Characteristic earthquake magnitude from USGS Quaternary Fault and Fold Database of the United States

4 Characteristic earthquake magnitude from Section 1803.3.2.1 of the 2014 OSSC - Design Earthquake.

5 Models of earthquake magnitude assign variable magnitudes for different portions of the Cascadia Subduction Zone, so multiple magnitudes are provided.

C.3.1.3.3 Code Specified Design Earthquake

Section 1803.3.2.1 of the 2014 Oregon Structural Specialty Code[36] (OSSC) indicates specific minimum requirements for earthquake magnitudes to be used in seismic analyses, which are summarized in the following table:

Table C1 OSSC Minimum Design Earthquake

Seismic Source	Minimum Design Earthquake
Shallow Crustal Faults	6.0
Cascadia Subduction Zone – Subducting Plate (Intraplate)	7.0
Cascadia Subduction Zone – Interface (Subduction Zone)	8.5

C.3.1.4 Seismic Sources in the Vicinity of the Site

Table C2 shows the previously discussed faults (Section C.3.1.1), the characteristic earthquake magnitude for each, and the distance and direction of the fault from the site.

[35] Pacific Northwest Seismic Network, 2017. Pacific Northwest Earthquake Sources Overview, *accessed February 2017,* from PNSN web site, http://pnsn.org/outreach/earthquakesources/.

[36] International Code Council, Inc., 2014. 2014 Oregon Structural Specialty Code. Based on the 2012 International Building Code.

The 2001 M6.8 Nisqually earthquake near Olympia, Washington, occurred within this seismogenic zone at a depth of 52 kilometers. The site is located within the intraplate seismogenic zone, as shown on Figure C1.

C.3.1.3 Characteristic Earthquake Magnitude

The maximum characteristic earthquake magnitude is defined as the largest earthquake that could be expected to be generated by a specific seismic source, independent of recurrence interval.

C.3.1.3.1 Historical Earthquakes

The Pacific Northwest is a seismically active area. Epicenters for historic earthquakes[28] in western Oregon from 1841 to 2002 are shown on Figure C1. The majority of these earthquakes are shallow (crustal) in nature, with a lesser amount of intraplate sources. No large-scale subduction-zone earthquakes occurred during this period.

Based on the historical record and crustal faulting models of the region, the maximum earthquake for crustal sources within the Pacific Northwest is estimated to be M5.75[29] (independent of recurrence interval). Similarly, the maximum earthquake for an intra-slab source on the subducting Juan De Fuca plate is estimated to be M7.5 to M7.7.

C.3.1.3.2 Empirical Determination of Characteristic Earthquake

Another method for estimating the characteristic earthquake that a particular seismic source could generate is by using empirical relationships between earthquake magnitude and fault rupture length[30]. Based on these relationships, the size of historical earthquakes, and the thickness of seismogenic crust in the region, the maximum earthquake magnitude expected from crustal sources is M6.0 to M6.6[31]. Based on the likely thin nature of the Juan de Fuca Plate, and comparing the historic seismicity along the intraplate area with other similar intraplate regions, the estimated maximum magnitude earthquake for intraplate sources is M7.0 to M7.5[32,33]. Similarly, based on magnitude versus rupture area relationships for subduction zone earthquakes worldwide, the maximum magnitude of a CSZ earthquake is estimated to be M8.0 to M9.2[34,35]. These magnitudes are also reflected in the probabilistic analyses used by U.S. Geological Survey.

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26 Kirby, Stephen H., Wang, Kelin, Dunlop, Susan, 2002, The Cascadia Subduction Zone and Related Subduction Systems—Seismic Structure, Intraslab Earthquakes and Processes, and Earthquake Hazards: U.S. Geological Survey Open-File Report 02-328, 182 pp.

27 Cascadia Region Earthquake Workshop, 2008. Cascadia Deep Earthquakes. Washington Division of Geology and Earth Resources, Open File Report 2008-1.

28 Niewendorp, Clark A., and Neuhaus, Mark E., Map of Selected Earthquakes for Oregon,1841 through 2002 by Oregon Department of Geology and Mineral Industries, OFR O-03-02.

29 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: unpublished report prepared for Oregon Department of Transportation, Personal Services Contract 11688, January 1995.

30 Bonilla, M.G., R. K. Mark, and J.J. Lienkaemper, 1984, Statistical relations among earthquake magnitude, surface rupture length, and surface fault displacement: Bulletin of the Seismological Society of America, V. 74, p. 2379-2411.

31 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

32 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

33 Pacific Northwest Seismic Network website, http://pnsn.org/outreach/earthquakesources/

34 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

C.3.1.2 Cascadia Subduction Zone Seismic Sources

The Cascadia Subduction Zone (CSZ) is a 1,100-kilometer-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continental plate at a rate of about 3 to 4 centimeters per year[19]. The fault trace is located off of the coast of southern British Columbia, Washington, Oregon, and northern California; approximately 215 kilometers west of the site (see attached Figure C1).

Two primary sources of seismicity are associated with the CSZ: relatively shallow earthquakes that occur on the interface between the two plates (Subduction Zone earthquakes), and deep earthquakes that occur along faults within the subducting Juan de Fuca plate (intraplate earthquakes).

C.3.1.2.1 Subduction Zone Earthquakes

Large subduction zone (megathrust) earthquakes occur within the upper approximate 30 kilometers of the contact between the two plates[20]. As the Juan de Fuca Plate subducts beneath the North American Plate through this zone, the plates are locked together by friction[21]. Stress slowly builds as the plates converge until the frictional resistance is exceeded, and the plates rapidly slip past each other resulting in a "megathrust" earthquake. The United States Geologic Survey estimates megathrust earthquakes on the CSZ may have magnitudes up to M9.2.

Geologic evidence indicates a recurrence interval for major subduction zone earthquakes of 250 to 650 years, with the last major event occurring in 1700[22,23]. The eastern margin of the seismogenic portion of the Cascadia Subduction zone is located approximately 90 kilometers west of the site, as shown on Figure C1.

C.3.1.2.2 Intraplate Earthquakes

Below about 30 kilometers, the plate interface does not appear to be locked by friction, and the plates slowly slide past each other. The curvature of the subducted plate increases as the advancing edge moves east, creating extensional forces within the plate. Normal faulting occurs in response to these extensional forces. This region of maximum curvature and faulting of the subducting plate is where large intraplate earthquakes are expected to occur, and is located at depths ranging from 30 to 60 kilometers[24,25,26]. Intraplate earthquakes within the Juan de Fuca plate generally have magnitudes less than M7.5[27].

---

19 DeMets, C., Gordon, R.G., Argus, D.F., Stein, S., 1990. Current plate motions: Geophysical Journal International, v. 101, p. 425-478.

20 Pacific Northwest Seismic Network, 2017. Pacific Northwest Earthquake Sources Overview, *accessed February 2017,* from PNSN web site, http://pnsn.org/outreach/earthquakesources/.

21 Pacific Northwest Seismic Network, 2017. Pacific Northwest Earthquake Sources Overview, *accessed February 2017,* from PNSN web site, http://pnsn.org/outreach/earthquakesources/.

22 Atwater, B.F., 1992. Geologic evidence for earthquakes during the past 2,000 years along the Copalis River, southern coastal Washington: Journal of Geophysical Research, v. 97, p. 1901-1919.

23 Peterson, C.D., Darienzo, M.E., Burns, S.F., and Burris, W.K., 1993. Field trip guide to Cascadia paleoseismic evidence along the northern California coast: evidence of subduction zone seismicity in the central Cascadia margin. Oregon Department of Geology and Mineral Industries, Oregon Geology, Vol. 55, p. 99-144.

24 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: unpublished report prepared for Oregon Department of Transportation, Personal Services Contract 11688, January 1995.

25 Geomatrix Consultants, 1993. Seismic margin Earthquake For the Trojan Site: Final Unpublished Report For Portland General Electric Trojan Nuclear Plant, Rainier, Oregon, May 1993.

Recent studies of this fault[16] concluded that the Portland Hills fault is active, based on contemporary seismicity in the vicinity of the fault, and seismic reflection data suggesting that the fault cuts late Pleistocene layered strata. Additionally, in May of 2000, while taking magnetic readings to map the fault, an Oregon Department of Geology and Mineral Industries (DOGAMI) geologist observed folded sediment in a retaining wall cut in North Clackamas Park south of Portland. The folded sediments consisted of sand and silt deposited by Pleistocene floods derived from glacial Lake Missoula approximately 12,800 to 15,000 years ago. An investigation of the folded strata by DOGAMI geologists and engineering consultants showed that the entire sequence of sediment layers is folded and they concluded that this folding is evidence for an active fault beneath the site, and the fault is either the Portland Hills fault, or a closely related structure[17].

C.3.1.1.10 *Grant Butte fault (USGS 878)*

The Grant Butte fault forms the southern margin of the Portland basin, and consists of a 10-kilometer-long normal fault. The Grant Butte fault offsets Pliocene-Pleistocene Springwater Formation and Boring Lava. No Quaternary surficial fault scarps have been identified, but the fault is largely buried by thick sequences of Pliocene to Pleistocene Missoula flood deposits. Based on radiometric age dating techniques, the fault has been active within the late Quaternary. Therefore, the Grant Butte fault is considered active with a long recurrence interval.

C.3.1.1.11 *Damascus-Tickle Creek fault zone (USGS 879)*

The Damascus-Tickle Creek fault zone consists of numerous relatively short northeast- and northwest-trending faults forming a broad fault zone along the southern edge of the Portland basin. The location of several eruptive vents of the Boring Lava suggest a direct relationship with the Damascus-Tickle Creek fault zone. The majority of the faults within the zone are buried by Pliocene to Pleistocene Missoula flood deposits, however, at least one fault strand may offset the flood deposits.

C.3.1.1.12 *Lacamas Lake fault (USGS 880).*

The Lacamas Lake fault is a northwest-trending structure located in the vicinity of Lacamas Lake, near Camas, Washington, at the northeastern margin of the Portland basin. This fault was originally identified by well-expressed lineaments defined by the relatively steep linear valley margins along both sides of Lacamas Lake[18]. Although recent activity on the Lacamas Lake fault is uncertain, the fault is considered active based on possible displacement of Troutdale sediments, prominent topographic lineaments associated with the fault, and possible associated seismicity. The fault is buried by Pleistocene Missoula flood deposits, suggesting a long recurrence interval.

C.3.1.1.13 *Sandy River fault zone (OR 4).*

The Sandy River fault zone is a northwest-trending structure located along the Sandy River southeast of Troutdale, at the eastern margin of the Portland basin. This fault was originally identified by gravity data, and is likely related to the Lacamas Lake fault (USGS Fault No. 880). The Sandy River fault zone is considered to be inactive or has a very long recurrence interval, but is included as a potential seismic source in the 2008 and 2014 National Seismic Hazard Maps.

---

[16] Wong *et al.*, 2001. The Portland Hills Fault: An Earthquake Generator or Just Another Old Fault? Published by Oregon Geology, V63, number 2, Spring 2001.

[17] Madin and Hemphill-Haley, 2001: The Portland Hills Fault at Rowe Middle School. Oregon Geology V63 p47.

[18] Madin and Hemphill-Haley, 2001: The Portland Hills Fault at Rowe Middle School. Oregon Geology V63 p47.

basalts, but no unequivocal evidence for Quaternary displacement has been identified. However, the majority of the faults are covered with very recent alluvium, which may have buried evidence of recent deformation. Estimates for the latest movements along the Gales Creek fault zone typically predate the late Pleistocene; in other words, the fault has not had activity within the last approximately 30,000 years. The recurrence interval for the Gales Creek fault zone is likely greater than 50,000 years, based on the information available.

C.3.1.1.6 Bolton fault (USGS 874)

The Bolton fault is a northwest-trending reverse fault, with a length of about 9 kilometers in the subsurface. There is no evidence that the Bolton fault has been active since the late Pleistocene; however, the fault is classified as potentially active because of the limited exposures and uncertainties in the relationships between local scarps and late Pleistocene Missoula flood deposits[12]. On this basis, a long recurrence interval is assigned to the Bolton Fault.

C.3.1.1.7 Oatfield fault (USGS 875)

The Oatfield fault consists of a 29-kilometer-long steeply dipping reverse fault that forms escarpments in Miocene Columbia River Basalt in the Tualatin Mountains. No fault scarps or displacement of surficial deposits have been described, but exposures within tunnels show offset of Boring Lava, indicating Quaternary activity. The slip rate for the Oatfield fault has been calculated to be about 0.1 mm per year based on the tunnel exposures. Given the very low slip rate and lack of displacement of surficial deposits, this fault is considered to have a very long recurrence interval.

C.3.1.1.8 East Bank fault (USGS 876)

The East Bank fault consists of a 29-kilometer-long steeply dipping reverse fault that parallels the Portland Hills fault. No Quaternary surficial fault scarps have been identified, and the fault is largely buried by thick sequences of Pleistocene Missoula flood deposits. Recent shallow seismic reflection data suggest subsurface displacement of the older Missoula flood deposits (before 12,700 years ago). Therefore, the fault is considered to be active, with a low slip rate and a very long recurrence interval.

C.3.1.1.9 Portland Hills fault (USGS 877)

The Portland Hills fault zone is a series of northwest-trending faults forming the northeastern margin of the Tualatin Mountains. The faults associated with this structural zone vertically displace the Columbia River Basalt Group by 1,130 feet, and appear to control thickness changes in late Pleistocene sediment[13]. Geomorphic lineaments suggestive of Pleistocene deformation have been identified within the fault zone, but none of the fault segments has been shown to cut Holocene deposits[14,15]. The fact that the faults do not cut Holocene sediments is most likely a result of the faulting being related to a time of intense uplift of the Oregon Coast Range during the Miocene, and little to no movement along the faults during the Holocene.

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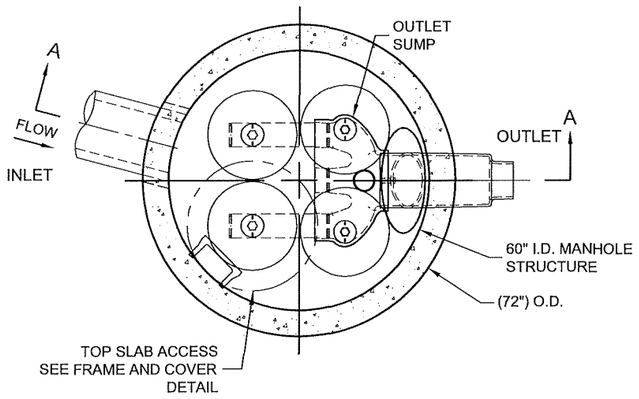
[12] Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

[13] Mabey, M.A., Madin, I.P., Youd, T.L., Jones, C.F., 1993, Earthquake hazard maps of the Portland quadrangle, Multnomah and Washington Counties, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries Geological Map Series GMS-79, Plate 2, 1:24,000.

[14] Conforth and Geomatrix Consultants, 1992. Seismic hazard evaluation, Bull Run dam sites near Sandy, Oregon: unpublished report to City of Portland Bureau of Water Works.

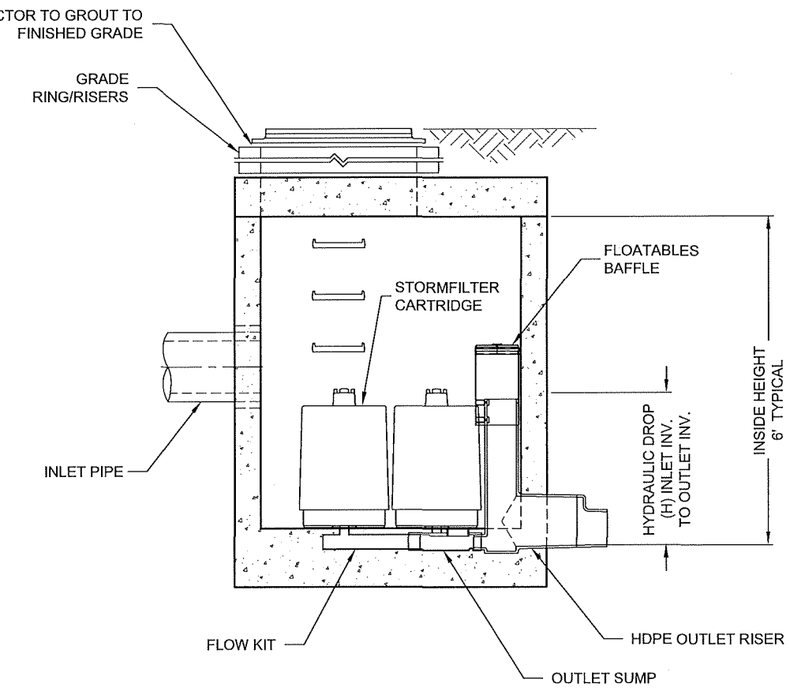
[15] Balsillie, J.J. and Benson, G.T., 1971. Evidence for the Portland Hills fault: The Ore Bin, Oregon Dept. of Geology and Mineral Industries, v. 33, p. 109-118.

APPENDIX C



PLAN VIEW

STANDARD OUTLET RISER
FLOWKIT: 41A



SECTION A-A

The Stormwater Management StormFilter®

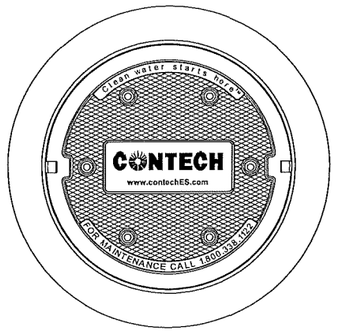
THE PRODUCT MAY BE PROTECTED BY ONE OR MORE OF THE FOLLOWING U.S. PATENTS #: 5,322,629; 5,624,576; 5,707,527; 5,985,157; 6,027,639; 6,284,136; 6,533,938; RELATED FOREIGN PATENTS; OR OTHER PATENTS PENDING.

STORMFILTER DESIGN NOTES

STORMFILTER TREATMENTCAPACITY IS A FUNCTION OF THE CARTRIDGE SELECTION AND THE NUMBER OF CARTRIDGES. THE STANDARD MANHOLE STYLE IS SHOWN WITH THE MAXIMUM NUMBER OF CARTRIDGES (4). VOLUME SYSTEM IS ALSO AVAILABLE WITH MAXIMUM 4 CARTRIDGES. Ø60" MANHOLE STORMFILTER PEAK HYDRAULIC CAPACITY IS 1.0 CFS. IF THE SITE CONDITIONS EXCEED 1.0 CFS AN UPSTREAM BYPASS STRUCTURE IS REQUIRED.

CARTRIDGE SELECTION

CARTRIDGE HEIGHT	27"		18"		LOW DROP	
RECOMMENDED HYDRAULIC DROP (H)	3.05'		2.3'		1.8'	
SPECIFIC FLOW RATE (gpm/sf)	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²	2 gpm/ft²	1 gpm/ft²
CARTRIDGE FLOW RATE (gpm)	22.5	11.25	15	7.5	10	5



FRAME AND COVER

(DIAMETER VARIES)
N.T.S.

SITE SPECIFIC DATA REQUIREMENTS

STRUCTURE ID	*
WATER QUALITY FLOW RATE (cfs)	*
PEAK FLOW RATE (cfs)	*
RETURN PERIOD OF PEAK FLOW (yrs)	*
# OF CARTRIDGES REQUIRED	*
CARTRIDGE FLOW RATE	*
MEDIA TYPE (CSF, PERLITE, ZPG, GAC, PHS)	*

PIPE DATA:	I.E.	MATERIAL	DIAMETER
INLET PIPE #1	*	*	*
INLET PIPE #2	*	*	*
OUTLET PIPE	*	*	*

RIM ELEVATION	*

ANTI-FLOTATION BALLAST	WIDTH	HEIGHT
	*	*

NOTES/SPECIAL REQUIREMENTS:

* PER ENGINEER OF RECORD

GENERAL NOTES

1. CONTECH TO PROVIDE ALL MATERIALS UNLESS NOTED OTHERWISE.
2. DIMENSIONS MARKED WITH ( ) ARE REFERENCE DIMENSIONS. ACTUAL DIMENSIONS MAY VARY.
3. FOR SITE SPECIFIC DRAWINGS WITH DETAILED VAULT DIMENSIONS AND WEIGHTS, PLEASE CONTACT YOUR CONTECH ENGINEERED SOLUTIONS LLC REPRESENTATIVE. www.ContechES.com
4. STORMFILTER WATER QUALITY STRUCTURE SHALL BE IN ACCORDANCE WITH ALL DESIGN DATA AND INFORMATION CONTAINED IN THIS DRAWING.
5. STRUCTURE SHALL MEET AASHTO HS20 LOAD RATING, ASSUMING EARTH COVER OF 0' - 5' AND GROUNDWATER ELEVATION AT, OR BELOW, THE OUTLET PIPE INVERT ELEVATION. ENGINEER OF RECORD TO CONFIRM ACTUAL GROUNDWATER ELEVATION. CASTINGS SHALL MEET AASHTO M306 AND BE CAST WITH THE CONTECH LOGO.
6. FILTER CARTRIDGES SHALL BE MEDIA-FILLED, PASSIVE, SIPHON ACTUATED, RADIAL FLOW, AND SELF CLEANING. RADIAL MEDIA DEPTH SHALL BE 7-INCHES. FILTER MEDIA CONTACT TIME SHALL BE AT LEAST 39 SECONDS.
7. SPECIFIC FLOW RATE IS EQUAL TO THE FILTER TREATMENT CAPACITY (gpm) DIVIDED BY THE FILTER CONTACT SURFACE AREA (sq ft).

INSTALLATION NOTES

1. ANY SUB-BASE, BACKFILL DEPTH, AND/OR ANTI-FLOTATION PROVISIONS ARE SITE-SPECIFIC DESIGN CONSIDERATIONS AND SHALL BE SPECIFIED BY ENGINEER OF RECORD.
2. CONTRACTOR TO PROVIDE EQUIPMENT WITH SUFFICIENT LIFTING AND REACH CAPACITY TO LIFT AND SET THE STORMFILTER STRUCTURE (LIFTING CLUTCHES PROVIDED).
3. CONTRACTOR TO INSTALL JOINT SEALANT BETWEEN ALL STRUCTURE SECTIONS AND ASSEMBLE STRUCTURE.
4. CONTRACTOR TO PROVIDE, INSTALL, AND GROUT INLET PIPE(S).
5. CONTRACTOR TO PROVIDE AND INSTALL CONNECTOR TO THE OUTLET RISER STUB. STORMFILTER EQUIPPED WITH A DUAL DIAMETER HDPE OUTLET STUB AND SAND COLLAR. IF OUTLET PIPE IS LARGER THAN 8 INCHES, CONTRACTOR TO REMOVE THE 8 INCH OUTLET STUB AT MOLDED IN CUT LINE. COUPLING BY FERNCO OR EQUAL AND PROVIDED BY CONTRACTOR.
6. CONTRACTOR TO TAKE APPROPRIATE MEASURES TO PROTECT CARTRIDGES FROM CONSTRUCTION-RELATED EROSION RUNOFF.

CONTECH® ENGINEERED SOLUTIONS LLC
www.ContechES.com
9025 Centre Pointe Dr., Suite 400, West Chester, OH 45069
800-338-1122 513-645-7000 513-645-7993 FAX

SFMH60
STORMFILTER
STANDARD DETAIL

CONTECH®
ENGINEERED SOLUTIONS

StormFilter Inspection and Maintenance Procedures



The Stormwater Management
StormFilter®

Maintenance Guidelines

The primary purpose of the Stormwater Management StormFilter® is to filter and prevent pollutants from entering our waterways. Like any effective filtration system, periodically these pollutants must be removed to restore the StormFilter to its full efficiency and effectiveness.

Maintenance requirements and frequency are dependent on the pollutant load characteristics of each site. Maintenance activities may be required in the event of a chemical spill or due to excessive sediment loading from site erosion or extreme storms. It is a good practice to inspect the system after major storm events.

Maintenance Procedures

Although there are many effective maintenance options, we believe the following procedure to be efficient, using common equipment and existing maintenance protocols. The following two-step procedure is recommended::

1. **Inspection**
   - Inspection of the vault interior to determine the need for maintenance.
2. **Maintenance**
   - Cartridge replacement
   - Sediment removal

Inspection and Maintenance Timing

At least one scheduled inspection should take place per year with maintenance following as warranted.

First, an inspection should be done before the winter season. During the inspection the need for maintenance should be determined and, if disposal during maintenance will be required, samples of the accumulated sediments and media should be obtained.

Second, if warranted, a maintenance (replacement of the filter cartridges and removal of accumulated sediments) should be performed during periods of dry weather.



In addition to these two activities, it is important to check the condition of the StormFilter unit after major storms for potential damage caused by high flows and for high sediment accumulation that may be caused by localized erosion in the drainage area. It may be necessary to adjust the inspection/ maintenance schedule depending on the actual operating conditions encountered by the system. In general, inspection activities can be conducted at any time, and maintenance should occur, if warranted, during dryer months in late summer to early fall.

Maintenance Frequency

The primary factor for determining frequency of maintenance for the StormFilter is sediment loading.

A properly functioning system will remove solids from water by trapping particulates in the porous structure of the filter media inside the cartridges. The flow through the system will naturally decrease as more and more particulates are trapped. Eventually the flow through the cartridges will be low enough to require replacement. It may be possible to extend the usable span of the cartridges by removing sediment from upstream trapping devices on a routine as-needed basis, in order to prevent material from being re-suspended and discharged to the StormFilter treatment system.

The average maintenance lifecycle is approximately 1-5 years. Site conditions greatly influence maintenance requirements. StormFilter units located in areas with erosion or active construction may need to be inspected and maintained more often than those with fully stabilized surface conditions.

Regulatory requirements or a chemical spill can shift maintenance timing as well. The maintenance frequency may be adjusted as additional monitoring information becomes available during the inspection program. Areas that develop known problems should be inspected more frequently than areas that demonstrate no problems, particularly after major storms. Ultimately, inspection and maintenance activities should be scheduled based on the historic records and characteristics of an individual StormFilter system or site. It is recommended that the site owner develop a database to properly manage StormFilter inspection and maintenance programs..



Inspection Procedures

The primary goal of an inspection is to assess the condition of the cartridges relative to the level of visual sediment loading as it relates to decreased treatment capacity. It may be desirable to conduct this inspection during a storm to observe the relative flow through the filter cartridges. If the submerged cartridges are severely plugged, then typically large amounts of sediments will be present and very little flow will be discharged from the drainage pipes. If this is the case, then maintenance is warranted and the cartridges need to be replaced.

Warning: In the case of a spill, the worker should abort inspection activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct an inspection:

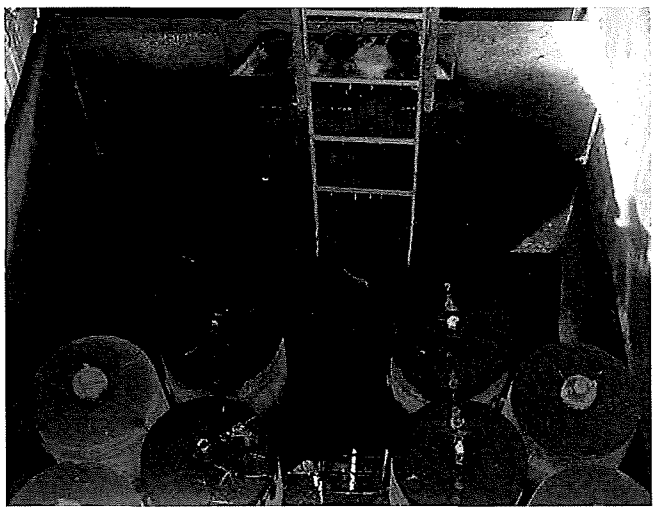
Important: Inspection should be performed by a person who is familiar with the operation and configuration of the StormFilter treatment unit.

1. If applicable, set up safety equipment to protect and notify surrounding vehicle and pedestrian traffic.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the access portals to the vault and allow the system vent.
4. Without entering the vault, visually inspect the inside of the unit, and note accumulations of liquids and solids.
5. Be sure to record the level of sediment build-up on the floor of the vault, in the forebay, and on top of the cartridges. If flow is occurring, note the flow of water per drainage pipe. Record all observations. Digital pictures are valuable for historical documentation.
6. Close and fasten the access portals.
7. Remove safety equipment.
8. If appropriate, make notes about the local drainage area relative to ongoing construction, erosion problems, or high loading of other materials to the system.
9. Discuss conditions that suggest maintenance and make decision as to weather or not maintenance is needed.

Maintenance Decision Tree

The need for maintenance is typically based on results of the inspection. The following Maintenance Decision Tree should be used as a general guide. (Other factors, such as Regulatory Requirements, may need to be considered)

1. Sediment loading on the vault floor.
   a. If >4" of accumulated sediment, maintenance is required.
2. Sediment loading on top of the cartridge.
   a. If >1/4" of accumulation, maintenance is required.
3. Submerged cartridges.
   a. If >4" of static water above cartridge bottom for more than 24 hours after end of rain event, maintenance is required. (Catch basins have standing water in the cartridge bay.)
4. Plugged media.
   a. If pore space between media granules is absent, maintenance is required.
5. Bypass condition.
   a. If inspection is conducted during an average rain fall event and StormFilter remains in bypass condition (water over the internal outlet baffle wall or submerged cartridges), maintenance is required.
6. Hazardous material release.
   a. If hazardous material release (automotive fluids or other) is reported, maintenance is required.
7. Pronounced scum line.
   a. If pronounced scum line (say ≥ 1/4" thick) is present above top cap, maintenance is required.



Maintenance

Depending on the configuration of the particular system, maintenance personnel will be required to enter the vault to perform the maintenance.

Important: If vault entry is required, OSHA rules for confined space entry must be followed.

Filter cartridge replacement should occur during dry weather. It may be necessary to plug the filter inlet pipe if base flows is occurring.

Replacement cartridges can be delivered to the site or customers facility. Information concerning how to obtain the replacement cartridges is available from Contech Engineered Solutions.

Warning: In the case of a spill, the maintenance personnel should abort maintenance activities until the proper guidance is obtained. Notify the local hazard control agency and Contech Engineered Solutions immediately.

To conduct cartridge replacement and sediment removal maintenance:

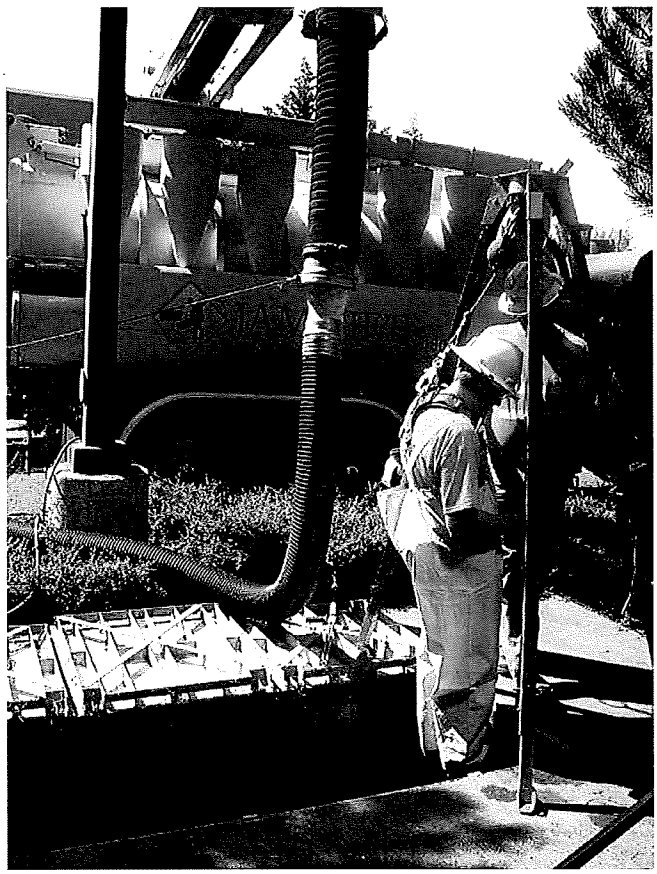
1. If applicable, set up safety equipment to protect maintenance personnel and pedestrians from site hazards.
2. Visually inspect the external condition of the unit and take notes concerning defects/problems.
3. Open the doors (access portals) to the vault and allow the system to vent.
4. Without entering the vault, give the inside of the unit, including components, a general condition inspection.
5. Make notes about the external and internal condition of the vault. Give particular attention to recording the level of sediment build-up on the floor of the vault, in the forebay, and on top of the internal components.
6. Using appropriate equipment offload the replacement cartridges (up to 150 lbs. each) and set aside.
7. Remove used cartridges from the vault using one of the following methods:

Method 1:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

   Using appropriate hoisting equipment, attach a cable from the boom, crane, or tripod to the loose cartridge. Contact Contech Engineered Solutions for suggested attachment devices.

B. Remove the used cartridges (up to 250 lbs. each) from the vault.



Important: Care must be used to avoid damaging the cartridges during removal and installation. The cost of repairing components damaged during maintenance will be the responsibility of the owner.

C. Set the used cartridge aside or load onto the hauling truck.

D. Continue steps a through c until all cartridges have been removed.

Method 2:

A. This activity will require that maintenance personnel enter the vault to remove the cartridges from the under drain manifold and place them under the vault opening for lifting (removal). Disconnect each filter cartridge from the underdrain connector by rotating counterclockwise 1/4 of a turn. Roll the loose cartridge, on edge, to a convenient spot beneath the vault access.

B. Unscrew the cartridge cap.

C. Remove the cartridge hood and float.

D. At location under structure access, tip the cartridge on its side.

E. Empty the cartridge onto the vault floor. Reassemble the empty cartridge.

F. Set the empty, used cartridge aside or load onto the hauling truck.

G. Continue steps a through e until all cartridges have been removed.

8. Remove accumulated sediment from the floor of the vault and from the forebay. This can most effectively be accomplished by use of a vacuum truck.
9. Once the sediments are removed, assess the condition of the vault and the condition of the connectors.
10. Using the vacuum truck boom, crane, or tripod, lower and install the new cartridges. Once again, take care not to damage connections.
11. Close and fasten the door.
12. Remove safety equipment.
13. Finally, dispose of the accumulated materials in accordance with applicable regulations. Make arrangements to return the used **empty** cartridges to Contech Engineered Solutions.

Material Disposal

The accumulated sediment found in stormwater treatment and conveyance systems must be handled and disposed of in accordance with regulatory protocols. It is possible for sediments to contain measurable concentrations of heavy metals and organic chemicals (such as pesticides and petroleum products). Areas with the greatest potential for high pollutant loading include industrial areas and heavily traveled roads.

Sediments and water must be disposed of in accordance with all applicable waste disposal regulations. When scheduling maintenance, consideration must be made for the disposal of solid and liquid wastes. This typically requires coordination with a local landfill for solid waste disposal. For liquid waste disposal a number of options are available including a municipal vacuum truck decant facility, local waste water treatment plant or on-site treatment and discharge.

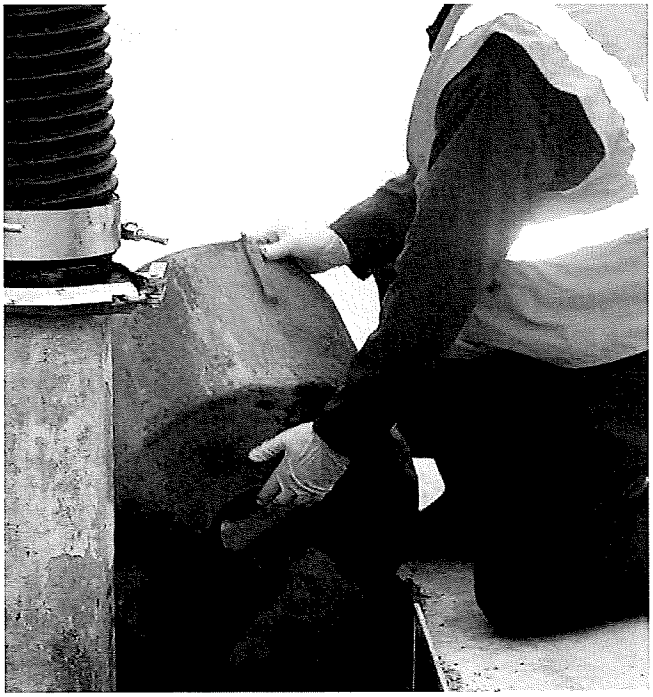
Related Maintenance Activities - Performed on an as-needed basis

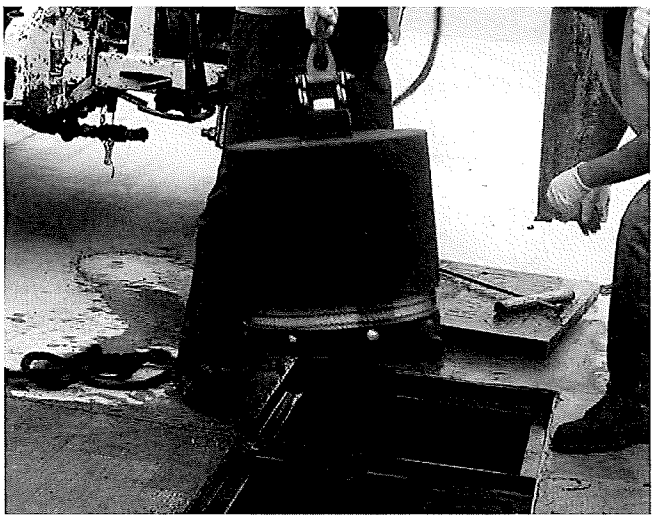
StormFilter units are often just one of many structures in a more comprehensive stormwater drainage and treatment system.

In order for maintenance of the StormFilter to be successful, it is imperative that all other components be properly maintained. The maintenance/repair of upstream facilities should be carried out prior to StormFilter maintenance activities.

In addition to considering upstream facilities, it is also important to correct any problems identified in the drainage area. Drainage area concerns may include: erosion problems, heavy oil loading, and discharges of inappropriate materials.







Inspection Report

Date: Personnel:

Location: System Size:

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other ☐

Sediment Thickness in Forebay: Date:

Sediment Depth on Vault Floor:

Structural Damage:

Estimated Flow from Drainage Pipes (if available):

Cartridges Submerged: Yes ☐ No ☐ Depth of Standing Water:

StormFilter Maintenance Activities (check off if done and give description)

☐ Trash and Debris Removal:

☐ Minor Structural Repairs:

☐ Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source:

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source:

Erosion of Landscaped Areas: Yes ☐ No ☐ Source:

Items Needing Further Work:

Owners should contact the local public works department and inquire about how the department disposes of their street waste residuals.

Other Comments:

Review the condition reports from the previous inspection visits.

StormFilter Maintenance Report

Date: _____ Personnel: _____

Location: _____ System Size: _____

System Type: Vault ☐ Cast-In-Place ☐ Linear Catch Basin ☐ Manhole ☐ Other ☐

List Safety Procedures and Equipment Used: _____

_____

_____

System Observations

Months in Service:

Oil in Forebay (if present): Yes ☐ No ☐

Sediment Depth in Forebay (if present): _____

Sediment Depth on Vault Floor: _____

Structural Damage: _____

Drainage Area Report

Excessive Oil Loading: Yes ☐ No ☐ Source: _____

Sediment Accumulation on Pavement: Yes ☐ No ☐ Source: _____

Erosion of Landscaped Areas: Yes ☐ No ☐ Source: _____

StormFilter Cartridge Replacement Maintenance Activities

Remove Trash and Debris: Yes ☐ No ☐ Details: _____

Replace Cartridges: Yes ☐ No ☐ Details: _____

Sediment Removed: Yes ☐ No ☐ Details: _____

Quantity of Sediment Removed (estimate?):

Minor Structural Repairs: Yes ☐ No ☐ Details: _____

Residuals (debris, sediment) Disposal Methods: _____

Notes:

_____

_____

_____

_____

_____

_____

_____

RECYCLED PAPER

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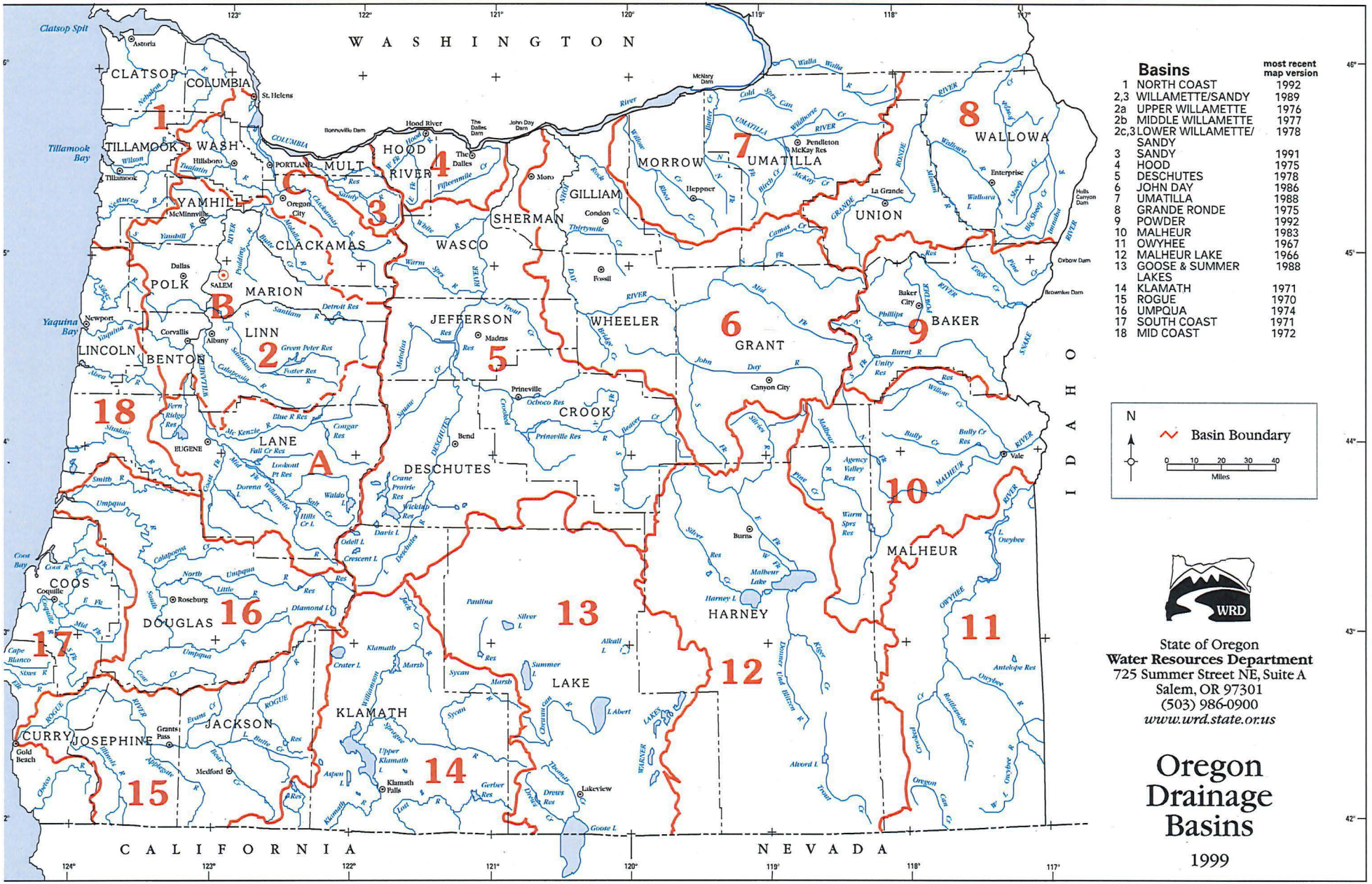
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APPENDIX D



Basins		most recent map version
1	NORTH COAST	1992
2,3	WILLAMETTE/SANDY	1989
2a	UPPER WILLAMETTE	1976
2b	MIDDLE WILLAMETTE	1977
2c,3	LOWER WILLAMETTE/ SANDY	1978
3	SANDY	1991
4	HOOD	1975
5	DESCHUTES	1978
6	JOHN DAY	1986
7	UMATILLA	1988
8	GRANDE RONDE	1975
9	POWDER	1992
10	MALHEUR	1983
11	OWYHEE	1967
12	MALHEUR LAKE	1966
13	GOOSE & SUMMER LAKES	1988
14	KLAMATH	1971
15	ROGUE	1970
16	UMPQUA	1974
17	SOUTH COAST	1971
18	MID COAST	1972

N

Basin Boundary

0 10 20 30 40

Miles

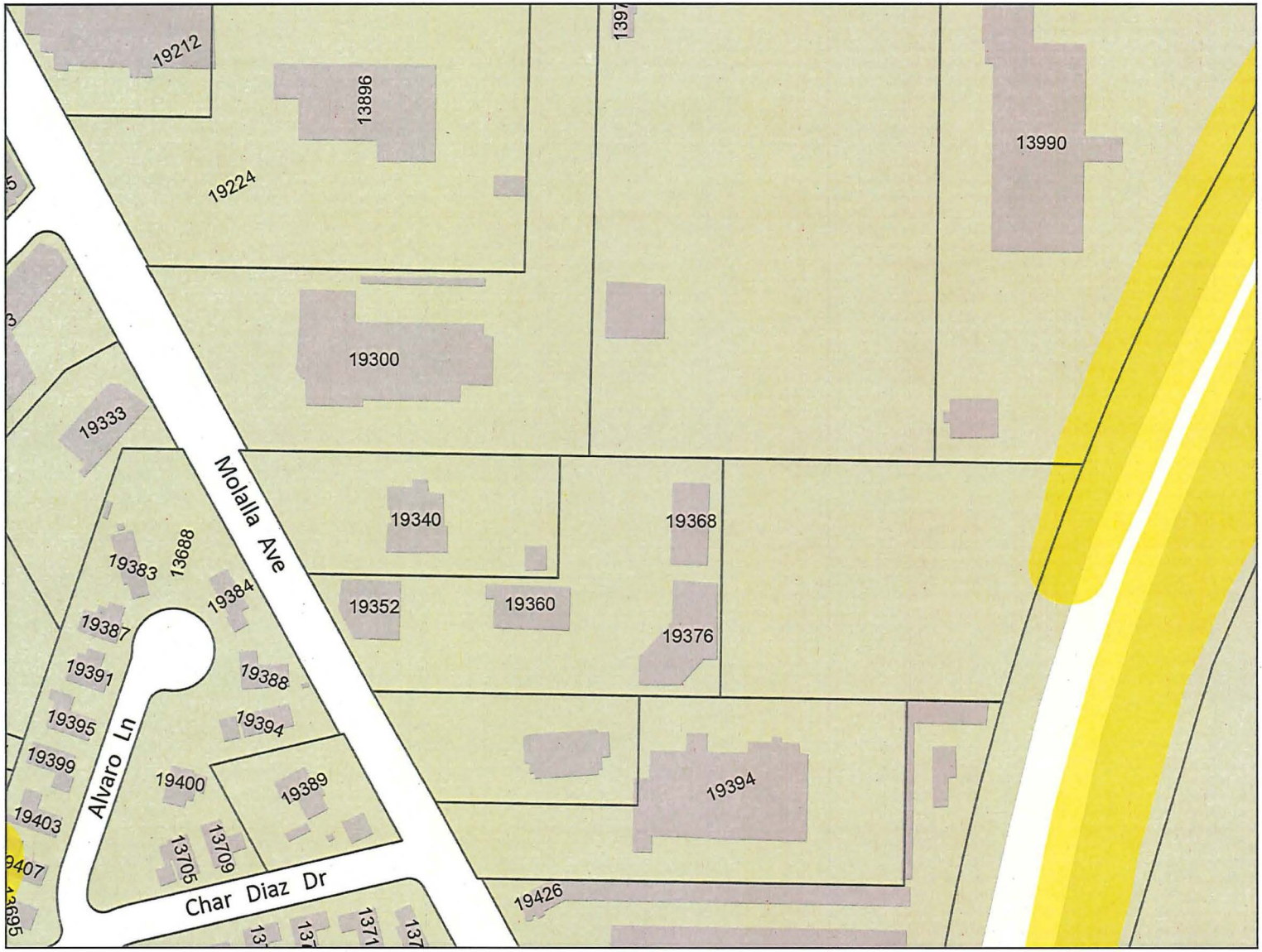
WRD

State of Oregon
Water Resources Department
725 Summer Street NE, Suite A
Salem, OR 97301
(503) 986-0900
www.wrd.state.or.us

Oregon Drainage Basins

1999

Geologic Hazards



Legend

- Taxlots
- Taxlots (Outside UGB)
- Unimproved ROW
- Geologic Hazards - All
- City Limits
- UGB
- Basemap

Notes

Overview Map



0 200 400 Feet

1: 2,400

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Map created 3/14/2017

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Table 2-2a.—Runoff curve numbers for urban areas[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type and hydrologic condition	Average percent impervious area[2]	A	B	C	D
Fully developed urban areas (vegetation established)					
Open space (lawns, parks, golf courses, cemeteries, etc.)[3]:					
Poor condition (grass cover < 50%)		68	79	86	89
Fair condition (grass cover 50% to 75%)		49	69	79	84
Good condition (grass cover > 75%)		39	61	74	80
Impervious areas:					
Paved parking lots, roofs, driveways, etc. (excluding right-of-way)		98	98	98	98
Streets and roads:					
Paved; curbs and storm sewers (excluding right-of-way)		98	98	98	98
Paved; open ditches (including right-of-way)		83	89	92	93
Gravel (including right-of-way)		76	85	89	91
Dirt (including right-of-way)		72	82	87	89
Western desert urban areas:					
Natural desert landscaping (pervious areas only)[4]		63	77	85	88
Artificial desert landscaping (impervious weed barrier, desert shrub with 1- to 2-inch sand or gravel mulch and basin borders)		96	96	96	96
Urban districts:					
Commercial and business	85	89	92	94	95
Industrial	72	81	88	91	93
Residential districts by average lot size:					
1/8 acre or less (town houses)	65	77	85	90	92
1/4 acre	38	61	75	83	87
1/3 acre	30	57	72	81	86
1/2 acre	25	54	70	80	85
1 acre	20	51	68	79	84
2 acres	12	46	65	77	82
Developing urban areas					
Newly graded areas (pervious areas only, no vegetation)[5]		77	86	91	94
Idle lands (CN's are determined using cover types similar to those in table 2-2c).					

[1]Average runoff condition, and $I_a = 0.2S$.
[2]The average percent impervious area shown was used to develop the composite CN's. Other assumptions are as follows: impervious areas are directly connected to the drainage system, impervious areas have a CN of 98, and pervious areas are considered equivalent to open space in good hydrologic condition. CN's for other combinations of conditions may be computed using figure 2-3 or 2-4.
[3]CN's shown are equivalent to those of pasture. Composite CN's may be computed for other combinations of open space cover type.
[4]Composite CN's for natural desert landscaping should be computed using figures 2-3 or 2-4 based on the impervious area percentage (CN = 98) and the pervious area CN. The pervious area CN's are assumed equivalent to desert shrub in poor hydrologic condition.
[5]Composite CN's to use for the design of temporary measures during grading and construction should be computed using figure 2-3 or 2-4, based on the degree of development (impervious area percentage) and the CN's for the newly graded pervious areas.

Table 2-2c.—Runoff curve numbers for other agricultural lands[1]

Cover description		Curve numbers for hydrologic soil group—			
Cover type	Hydrologic condition	A	B	C	D
Pasture, grassland, or range—continuous forage for grazing.[2]	Poor	68	79	86	89
	Fair	49	69	79	84
	Good	39	61	74	80
Meadow—continuous grass, protected from grazing and generally mowed for hay.	—	30	58	71	78
Brush—brush-weed-grass mixture with brush the major element.[3]	Poor	48	67	77	83
	Fair	35	56	70	77
	Good	[4]30	48	65	73
Woods—grass combination (orchard or tree farm).[5]	Poor	57	73	82	86
	Fair	43	65	76	82
	Good	32	58	72	79
Woods.[6]	Poor	45	66	77	83
	Fair	36	60	73	79
	Good	[4]30	55	70	77
Farmsteads—buildings, lanes, driveways, and surrounding lots.	—	59	74	82	86

[1]Average runoff condition, and $I_a = 0.2S$.

[2]*Poor:* <50% ground cover or heavily grazed with no mulch.
Fair: 50 to 75% ground cover and not heavily grazed.
Good: >75% ground cover and lightly or only occasionally grazed.

[3]*Poor:* <50% ground cover.
Fair: 50 to 75% ground cover.
Good: >75% ground cover.

[4]Actual curve number is less than 30; use CN = 30 for runoff computations.

[5]CN's shown were computed for areas with 50% woods and 50% grass (pasture) cover. Other combinations of conditions may be computed from the CN's for woods and pasture.

[6]*Poor:* Forest litter, small trees, and brush are destroyed by heavy grazing or regular burning.
Fair: Woods are grazed but not burned, and some forest litter covers the soil.
Good: Woods are protected from grazing, and litter and brush adequately cover the soil.

Appendix A: Hydrologic soil groups

Soils are classified into hydrologic soil groups (HSG's) to indicate the minimum rate of infiltration obtained for bare soil after prolonged wetting. The HSG's, which are A, B, C, and D, are one element used in determining runoff curve numbers (see chapter 2). For the convenience of TR-55 users, exhibit A-1 lists the HSG classification of United States soils.

The infiltration rate is the rate at which water enters the soil at the soil surface. It is controlled by surface conditions. HSG also indicates the transmission rate—the rate at which the water moves within the soil. This rate is controlled by the soil profile. Approximate numerical ranges for transmission rates shown in the HSG definitions were first published by Musgrave (USDA 1955). The four groups are defined by SCS soil scientists as follows:

Group A soils have low runoff potential and high infiltration rates even when thoroughly wetted. They consist chiefly of deep, well to excessively drained sands or gravels and have a high rate of water transmission (greater than 0.30 in/hr).

Group B soils have moderate infiltration rates when thoroughly wetted and consist chiefly of moderately deep to deep, moderately well to well drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission (0.15-0.30 in/hr).

Group C soils have low infiltration rates when thoroughly wetted and consist chiefly of soils with a layer that impedes downward movement of water and soils with moderately fine to fine texture. These soils have a low rate of water transmission (0.05-0.15 in/hr).

Group D soils have high runoff potential. They have very low infiltration rates when thoroughly wetted and consist chiefly of clay soils with a high swelling potential, soils with a permanent high water table, soils with a claypan or clay layer at or near the surface, and shallow soils over nearly impervious material. These soils have a very low rate of water transmission (0-0.05 in/hr).

In exhibit A-1, some of the listed soils have an added modifier; for example, "Abrazo, gravelly." This refers to a gravelly phase of the Abrazo series that is found in SCS soil map legends.

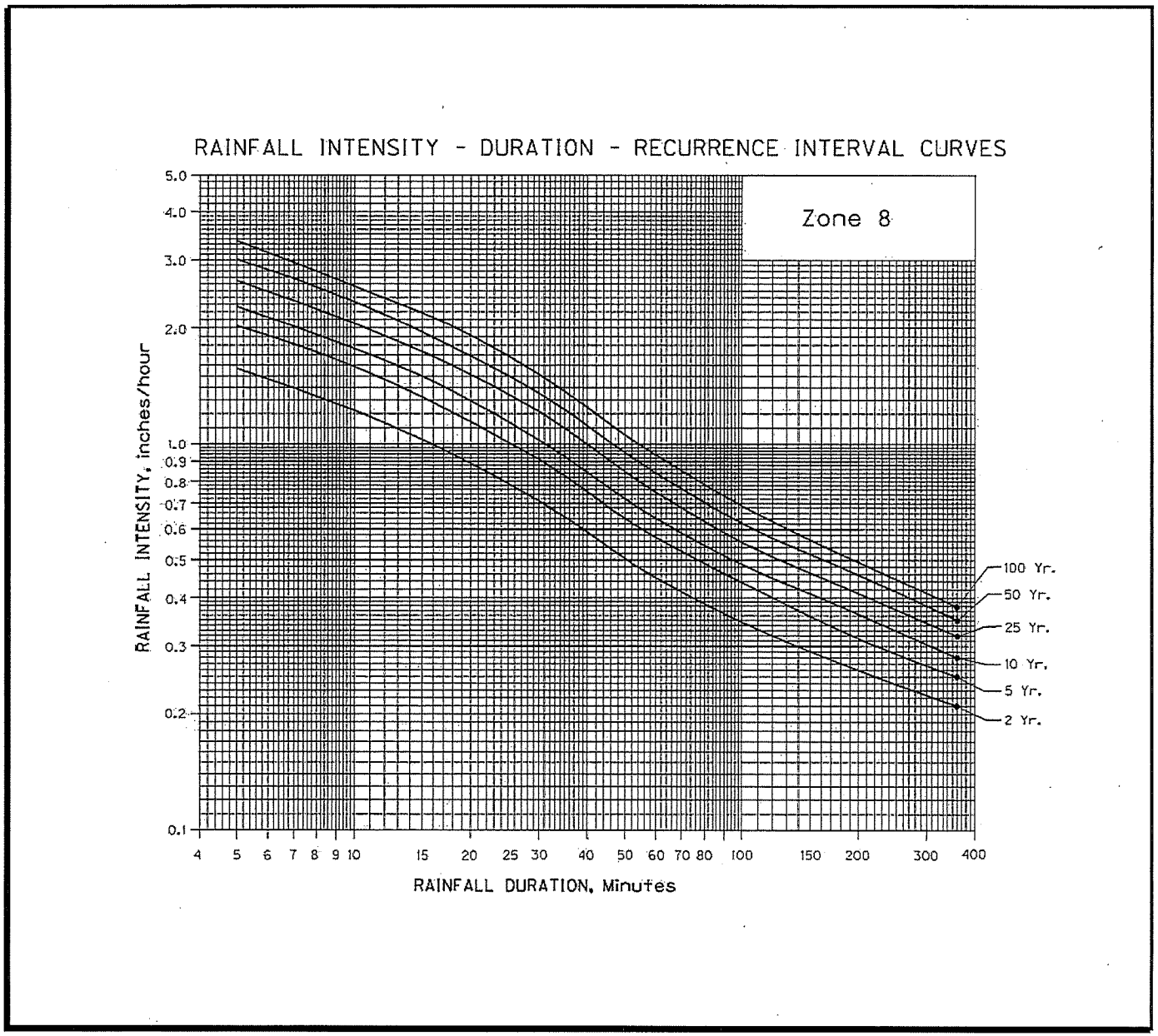
Disturbed soil profiles

As a result of urbanization, the soil profile may be considerably altered and the listed group classification may no longer apply. In these circumstances, use the following to determine HSG according to the texture of the new surface soil, provided that significant compaction has not occurred (Brakensiek and Rawls 1983):

HSG	*Soil textures*
A	Sand, loamy sand, or sandy loam
B	Silt loam or loam
C	Sandy clay loam
D	Clay loam, silty clay loam, sandy clay, silty clay, or clay

Drainage and group D soils

Some soils in the list are in group D because of a high water table that creates a drainage problem. Once these soils are effectively drained, they are placed in a different group. For example, Ackerman soil is classified as A/D. This indicates that the drained Ackerman soil is in group A and the undrained soil is in group D.


RAINFALL INTENSITY - DURATION - RECURRENCE INTERVAL CURVES
Zone 8
RAINFALL INTENSITY, inches/hour
5.0
4.0
3.0
2.0
1.0
0.9
0.8
0.7
0.6
0.5
0.4
0.3
0.2
0.1
4 5 6 7 8 9 10 15 20 25 30 40 50 60 70 80 100 150 200 300 400
RAINFALL DURATION, Minutes
100 Yr.
50 Yr.
25 Yr.
10 Yr.
5 Yr.
2 Yr.

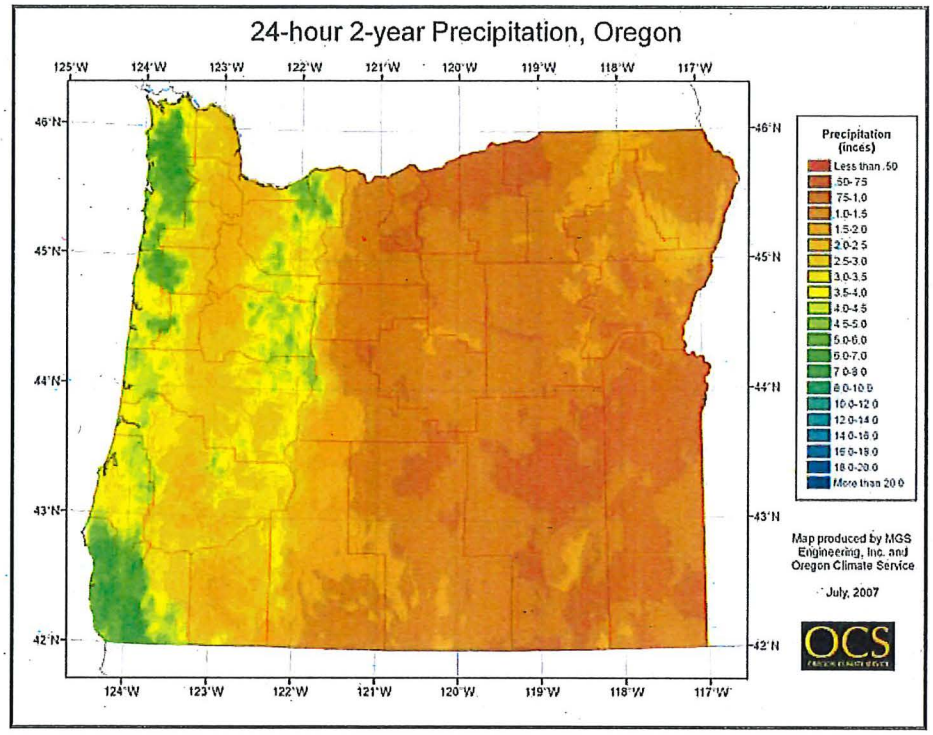


Figure B.2: Isopluvial Map of 24-Hour Precipitation for 2-Year Recurrence Interval for Oregon State.

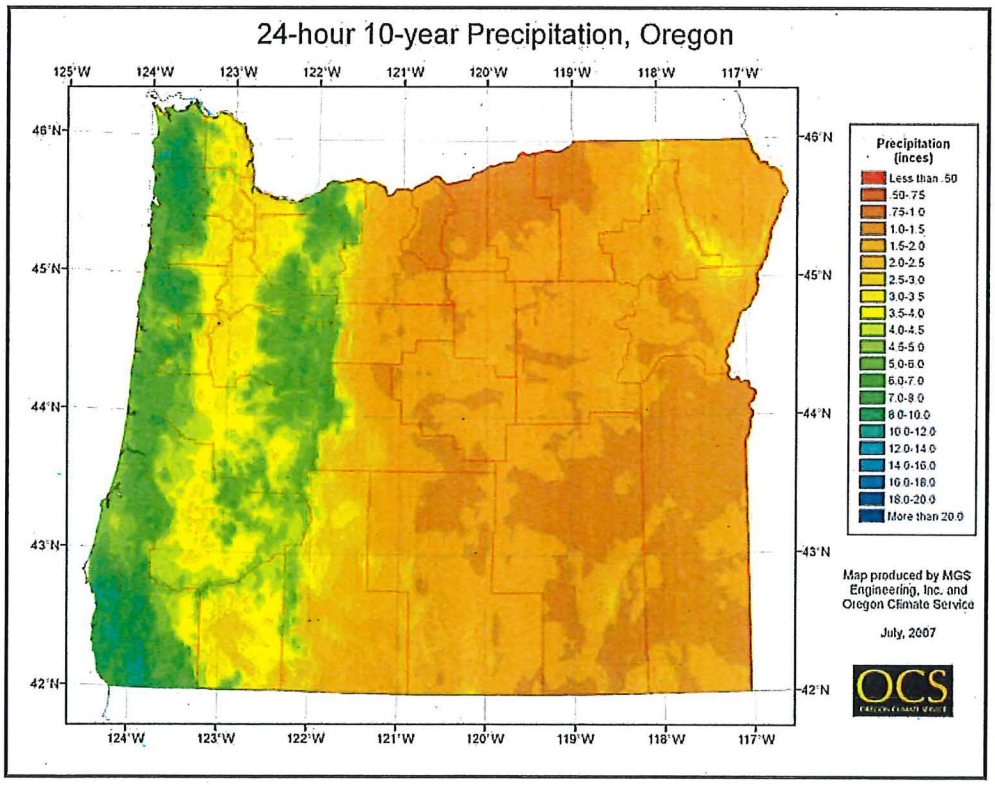


Figure B.3: Isopluvial Map of 24-Hour Precipitation for 10-Year Recurrence Interval for Oregon State.

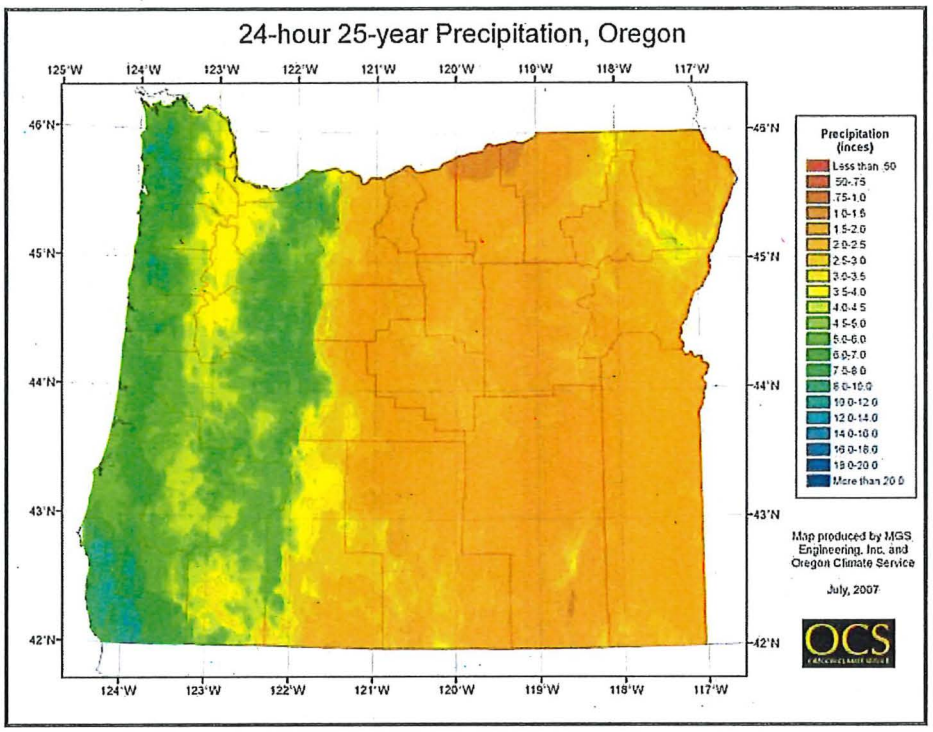


Figure B.4: Isopluvial Map of 24-Hour Precipitation for 25-Year Recurrence Interval for Oregon State.

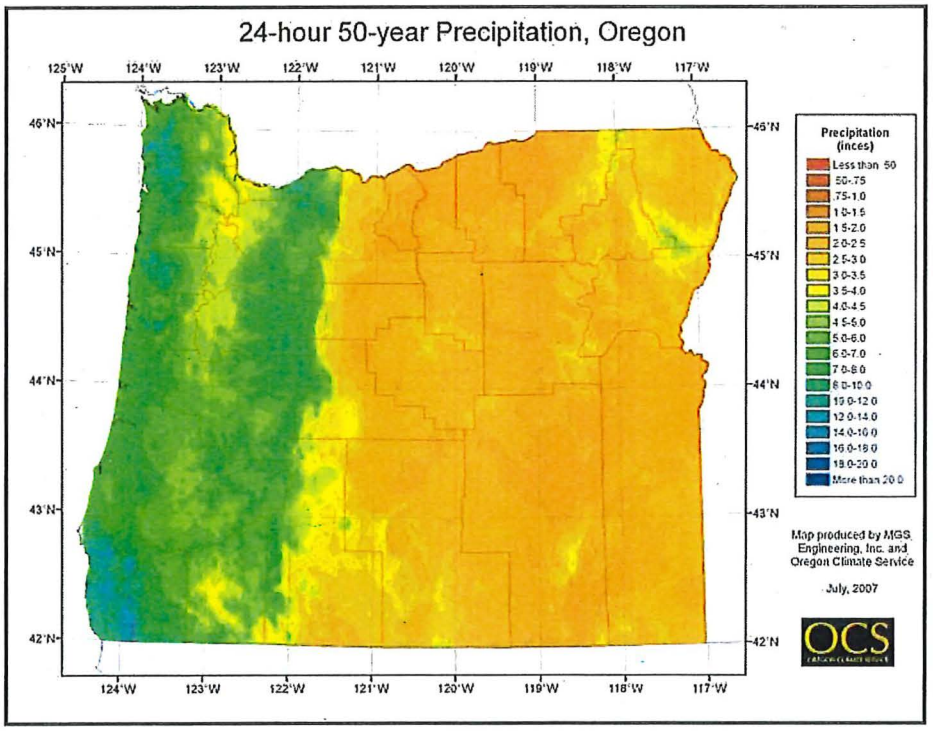


Figure B.5: Isopluvial Map of 24-Hour Precipitation for 50-Year Recurrence Interval for Oregon State.

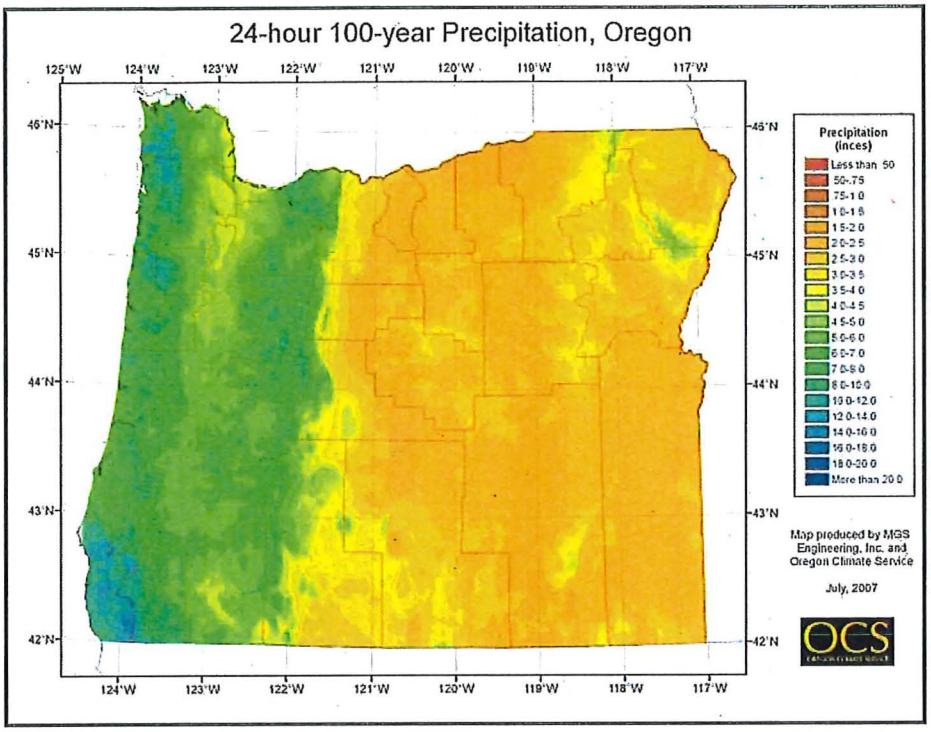


Figure B.6: Isopluvial Map of 24-Hour Precipitation for 100-Year Recurrence Interval for Oregon State.

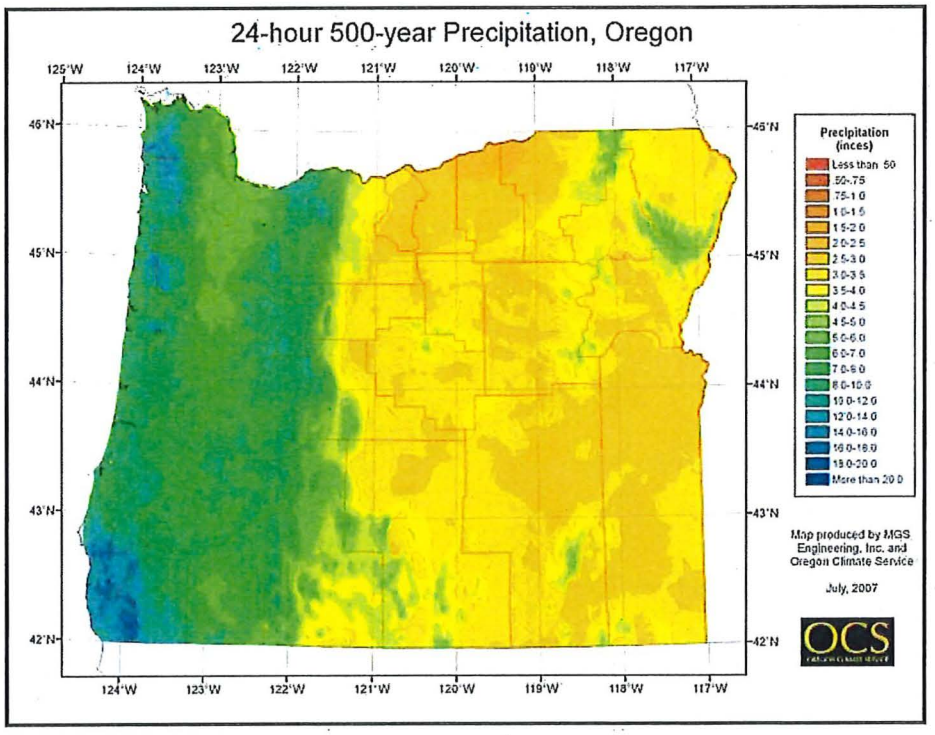
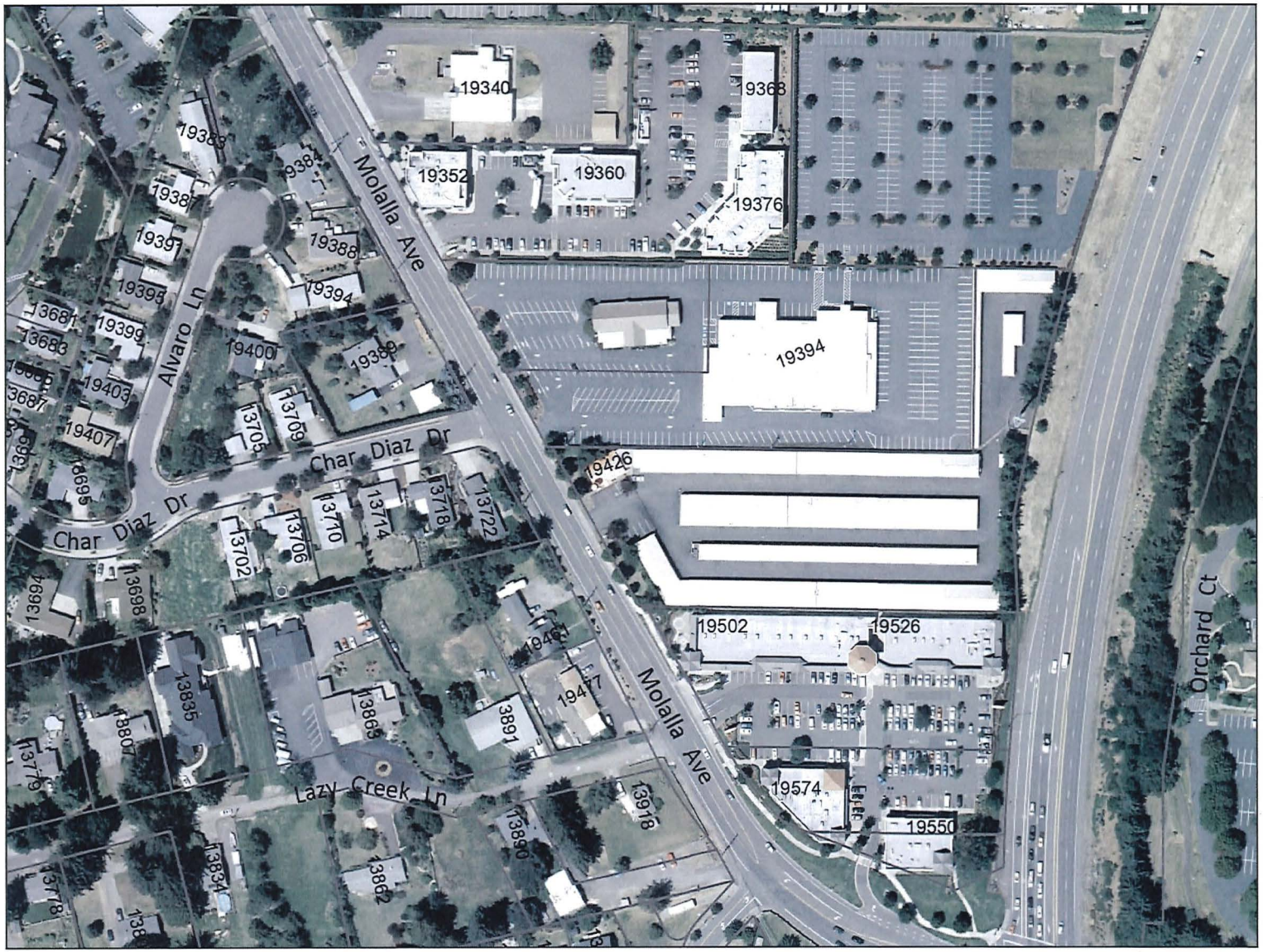


Figure B.7: Isopluvial Map of 24-Hour Precipitation for 500-Year Recurrence Interval for Oregon State.

Oregon City GIS Map



Legend

- Taxlots
- 1996 Flood Inundation
- FEMA 2008 - Base Flood Elevation
- FEMA 2008 - Floodway
- FEMA 2008 - 100 yr Floodplain
- FEMA 2008 - 500 yr Floodplain
- City Limits
- UGB

Notes

Firestate #16 Flood Map

Overview Map



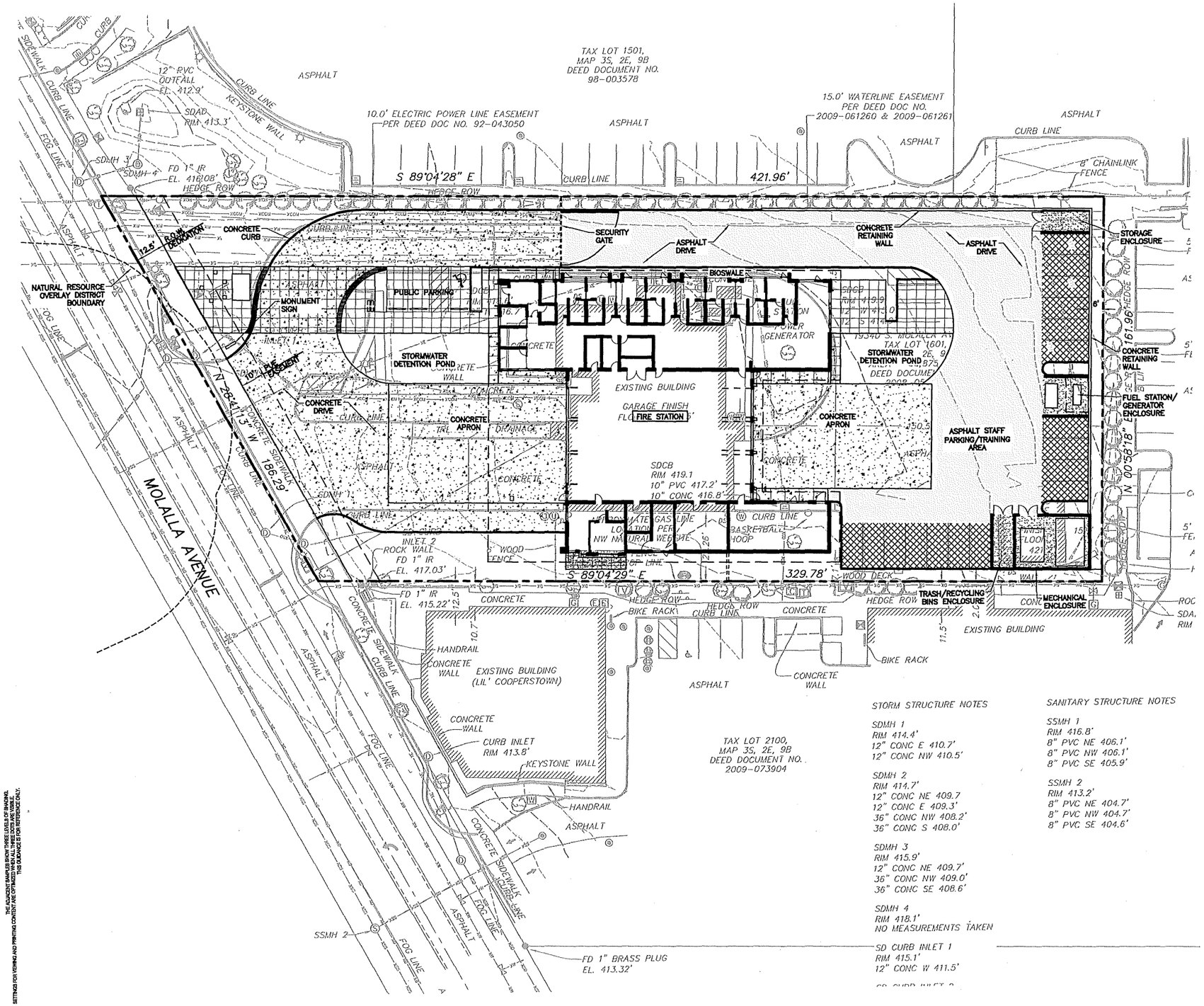
0 200 400 Feet

1: 2,400

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Map created 4/10/2017

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STORM STRUCTURE NOTES

SDMH 1
RIM 414.4'
12" CONC E 410.7'
12" CONC NW 410.5'

SDMH 2
RIM 414.7'
12" CONC NE 409.7
12" CONC E 409.3'
36" CONC NW 408.2'
36" CONC S 408.0'

SDMH 3
RIM 415.9'
12" CONC NE 409.7'
36" CONC NW 409.0'
36" CONC SE 408.6'

SDMH 4
RIM 418.1'
NO MEASUREMENTS TAKEN

SD CURB INLET 1
RIM 415.1'
12" CONC W 411.5'

SANITARY STRUCTURE NOTES

SSMH 1
RIM 416.8'
8" PVC NE 406.1'
8" PVC NW 406.1'
8" PVC SE 405.9'

SSMH 2
RIM 413.2'
8" PVC NE 404.7'
8" PVC NW 404.7'
8" PVC SE 404.6'

LEGEND

- LIGHT FLEXIBLE PAVEMENT
- MODERATE FLEXIBLE PAVEMENT
- RIGID PEDESTRIAN PAVEMENT
- CONCRETE APRON
- PEDESTRIAN WALK
- CONCRETE SLAB

PROPERTY INFORMATION

ADDRESS:	19340 MOLALLA AVENUE
PROPERTY AREA:	1.34 ACRES (58,538 SQUARE FEET)
TAX LOT:	1601
MAP:	32E09B
ZONING:	C (GENERAL COMMERCIAL DISTRICT)
PROPOSED IMPERVIOUS AREA:	45,914 SQUARE FEET (78.4%)
PROPOSED PERVIOUS AREA:	12,624 SQUARE FEET (21.6%)

HORIZ. 0 10 20 40 Scale in Feet

PACE
An Engineering Services Company
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Lake Oswego, OR 97035
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503 227 4920 FAX
www.henneberyeddy.com

CLACKAMAS FIRE DISTRICT #1

FIRE STATION 16

19340 MOLALLA AVE
OREGON CITY, OR

HEA Project no. 16073
Date: APRIL 17, 2017
LAND USE & DESIGN REVIEW
Revisions:

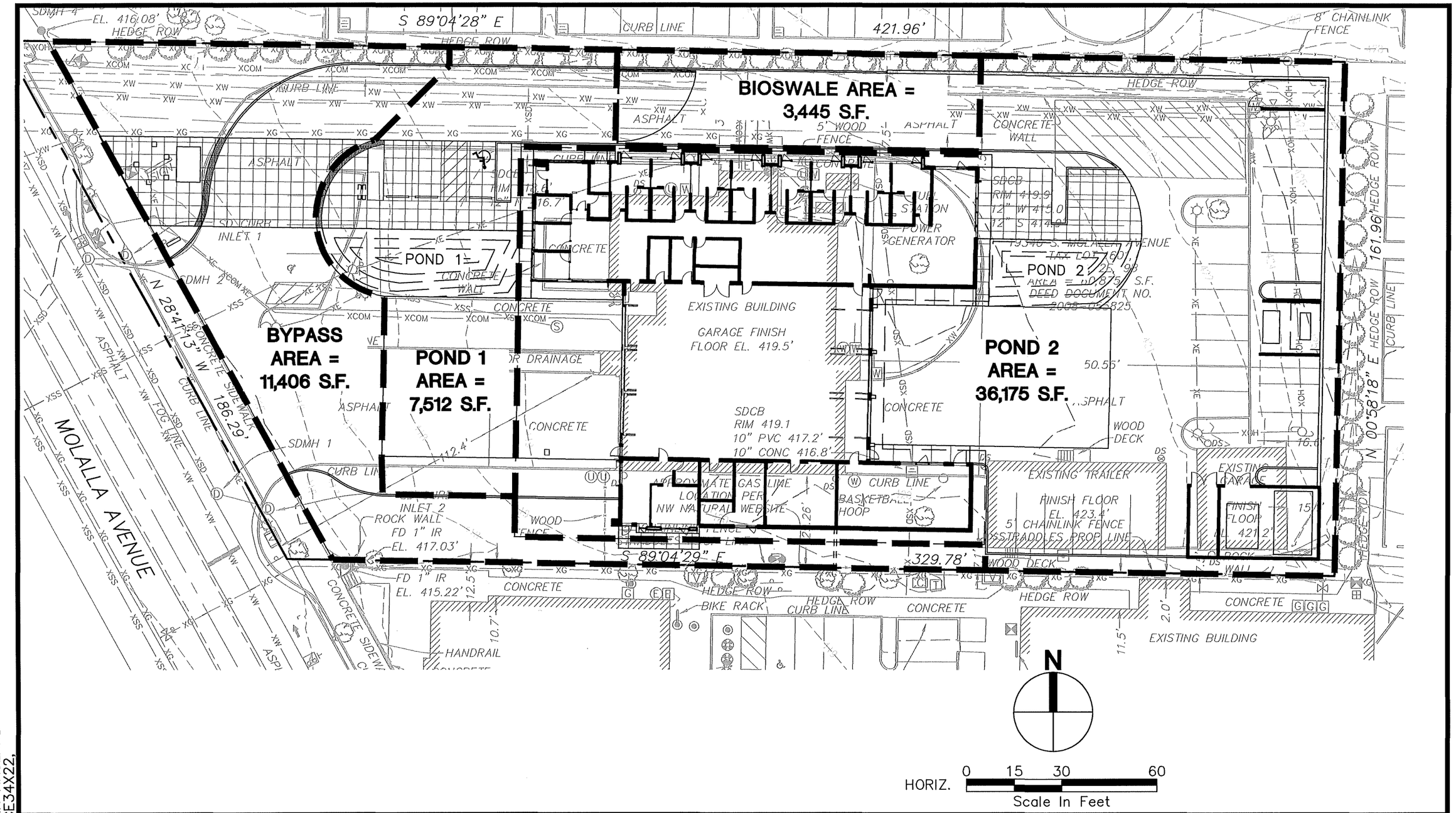
LAND USE & DESIGN REVIEW
Drawn by: MA
Checked by: BL
Sheet: CIVIL SITE PLAN

C200

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FILE NAME: P:\P16\16075 - CLACKAMAS FIRE DIST #1 - FIRE STATION 16\CAD\ENGINEERING\SHEETS\P16075-SITE.DWG
SAVE TIME: 4/13/2017 3:16:07 PM
PLOT TIME: 4/13/2017 3:16:07 PM
USER NAME: MARK ASLAND
XREF FILES: PACE34X22.

THE ADJACENT SWATCH SHOW THREE LEVELS OF SHADING.
SETTINGS FOR VIEWING AND PRINTING CONTENT ARE OPTIMIZED WHEN ALL THREE DOTS ARE VISIBLE.
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FILE NAME: P:\P16\16875 – CLACKAMAS FIRE DIST #1 – FIRE STATION 16\CAD\ENGINEERING\FIGURES\SHEETS\P16875–DETENTI
SAVE TIME: 4/14/2017 11:34:48 AM
PLOT TIME: 4/14/2017 11:42 AM
USER NAME:MARK AASLAND
XREF FILES: PACE34X22,

Geotechnical Investigation Report:

Carlson Geotechnical

A Division of Carlson Testing, Inc.
Phone: (503) 601-8250
Fax: (503) 601-8254

Bend Office	**(541) 330-9155**
Eugene Office	**(541) 345-0289**
Salem Office	**(503) 589-1252**
Tigard Office	**(503) 684-3460**

Report of
Geotechnical Investigation &
Site-Specific Seismic Hazards Study
Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

Prepared for

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

February 23, 2017

Carlson Geotechnical

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Eugene Office (541) 345-0289
Salem Office (503) 589-1252
Tigard Office (503) 684-3460

February 23, 2017

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

Report of
Geotechnical Investigation &
Site-Specific Seismic Hazards Study
Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

Dear Mr. Vallance:

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this report summarizing the results of our geotechnical investigation and site-specific seismic hazard study (SSSHS) for the proposed Fire Station 16 replacement project. The site is located at 19340 Molalla Avenue in Oregon City, Oregon. We performed our work in general accordance with CGT Proposal GP7361R1, dated January 16, 2017. Written authorization for our services was received on July 21, 2016, in the form of Clackamas County Fire District #1 Purchase Order 16-1758.

We appreciate the opportunity to work with you on this project. Please contact us at 503.601.8250 if you have any questions regarding this report.

Respectfully Submitted,
CARLSON GEOTECHNICAL

CERTIFIED OREGON RYAN T. HOUSER E1914 ENGINEERING GEOLOGIST
EXPIRES 12/1/17

REGISTERED PROFESSIONAL ENGINEER 15764 OREGON January 21, 1992 WILLIAM M. WEYRAUCH
EXPIRES: 6.30.2018

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Site Plan ..... Figure 2
Site Photographs ..... Figure 3
Retaining Wall Pressure Distribution ..... Figure 4
Field Investigation and Laboratory Testing ..... Appendix A
Infiltration Test Results ..... Appendix B
Site-Specific Seismic Hazard Study ..... Appendix C

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1.0 INTRODUCTION

Carlson Geotechnical (CGT), a division of Carlson Testing, Inc. (CTI), is pleased to submit this report summarizing the results of our geotechnical investigation and site-specific seismic hazard study (SSSHS) for the proposed Fire Station 16 replacement project. The site is located at 19340 Molalla Avenue in Oregon City, Oregon, as shown on the attached Figure 1.

1.1 Project Information

CGT developed an understanding of the proposed project based on our review of the Request for Proposals for Geotechnical Services for Fire Station #16 (RFP), issued by Clackamas Fire District #1 on December 30, 2016, and subsequent correspondence with you and the design team. We understand the project is in its design stage, and will include:

- Demolition of the existing fire station building.
- Construction of a new fire station building. A site plan was included with the RFP showing the footprint of the new fire station (Figure 2). The new building will have a footprint similar to the existing approximate 7,000 square-foot building. We understand the new two-story building will incorporate a slab-on-grade floor and no below-grade levels are planned. The project structural engineer, Mr. Robert Aman, P.E., S.E., with Nishkian Dean, provided the following loading information for the proposed building:
  - Maximum continuous wall footing load: 3 kips per lineal foot (klf).
  - Maximum column load: 20 kips.
  - Maximum slab/pavement load: 250 psf (fire trucks).
- Construction of a new retaining wall along the eastern end of the site. The new retaining wall will be up to about 5 feet in height.
- No grading plans have been provided, but we understand that the new fire station will include cuts up to about 5 feet in depth on the eastern portion of the site, with minimal grading to be performed on the western portion of the site.
- The RFP indicated infiltration testing should be performed. Subsequent discussions with the project architect and civil engineer directed the testing be performed at two locations.

1.2 Scope of Work

Our scope of work included the following:

- Contact the Oregon Utilities Notification Center and arrange for a private utility locating contractor to mark the locations of public utilities at the site within a 20-foot radius of our planned explorations.
- Explore subsurface conditions at the site by advancing eight machine-drilled soil borings to depths up to about 25¾ feet below ground surface (bgs) using a track-mounted drill rig provided and operated by our drilling subcontractor. The field exploration is summarized in the attached Appendix A.
- Perform infiltration testing at selected areas on the site. Results of infiltration testing are presented in the attached Appendix B.
- Classify the soils encountered in the borings in general accordance with the Visual-Manual procedure (ASTM D2488).

- Collect representative disturbed and relatively undisturbed samples of the soils and rock encountered within the explorations in order to perform laboratory testing and to confirm our field classifications.
- Conduct a Site-Specific Seismic Hazards Study (SSSHS) in general accordance with the requirements of Section 1803.3.2 of the 2014 Oregon Structural Specialty Code (OSSC). The results of the SSSHS are presented in the attached Appendix C.
- Provide this written report summarizing the results of our geotechnical investigation, site-specific seismic hazards study, and geotechnical recommendations for the project.

2.0 SITE DESCRIPTION

2.1 Site Geology

Based on available geologic mapping[1] of the area, the site is underlain by Pliocene-Pleistocene age Boring Lavas (basalt). See Section C.2.0 in Appendix C for further discussion.

2.2 Site Surface Conditions

The approximate 1.4-acre site was bordered by Molalla Avenue to the west, and commercial/industrial development to the north, east, and south. The site generally descended gently to the west with a total relief of about 8 feet. The site was occupied by the existing single-story fire station, a storage building, and a temporary modular building. The majority of the remainder of the site was paved with an asphaltic concrete parking lot and drive lanes. Vegetation on the site was limited to grasses and landscaped trees in planters on the edges of the parking area. Photographs taken at the time of our fieldwork are attached as Figure 3.

2.3 Subsurface Conditions

2.3.1 Subsurface Investigation

Our subsurface investigation consisted of the advancement of eight borings (B-1 through B-8) completed on February 9 and 10, 2017. The approximate exploration locations are shown on the Site Plan, attached as Figure 2. In summary, the borings were advanced to depths ranging from about 5 to 25¾ feet bgs. Details regarding the subsurface investigation, logs of the explorations, and laboratory testing performed on selected samples are presented in Appendix A.

2.3.2 Soil

The following describes each of the subsurface materials encountered at the site.

2.3.2.1 Undocumented Fill

Organic Clay Topsoil Fill (OL Fill): Undocumented clay topsoil fill was encountered at the surface of B-2, B-3, and B-7. Undocumented fill refers to materials placed without (available) records of subgrade conditions or evaluation of compaction. The clay topsoil fill was typically dark brown, moist, contained abundant rootlets and trace angular gravel up to about ¾-inch in diameter. The clay topsoil fill extended to depths of about ¼ foot bgs, where encountered.

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[1] Ma, Madin, Duplantis, and Williams, 2012, Lidar-based Surficial Geologic Map and Database of the Greater Portland, Oregon, Area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington Oregon Department of Geology and Mineral Industries Open-File Report O-12-02.

Asphaltic Concrete Pavement: Asphaltic concrete (AC) pavement was encountered at the surface of boring B-4 and B-6, and was about 3 to 5 inches thick.

Undocumented Poorly Graded Gravel Fill (GP Fill): Undocumented poorly graded gravel fill was encountered underlying the AC in B-4 and B-6, and underlying the clay topsoil fill in B-7. The poorly graded gravel fill was generally dark gray, moist to wet, angular, up to about 1-inch diameter, and extended to depths of about 1 to 2 feet bgs.

2.3.2.2 Topsoil

Clay Topsoil (OL): Clay topsoil was encountered at the surface of borings B-1, B-3, B-5, and B-8, and underlying the undocumented fill in B-7. This soil was typically dark brown, moist, contained abundant rootlets, contained trace roots up to about ¼ inch in diameter, and extended to depths of about ¼- to 2½ feet bgs.

2.3.2.3 Residual Soil

Sandy Fat Clay (CH): Underlying the clay topsoil and undocumented fill in the borings was native sandy fat clay (CH). The sandy fat clay was typically medium stiff to very stiff, reddish brown with gray and black mottling, moist to wet, and exhibited high plasticity. The sand portion of this soil was fine- to medium-grained. A trace of angular gravel up to about 1 inch in diameter was observed within this soil in some of the borings. This soil extended to the full depths explored in B-5 (about 5 feet bgs), and to depths of about 4½ to 9½ feet bgs in the remainder of the borings.

Clayey Sand (SC): Underlying the sandy fat clay soil was clayey sand (SC). This soil was typically loose to very dense, reddish brown with dark red and gray mottling, moist, fine-grained, and contained trace angular gravel. This soil extended to the full depths explored in B-4 (about 14 feet bgs), B-6 (about 16½ feet bgs), B-7 (about 10½ feet bgs), and to depths of about 9 to 20½ feet bgs in the remainder of the borings.

The native sandy fat clay (CH) and clayey sand (SC) soils observed in the explorations and mapped within the area of the project site are consistent with residual soil resulting from the in-place weathering of the underlying basalt bedrock.

2.3.2.4 Bedrock

Basalt Bedrock (RX): Underlying the native residual soils in borings B-1, B-2, B-3, and B-8 was native basalt bedrock. The basalt bedrock was typically hard to very hard (R4-R5), gray with black and white minerals, and slightly weathered to fresh. Practical refusal of the drilling equipment was encountered within the basalt bedrock at depths ranging from about 9 to 20½ feet bgs in the borings. Boring B-5 included coring to approximately 5 feet below the surface of the bedrock. The recovered sample showed a rock quality designation (RQD) of 77% ("Good").

2.3.3 Groundwater

Perched groundwater was encountered within the hollow-stem auger borings at depths ranging from about 5 to 20 feet bgs on February 9 and 10, 2017. The groundwater appears to be perched on the basalt bedrock and low-permeability overlying fat clay soils. We researched available well logs located within

Section 8, Township 3 South, Range 2 East, Willamette Meridian, on the Oregon Water Resources Department (OWRD)[2] website. Our review indicated that groundwater levels in the area varied with surface elevations and generally ranged from about 5 to 30 feet bgs.

It should be noted groundwater levels vary with local topography. In addition, the groundwater levels reported on the OWRD logs often reflect the purpose of the well, so water well logs may only report deeper, confined groundwater, while geotechnical or environmental borings will often report any groundwater encountered, including shallow, unconfined groundwater. Therefore, the levels reported on the OWRD well logs referenced above are considered generally indicative of local water levels and may not reflect actual groundwater levels at the project site.

A depth to groundwater map for the Portland area[3] indicates groundwater is present at depths of about 18 feet bgs in the vicinity of the site. It should be noted that the levels reported by the referenced map are average values for a given location and incorporate a degree of uncertainty. For this location the uncertainty is described as "Moderate". We anticipate that groundwater levels will fluctuate due to seasonal and annual variations in precipitation, changes in site utilization, or other factors. Additionally, the on-site residual soils (CH, SC) are conducive to formation of perched groundwater.

3.0 SITE-SPECIFIC SEISMIC HAZARDS STUDY

3.1 Overview

We performed a Site-Specific Seismic Hazards Study for the site in accordance with Section 1803 of the 2014 Oregon Structural Specialty Code (OSSC). The complete results of our hazards study are presented in the attached Appendix B. The following conclusions highlight the results of our SSSHS:

- We conclude the potential for seismically-induced liquefaction settlement at the site is very low.
- We conclude there is a very low risk of surface rupture from faulting.
- We conclude there is a negligible risk of surface rupture from lateral spread.
- We conclude there is a very low risk of slope instability from a design-level earthquake.
- We conclude there is a negligible risk of tsunami/seiche inundation at this site.

3.2 Seismic Ground Motion Values

Earthquake ground motion parameters for the site were obtained based on the United States Geological Survey (USGS) Seismic Design Values for Buildings - Ground Motion Parameter Calculator[4]. The following table shows the recommended seismic design parameters for the site.

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2 Oregon Water Resources Department, 2017. Well Log Records, *accessed February 2017*, from OWRD web site: http://apps.wrd.state.or.us/apps/gw/well_log/.

3 Snyder, D.T., 2008, Estimated depth to ground water and configuration of the water table in the Portland, Oregon area: U.S. Geological Survey, Scientific Investigations Report SIR-2008-5059, scale 1:60,000.

4 United States Geological Survey, 2017. Seismic Design Parameters determined using:, "U.S. Seismic Design Maps Web Application," *accessed February 2017*, from the USGS website *http://earthquake.usgs.gov*.

Table 1 Seismic Ground Motion Values

Parameter		Value
Mapped Acceleration Parameters	Spectral Acceleration, 0.2 second (S_s)	0.902g
	Spectral Acceleration, 1.0 second (S_1)	0.392g
Coefficients (Site Class D)	Site Coefficient, 0.2 sec. (F_a)	1.139
	Site Coefficient, 1.0 sec. (F_v)	1.616
Adjusted MCE Spectral Response Parameters	MCE Spectral Acceleration, 0.2 sec. (S_{MS})	1.027g
	MCE Spectral Acceleration, 1.0 sec. (S_{M1})	0.633g
Design Spectral Response Accelerations	Design Spectral Acceleration, 0.2 seconds (S_{DS})	0.685g
	Design Spectral Acceleration, 1.0 second (S_{D1})	0.422g

4.0 CONCLUSIONS

Based on the results of our field explorations and analyses, the site may be developed as described in Section 1.1, provided the recommendations presented in this report are incorporated into the design and development. We conclude the primary geotechnical considerations at this site include:

- The presence of potentially expansive fat clay soils at the proposed foundation and pavement subgrade depths.
- The presence of relatively shallow groundwater level at the site.
- The presence of near-surface, moisture-sensitive soils that are susceptible to disturbance during wet weather. This includes both the sandy fat clay (CH) as well as the clayey sand (SC).

These considerations are described in more detail in the following sections.

4.1 Expansion Potential

The primary geotechnical consideration for the project is the presence of high plasticity, fat clay (CH) soils. These soils are highly sensitive to changes in moisture content and have a high potential for exhibiting shrink-swell (expansive-contractive) behavior. Foundations, floor slabs, and pavements founded directly on these soils may be subject to cyclic shrink-swell movements that can result in differential movements and distress. In the absence of additional laboratory testing to evaluate the expansive potential of the onsite, fat clay soils, we recommend measures be taken to protect foundation elements and pavements from the potentially damaging effects of shrink-swell movements. Specific recommendations for foundation, floor slab, and pavement subgrade preparation are presented in Sections 5.6.1, 5.8.1, and 5.9.1, respectively.

4.2 Shallow Groundwater

Perched groundwater was encountered in several of the borings at depths ranging from about 5 to 20 feet bgs, and will likely be encountered during excavation of deeper utility trenches at the site. Specific recommendations for temporary dewatering of trenches and excavations, if required, are provided in Section 5.2.3.

4.3 Subgrade Moisture Sensitivity

The near surface sandy fat clay (CH) soil is susceptible to disturbance during wet weather. Trafficability of this soil may be difficult, and significant damage to the subgrade could occur, if earthwork is undertaken without proper precautions at times when the exposed soils are more than a few percentage points above

optimum moisture content. In the event that construction occurs during wet weather, CGT recommends that measures be implemented to protect the fine-grained subgrade in areas of repeated construction traffic. Geotechnical recommendations for wet weather construction are presented in Section 5.3.

5.0 RECOMMENDATIONS

The recommendations presented in this report are based on the information provided to us, results of our field investigation and analyses, laboratory data, and professional judgment. CGT has observed only a small portion of the pertinent subsurface conditions. The recommendations are based on the assumptions that the subsurface conditions do not deviate appreciably from those found during the field investigation. CGT should be consulted for further recommendations if the design of the proposed development changes and/or variations or undesirable geotechnical conditions are encountered during site development.

5.1 Site Preparation

5.1.1 Demolition

Demolition of the existing buildings should include complete removal of all structural elements, including asphalt parking areas, foundations, and concrete slabs. Abandoned buried utilities should similarly be removed or grouted full. Concrete and asphalt debris resulting from demolition may be re-used as structural fill, provided it is processed in accordance with the recommendations presented in Section 5.4.1.1. Alternatively, demolition debris should be hauled off site for disposal.

5.1.2 Site Stripping

Existing vegetation, topsoil, and undocumented fills (OH Fill, GP Fill) should be removed from proposed building and pavement areas, and for a 5-foot-margin around such locations. Based on the results of our field explorations, stripping depths at the site are anticipated to extend to approximately ¼ to 2 feet bgs across the majority of the site. These materials may be deeper or shallower at locations away from our explorations. The geotechnical engineer or his representative should provide recommendations for actual stripping depths based on observations during site stripping. Stripped topsoil and rooted soils should be transported off-site for disposal, or stockpiled for later use in landscaped areas. Asphalt, concrete debris, and undocumented gravel fill (GP Fill) may be stockpiled for later re-use as structural fill, as discussed in Section 5.4.1.1.

5.1.3 Existing Utilities & Below-Grade Structures

All existing utilities at the site should be identified prior to excavation. Abandoned utility lines beneath the new building, pavements, and hardscaping features should be completely removed or grouted full. Soft, loose, or otherwise unsuitable soils encountered in utility trench excavations should be removed and replaced with structural fill in conformance with Section 5.4 this report. Buried structures (i.e. footings, foundation walls, retaining walls, slabs-on-grade, tanks, etc.), if encountered during site development, should be completely removed and replaced with structural fill in conformance with Section 5.4.

5.1.4 Erosion Control

Erosion and sedimentation control measures should be employed in accordance with applicable City, County, and State regulations.

5.2 Temporary Excavations

5.2.1 Overview

Conventional earthmoving equipment in proper working condition should be capable of making necessary excavations for the anticipated site cuts as described earlier in this report. While not currently planned, excavations deeper than 10 feet may encounter basalt bedrock, which may require the use of hydraulic hammers and/or other specialized rock excavation equipment.

All excavations should be in accordance with applicable OSHA and state regulations. It is the contractor's responsibility to select the excavation methods, to monitor site excavations for safety, and to provide any shoring required to protect personnel and adjacent improvements. A "competent person", as defined by OR-OSHA, should be on-site during construction in accordance with regulations presented by OR-OSHA. CGT's current role on the project does not include review or oversight of excavation safety.

5.2.2 OSHA Soil Type

For use in the planning and construction of temporary excavations up to 10 feet in depth, an OSHA soil type of "B" can be used for the fine-grained residual soils (CH, SC) encountered near the surface of the site.

5.2.3 Dewatering Considerations (if considered)

As indicated in Section 4.2, groundwater will likely be encountered in excavations extending to depths below about 5 to 10 feet bgs, depending on the time of year earthwork is undertaken. The soils encountered at and below this depth are primarily clayey and have a low rate of transmissivity. Therefore, we would expect slow to moderate seepage to occur during excavation.

Pumping from sumps should be effective in removing groundwater within shallow or localized excavations extending below the groundwater level. Pumping from multiple well points may be required for larger excavations. The sumps or wells should be installed to remove water to a depth of at least 2 feet below the lowest elevation of the excavation, and should be installed and put into operation prior to commencing excavation. The project civil engineer should determine the appropriate size, number, and location of sump pumps or wells, and also evaluate requirements for disposal of the resultant discharge. The sumps or well points could be installed permanently, if desired.

5.2.4 Utility Trenches

In order to minimize the potential for soil expansion after construction, we recommend that excavations into the sandy fat clay be kept open only the minimum amount of time required to complete the work. Extended periods of sidewall or excavation bottom drying should be avoided. Temporary trench cuts should stand near vertical to depths of approximately 4 feet in the native fine-grained residual soil (CH, SC) encountered at the site. Some instability may occur if the side walls are allowed to dry or if seepage occurs. If seepage undermines the stability of the trench, or if sidewall caving is observed during excavation, the sidewalls should be flattened or shored. Depending on the time of year trench excavations occur, trench dewatering may be required in order to maintain dry working conditions, particularly if the invert elevations of the proposed utilities are below the groundwater level. If groundwater is present at the base of utility excavations, we recommend placing trench stabilization material at the base of the excavations. Trench stabilization material should be in conformance with Section 5.4.4.

5.2.5 Excavations Near Foundations

Excavations near footings should not extend within a 1½H:1V (horizontal:vertical) plane projected out and down from the outside, bottom edge of the footings. In the event excavation needs to extend below the referenced plane, temporary shoring of the excavation and/or underpinning of the subject footing may be required. The geotechnical engineer should be consulted to review proposed excavation plans for this design case to provide specific recommendations.

5.3 Wet Weather Considerations

For planning purposes, the wet season should be considered to extend from late September to late June. It is our experience that dry weather working conditions should prevail between early July and mid-September. Notwithstanding the above, soil conditions should be evaluated in the field by the geotechnical engineer or his representative at the initial stage of site preparation to determine whether the recommendations within this section should be incorporated into construction.

5.3.1 Overview

Due to the fines content, the residual soil (CH, SC) is susceptible to disturbance during wet weather. Trafficability of these soils may be difficult, and significant damage to subgrade soils could occur, if earthwork is undertaken without proper precautions at times when the exposed soils are more than a few percentage points above optimum moisture content. For wet weather construction, site preparation activities may need to be accomplished using track-mounted equipment, loading removed material onto trucks supported on granular haul roads, or other methods to limit soil disturbance. The geotechnical engineer or his representative should evaluate the subgrade during excavation by probing rather than proof rolling. Soils that have been disturbed during site preparation activities, or soft or loose areas identified during probing, should be over-excavated to firm, stable subgrade, and replaced with imported granular structural fill in conformance with Section 5.4.2.

5.3.2 Geotextile Separation Fabric

CGT recommends that a geotextile separation fabric be placed as a barrier between the prepared subgrade and granular fill/base rock in areas of repeated or heavy construction traffic. The geotextile fabric should meet the requirements presented in the current Oregon Department of Transportation (ODOT) Standard Specification for Construction, Section 02320.

5.3.3 Granular Working Surfaces (Haul Roads & Staging Areas)

Haul roads subjected to repeated heavy, tire-mounted, construction traffic (e.g. dump trucks, concrete trucks, etc.) will require a minimum of 18 inches of imported granular material. For light staging areas, 12 inches of imported granular material should be sufficient. Additional granular material or geo-grid reinforcement may be recommended based on site conditions and/or loading at the time of construction. The imported granular material should be in conformance with Section 5.4.2 and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. The prepared subgrade should be covered with geotextile fabric prior to placement of the imported granular material. The imported granular material should be placed in a single lift (up to 24 inches deep) and compacted using a smooth-drum, non-vibratory roller until well-keyed.

5.4 Structural Fill

The geotechnical engineer should be provided the opportunity to review all materials considered for use as structural fill (prior to placement). Samples of the proposed fill materials should be submitted to the geotechnical engineer a minimum of 2 days prior their use on site.[5] The geotechnical engineer or his representative should be contacted to evaluate compaction of structural fill as the material is being placed. Evaluation of compaction may take the form of in-place density tests and/or proof roll tests with suitable equipment. Structural fill should be evaluated at intervals not exceeding every 2 vertical feet as the fill is being placed.

5.4.1 On-Site Soils – General Use

5.4.1.1 Asphalt & Concrete Debris

Asphalt and concrete debris resulting from the demolition of existing pavements and other features (foundations, floor slabs, sidewalks, etc.) can be re-used as structural fill if processed/crushed into material that is fairly well-graded between coarse and fine. This material should not be used within 12 inches of the foundation, floor slab or pavement base rock section. The processed/crushed concrete and/or asphalt should contain no organic matter, debris, or particles larger than 4 inches in diameter. Moisture conditioning (wetting) should be expected in order to achieve adequate compaction. When used as structural fill, this material should be placed and compacted in general accordance with Section 5.4.2.

5.4.1.2 Residual Soil: Sandy Fat Clay (CH), and Clayey Sand (SC)

CGT recommends against reuse of these soils as structural fill, due to the difficulty in properly moisture conditioning these soils and their high potential for expansion and contraction with changing moisture conditions.

5.4.1.3 Poorly Graded Gravel Fill (GP)

Re-use of the on-site, relatively clean, gravelly fill soils as structural fill is feasible, provided the materials are kept clean of organics, debris, and particles larger than 4 inches in diameter. If reused as structural fill, these materials should be prepared in general accordance with Section 5.4.2.

If the on-site materials cannot be properly moisture-conditioned and/or processed, we recommend using imported granular material for structural fill.

5.4.2 Imported Granular Structural Fill – General Use

Imported granular structural fill should consist of angular pit or quarry run rock, crushed rock, or crushed gravel that is fairly well graded between coarse and fine particle sizes. The granular fill should contain no organic matter, debris, or particles larger than 2 inches, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. The percentage of fines can be increased to 12 percent of the material passing the U.S. Standard No. 200 Sieve if placed during dry weather, and provided the fill material is moisture-conditioned, as necessary, for proper compaction. Imported granular fill material should be compacted to not less than 95 percent of the material's maximum dry density, as determined in general accordance with ASTM D1557 (Modified Proctor). Proper moisture conditioning and the use of vibratory equipment will facilitate compaction of these materials.

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[5] Laboratory testing for moisture density relationship (Proctor) is required. Tests for gradation may be required.

Granular fill materials with high percentages of particle sizes in excess of 1½ inches are considered non-moisture-density testable materials. As an alternative to conventional density testing, compaction of these materials should be evaluated by proof roll test observation (deflection tests), where accepted by the geotechnical engineer.

5.4.3 Floor Slab Base Rock

Floor slab base rock should consist of well-graded granular material (crushed rock) containing no organic matter or debris, have a maximum particle size of ¾ inch, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. Floor slab base rock should be placed in one lift and compacted to not less than 95 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). We recommend "choking" the surface of the base rock with fine sand just prior to concrete placement. Choking means the voids between the largest aggregate particles are filled with sand, but does not provide a layer of sand above the base rock. Choking the base rock surface reduces the lateral restraint on the bottom of the concrete during curing and therefore reduces the potential for slab cracking.

5.4.4 Pavement Base and Subbase Material

Pavement base material should meet the dense-graded aggregate requirements of the Oregon Department of Transportation - Oregon Standard Specifications for Construction (ODOT OSSC) Section 2630.10. A maximum aggregate size of 2 inches or less is recommended. Pavement subbase material should meet the requirements of imported granular structural fill described in Section 5.4.2.

5.4.5 Trench Base Stabilization Material

If groundwater is present at the base of utility excavations, trench base stabilization material should be placed. Trench base stabilization material should consist of a minimum of 1 foot of well-graded granular material with a maximum particle size of 4 inches and less than 5 percent material passing the U.S. Standard No. 40 Sieve. The material should be free of organic matter and other deleterious material, placed in one lift, and compacted until well-keyed.

5.4.6 Trench Backfill Material

Trench backfill for the utility pipe base and pipe zone should consist of granular material as recommended by the utility pipe manufacturer. In the absence of manufacturer recommendations, the trench backfill above the pipe zone should consist of well-graded granular material containing no organic matter or debris, have a maximum particle size of ¾ inch, and have less than 8 percent material passing the U.S. Standard No. 200 Sieve. As a guideline, trench backfill should be placed in maximum 12-inch-thick lifts. The earthwork contractor may elect to use alternative lift thicknesses based on their experience with specific equipment and fill material conditions during construction in order to achieve the required compaction. The following table presents recommended relative compaction percentages for utility trench backfill.

Table 2 Utility Trench Backfill Compaction Recommendations

Backfill Zone	Recommended Minimum Relative Compaction	
	Structural Areas[1]	Landscaping Areas
Pipe Base and Within Pipe Zone	90% ASTM D1557 or pipe manufacturer's recommendation	88% ASTM D1557 or pipe manufacturer's recommendation
Above Pipe Zone	92% ASTM D1557	90% ASTM D1557
Within 3 Feet of Design Subgrade	95% ASTM D1557	90% ASTM D1557

[1] Includes proposed building, pavement areas, structural fill areas, exterior hardscaping, etc.

5.5 Permanent Slopes

Permanent cut or fill slopes constructed at the site, if any, should be graded at 2H:1V or flatter. Constructed slopes should be overbuilt by a few feet depending on their size and gradient so that they can be properly compacted prior to being cut to final grade. The surface of all slopes should be protected from erosion by seeding, sodding, or other acceptable means. Adjacent on-site and off-site structures should be located at least 5 feet from the top of slopes.

5.6 Shallow Foundations

5.6.1 Subgrade Preparation

Sandy fat clay (CH) was encountered at the proposed foundation depths in the area of the proposed building and retaining wall, and will be exposed in foundation excavations during construction. Due to its expansive potential, variations in the moisture content of the sandy fat clay (CH) soil should be minimized. This can be accomplished by ensuring that the bearing soils are located a minimum of 3½ feet below the surrounding site grades. In areas where the footings are not at least 3½ feet below the surrounding grades, a minimum of 24 inches of crushed base rock should be placed under the building and retaining wall footings. Combined with the recommended 18-inch footing embedment depth (Section 5.6.2), the crushed rock typically provides sufficient protection from the expansive characteristics of the fat clay (CH) soil left in place. This crushed rock fill should be placed as described in Section 5.4.2 above. Once over excavations are made, the native subgrade soils should not be exposed to periods of wetting or drying, but should be backfilled as soon as possible.

The geotechnical engineer or their representative should be contacted to observe subgrade conditions prior to placement of granular backfill. If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill in conformance with Section 5.4.2. The maximum particle size of over-excavation backfill should be limited to 1½ inches. All granular pads for footings should be constructed a minimum of 6 inches wider on each side of the footing for every vertical foot of over-excavation.

5.6.2 Minimum Footing Width & Embedment

Minimum footing widths should be in conformance with the current OSSC. As a guideline, CGT recommends individual spread footings have a minimum width of 24 inches. We recommend continuous

wall footings have a minimum width of 18 inches. All footings should be founded at least 18 inches below the lowest, permanent adjacent grade to develop lateral capacity and for frost protection.

5.6.3 Bearing Pressure & Settlement

Footings founded as recommended above may be proportioned for a maximum allowable soil bearing pressure of 2,500 pounds per square foot (psf). This bearing pressure is a net bearing pressure, applies to the total of dead and long-term live loads, and may be increased by one-third when considering seismic or wind loads. For foundations founded as recommended above, total settlement of foundations is anticipated to be less than 1 inch. Differential settlements between adjacent columns and/or bearing walls should not exceed ½-inch. If an increased allowable soil bearing pressure is desired, the geotechnical engineer should be consulted.

5.6.4 Lateral Capacity

A maximum passive (equivalent fluid) earth pressure of 250 pounds per cubic foot (pcf) is recommended for design of footings confined by the native soils described above, or imported granular structural fill that is properly placed and compacted during construction. The recommended earth pressure was computed using a factor of safety of 1½, which is appropriate due to the amount of movement required to develop full passive resistance. In order to develop the above capacity, the following should be understood:

1. Concrete must be poured neat in excavations or the foundations must be backfilled with imported granular structural fill,
2. The adjacent grade must be level,
3. The static ground water level must remain below the base of the footings throughout the year.
4. Adjacent floor slabs, pavements, or the upper 12-inch-depth of adjacent, unpaved areas should not be considered when calculating passive resistance.

An ultimate coefficient of friction equal to 0.45 may be used when calculating resistance to sliding for footings founded on a minimum of 6 inches of imported granular structural fill (crushed rock) that is properly placed and compacted during construction.

5.6.5 Subsurface Drainage

Recognizing the predominantly fine-grained soils encountered at this site, placement of foundation drains is recommended at the outside base elevations of perimeter continuous wall footings. Foundation drains should consist of a minimum 4-inch diameter, perforated, PVC drainpipe wrapped with a non-woven geotextile filter fabric. The drains should be backfilled with a minimum of 2 cubic feet of open graded drain rock per lineal foot of pipe. The drain rock should also be encased in a geotextile fabric in order to provide separation from the surrounding soils. Foundation drains should be positively sloped and should outlet to a suitable discharge point. The geotechnical engineer or his representative should observe the drains prior to backfilling. Roof drains should not be tied into foundation drains.

5.7 Rigid Retaining Walls

5.7.1 Footings

Retaining wall footings should be designed and constructed in conformance with the recommendations presented in Section 5.6, as applicable.

5.7.2 Wall Drains

We recommend placing a retaining wall drain at the base elevation of the heel of the retaining wall footing. Retaining wall drains should consist of a minimum 4-inch-diameter, perforated, HDPE (High Density Polyethylene) drainpipe wrapped with a non-woven geotextile filter fabric. The drains should be backfilled with a minimum of 2 cubic feet of open graded drain rock per lineal foot of pipe. The drain rock should be encased in a geotextile fabric in order to provide separation from the surrounding soils. Retaining wall drains should be positively sloped and should outlet to a suitable discharge point. The geotechnical engineer or his representative should be contacted to observe the drains prior to backfilling. Roof or area drains should not be tied into retaining wall drains.

5.7.3 Wall Backfill

Retaining walls should be backfilled with imported granular structural fill in conformance with Section 5.4.2 and contain less than 5 percent passing the U.S. Standard No. 200 Sieve. The backfill should be compacted to a minimum of 90 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). When placing fill behind walls, care must be taken to minimize undue lateral loads on the walls. Heavy compaction equipment should be kept at least "H" feet from the back of the walls, where "H" is the height of the wall. Light mechanical or hand tamping equipment should be used for compaction of backfill materials within "H" feet of the back of the walls.

5.7.4 Design Parameters & Limitations

For rigid retaining walls founded, backfilled, and drained as recommended above, the following table presents parameters recommended for design.

Table 3 Design Parameters for Rigid Retaining Walls

Retaining Wall Condition	Modeled Backfill Condition	Static Equivalent Fluid Pressure (S_A)	Seismic Equivalent Fluid Pressure (S_{AE})
Not Restrained from Rotation	Level (i = 0)	34 pcf	46 pcf
Restrained from Rotation	Level (i = 0)	58 pcf	63 pcf

Note 1: Refer to the attached Figure 4 for a graphical representation of static and seismic loading conditions. Seismic component of active thrust acts at 0.6H above the base of the wall.

Note 2: Seismic (dynamic) lateral loads were computed using the Mononobe-Okabe Equation as presented in the 1997 Federal Highway Administration (FHWA) design manual.

The above design recommendations are based on the assumptions that:

(1) The walls consist of concrete cantilevered retaining walls (β = 0 and δ = 24 degrees, see Figure 4).
(2) The walls are 10 feet or less in height.
(3) The backfill is drained and consists of imported granular structural fill (ϕ = 38 degrees).
(4) No line load or point load surcharges are imposed behind the walls.
(5) The grade behind the wall is level, or sloping down and away from the wall, for a distance of 10 feet or more from the wall.
(6) The grade in front of the walls is level or sloping up for a distance of at least 5 feet from the wall.

Re-evaluation of our recommendations will be required if the retaining wall design criteria for the project vary from these assumptions.

5.8 Interior Floor Slabs

5.8.1 Subgrade Preparation

Satisfactory subgrade support and mitigation of potential expansive soil considerations for slabs constructed on grade, supporting up to 250 psf area loading, can be obtained from a minimum of 24 inches of granular structural fill placed over the native sandy fat clay (CH). The crushed rock typically provides sufficient protection from the expansive characteristics of the sandy fat clay (CH) soil left in place. This crushed rock fill should be placed as described in Section 5.4.2 above. Once over excavations are made, the native subgrade soils should not be exposed to periods of wetting or drying, but should be backfilled as soon as possible.

The geotechnical engineer or his representative should observe floor slab subgrade soils to evaluate surface consistencies. If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the CGT geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill as described in Section 5.4.2.

5.8.2 Crushed Rock Base

Concrete floor slabs should be supported on a minimum 6-inch-thick layer of crushed rock. For interior slabs-on-grade, this base rock may be considered part of the 24 inches of granular structural fill recommended to cover the native sandy fat clay (CH).

5.8.2.1 Floor Slabs in Non-Habitable Areas

Floor slab base rock under slabs in non-habitable areas (i.e., storage areas, exterior slabs, etc.) should consist of well-graded granular material (crushed rock) containing no organic matter or debris, have a maximum particle size of ¾-inch, and have less than 5 percent material passing the U.S. Standard No. 200 Sieve. Floor slab base rock should be placed in one lift and compacted to not less than 95 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). We recommend "choking" the surface of the base rock with fine sand just prior to concrete placement. Choking means the voids between the largest aggregate particles are filled with sand, but does not provide a layer of sand above the base rock. Choking the base rock surface reduces the lateral restraint on the bottom of the concrete during curing. Choking the base rock also reduces punctures in vapor retarding membranes due to foot traffic where such membranes are used.

5.8.2.2 Floor Slabs in Habitable Areas

Floor slab base rock in areas where radon gas mitigation is desired (i.e. under floor slabs within work areas and living spaces) should be supported on a minimum 6-inch-thick layer of gas-permeable base rock. The gas-permeable base rock should consist of open-graded crushed rock containing no organic matter or debris, with all material passing through a 2-inch sieve and retained on the ¼-inch sieve, in accordance with Section 1812.3.2, Bullet 1, of the 2014 OSSC.

Section 1812.3.3 of the 2014 OSSC recommends that a minimum 6-mil polyethylene sheeting (or 3-mil cross-laminated polyethylene sheeting), or equivalent material with equal or greater resistance to puncture, be placed on top of the gas-permeable base rock to act as a soil-gas-retarder. Placement and installation of this sheeting should be in conformance with that indicated in Section 1812.3.3 of the 2014 OSSC.

The geotechnical engineer or his representative should be contacted to observe gas-permeable base rock conditions prior to placement of the soil-gas-retarder.

5.8.3 Design Considerations

For floor slabs constructed as recommended, a modulus of subgrade reaction of 140 pounds per cubic inch (pci) is recommended for the design of the floor slab. Floor slabs constructed as recommended will likely settle less than ½-inch. For general floor slab construction, slabs should be jointed around columns and walls to permit slabs and foundations to settle differentially.

5.8.4 Subgrade Moisture Considerations

Liquid moisture and moisture vapor should be expected at the subgrade surface. The recommended crushed rock base is anticipated to provide protection against liquid moisture. Where moisture vapor emission through the slab must be minimized, e.g. impervious floor coverings, storage of moisture sensitive materials directly on the slab surface, etc., a vapor retarding membrane or vapor barrier below the slab should be considered. Factors such as cost, special considerations for construction, floor coverings, and end use suggest that the decision regarding a vapor retarding membrane or vapor barrier be made by the architect and owner.

If a vapor retarder or vapor barrier is placed below the slab, its location should be based on current American Concrete Institute (ACI) guidelines, ACI 302 Guide for Concrete Floor and Slab Construction. In some cases, this indicates placement of concrete directly on the vapor retarder or barrier. Please note that the placement of concrete directly on impervious membranes increases the risk of plastic shrinkage cracking and slab curling in the concrete. Construction practices to reduce or eliminate such risk, as described in ACI 302, should be employed during concrete placement.

5.9 Pavements

5.9.1 Subgrade Preparation

Satisfactory subgrade support for pavements constructed on grade can be obtained from a minimum of 24 inches of granular structural fill (subbase) placed over the native sandy fat clay (CH). The crushed rock typically provides sufficient protection from the expansive characteristics of the sandy fat clay (CH) soil left in place. This crushed rock fill should be placed as described in Section 5.4.2 above. Once over-excavations are made, the native subgrade soils should not be exposed to periods of wetting or drying, but should be backfilled as soon as possible.

The geotechnical engineer or his representative should observe pavement subgrade soils to evaluate surface consistencies. If soft, loose, or otherwise unsuitable soils are encountered, they should be over-excavated as recommended by the CGT geotechnical representative at the time of construction. The resulting over-excavation should be brought back to grade with imported granular structural fill (subbase) as

described in Section 5.4.2. Pavement subgrade surfaces should be crowned (or sloped) for proper drainage in accordance with specifications provided by the project civil engineer.

5.9.2 Traffic Classifications

Recognizing that traffic data has not been provided, CGT has considered two levels of traffic demand for review and design of pavement sections. We modeled the following design cases (traffic levels) developed from the Asphalt Pavement Association of Oregon (APAO):

- *APAO Level II (Light):* This design case considers typical ADTT of 2 to 7 per day over 20 years. Examples under this loading consist of residential streets and parking lots of less than 500 stalls. We anticipate this traffic loading will be appropriate for the proposed passenger vehicle parking stalls.
- *APAO Level III (Low Moderate):* This design case considers typical ADTT of 7 to 14 per day over 20 years. Examples under this loading consist of rural minor collector streets and parking lots of more than 500 stalls. We anticipate this traffic loading will be appropriate for the drive lane, exterior aprons and fire truck parking areas.

We recommend the owner and design team review the traffic levels presented above and select those that most accurately represent anticipated daily truck traffic for select new pavements.

5.9.3 Input Parameters

Designs of the hot mixed asphaltic concrete (HMAC) flexible pavement sections and the rigid Portland cement concrete (PCC) rigid slab section presented below were based on the parameters presented in the following table and design approaches from:

- The American Association of State Highway and Transportation Officials (AASHTO) 1993 "Design of Pavement Structures" manual,
- The Asphalt Pavement Association of Oregon (APAO) 2003 "Asphalt Pavement Design Guide", and
- The Oregon Department of Transportation (ODOT) 2011 "Pavement Design Guide".

If any of the items listed in Table 4 or Table 5 need to be revised, please contact us and we will reassess the pavement design sections presented below.

5.9.3.1 HMAC Analysis Inputs

Table 4 Input Parameters Used in HMAC Pavement Design

Input Parameter	Design Value[1]	Input Parameter		Design Value[1]
Pavement Design Life	20 years	Resilient Modulus[4]	Residual Soil (CH)	4,000 psi
Annual Percent Growth	0 percent		Poorly Graded Gravel or Crushed Aggregate Base	22,500 psi
Serviceability	4.2 initial 2.5 terminal	Structural Coefficient[2]	Crushed Aggregate Base	0.10
Reliability[2]	75 percent		Asphalt	0.42
Standard Deviation[2]	0.49	Vehicle Traffic[5] (range in ESALs)	APAO Level II (Light) – Parking	Up to 50,000
Drainage Factor[3]	1.0		APAO Level III (Low Moderate) – Entrances and Drive Lanes	Up to 100,000

[1] If any of the above parameters are incorrect, please contact us so that we may revise our recommendations, if warranted.
[2] Value based on guidelines presented in Section 5.3 of the 2011 ODOT Pavement Design Guide and APAO manual.
[3] Assumes good drainage away from pavement, base, and subgrade is achieved by proper crowning of subgrades.
[4] Values based on experience with similar soils prepared as recommended in this report.
[5] ESAL = Total 18-Kip equivalent single axle load. Traffic levels taken from Table 3.1 of APAO manual. If an increased traffic load is estimated, please contact us so that we may refine the traffic loading and revise our recommendations, if warranted.

5.9.3.2 PCC Pavements Analysis Inputs

Table 5 Input Parameters Used in PCC Pavement Design

Input Parameter	Design Value[1]	Input Parameter		Design Value[1]
Pavement Design Life	20 years	Modulus of Subgrade Reaction[4]	24 in. of Subbase Granular Fill (e.g., crushed aggregate base, clean sand) [placed on separation fabric over residual soil (CH)]	140 pci
Annual Percent Growth	0 percent			
Serviceability	4.2 initial 2.5 terminal	PCC Parameters[2]	Elastic Modulus	5,000 ksi
Reliability[2]	80 percent		Modulus of Rupture	0.7 ksi
Combined Standard Error[2]	0.49	Vehicle Traffic[5] (range in ESALs)	APAO Level III (Low Moderate) – Entrances and Drive Lanes	Up to 100,000
Drainage Factor[3]	1.0			
Load Transfer Coefficient	3.2			

[1] If any of the above parameters are incorrect, please contact us so that we may revise our recommendations, if warranted.
[2] Value based on guidelines presented in the ODOT Pavement Design Guide.
[3] Assumes good drainage away from pavement, base, and subgrade is achieved by proper crowning of subgrades.
[4] Values based on experience with similar soils prepared as recommended in this report.
[5] ESAL = Total 18-Kip equivalent single axle load. Traffic levels taken from Table 3.1 of APAO manual. If an increased traffic load is estimated, please contact us so that we may refine the traffic loading and revise our recommendations, if warranted.

5.9.4 Recommended Minimum Pavement Sections

5.9.4.1 Recommended Minimum Flexible Pavement Sections

The following table presents the minimum flexible pavement sections for the traffic levels indicated in the preceding table, based on the referenced design procedures.

Table 6 Recommended Minimum Flexible Pavement Sections

Material	APAO Traffic Loading	
	Level II	Level III
Asphalt Pavement (inches)	3½	4½
Crushed Aggregate Base (inches)	12	12
Granular Subbase (inches)	24	24
Subgrade Soils	Prepared in accordance with Section 5.9.1.	

Note 1: Thicknesses shown assume dry weather construction. A thicker granular subbase section may be required in wet conditions in order to support construction traffic and protect the subgrade.
Note 2: Thicknesses shown assume subgrade is observed by geotechnical engineer representative prior to placement of separation fabric on fat clay (CH) subgrade.
Note 3: Refer to Section 5.3 for additional discussion.

5.9.4.2 Recommended Minimum Rigid Pavement Sections

The following table presents the minimum rigid pavement sections for the traffic levels indicated in the preceding table, based on the referenced design procedures.

Table 7 Recommended Minimum Rigid Pavement Sections

Material	APAO Traffic Loading
	Level III
PCC Slab (inches)	6
Crushed Aggregate Base (inches)	6
Granular Subbase (inches)	24
Subgrade Soils	Prepared in accordance with Section 5.9.1.

Note 1: Thicknesses shown assume dry weather construction. A thicker granular subbase section may be required in wet conditions in order to support construction traffic and protect the subgrade.
Note 2: Thicknesses shown assume subgrade is observed by geotechnical engineer representative prior to placement of separation fabric on fat clay (CH) subgrade.
Note 3: Refer to Section 5.3 for additional discussion.

5.9.5 Pavement Materials

Asphalt pavement and base course material should conform to the most current State of Oregon, Standard Specifications for Highway Construction. Place aggregate base in one lift, and compact to at least 95 percent of the material's maximum dry density as determined in general accordance with ASTM D1557 (Modified Proctor). HMAC pavement should be compacted to at least 91 percent of the material's theoretical maximum density as determined in general accordance with ASTM D2041 (Rice Specific Gravity).

5.10 Additional Drainage Considerations

Subsurface drains should be connected to the nearest storm drain, on-site infiltration system (to be designed by others) or other suitable discharge point. Paved surfaces and grading near or adjacent to the building should be sloped to drain away from the building. Surface water from paved surfaces and open spaces should be collected and routed to a suitable discharge point. Surface water should not be directed into foundation drains.

6.0 RECOMMENDED ADDITIONAL SERVICES

6.1 Design Review

Geotechnical design review of project plans is of paramount importance. As indicated previously, we recommend the geotechnical engineer be consulted to provide specific geotechnical recommendations for the building foundation system as plans are being developed to provide supplemental recommendations for design and construction.

6.2 Observation of Construction

Satisfactory earthwork, foundation, floor slab, and pavement performance depends to a large degree on the quality of construction. Sufficient observation of the contractor's activities is a key part of determining that the work is completed in accordance with the construction drawings and specifications. Subsurface conditions observed during construction should be compared with those encountered during subsurface explorations, and recognition of changed conditions often requires experience. We recommend that qualified personnel visit the site with sufficient frequency to detect whether subsurface conditions change significantly from those observed to date and anticipated in this report. We recommend the geotechnical engineer or their representative attend a pre-construction meeting coordinated by the contractor and/or developer. The project geotechnical engineer or their representative should provide observations and/or testing of at least the following earthwork elements during construction:

- Site Stripping and Demolition
- Subgrade Preparation for Shallow Foundations, Retaining Walls, Structural Fills, Floor Slabs, and Pavements
- Compaction of Structural Fill, Retaining Wall Backfill, and Utility Trench Backfill
- Compaction of Base Rock for Floor Slabs & Pavements
- Compaction of HMAC for Pavements

It is imperative that the owner and/or contractor request earthwork observations and testing at a frequency sufficient to allow the geotechnical engineer to provide a final letter of compliance for the earthwork activities.

7.0 LIMITATIONS

We have prepared this report for use by the owner/developer and other members of the design and construction team for the proposed development. The opinions and recommendations contained within this report are not intended to be, nor should they be construed as a warranty of subsurface conditions, but are forwarded to assist in the planning and design process.

We have made observations based on our explorations that indicate the soil conditions at only those specific locations and only to the depths penetrated. These observations do not necessarily reflect soil types, strata thickness, or water level variations that may exist between or away from our explorations. If subsurface conditions vary from those encountered in our site explorations, CGT should be alerted to the change in conditions so that we may provide additional geotechnical recommendations, if necessary. Observation by experienced geotechnical personnel should be considered an integral part of the construction process.

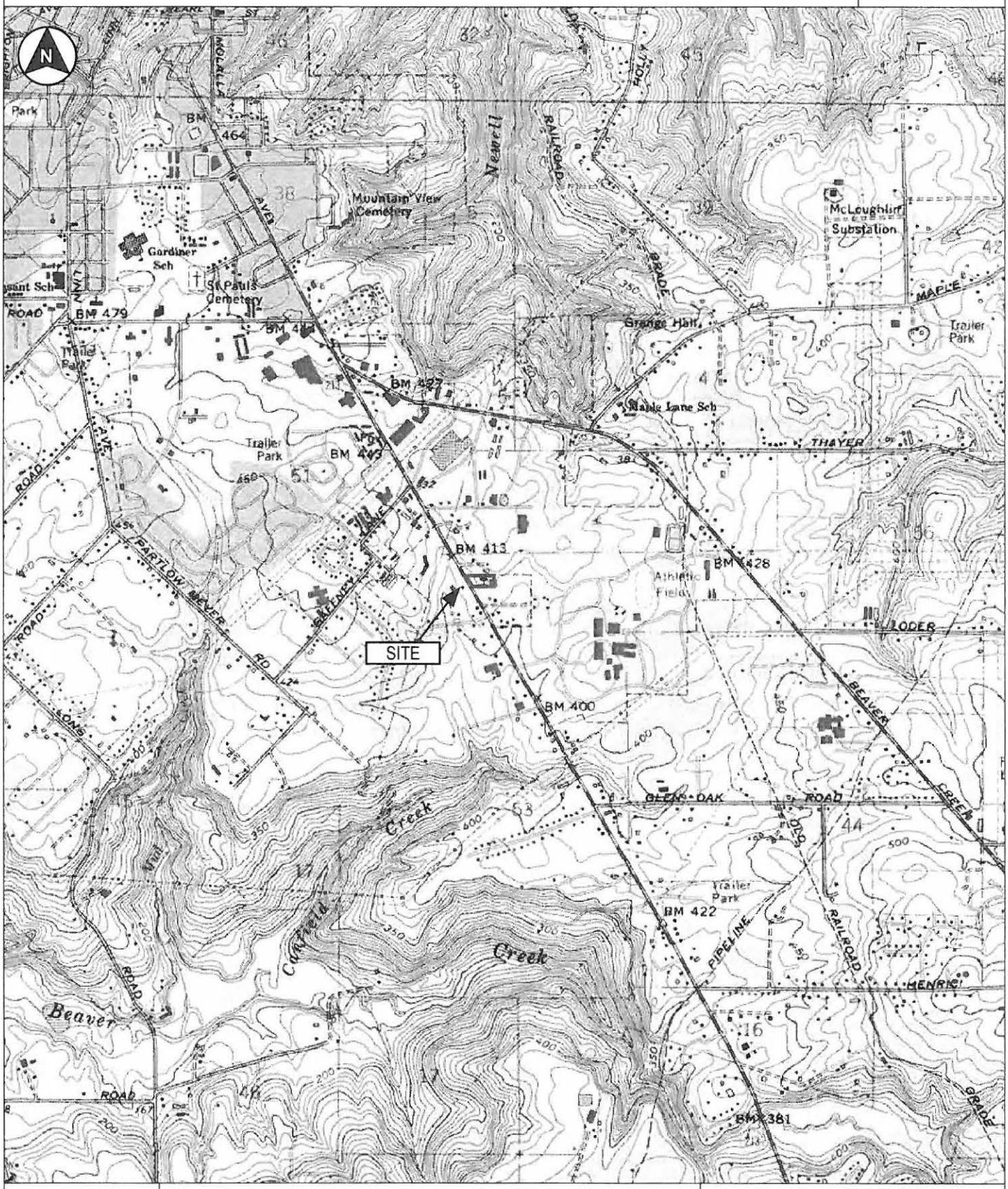
The owner/developer is responsible for ensuring that the project designers and contractors implement our recommendations. When the design has been finalized, prior to releasing bid packets to contractors, we recommend that the design drawings and specifications be reviewed by our firm to see that our recommendations have been interpreted and implemented as intended. If design changes are made, we request that we be retained to review our conclusions and recommendations and to provide a written modification or verification. Design review and construction phase testing and observation services are beyond the scope of our current assignment, but will be provided for an additional fee.

The scope of our services does not include services related to construction safety precautions, and our recommendations are not intended to direct the contractor's methods, techniques, sequences, or procedures, except as specifically described in our report for consideration in design.

Geotechnical engineering and the geologic sciences are characterized by a degree of uncertainty. Professional judgments presented in this report are based on our understanding of the proposed construction, familiarity with similar projects in the area, and on general experience. 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 made. This report is subject to review and should not be relied upon after a period of three years.

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FIGURE 1
Site Location



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Map created with TOPO!™, © 2006 National Geographic Holdings
USGS 7.5 Minute Topographic Map Series, Oregon City, Oregon Quadrangle, 1985.

Township 3 South, Range 2 East, Section 8 Willamette Meridian

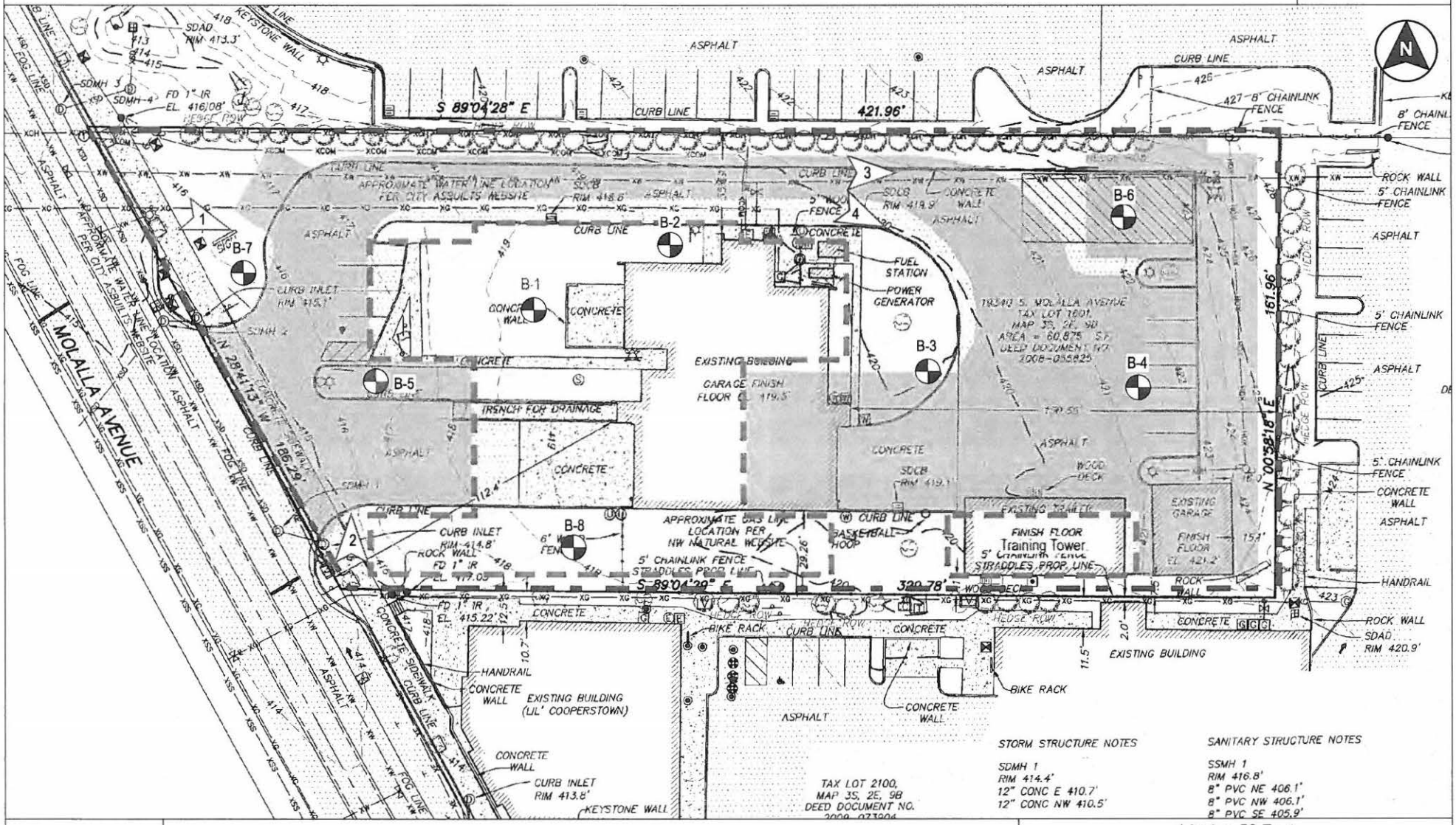
Latitude: 45.326737° North
Longitude: 122.581892° West

1 Inch = 2,000 feet

0 2000 4000

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FIGURE 2
Site Plan



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LEGEND

- Property Line
- Proposed Building Locations
- Proposed Parking Area
- Infiltration test boring
- Drilled boring
- 1 Orientation of site photographs shown on Figure 3

1 Inch = 50 Feet

0 50 100

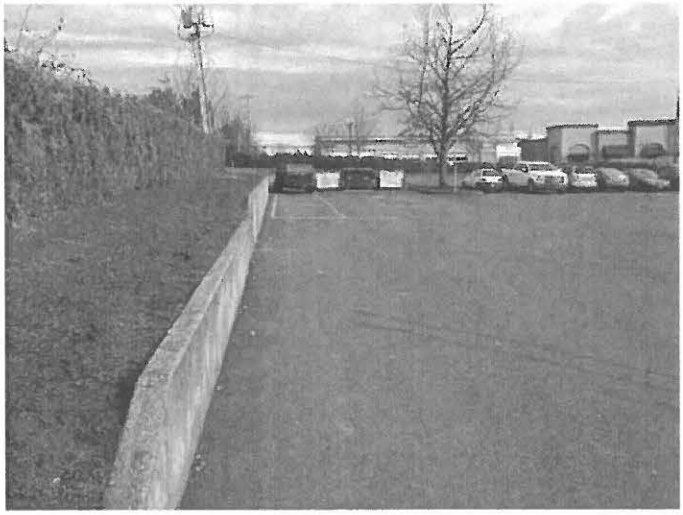
NOTES: Site plan provided by Centerline Concepts Land Surveying, Inc., dated January 25, 2016. All exploration locations are considered approximate.



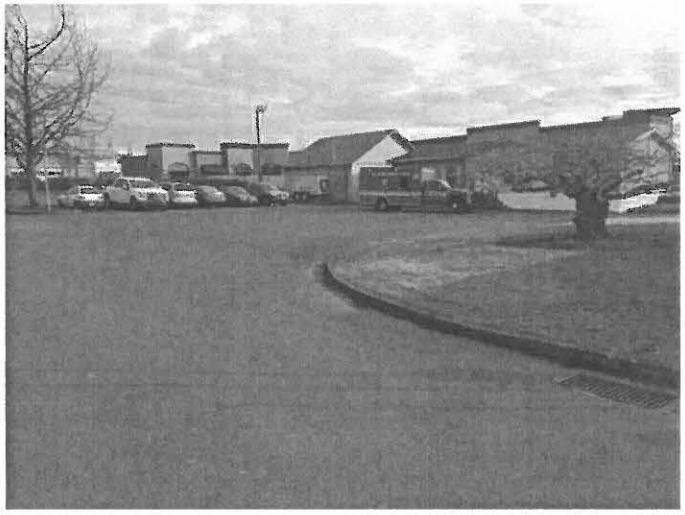
Photograph 1: Existing fire station (to be removed), facing southeast.



Photograph 2: West end of site, facing north.



Photograph 3: North-central portion of site, facing east.



Photograph 4: North-central portion of site, facing southeast.

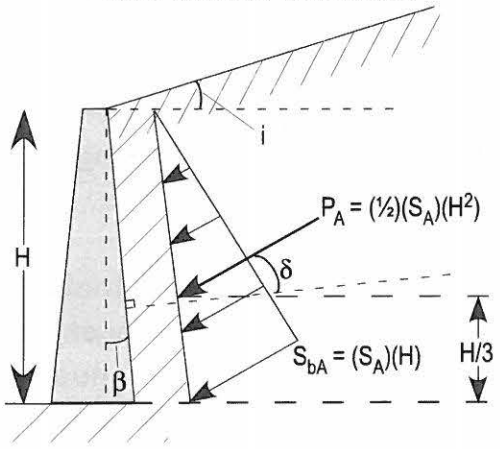
See Figure 2 for approximate photograph locations and directions. Photographs were taken at the time of our fieldwork.

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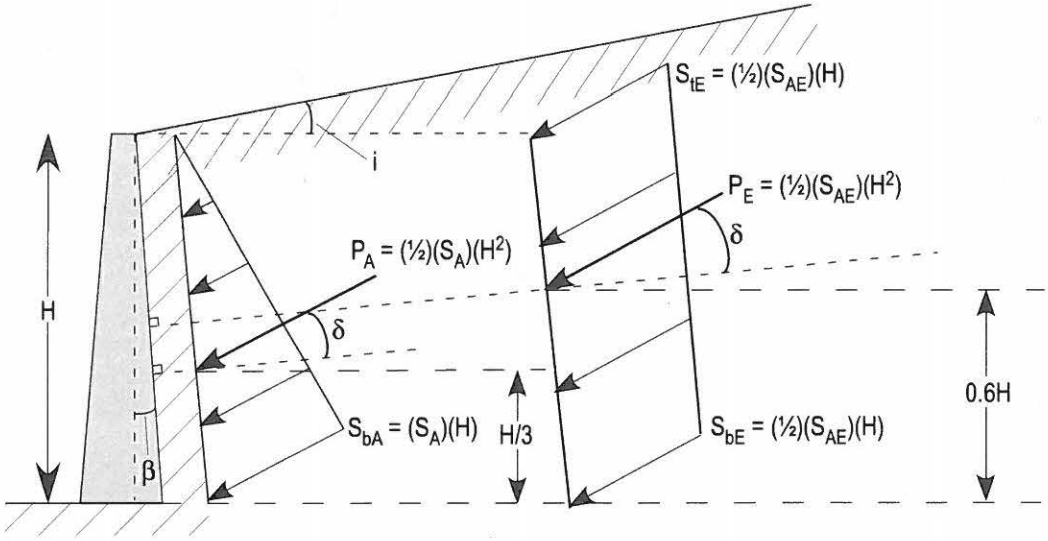
FIGURE 4
Retaining Walls

ACTIVE LATERAL PRESSURE DISTRIBUTION

STATIC LOADING CONDITIONS



SEISMIC LOADING CONDITIONS



LEGEND

P_A = Static active thrust force acting at a triangular distribution on wall (lb/ft^3)

P_E = Dynamic component of active thrust force acting at a uniform distribution on wall (lb/ft)

i = Slope of backfill (degrees)**

S_A = Active (static) component of equivalent fluid pressure (lb/ft^3)*

S_{tE} = Active earth pressure (dynamic) at the top of the wall (lb/ft^3)

S_{bA} = Active earth pressure (static) at the bottom of the wall (lb/ft^3)

ϕ = Internal angle of friction for backfill (degrees)**

δ = Angle from normal of back of wall (degrees). Based on friction developing between wall and backfill**

β = Slope of back of wall (degrees)**

S_{AE} = Dynamic component of equivalent fluid pressure (lb/ft^3)*

S_{bE} = Active earth pressure (dynamic) at bottom of the wall (lb/ft^3)*

*Refer to report text for calculated values **Refer to report text for modeled/assumed values

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Notes

1. Uniform pressure distribution of seismic loading is based on empirical evaluations [Sherif et al, 1982 and Whitman, 1990].
2. Placement of seismic resultant force at 0.6H is based on wall behavior and model test results [Whitman, 1990].

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Appendix A: Subsurface Investigation and Laboratory Testing

Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

February 23, 2017

Prepared For:

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

Prepared by
Carlson Geotechnical

Exploration Key ..... Figure A1
Soil Classification ..... Figure A2
ODOT Rock Classification ..... Figure A3
Boring Logs ..... Figures A4 – A11

A.1.0 SUBSURFACE INVESTIGATION

Our field investigation consisted of eight borings completed on February 9 and 10, 2017. The approximate exploration locations are shown on the Site Plan, attached to the geotechnical report as Figure 2. The exploration locations shown therein were determined based on measurements from existing site features (buildings, etc.) and should be considered approximate. Surface elevations indicated on the logs were estimated based on the topographic contours as shown on the Site Plan attached to the geotechnical report (Figure 2) and should be considered approximate.

A.1.1 Drilled Borings

The borings (B-1 through B-8) were advanced at the site to depths ranging from about 5 to 25¾ feet bgs using a Diedrich D-50 track-mounted drill rig provided and operated by our subcontractor, Holocene Drilling of Puyallup, Washington. The borings were advanced using the hollow-stem auger drilling technique. Upon completion, the borings were backfilled with granular bentonite and the pavement areas were patched with cold-patch asphalt. Drilling waste (cuttings and drilling fluids) was left onsite in a utility trailer provided by the client.

Standard Penetration Tests (SPTs) were conducted within the borings using a split-spoon sampler in general accordance with American Society for Testing and Materials (ASTM) D1586. The SPTs were conducted at 2½- to 5-foot intervals to the termination depths of the borings. The SPT is described on the attached Exploration Key, Figure A1.

A.1.2 Material Classification & Sampling

Soil samples were obtained at selected intervals in the borings using the referenced split-spoon (SPT) sampler, detailed on Figure A1. A qualified member of CGT's staff collected the samples and logged the soils in general accordance with the Visual-Manual Procedure (ASTM 2488) and ODOT Rock Classification Criteria. An explanation of these classification systems are attached as Figures A2 and A3. The SPT samples were stored in sealable plastic bags and the core sample was placed in a rock core box and transported to our soils laboratory for further examination and testing. Our geotechnical staff visually examined all samples in order to refine the initial field classifications.

A.1.3 Subsurface Conditions

Subsurface conditions are summarized in Section 2.3.2 of the geotechnical report. Detailed logs of the explorations are presented on the attached exploration logs, Figures A4 through A11.

A.1.4 Infiltration Testing

One infiltration test was performed in boring B-5 at a depth of about 5 feet bgs. The results of the infiltration testing are presented in Appendix B.

A.1.5 Laboratory Testing

Laboratory testing was performed on samples collected in the field to refine our initial field classifications and determine in-situ parameters. Laboratory testing included the following:

- Twenty-two moisture content determinations (ASTM D2216).
- Two Atterberg limits (plasticity) tests (ASTM D4318).
- Five percentage-passing the U.S. Standard No. 200 Sieve tests (ASTM D1140).

Results of the laboratory tests are shown on the exploration logs.

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FIGURE A1
Exploration Key

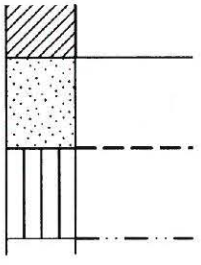
GEOTECHNICAL LABORATORY TESTING

PL — MC — LL	Atterberg limits (plasticity) test results (ASTM D4318): PL = Plastic Limit, LL = Liquid Limit, and MC= Moisture Content (ASTM D2216)
☐ FINES CONTENT (%)	Percentage passing the U.S. Standard No. 200 Sieve (ASTM D1140)

SAMPLING

GRAB	Grab sample
SPT	**Standard Penetration Test** (SPT) consists of driving a 2-inch, outside-diameter, split-spoon sampler into the undisturbed formation with repeated blows of a 140-pound, hammer falling a vertical distance of 30 inches (ASTM D1586). The number of blows (N-value) required to drive the sampler the last 12 inches of an 18-inch sample interval is used to characterize the soil consistency or relative density. The drill rig was equipped with an cat-head or automatic hammer to conduct the SPTs. The observed N-values, hammer efficiency, and N_{60} are noted on the boring logs.
MC	**Modified California** sampling consists of 3-inch, outside-diameter, split-spoon sampler (ASTM G3550) driven similarly to the SPT sampling method described above. A sampler diameter correction factor of 0.44 is applied to calculate the equivalent SPT N_{60} value per Lacroix and Horn, 1973.
CORE	**Rock Coring** interval
SH	**Shelby Tube** is a 3-inch, inner-diameter, thin-walled, steel tube push sampler (ASTM D1587) used to collect relatively undisturbed samples of fine-grained soils.
WDCP	**Wildcat Dynamic Cone Penetrometer** (WDCP) test consists of driving 1.1-inch diameter, steel rods with a 1.4-inch diameter, cone tip into the ground using a 35-pound drop hammer with a 15-inch free-fall height. The number of blows required to drive the steel rods is recorded for each 10 centimeters (3.94 inches) of penetration. The blow count for each interval is then converted to the corresponding SPT N_{60} values.
DCP	**Dynamic Cone Penetrometer** (DCP) test consists of driving a 20-millimeter diameter, hardened steel cone on 16-millimeter diameter steel rods into the ground using a 10-kilogram drop hammer with a 460-millimeter free-fall height. The depth of penetration in millimeters is recorded for each drop of the hammer.
POCKET PEN. (tsf)	**Pocket Penetrometer** test is a hand-held instrument that provides an approximation of the unconfined compressive strength in tons per square foot (tsf) of cohesive, fine-grained soils.

CONTACTS



Observed (measured) contact between soil or rock units.

Inferred (approximate) contact between soil or rock units.

Transitional (gradational) contact between soil or rock units.

ADDITIONAL NOTATIONS

Italics	Notes drilling action or digging effort
{ Braces }	Interpretation of material origin/geologic formation (e.g. { Base Rock } or { Columbia River Basalt })

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FIGURE A2
Soil Classification

Classification of Terms and Content

NAME: Group Name and Symbol
Relative Density or Consistency
Color
Moisture Content
Plasticity
Other Constituents
Other: Grain Shape, Approximate Gradation
Organics, Cement, Structure, Odor, etc.
Geologic Name or Formation

USCS Grain Size

Fines		<#200 (.075 mm)
Sand	Fine Medium Coarse	#200 - #40 (.425 mm) #40 - #10 (2 mm) #10 - #4 (4.75)
Gravel	Fine Coarse	#4 - 0.75 inch 0.75 inch - 3 inches
Cobbles		3 to 12 inches; scattered <15% est. numerous >15% est.
Boulders		> 12 inches

Relative Density or Consistency

Granular Material		Fine-Grained (cohesive) Materials				
SPT N-Value	Density	SPT N-Value	Torvane tsf Shear Strength	Pocket Pen tsf Unconfined	Consistency	Manual Penetration Test
		<2	<0.13	<0.25	Very Soft	Thumb penetrates more than 1 inch
0 - 4	Very Loose	2 - 4	0.13 - 0.25	0.25 - 0.50	Soft	Thumb penetrates about 1 inch
4 - 10	Loose	4 - 8	0.25 - 0.50	0.50 - 1.00	Medium Stiff	Thumb penetrates about ¼ inch
10 - 30	Medium Dense	8 - 15	0.50 - 1.00	1.00 - 2.00	Stiff	Thumb penetrates less than ¼ inch
30 - 50	Dense	15 - 30	1.00 - 2.00	2.00 - 4.00	Very Stiff	Readily indented by thumbnail
>50	Very Dense	>30	>2.00	>4.00	Hard	Difficult to indent by thumbnail

Moisture Content

Dry: Absence of moisture, dusty, dry to the touch
Damp: Some moisture but leaves no moisture on hand
Moist: Leaves moisture on hand
Wet: Visible free water, likely from below water table

	Plasticity	Dry Strength	Dilatancy	Toughness
ML	Non to Low	Non to Low	Slow to Rapid	Low, can't roll
CL	Low to Medium	Medium to High	None to Slow	Medium
MH	Medium to High	Low to Medium	None to Slow	Low to Medium
CH	Medium to High	High to Very High	None	High

Structure

Stratified: Alternating layers of material or color >6 mm thick
Laminated: Alternating layers < 6 mm thick
Fissured: Breaks along definite fracture planes
Slickensided: Striated, polished, or glossy fracture planes
Blocky: Cohesive soil that can be broken down into small angular lumps which resist further breakdown
Lenses: Has small pockets of different soils, note thickness
Homogeneous: Same color and appearance throughout

Visual-Manual Classification

Major Divisions			Group Symbols	Typical Names
Coarse Grained Soils: More than 50% retained on No. 200 sieve	Gravels: 50% or more *retained* on the No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel/sand mixtures, little or no fines
			GP	Poorly-graded gravels and gravel/sand mixtures, little or no fines
		Gravels with Fines	GM	Silty gravels, gravel/sand/silt mixtures
			GC	Clayey gravels, gravel/sand/clay mixtures
	Sands: More than 50% *passing* the No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines
			SP	Poorly-graded sands and gravelly sands, little or no fines
		Sands with Fines	SM	Silty sands, sand/silt mixtures
			SC	Clayey sands, sand/clay mixtures
Fine-Grained Soils: 50% or more Passes No. 200 Sieve	Silt and Clays Low Plasticity Fines		ML	Inorganic silts, rock flour, clayey silts
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
			OL	Organic silt and organic silty clays of low plasticity
	Silt and Clays High Plasticity Fines		MH	Inorganic silts, clayey silts
			CH	Inorganic clays of high plasticity, fat clays
			OH	Organic clays of medium to high plasticity
Highly Organic Soils			PT	Peat, muck, and other highly organic soils

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ASTM D2488 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure)

Table 22: Scale of Relative Rock Weathering

Designation	Field Identification
Fresh	Crystals are bright. Discontinuities may show some minor surface staining. No discoloration in rock fabric.
Slightly Weathered	Rock mass is generally fresh. Discontinuities are stained and may contain clay. Some discoloration in rock fabric. Decomposition extends up to 1-inch into rock.
Moderately Weathered	Rock mass is decomposed 50% or less. Significant portions of rock show discoloration and weathering effects. Crystals are dull and show visible chemical alteration. Discontinuities are stained and may contain secondary mineral deposits.
Predominantly Weathered	Rock mass is more than 50% decomposed. Rock can be excavated with geologist's pick. All discontinuities exhibit secondary mineralization. Complete discoloration of rock fabric. Surface of core is friable and usually pitted due to washing out of highly altered minerals by drilling water.
Decomposed	Rock mass is completely decomposed. Original rock fabric may be evident. May be reduced to soil with hand pressure.

Table 23: Scale of Relative Rock Hardness

Term	Hardness Designation	Field Identification	Approximate Unconfined Compressive Strength
Extremely Soft	R0	Can be indented with difficulty by thumbnail. May be moldable or friable with finger pressure.	<100 psi
Very Soft	R1	Crumbles under firm blows with point of geology pick. Can be peeled by pocket knife. Scratched with finger nail.	100-1000 psi
Soft	R2	Can be peeled by pocket knife with difficulty. Cannot be scratched with finger nail. Shallow indention made by firm blow of geology pick.	1000-4000 psi
Medium Hard	R3	Can be scratched by knife or pick. specimen can be fractured with a single firm blow of hammer/geology pick.	4000-8000 psi
Hard	R4	Can be scratched with knife or pick only with difficulty. Several hard blows required to fracture specimen.	8000-16000 psi
Very Hard	R5	Cannot be scratched by knife or sharp pick. Specimen requires many blows of hammer to fracture or chip. Hammer rebounds after impact.	>16000 psi

Table 24: Stratification Terms

Term	Characteristics
Laminations	Thin beds (<1cm).
Fissle	Tendency to break along laminations.
Parting	Tendency to break parallel to bedding, any scale.
Foliation	Non-depositional, e.g., segregation and layering of minerals in metamorphic rock.

Tables adapted from the 1987 Soil and Rock Classification Manual, Oregon Department of Transportation.

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FIGURE A4

Boring B-1

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 419 ft **ELEVATION DATUM** Figure 2

WEATHER Rainy, ~55°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 20.0 ft / El. 399.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

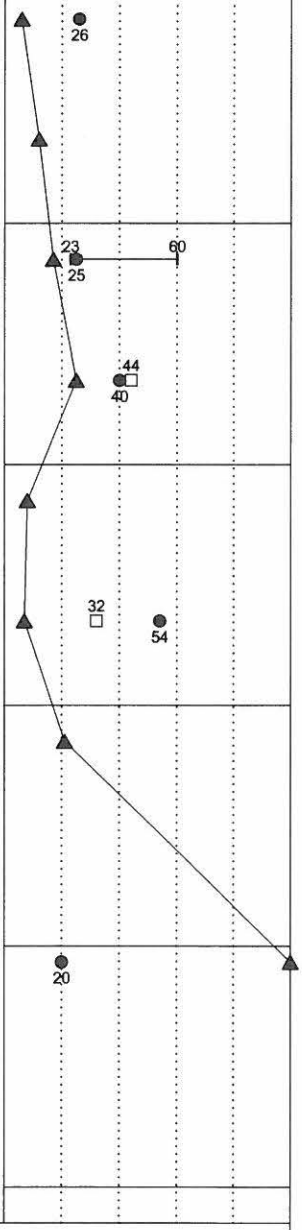
ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
		OL	**CLAY TOPSOIL:** Dark brown, moist, abundant rootlets and trace roots up to ~¼ inch in diameter.		0					
			SANDY FAT CLAY: Medium stiff, reddish brown with gray and black mottling, moist, high plasticity, fine-grained sand. Stiff below ~2½ feet bgs.			SPT 1	67	1-1-4 (5)	6	
415		CH				SPT 2	100	1-3-7 (10)	12	
			Very stiff, with basalt fragments up to ~1½ inches in diameter below ~5 feet bgs.		5	SPT 3	100	2-6-8 (14)	17	
			CLAYEY SAND: Medium dense to loose, reddish brown with dark red and gray mottling, moist, fine-grained.			SPT 4	100	3-14-6 (20)	25	
410					10	SPT 5	89	1-2-4 (6)	8	
						SPT 6	100	1-2-3 (5)	7	
405		SC			15	SPT 7	100	4-8-7 (15)	21	
400				▽	20	SPT 8	100	16-50/2"	100	
			Groundwater observed at ~20 feet bgs.							
			BASALT: Hard to very hard (R4-R5), gray with black and white minerals, slightly weathered to fresh.			CORE 9	77 (77)			
395		RX			25					

▲ SPT N_{60} VALUE ▲

PL — MC — LL

□ FINES CONTENT (%) □

0 20 40 60 80 100



- Boring terminated at ~25¾ feet bgs.
- No caving observed.
- Boring backfilled with granular bentonite.

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FIGURE A5
Boring B-2

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 419 ft **ELEVATION DATUM** Figure 2

WEATHER Rainy, ~55°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 7.5 ft / El. 411.5 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
		OL Fill	**CLAY TOPSOIL FILL:** Dark brown, moist, abundant rootlets and angular gravel up to ~¾ inch in diameter.		0	SPT 1	89	1-1-2 (3)	4	
415		CH	**SANDY FAT CLAY:** Very soft, reddish brown, moist, high plasticity, fine-grained sand, trace angular gravel up to ~1 inch in diameter.			SPT 2	28	0-0-1 (1)	1	
			Stiff, reddish brown with light and dark orange and black mottling, below ~5 feet bgs.		5	SPT 3	100	1-4-5 (9)	11	
410		SC	**CLAYEY SAND:** Dense to very dense, reddish brown with dark red and gray mottling, moist, fine-grained. Groundwater observed at ~7½ feet bgs.	▽		SPT 4	100	1-50/3"	100	
		RX	**BASALT:** Hard to very hard (R4-R5), gray with black and white minerals, slightly weathered.			SPT 5	0	50/1"	100	

▲ SPT N_{60} VALUE ▲

PL — MC — LL

☐ FINES CONTENT (%) ☐

0 20 40 60 80 100

28 39 64

- Boring terminated at ~9 feet bgs due to practical refusal on bedrock.
- No caving observed.
- Boring backfilled with spoils.

405

400

395

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FIGURE A6

Boring B-3

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 420 ft **ELEVATION DATUM** Figure 2

WEATHER Rainy, ~55°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 11.0 ft / El. 409.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
		OL	**CLAY TOPSOIL:** Dark brown, moist, abundant rootlets.		0	SPT 1	78	0-1-3 (4)	5	
		CH	**SANDY FAT CLAY:** Medium stiff, reddish brown with black mottling, moist, high plasticity, fine-grained sand. Stiff, reddish brown to dark reddish brown with black and slight orange mottling below ~2½ feet bgs.			SPT 2	89	3-3-4 (7)	9	
415					5	SPT 3	100	2-3-3 (6)	7	
		SC	**CLAYEY SAND:** Loose, reddish brown with gray, black, and light orange mottling, moist, fine-grained. Reddish brown with black, gray, and yellow mottling below ~7½ feet bgs.			SPT 4	100	1-2-1 (3)	4	
410			Very loose below ~10 feet bgs. Groundwater observed at ~11 feet bgs.	▽	10	SPT 5	100	1-1-1 (2)	3	
		RX	**BASALT:** Hard to very hard (R4-R5), gray with black and white minerals, slightly weathered.							
405			• Boring terminated at ~12½ feet bgs due to practical refusal on bedrock. • No caving observed. • Boring backfilled with granular bentonite.							
400										
395										

▲ SPT N_{60} VALUE ▲

PL LL MC

☐ FINES CONTENT (%) ☐

0 20 40 60 80 100

41

39 77 66

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FIGURE A7
Boring B-4

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 421 ft **ELEVATION DATUM** Figure 2

WEATHER Rainy, ~55°F **SURFACE** Asphaltic Concrete **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 5.0 ft / El. 416.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ / PL LL MC / □ FINES CONTENT (%) □
420		AC / GP Fill	**ASPHALTIC CONCRETE:** Approximately 3 inches thick. **POORLY GRADED GRAVEL FILL:** Dark gray, wet, angular, up to ~1 inch in diameter		0						0 20 40 60 80 100
		CH	**SANDY FAT CLAY:** Stiff, reddish brown with black mottling, moist to wet, high plasticity, fine-grained sand.			SPT 1	100	3-4-5 (9)	11		
				▽	5						
415			Reddish brown with gray, black, and yellow mottling below ~5 feet bgs. Groundwater observed at ~5 feet bgs.			SPT 2	100	1-3-5 (8)	10		
			CLAYEY SAND: Medium dense to loose, orange to brown, with black and purple mottling, moist to wet, fine-grained.			SPT 3	100	2-3-5 (8)	10		61
					10						
410		SC	Dark red to brown with black and orange mottling below ~10 feet bgs.			SPT 4	100	3-3-6 (9)	12		38 61
						SPT 5	100	1-3-4 (7)	9		
405			• Boring terminated at ~14 feet bgs. • No caving observed. • Boring backfilled with granular bentonite and surface restored with fast-setting concrete.								
400											
395											

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FIGURE A8
Boring B-5

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/9/17 **GROUND ELEVATION** 417 ft **ELEVATION DATUM** Figure 2

WEATHER Cloudy, ~55°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** ---

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)	▲ SPT N_{60} VALUE ▲ PL LL MC ☐ FINES CONTENT (%) ☐ 0 20 40 60 80 100
415		OL	**CLAY TOPSOIL:** Dark brown, moist, abundant rootlets.		0						
		CH	**SANDY FAT CLAY:** Stiff, brown with black mottling, moist, high plasticity, fine-grained sand.								
					5	SPT 1	67	1-4-5 (9)	11		▲ 26 ☐ 52
410			• Boring terminated at ~5 feet bgs. • No groundwater or caving observed. • Infiltration test IT-1 performed at ~5 feet bgs. See Appendix B for test results. • Boring backfilled with spoils.								
405											
400											
395											
390											

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FIGURE A9
Boring B-6

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/10/17 **GROUND ELEVATION** 422 ft **ELEVATION DATUM** Figure 2

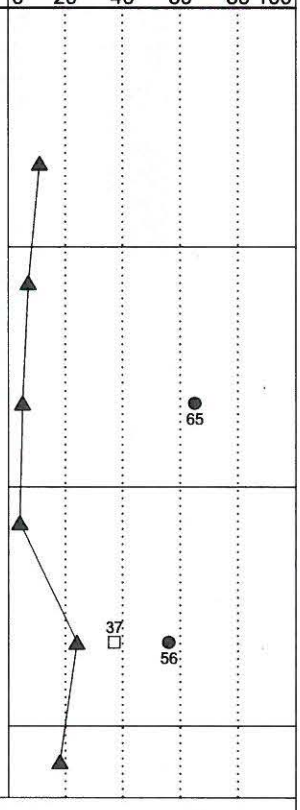
WEATHER Cloudy, ~50°F **SURFACE** Asphaltic Concrete **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 5.0 ft / El. 417.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
420		AC	**ASPHALTIC CONCRETE:** Approximately 5 inches thick.		0					
		GP Fill	**POORLY GRADED GRAVEL FILL:** Dark gray, moist, angular, up to ~1 inch in diameter							
		CH	**SANDY FAT CLAY:** Stiff, reddish brown, moist, high plasticity, fine-grained sand.			SPT 1	44	5-4-5 (9)	11	
			Groundwater observed at ~5 feet bgs. Medium stiff below ~5 feet bgs.	▽	5	SPT 2	67	2-2-4 (6)	7	
415						SPT 3	100	1-1-3 (4)	5	
		SC	**CLAYEY SAND:** Loose, reddish brown with purple and black mottling, wet, fine-grained.		10	SPT 4	78	1-1-2 (3)	4	
410			Reddish brown with black and yellow mottling below ~10 feet bgs,			SPT 5	89	1-9-9 (18)	24	
			Medium dense, reddish brown with black and slight gray mottling, trace subrounded gravel up to ~½ inch in diameter below ~12½ feet bgs.		15	SPT 6	94	1-4-9 (13)	18	
405										
400										
395										



- Boring terminated at ~16½ feet bgs.
- No caving observed.
- Boring backfilled with granular bentonite and surface restored with fast-setting concrete.

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FIGURE A10
Boring B-7

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/10/17 **GROUND ELEVATION** 416 ft **ELEVATION DATUM** Figure 2

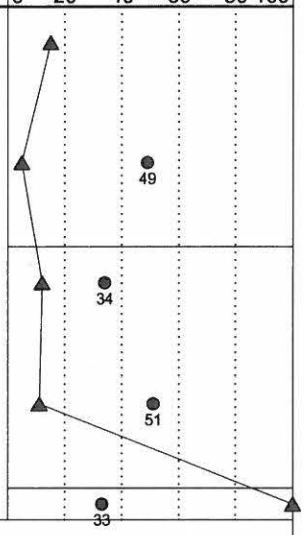
WEATHER Cloudy, ~45°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 10.0 ft / El. 406.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
415		OL Fill	**CLAY TOPSOIL FILL:** Dark brown, moist, abundant rootlets.		0	SPT 1	33	1-6-6 (12)	15	
		GP FILL	**POORLY GRADED GRAVEL FILL:** Dark gray, moist, angular, up to ~½ inch in diameter.							
		OL	**CLAY TOPSOIL:** Stiff, dark brown, moist, abundant rootlets.			SPT 2	100	1-2-2 (4)	5	
			SANDY FAT CLAY: Medium stiff, brown, wet, high plasticity, fine-grained sand, trace subangular gravel up to ~¾ inch in diameter.		5					
410		CH	Stiff, orange to brown, moist, trace rounded to subrounded gravel up to ~1 inch in diameter below ~5 feet bgs.			SPT 3	100	2-5-5 (10)	12	
			Reddish brown with black and gray mottling below ~7½ feet bgs.			SPT 4	100	1-2-7 (9)	11	
405		SC	**CLAYEY SAND:** Very dense, gray with minor black mottling, wet, fine-grained. Groundwater observed at ~10 feet bgs.	▽	10	SPT 5	75	19-50/2"	100	



- Boring terminated at ~10½ feet bgs.
- No caving observed.
- Boring backfilled with granular bentonite.

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FIGURE A11
Boring B-8

CLIENT Clackamas Fire District #1 **PROJECT NAME** CFD #1 Figure Station 16

PROJECT NUMBER G1704558 **PROJECT LOCATION** 19340 Molalla Ave, Oregon City, Oregon

DATE STARTED 2/10/17 **GROUND ELEVATION** 419 ft **ELEVATION DATUM** Figure 2

WEATHER Cloudy, ~50°F **SURFACE** Grass Lawn **LOGGED BY** HHP **REVIEWED BY** RTH

DRILLING CONTRACTOR Holocene Drilling **SEEPAGE** ---

EQUIPMENT Deidrich D-50 Turbo, Track-Mounted Drill Rig **GROUNDWATER AT END** 10.0 ft / El. 409.0 ft

DRILLING METHOD 3¼-inch (ID) Hollow Stem Auger **GROUNDWATER AFTER DRILLING** ---

ELEVATION (ft)	GRAPHIC LOG	GROUP SYMBOL	MATERIAL DESCRIPTION	GROUNDWATER	DEPTH (ft)	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N_{SPT} VALUE)	N_{60} VALUE ETR_{Hammer} = 98.1%	DRY UNIT WT. (pcf)
		OL	**CLAY TOPSOIL:** Medium stiff, dark brown, moist, abundant rootlets.		0	SPT 1	44	1-1-3 (4)	5	
			SANDY FAT CLAY: Medium stiff, brown with black and orange mottling, moist, high plasticity, fine-grained sand.							
415		CH				SPT 2	67	1-1-3 (4)	5	
			Stiff, reddish brown with black and yellow mottling below ~5 feet bgs.		5	SPT 3	100	2-5-7 (12)	15	
			CLAYEY SAND: Medium dense, reddish brown with black and gray mottling, wet, fine-grained.			SPT 4	100	1-4-5 (9)	11	
410				▽	10					
			Groundwater observed at ~10 feet bgs.			SPT 5	100	2-5-5 (10)	13	
			Gray with black and orange mottling below ~12½ feet bgs.			SPT 6	100	2-4-4 (8)	10	
405		SC			15					
						SPT 7	100	4-5-6 (11)	15	
400					20					
		RX	**BASALT:** Hard to very hard (R4-R5), gray with black and white minerals, slightly weathered.			SPT 8	100	50/3"	100	

▲ SPT N_{60} VALUE ▲

PL LL MC

☐ FINES CONTENT (%) ☐

0 20 40 60 80 100

37 55 66 58

- Boring terminated at ~20¼ feet bgs.
- No caving observed.
- Boring backfilled with granular bentonite.

395

CGT BOREHOLE G1704558.GPJ GINT US.GDT 2/22/17

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Appendix B: Results of Infiltration Testing

Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

February 23, 2017

Prepared For:

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
Clackamas, Oregon 97015

Prepared by
Carlson Geotechnical

B.1.0 INTRODUCTION

Project architect Ms. Camilla Cok with Hennebery Eddy Architects, Inc., requested infiltration testing at two locations on a site map provided to CGT. Ms. Cok indicated testing should be performed at a depth of 11 feet below existing ground surface (bgs) at the eastern location, and 7 feet bgs at the western location.

Groundwater seepage was encountered at the western location (in boring B-4) at a depth of about 5 feet bgs during drilling. A minimum separation of 5 feet of separation between groundwater and infiltration testing should be maintained, which was not feasible at this location.

Groundwater in the vicinity of the eastern test location (boring B-5) was measured at about 10 feet bgs, so the test depth was adjusted to 5 feet bgs to maintain the required separation distance. The test was performed in a drilled hollow-stem auger boring, designated B-5 on the Site Plan, which is attached to the main report as Figure 2.

B.2.0 TEST PROCEDURE

One infiltration test was performed within a prepared machine-drilled hollow stem auger boring at the site on February 9 and 10, 2017, in general accordance with the Encased Falling Head test method described in Appendix E of the Stormwater Standards, Clackamas County Service District No. 1, dated July 1, 2013. The following table presents the depth of the test and the subsurface material encountered at the test depth.

Table B1 Infiltration Test Depths & Materials

Infiltration Test	Exploration	Test Depth[1] (feet bgs)	Test Elevation[2] (feet)	Subsurface Material at Test Depth	Percent Passing US No. 200 Sieve Results (%)
IT-1	B-5	5	411	Sandy Fat Clay (CH)	52

1 Relative to existing site grades. bgs = below ground surface.

2 Estimated from topographic map provided by Hennebery Eddy Architects, Inc., as shown on Figure 2, Site Plan. Elevations should be considered approximate.

The machine-drilled boring (B-5) was advanced to the test depth on February 9, 2017, using a Deidrich D-50 track-mounted drill rig with 8-inch outside diameter/6-inch inside-diameter hollow stem auger. Once the boring was advanced to the test depth, a garden hose was lowered to the bottom of the boring (i.e., to prevent scouring) and a 12-inch column of water was placed in the boring.

Due to the presence of clay soils at the test depth, the soils were allowed to presoak overnight in accordance with the test method. The water had not completely drained away by the following morning, so testing proceeded upon our arrival. Water level readings were recorded on 20-minute intervals for a period of 2 hours.

B.3.0 TEST RESULTS

The following tables present the raw data and calculated rates of infiltration that we observed from the infiltration tests. Please note the calculated infiltration rates do not include any safety or correction factors.

Table B2 Results of Infiltration Test IT-1

Infiltration Test	Trial	Time Interval (minutes)	Drop in Water Level[1] (inches)	Raw Infiltration Rate (inches per hour)
IT-1	1	20	1/8	3/8
	2	20	0	0
	3	20	0	0
	4	20	1/8	3/8
	5	20	0	0
	6	20	0	0
	7	20	0	0

1 Measured to nearest 1/8 inch using a measuring tape and top of pipe as a fixed datum.

B.4.0 DISCUSSION

The measured raw (unfactored) infiltration rate for the infiltration test presented above is zero. It is our opinion that this rate is representative of the earthen materials encountered in the borings (clayey sand, sandy fat clay, and basalt bedrock), as evidenced by the presence of perched groundwater at the site.

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Appendix C: Site-Specific Seismic Hazards Study

Clackamas Fire District #1
Fire Station 16 Replacement
19340 Molalla Avenue
Oregon City, Oregon

CGT Project Number G1704558

February 23, 2017

Prepared For:

Mr. Scott Vallance
Clackamas Fire District #1
15800 SE 130th Avenue
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Prepared by
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Regional Seismicity ..... Figure C1

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C.1.0 INTRODUCTION

Based on the information provided, we understand the proposed building will be classified as an "Essential Facility" per Oregon Revised Statutes (ORS) 455.447. We also understand the proposed facility is considered a Risk Category IV Structure, and a Site-Specific Seismic Hazards Study (SSSHS) is required for the project in accordance with Section 1803.3.2 of the 2014 Oregon Structural Specialty Code (OSSC). This appendix presents the results of that study.

C.2.0 GEOLOGIC SETTING

C.2.1 Regional Geology

The site is located within the Willamette Valley physiographic province in Oregon City, Oregon. The Willamette Valley is a broad, trough-like lowland defined by uplift and faulting of the Coast and Western Cascade Ranges to the west and east respectively. Approximately 35 million years ago, a large slab of oceanic crust and associated marine sediments accreted onto the margin of North America, which was located in a rough line from southwestern Oregon to the northeastern portion of the state. A portion of this accreted slab became the Willamette Valley, which was still covered by a shallow ocean. Additional accretion, faulting, and folding created the Coast Range to the west. This folding and faulting also raised the Willamette Valley out of the sea. Volcanic activity from the Cascade Range approximately 25 million years ago covered and filled in much of the southern and eastern portions of the early Willamette Valley[1].

Approximately 15 million years ago, these marine sediments were covered by the Columbia River Basalts that flowed down the Columbia River Gorge as far south as Salem. Uplift and tilting of the Oregon Coast Range and the western Cascade Range formed the trough-like character of the Willamette Valley, and folded and faulted the Columbia River Basalts. The ancestral Columbia River deposited sand and gravel in the northern part of the valley near the site. Approximately 1.3 to 2.6 million years ago, a volcanic episode erupted the Boring Lavas in several localized vents, including Mt. Scott, Mt. Sylvania, and Mt. Tabor. Catastrophic glacial floods later flowed into the Willamette Valley approximately 21,000 and 12,000 years ago[2] and deposited fine to coarse-grained sedimentary assemblages (Pleistocene flood deposits) mapped throughout the area[3,4].

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1 Pacific Northwest Ecosystem Research Consortium, 2002. Willamette River Basin: trajectories of environmental and ecological change, Oregon State University Press.

2 Ma, Madin, Duplantis, and Williams, 2012, Lidar-based Surficial Geologic Map and Database of the Greater Portland, Oregon, Area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington Oregon Department of Geology and Mineral Industries Open-File Report O-12-02.

3 Orr, Elizabeth L., Orr, William N., and Baldwin, Ewart M., 1992, Geology of Oregon, Fourth Edition: Kendall/Hunt Publishing, pp. 203-222.

4 O'Connor, Jim E., et al., 2001, Origin, extent, and thickness of quaternary geologic units in the Willamette Valley, Oregon: US Geological Survey, Professional Paper 1620,52p, 1plate.

C.2.2 Site Geology

Based on available geologic mapping[5] of the area, the site is underlain by Boring Lava basalt. Fresh (un-weathered) Boring Lava is described as light gray, open-textured, olivine basalt with some pyroclastic material of limited extent. A thick residual soil often forms on the Boring Lava, and is the result of in-place weathering of the basalt. Subsurface geology at the site is described in greater detail in Section C.4.1 below.

C.3.0 GROUND MOTION HAZARD ANALYSIS

The geological and geotechnical data developed within the geotechnical report were used to evaluate the ground motion response of the project site to various earthquake sources and events. The ground motion hazard analysis addresses the following seismic hazards for the site in accordance with Section 1803.7 of the OSSC:

- Ground Shaking;
- Liquefaction;
- Lateral Spread;
- Earthquake-induced Landsliding;
- Inundation from Tsunami / Seiche; and
- Surface Rupture due to Fault Displacement.

The analysis was based on procedures presented in Section 1613.3.4 of the 2014 OSSC and Section 11.4 of American Society of Civil Engineers (ASCE) Minimum Design Loads for Buildings and Other Structures (ASCE 7-10), which provides a design response spectrum. A site-specific response analysis could be performed to develop a site-specific design response spectrum at the owner's discretion, if desired, for an additional fee.

C.3.1 Earthquake Sources and Seismicity

The site is located in a tectonically active area that may be affected by crustal earthquakes, large subduction zone earthquakes, or earthquakes caused by faulting within the subducting slab (intraplate earthquakes).

C.3.1.1 Crustal Sources

Crustal earthquakes typically occur at depths ranging from 15 to 40 kilometers bgs[6]. According to the United States Geological Survey Quaternary fault and fold database[7], nearby seismic sources capable of producing damaging earthquakes in this region include Helvetia fault, Beaverton fault zone, Canby-Molalla fault, Newberg fault, Gales Creek fault zone, Mount Angel fault, Bolton fault, Oatfield fault, East

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5 Ma, Madin, Duplantis, and Williams, 2012, Lidar-based Surficial Geologic Map and Database of the Greater Portland, Oregon, Area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington Oregon Department of Geology and Mineral Industries Open-File Report O-12-02.

6 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: unpublished report prepared for Oregon Department of Transportation, Personal Services Contract 11688, January 1995.

7 U.S. Geological Survey, 2017. Quaternary fault and fold database for the United States, *accessed February 2017*, from USGS web site: http://earthquakes.usgs.gov/regional/qfaults/.

Bank fault, Portland Hills fault, Grant Butte fault, Damascus-Tickle Creek fault, Lacamas Lake fault, and the Sandy River fault zone. Details of each of these faults are provided in the following sections. Refer to Table C2 presented in Section C.3.1.4 of this appendix for the approximate distance and direction to these faults from the project site.

C.3.1.1.1 Helvetia fault (USGS 714)

The Helvetia fault is a north-northwest trending structure located on the northeastern margin of the Tualatin Basin. There is no evidence for displacement of late Quaternary deposits along the fault; however, the most recent age of displacement is poorly constrained[8]. Therefore, the fault is considered active, but with a long recurrence interval.

C.3.1.1.2 Beaverton fault zone (USGS 715)

The Beaverton fault zone consists of an east-west striking normal fault that forms the southern margin of the Tualatin basin. This fault offsets Miocene Columbia River Basalt, but is covered by thick sequences of Pliocene to Pleistocene Missoula flood deposits. As a result, no fault scarp is present at the surface, and the Beaverton fault zone is not present on most geologic maps of the area. Yeats and others[9] indicate that the Beaverton Faults displace post-Columbia River Basalt sediments; however, the age and nature of deformation is not known. The Beaverton fault is considered active, but with a long recurrence interval.

C.3.1.1.3 Canby-Molalla fault (USGS 716)

The Canby-Molalla fault is a right-lateral strike-slip fault located within the Willamette Valley. The Canby-Molalla fault appears to offset Missoula flood deposits, and seismic reflection surveys suggest Holocene deformation of sediments. The fault has little geomorphologic expression, but is considered active, with a slip rate of less than 0.2 mm per year.

C.3.1.1.4 Newberg fault (USGS 717)

The Newberg fault is a 5-kilometer-long portion of the Gales Creek-Mount Angel structural zone, which consists of a 73-kilometer-long zone of right-lateral strike-slip faults located within the Willamette Valley. The fault zone offsets Miocene Columbia River basalts, but no unequivocal evidence for Quaternary displacement has been identified. The Newberg fault is recognized in the subsurface by vertical separation of the Columbia River Basalt, and offset seismic reflectors in overlying basin sediments[10,11], with no definitive geomorphologic evidence of faulting. The majority of the fault trace is covered with Holocene alluvium, which may have buried recent deformation. Due to the uncertainty in activity level, the fault has been classified as active.

C.3.1.1.5 Gales Creek fault zone (USGS 718)

The Gales Creek fault zone is a 73-kilometer-long zone of northwest-trending right-lateral strike-slip faults located on the western margin of the Willamette Valley. The fault zone offsets Miocene Columbia River

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8 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

9 Yeats, R.S., *et al.*, 1996. Tectonics of the Willamette Valley Oregon: in Assessing earthquake hazards and reducing risk in the Pacific Northwest, v. 1: U.S. Geological Survey Professional Paper 1560, p. 183-222, 5 plates, scale 1;100,000.

10 Werner, K.S., Nabelek, J., Yeats, R.S., Malone, S., 1992. The Mount Angel fault: implications of seismic-reflection data and the Woodburn, Oregon, earthquake sequence of August, 1990: Oregon Geology, v. 54, p. 112-117.

11 Yeats, R.S., *et al.*, 1996. Tectonics of the Willamette Valley Oregon: in Assessing earthquake hazards and reducing risk in the Pacific Northwest, v. 1: U.S. Geological Survey Professional Paper 1560, p. 183-222, 5 plates, scale 1:100,000.

basalts, but no unequivocal evidence for Quaternary displacement has been identified. However, the majority of the faults are covered with very recent alluvium, which may have buried evidence of recent deformation. Estimates for the latest movements along the Gales Creek fault zone typically predate the late Pleistocene; in other words, the fault has not had activity within the last approximately 30,000 years. The recurrence interval for the Gales Creek fault zone is likely greater than 50,000 years, based on the information available.

C.3.1.1.6 Bolton fault (USGS 874)

The Bolton fault is a northwest-trending reverse fault, with a length of about 9 kilometers in the subsurface. There is no evidence that the Bolton fault has been active since the late Pleistocene; however, the fault is classified as potentially active because of the limited exposures and uncertainties in the relationships between local scarps and late Pleistocene Missoula flood deposits[12]. On this basis, a long recurrence interval is assigned to the Bolton Fault.

C.3.1.1.7 Oatfield fault (USGS 875)

The Oatfield fault consists of a 29-kilometer-long steeply dipping reverse fault that forms escarpments in Miocene Columbia River Basalt in the Tualatin Mountains. No fault scarps or displacement of surficial deposits have been described, but exposures within tunnels show offset of Boring Lava, indicating Quaternary activity. The slip rate for the Oatfield fault has been calculated to be about 0.1 mm per year based on the tunnel exposures. Given the very low slip rate and lack of displacement of surficial deposits, this fault is considered to have a very long recurrence interval.

C.3.1.1.8 East Bank fault (USGS 876)

The East Bank fault consists of a 29-kilometer-long steeply dipping reverse fault that parallels the Portland Hills fault. No Quaternary surficial fault scarps have been identified, and the fault is largely buried by thick sequences of Pleistocene Missoula flood deposits. Recent shallow seismic reflection data suggest subsurface displacement of the older Missoula flood deposits (before 12,700 years ago). Therefore, the fault is considered to be active, with a low slip rate and a very long recurrence interval.

C.3.1.1.9 Portland Hills fault (USGS 877)

The Portland Hills fault zone is a series of northwest-trending faults forming the northeastern margin of the Tualatin Mountains. The faults associated with this structural zone vertically displace the Columbia River Basalt Group by 1,130 feet, and appear to control thickness changes in late Pleistocene sediment[13]. Geomorphic lineaments suggestive of Pleistocene deformation have been identified within the fault zone, but none of the fault segments has been shown to cut Holocene deposits[14,15]. The fact that the faults do not cut Holocene sediments is most likely a result of the faulting being related to a time of intense uplift of the Oregon Coast Range during the Miocene, and little to no movement along the faults during the Holocene.

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12 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

13 Mabey, M.A., Madin, I.P., Youd, T.L., Jones, C.F., 1993, Earthquake hazard maps of the Portland quadrangle, Multnomah and Washington Counties, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries Geological Map Series GMS-79, Plate 2, 1:24,000.

14 Conforth and Geomatrix Consultants, 1992. Seismic hazard evaluation, Bull Run dam sites near Sandy, Oregon: unpublished report to City of Portland Bureau of Water Works.

15 Balsillie, J.J. and Benson, G.T., 1971. Evidence for the Portland Hills fault: The Ore Bin, Oregon Dept. of Geology and Mineral Industries, v. 33, p. 109-118.

Recent studies of this fault[16] concluded that the Portland Hills fault is active, based on contemporary seismicity in the vicinity of the fault, and seismic reflection data suggesting that the fault cuts late Pleistocene layered strata. Additionally, in May of 2000, while taking magnetic readings to map the fault, an Oregon Department of Geology and Mineral Industries (DOGAMI) geologist observed folded sediment in a retaining wall cut in North Clackamas Park south of Portland. The folded sediments consisted of sand and silt deposited by Pleistocene floods derived from glacial Lake Missoula approximately 12,800 to 15,000 years ago. An investigation of the folded strata by DOGAMI geologists and engineering consultants showed that the entire sequence of sediment layers is folded and they concluded that this folding is evidence for an active fault beneath the site, and the fault is either the Portland Hills fault, or a closely related structure[17].

C.3.1.1.10 *Grant Butte fault (USGS 878)*

The Grant Butte fault forms the southern margin of the Portland basin, and consists of a 10-kilometer-long normal fault. The Grant Butte fault offsets Pliocene-Pleistocene Springwater Formation and Boring Lava. No Quaternary surficial fault scarps have been identified, but the fault is largely buried by thick sequences of Pliocene to Pleistocene Missoula flood deposits. Based on radiometric age dating techniques, the fault has been active within the late Quaternary. Therefore, the Grant Butte fault is considered active with a long recurrence interval.

C.3.1.1.11 *Damascus-Tickle Creek fault zone (USGS 879)*

The Damascus-Tickle Creek fault zone consists of numerous relatively short northeast- and northwest-trending faults forming a broad fault zone along the southern edge of the Portland basin. The location of several eruptive vents of the Boring Lava suggest a direct relationship with the Damascus-Tickle Creek fault zone. The majority of the faults within the zone are buried by Pliocene to Pleistocene Missoula flood deposits, however, at least one fault strand may offset the flood deposits.

C.3.1.1.12 *Lacamas Lake fault (USGS 880).*

The Lacamas Lake fault is a northwest-trending structure located in the vicinity of Lacamas Lake, near Camas, Washington, at the northeastern margin of the Portland basin. This fault was originally identified by well-expressed lineaments defined by the relatively steep linear valley margins along both sides of Lacamas Lake[18]. Although recent activity on the Lacamas Lake fault is uncertain, the fault is considered active based on possible displacement of Troutdale sediments, prominent topographic lineaments associated with the fault, and possible associated seismicity. The fault is buried by Pleistocene Missoula flood deposits, suggesting a long recurrence interval.

C.3.1.1.13 *Sandy River fault zone (OR 4).*

The Sandy River fault zone is a northwest-trending structure located along the Sandy River southeast of Troutdale, at the eastern margin of the Portland basin. This fault was originally identified by gravity data, and is likely related to the Lacamas Lake fault (USGS Fault No. 880). The Sandy River fault zone is considered to be inactive or has a very long recurrence interval, but is included as a potential seismic source in the 2008 and 2014 National Seismic Hazard Maps.

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[16] Wong *et al.*, 2001. The Portland Hills Fault: An Earthquake Generator or Just Another Old Fault? Published by Oregon Geology, V63, number 2, Spring 2001.

[17] Madin and Hemphill-Haley, 2001: The Portland Hills Fault at Rowe Middle School. Oregon Geology V63 p47.

[18] Madin and Hemphill-Haley, 2001: The Portland Hills Fault at Rowe Middle School. Oregon Geology V63 p47.

C.3.1.2 Cascadia Subduction Zone Seismic Sources

The Cascadia Subduction Zone (CSZ) is a 1,100-kilometer-long zone of active tectonic convergence where oceanic crust of the Juan de Fuca Plate is subducting beneath the North American continental plate at a rate of about 3 to 4 centimeters per year[19]. The fault trace is located off of the coast of southern British Columbia, Washington, Oregon, and northern California; approximately 215 kilometers west of the site (see attached Figure C1).

Two primary sources of seismicity are associated with the CSZ: relatively shallow earthquakes that occur on the interface between the two plates (Subduction Zone earthquakes), and deep earthquakes that occur along faults within the subducting Juan de Fuca plate (intraplate earthquakes).

C.3.1.2.1 Subduction Zone Earthquakes

Large subduction zone (megathrust) earthquakes occur within the upper approximate 30 kilometers of the contact between the two plates[20]. As the Juan de Fuca Plate subducts beneath the North American Plate through this zone, the plates are locked together by friction[21]. Stress slowly builds as the plates converge until the frictional resistance is exceeded, and the plates rapidly slip past each other resulting in a "megathrust" earthquake. The United States Geologic Survey estimates megathrust earthquakes on the CSZ may have magnitudes up to M9.2.

Geologic evidence indicates a recurrence interval for major subduction zone earthquakes of 250 to 650 years, with the last major event occurring in 1700[22,23]. The eastern margin of the seismogenic portion of the Cascadia Subduction zone is located approximately 90 kilometers west of the site, as shown on Figure C1.

C.3.1.2.2 Intraplate Earthquakes

Below about 30 kilometers, the plate interface does not appear to be locked by friction, and the plates slowly slide past each other. The curvature of the subducted plate increases as the advancing edge moves east, creating extensional forces within the plate. Normal faulting occurs in response to these extensional forces. This region of maximum curvature and faulting of the subducting plate is where large intraplate earthquakes are expected to occur, and is located at depths ranging from 30 to 60 kilometers[24,25,26]. Intraplate earthquakes within the Juan de Fuca plate generally have magnitudes less than M7.5[27].

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19 DeMets, C., Gordon, R.G., Argus, D.F., Stein, S., 1990. Current plate motions: Geophysical Journal International, v. 101, p. 425-478.

20 Pacific Northwest Seismic Network, 2017. Pacific Northwest Earthquake Sources Overview, *accessed February 2017,* from PNSN web site, http://pnsn.org/outreach/earthquakesources/.

21 Pacific Northwest Seismic Network, 2017. Pacific Northwest Earthquake Sources Overview, *accessed February 2017,* from PNSN web site, http://pnsn.org/outreach/earthquakesources/.

22 Atwater, B.F., 1992. Geologic evidence for earthquakes during the past 2,000 years along the Copalis River, southern coastal Washington: Journal of Geophysical Research, v. 97, p. 1901-1919.

23 Peterson, C.D., Darienzo, M.E., Burns, S.F., and Burris, W.K., 1993. Field trip guide to Cascadia paleoseismic evidence along the northern California coast: evidence of subduction zone seismicity in the central Cascadia margin. Oregon Department of Geology and Mineral Industries, Oregon Geology, Vol. 55, p. 99-144.

24 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: unpublished report prepared for Oregon Department of Transportation, Personal Services Contract 11688, January 1995.

25 Geomatrix Consultants, 1993. Seismic margin Earthquake For the Trojan Site: Final Unpublished Report For Portland General Electric Trojan Nuclear Plant, Rainier, Oregon, May 1993.

The 2001 M6.8 Nisqually earthquake near Olympia, Washington, occurred within this seismogenic zone at a depth of 52 kilometers. The site is located within the intraplate seismogenic zone, as shown on Figure C1.

C.3.1.3 Characteristic Earthquake Magnitude

The maximum characteristic earthquake magnitude is defined as the largest earthquake that could be expected to be generated by a specific seismic source, independent of recurrence interval.

C.3.1.3.1 Historical Earthquakes

The Pacific Northwest is a seismically active area. Epicenters for historic earthquakes[28] in western Oregon from 1841 to 2002 are shown on Figure C1. The majority of these earthquakes are shallow (crustal) in nature, with a lesser amount of intraplate sources. No large-scale subduction-zone earthquakes occurred during this period.

Based on the historical record and crustal faulting models of the region, the maximum earthquake for crustal sources within the Pacific Northwest is estimated to be M5.75[29] (independent of recurrence interval). Similarly, the maximum earthquake for an intra-slab source on the subducting Juan De Fuca plate is estimated to be M7.5 to M7.7.

C.3.1.3.2 Empirical Determination of Characteristic Earthquake

Another method for estimating the characteristic earthquake that a particular seismic source could generate is by using empirical relationships between earthquake magnitude and fault rupture length[30]. Based on these relationships, the size of historical earthquakes, and the thickness of seismogenic crust in the region, the maximum earthquake magnitude expected from crustal sources is M6.0 to M6.6[31]. Based on the likely thin nature of the Juan de Fuca Plate, and comparing the historic seismicity along the intraplate area with other similar intraplate regions, the estimated maximum magnitude earthquake for intraplate sources is M7.0 to M7.5[32,33]. Similarly, based on magnitude versus rupture area relationships for subduction zone earthquakes worldwide, the maximum magnitude of a CSZ earthquake is estimated to be M8.0 to M9.2[34,35]. These magnitudes are also reflected in the probabilistic analyses used by U.S. Geological Survey.

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26 Kirby, Stephen H., Wang, Kelin, Dunlop, Susan, 2002, The Cascadia Subduction Zone and Related Subduction Systems—Seismic Structure, Intraslab Earthquakes and Processes, and Earthquake Hazards: U.S. Geological Survey Open-File Report 02-328, 182 pp.

27 Cascadia Region Earthquake Workshop, 2008. Cascadia Deep Earthquakes. Washington Division of Geology and Earth Resources, Open File Report 2008-1.

28 Niewendorp, Clark A., and Neuhaus, Mark E., Map of Selected Earthquakes for Oregon,1841 through 2002 by Oregon Department of Geology and Mineral Industries, OFR O-03-02.

29 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: unpublished report prepared for Oregon Department of Transportation, Personal Services Contract 11688, January 1995.

30 Bonilla, M.G., R. K. Mark, and J.J. Lienkaemper, 1984, Statistical relations among earthquake magnitude, surface rupture length, and surface fault displacement: Bulletin of the Seismological Society of America, V. 74, p. 2379-2411.

31 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

32 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

33 Pacific Northwest Seismic Network website, http://pnsn.org/outreach/earthquakesources/

34 Geomatrix Consultants, 1995. Seismic Design Mapping, State of Oregon: Final Report to Oregon Department of Transportation, Project No. 2442.

C.3.1.3.3 Code Specified Design Earthquake

Section 1803.3.2.1 of the 2014 Oregon Structural Specialty Code[36] (OSSC) indicates specific minimum requirements for earthquake magnitudes to be used in seismic analyses, which are summarized in the following table:

Table C1 OSSC Minimum Design Earthquake

Seismic Source	Minimum Design Earthquake
Shallow Crustal Faults	6.0
Cascadia Subduction Zone – Subducting Plate (Intraplate)	7.0
Cascadia Subduction Zone – Interface (Subduction Zone)	8.5

C.3.1.4 Seismic Sources in the Vicinity of the Site

Table C2 shows the previously discussed faults (Section C.3.1.1), the characteristic earthquake magnitude for each, and the distance and direction of the fault from the site.

[35] Pacific Northwest Seismic Network, 2017. Pacific Northwest Earthquake Sources Overview, *accessed February 2017*, from PNSN web site, http://pnsn.org/outreach/earthquakesources/.

[36] International Code Council, Inc., 2014. 2014 Oregon Structural Specialty Code. Based on the 2012 International Building Code.

Table C2 Fault, Characteristic Earthquake Magnitude, and Distance from Site.

USGS Fault No.	Earthquake Source	Char Mag	Type of Fault	USGS Fault Class[1]	Fault Orientation (strike & dip)	Approximate Earthquake depth (km)	Fault Trace Distance (km) & Direction from Site	Notes
874	Bolton fault	6.19	Reverse	B	N53W 60N	15 to 40 km	4.5 km NNW	2
875	Oatfield fault	6.00	Reverse	A	N41W 70S	15 to 40 km	6 km N	3,4
877	Portland Hills fault	7.05	Reverse	A	N37W 70N	15 to 40 km	6 km NNE	2
879	Damascus-Tickle Creek fault	6.00	Right Lateral Strike Slip	A	N-S 90 (Vertical)	15 to 40 km	7 km NE	3,4
716	Canby-Molalla fault	6.00	Right Lateral Strike Slip	A	N34W 90 (vertical)	15 to 40 km	8 km WSW	3,4
876	East Bank fault	6.00	Reverse	A	N46W 70N	15 to 40 km	14 km NNE	3,4
878	Grant Butte fault	6.21	Normal	A	N90E 60N	15 to 40 km	17 km N	2
715	Beaverton fault zone	6.00	Normal	A	N86E Unknown Dip	15 to 40 km	25 km NW	3,4
OR4	Sandy River fault zone	6.50	Strike-Slip	C	90.00	15 to 40 km	28 km NE	2
873	Mount Angel fault	6.80	Thrust	A	N43E 60 to 70 N	15 to 40 km	29 km SW	2
717 / OR3	Newberg fault	6.85	Right Lateral Strike Slip	A	N42W 90 (vertical)	15 to 40 km	30 km W	2
880	Lacamas Lake fault	6.67	Normal	A	N43W 75S	15 to 40 km	31 km NE	2
714	Helvetia fault	6.40	Normal	A	N26W SW	15 to 40 km	36 km NW	2
718 / OR1	Gales Creek fault zone	6.75	Right Lateral Strike Slip	A	N41W 90 (vertical)	15 to 40 km	40 km W	2
	CSZ - Intraplate	7.00	Normal	A	N30W 10 to 20 E	30 to 60 km	Within seismogenic zone	3
	CSZ	9.0 8.3	Mega-Thrust	A	N30W 10 to 20 E	<30 km	90 km (to east edge of seismogenic zone)	3,5

1 USGS Fault Classes from USGS Earthquake Hazards Program, 2008 National Seismic Hazard Maps
Class A: Fault with convincing evidence of Quaternary activity (ACTIVE)
Class B: Fault that requires further study in order to confidently define their potential as possible sources of earthquake-induced ground motion (POTENTIALLY ACTIVE)
Class C: Fault with insufficient evidence for Quaternary activity (LOW POTENTIAL FOR ACTIVITY)

2 Characteristic earthquake magnitude from USGS Earthquake Hazards Program, 2008 National Seismic Hazard Maps – Fault Parameters

3 Characteristic earthquake magnitude from USGS Quaternary Fault and Fold Database of the United States

4 Characteristic earthquake magnitude from Section 1803.3.2.1 of the 2014 OSSC - Design Earthquake.

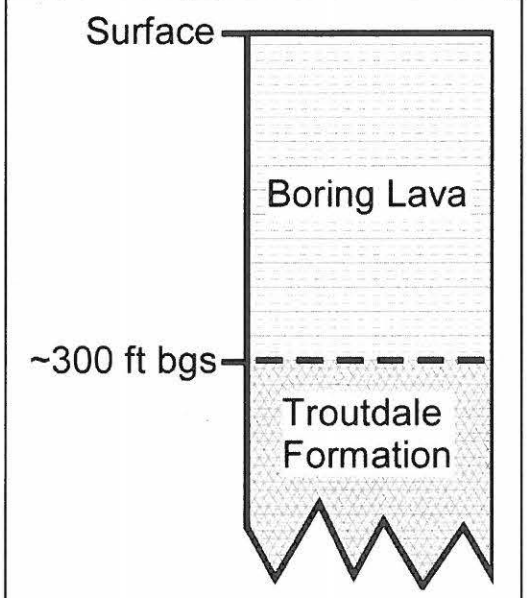
5 Models of earthquake magnitude assign variable magnitudes for different portions of the Cascadia Subduction Zone, so multiple magnitudes are provided.

C.4.0 SEISMIC SITE CLASS

C.4.1 Geologic Profile

Boring Lava: Based on drilled borings, available geologic mapping of the area[37,38], and review of local water well logs, the site is underlain by Boring Lava. The Boring Lava consists of basalt flows produced by more than 80 volcanic vents located throughout the greater Portland metropolitan area[39]. Eruptions from these vents produced dozens of cinder cones and small shield volcanoes that rise up to about 650 feet above the surrounding landscape. Each volcano or cinder cone was generally formed by a single eruption.

Inset 1: Geologic Profile



The site is mapped within the Basalt of Canemah, which is one of the oldest flows associated with the Boring volcanoes at about 2.4 million years old. This lava flow is described as massive, medium-grained, diktytaxitic olivine basalt. The flow is often deeply weathered forming a thick residual soil consisting of red clay. The Basalt of Canemah has been measured in water wells in the vicinity of the site as 100 to 150 meters thick.

The existing volcanic vents are all considered extinct; however, the Boring Volcanic Field is considered to be potentially active. The most recent eruption associated with the Boring Volcanic Field occurred approximately 57,000 years ago and was located approximately 55 kilometers northeast of the site at Beacon Rock.

Troutdale Formation Sediments: Geologic mapping[40] indicates that the Boring Lava in the project area is underlain by Pliocene Troutdale formation deposits. The Troutdale formation consists of interbedded gravel, sand, and silt, deposited by an ancestral Columbia River and reworked by later streams and rivers. The Troutdale formation deposits are mapped as greater than 1,000 feet thick in the vicinity of the site.

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37 Ma, L., Madin, I.P., Duplantis, S., and Williams, K.J., 2012, Lidar-based surficial geologic map and database of the greater Portland, Oregon, area, Clackamas, Columbia, Marion, Multnomah, Washington, and Yamhill Counties, Oregon, and Clark County, Washington: Oregon Department of Geology and Mineral Industries, Open-File Report 0-2012-02, scale 1:8,000.

38 Madin, I.P., 2007, Preliminary geologic map of the Oregon City quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Geological Map Series GMS-119, scale 1:24,000.

39 Allen, John E. (September 1975). "Volcanoes of the Portland Area, Oregon" (PDF). The Ore Bin. Portland, Oregon: State of Oregon Department of Geology and Mineral Industries. 37 (9): 151. Retrieved 2009-06-16.

40 Madin, I.P., 2007, Preliminary geologic map of the Oregon City quadrangle, Clackamas County, Oregon: Oregon Department of Geology and Mineral Industries, Geological Map Series GMS-119, scale 1:24,000.

C.4.2 Site Class Determination

The determination of the seismic site class is based on subsurface data in accordance with Chapter 20 of the ASCE 7-10. CGT used Standard Penetration Test (SPT) N-values for determination of the site classification for this project. The SPT subsurface exploration method is described in the geotechnical investigation report. Chapter 20 of ASCE 7-10 requires that the stiffness of the soils (or rock) be measured or reasonably estimated for the upper 100 feet bgs.

Boring B-1 was advanced to a depth of about 25½ feet bgs and terminated in hard basalt bedrock. The basalt bedrock was consistent with the Boring Lava mapped in the area of the site, which is anticipated to extend to depths of several hundred feet bgs. In accordance with Section 20.4.2 of ASCE 7-10, a SPT N-value of 100 was used to represent the refusal conditions (50+ SPT blows for less than 6 inches of penetration) met at the deepest SPT measurement. To satisfy code requirements, we extended this N-value to a depth of 100 feet bgs. The results of the site class calculations are shown in the following table.

Table C3 Calculation for Determination of Site Classification

Bottom Depth (feet)	Soil Type	Field SPT (N_i)	Layer Thickness [d_i] (feet)	d_i/N_i
1.5	CH	5	1.5	0.30
4	CH	10	2.5	0.25
6.5	CH	14	2.5	0.18
9	SC	20	2.5	0.13
11.5	SC	6	2.5	0.42
14	SC	5	2.5	0.50
16.5	SC	15	2.5	0.17
20.5	SC	15	4	0.27
100	RX (Basalt)	100	79.5	0.80
TOTALS			**100.0**	**3.00**

Geometric Mean:
(ASCE 7-10 Section 20.4.2
Equation 40.4.-2)

$$\overline{N} = \frac{\sum_{i=1}^{n} d_i}{\sum_{i=1}^{n} \frac{d_i}{N_i}} = \mathbf{36.08}$$

Based on the guidelines presented in Table 20.3-1 in Chapter 20 of the ASCE 7-10, the project site is designated as Site Class D.

C.5.0 SEISMIC GROUND MOTION VALUES

Earthquake ground motion parameters for the site were obtained based on the United States Geological Survey (USGS) Seismic Design Values for Buildings - Ground Motion Parameter Calculator[41]. The following table shows the recommended seismic design parameters for the site.

Table C4 Seismic Ground Motion Values

	Parameter	Value
Mapped Acceleration Parameters	Spectral Acceleration, 0.2 second (S_s)	0.902g
	Spectral Acceleration, 1.0 second (S_1)	0.392g
Coefficients (Site Class D)	Site Coefficient, 0.2 sec. (F_a)	1.139
	Site Coefficient, 1.0 sec. (F_v)	1.616
Adjusted MCE Spectral Response Parameters	MCE Spectral Acceleration, 0.2 sec. (S_{MS})	1.027g
	MCE Spectral Acceleration, 1.0 sec. (S_{M1})	0.633g
Design Spectral Response Accelerations	Design Spectral Acceleration, 0.2 seconds (S_{DS})	0.685g
	Design Spectral Acceleration, 1.0 second (S_{D1})	0.422g

Based on Section 1613.3.5 of the 2014 OSSC, the site falls into a Seismic Design Category D.

The recommendations presented above were based on design procedures presented in Section 11.4 of ASCE 7-10. A site-specific response analysis could be performed to develop a site-specific design response spectrum at the owner's discretion, if desired, for an additional fee.

C.6.0 SEISMIC HAZARDS

C.6.1 Liquefaction

In general, liquefaction occurs when deposits of loose/soft, saturated, cohesionless soils, generally sands and silts, are subjected to strong earthquake shaking. If these deposits cannot drain quickly enough, pore water pressures can increase, approaching the value of the overburden pressure. The shear strength of a cohesionless soil is directly proportional to the effective stress, which is equal to the difference between the overburden pressure and the pore water pressure. When the pore water pressure increases to the value of the overburden pressure, the shear strength of the soil reduces to zero, and the soil deposit can liquefy. The liquefied soils can undergo rapid consolidation or, if unconfined, can flow as a liquid. Structures supported by the liquefied soils can experience rapid, excessive settlement, shearing, or even catastrophic failure.

The susceptibility of sands, gravels, and sand-gravel mixtures to liquefaction is typically assessed based on penetration resistance, as measured using SPTs, CPTs, or Becker Hammer Penetration tests (BPTs). For fine-grained soils, susceptibility to liquefaction is evaluated based on penetration resistance and plasticity, among other characteristics. Criteria for identifying non-liquefiable, fine-grained soils are

[41] United States Geological Survey, 2017. Seismic Design Parameters determined using:, "U.S. Seismic Design Maps Web Application," *accessed February 2017*, from the USGS website http://earthquake.usgs.gov.

constantly evolving. Current practice to identify non-liquefiable, fine-grained soils is based on plasticity characteristics of the soils, as follows: (1) liquid limit greater than 47 percent, (2) plasticity index greater than 20 percent, and (3) moisture content less than 85 percent of the liquid limit[42].

The Oregon Department of Geology and Mineral Industries' Oregon Statewide Geohazards Viewer[43] shows that the soils at the site and immediate vicinity do not have a potential for seismically-induced liquefaction. This is supported by the earthen materials encountered in the borings (high plasticity clay soils and basalt bedrock). Therefore, we conclude the potential for seismically-induced liquefaction settlement at the site is very low.

C.6.2 Surface Rupture

C.6.2.1 Faulting

As discussed above, the site is situated in a region of the country characterized by extensive faulting and known for seismic activity. However, no known faults are mapped on or immediately adjacent to the site. Therefore, the risk of surface rupture impacting the proposed development at the site due to faulting is considered very low.

C.6.2.2 Lateral Spread

Surface rupture due to lateral spread can occur on sites underlain by liquefiable soils that are located on or immediately adjacent to slopes steeper than about 3 degrees (20H:1V), and/or adjacent to a free face, such as a stream bank or the shore of an open body of water. During lateral spread, the materials overlying the liquefied soils are subject to lateral movement downslope or toward the free face. Recognizing the lack of liquefiable soils, we characterize the risk of surface rupture due to lateral spread as negligible.

C.6.3 Slope Stability

Due to the relatively flat to gently sloping topography on and surrounding the site, we conclude the risk of seismically-induced slope instability is very low.

C.6.4 Tsunami/Seiche Inundation

The site is geographically distant from the Oregon coast and therefore not at risk of inundation from a tsunami occurring in the Pacific Ocean.

The term seiche refers to oscillating standing waves that can produce dramatic changes in water level over relatively short periods of time and can cause inundation of nearby areas. A seiche can be generated in enclosed or partially enclosed bodies of water by atmospheric conditions or seismic activity. The site is not located near any large body of water that could produce a seismically-induced seiche. Accordingly, the hazard associated with seiche inundation at the site is considered negligible.

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[42] Seed, R.B. et al., 2003. Recent Advances in Soil Liquefaction Engineering: A Unified and Consistent Framework. Earthquake Engineering Research Center Report No. EERC 2003-06.

[43] Oregon Department of Geology and Mineral Industries, 2016. Oregon Statewide Geohazards Viewer, *accessed February 2017*, from DOGAMI web site: http://www.oregongeology.org/sub/hazvu/index.htm.

C.7.0 REPORT SUBMITTAL

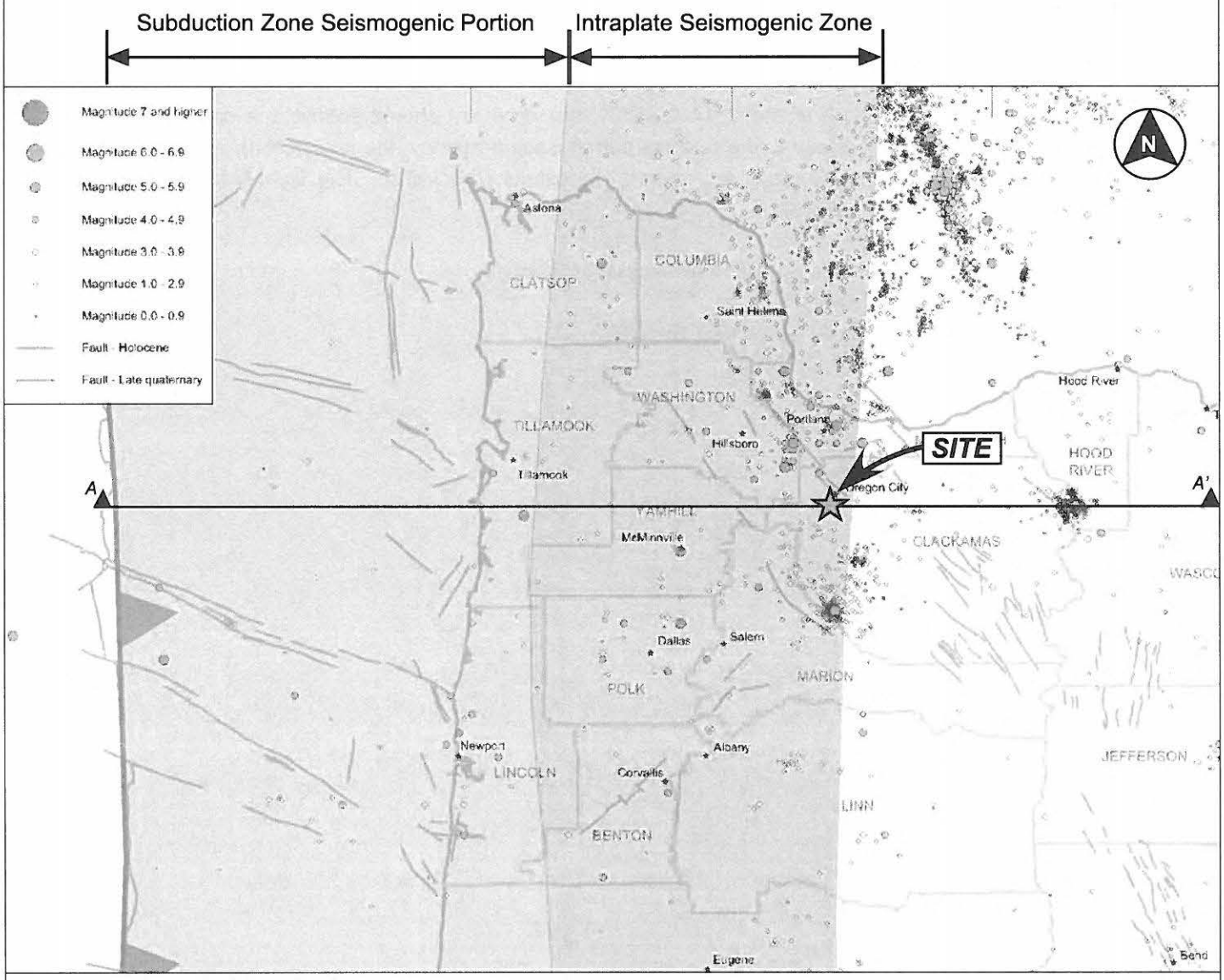
According to Section 1803.9 of the 2014 OSSC[44], the applicant should submit one copy of the Site-Specific Seismic Hazards Study to the building permit issuing agency (the jurisdiction), and one copy to the Oregon Department of Geology and Mineral Industries (DOGAMI). The DOGAMI report can be submitted to the following address:

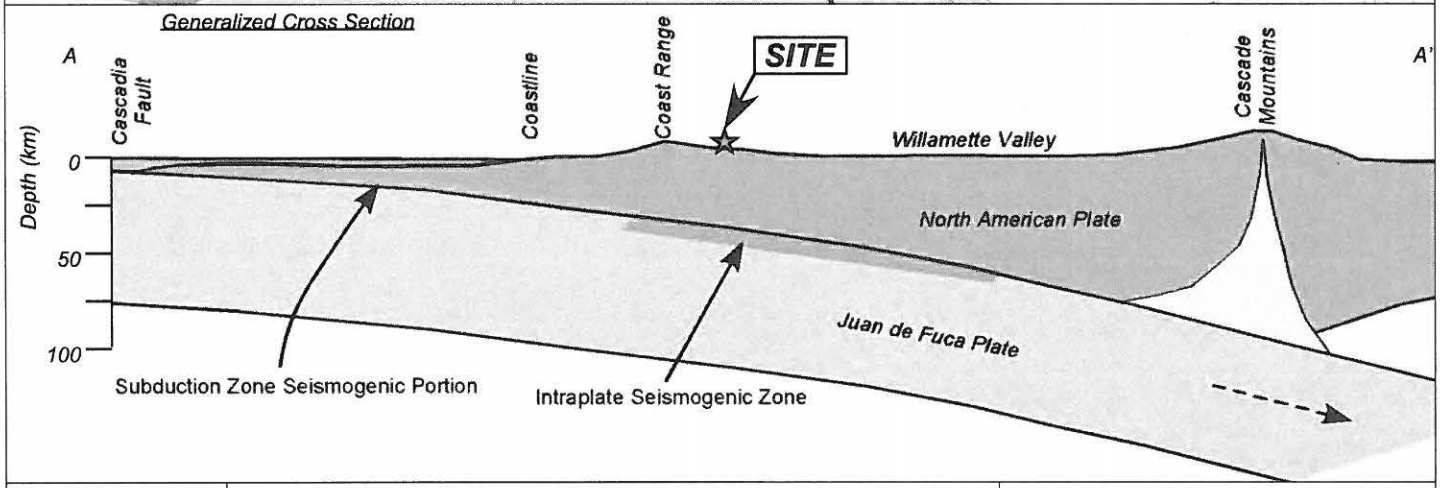
DOGAMI – Site Specific Seismic Hazards Study
Administrative Offices
800 NE Oregon Street #28, Suite 965
Portland, Oregon 97232

[44] International Code Council, Inc., 2014. 2014 Oregon Structural Specialty Code. Based on the 2012 International Building Code.

CFD #1 FIRE STATION 16 - OREGON CITY, OREGON
Project Number G1704558

FIGURE C1
Regional Seismicity





CARLSON CGT GEOTECHNICAL 503-601-8250

- McCrory, Blair, Oppenheimer, and Walter, 2004. Depth to the Juan de Fuca slab beneath the Cascadia subduction margin - A 3-D model for storing earthquakes: U.S. Geological Survey Data Series 91.
- Niewendorp, Clark A., and Neuhaus, Mark E. , Map of Selected Earthquakes for Oregon,1841 through 2002 by Oregon Department of Geology and Mineral Industries, OFR O-03-02.

Scale 1 Inch = 50 kilometers

0 50 100

Clackamas Fire District #1 – Fire Station 16 Replacement
5/16/2017

MEMO:
The following information has been added to the narrative as requested by Oregon City Planning Department.

- Overarching statement for each variance indicating what the variance is asking for.
- Additional details/information for the following:
    - Flagpoles / Height
    - Covered Site Storage
    - Fuel Station / Generator
    - Mechanical / Refuse enclosure (screened / height of screening)
    - Ped Seating (Material Size)

CHAPTER 17.60 - VARIANCE
17.60.030 – Variance

The applicant is seeking two (2) variance approvals for this project. (1) Site Variance related to vehicular parking and building setback from street frontage, (2) Building Design related to facade articulation along the proposed north facade. Each variance is listed along with response to applicable criteria below.

Site Variances from OCMC 17.62.050.2a and 17.62.055.D.1a-i – *Variance of maximum allowed setback from the street for an institutional building, unless elements from 17.62.055d.1a-I are incorporated.*

OCMC 17.62.050
2. Vehicular Access and Connectivity.
a. Parking areas shall be located behind buildings, below buildings, or on one or both sides of buildings.

Applicant's Response: The applicant is requesting a variance to allow off-street parking for the public to be located in front of the proposed fire station. The public parking area will accommodate (3) parking spaces, which includes an accessible parking space. Off-street parking for the staff will be located behind the building. The proposed site plan is designed to provide the utmost safe environment for access to and from the public way for pedestrians and automobiles, while offering appropriate opportunities for privacy and security transitions from public to private spaces/areas. The parking area in front of the building is designed to blend into the public plaza walk as much as possible. Currently, the existing fire station offers 96 hours of public parking space per day. On average the maximum amount observed is 2-3 hours/day. The building use expects similar public parking use. Onsite circulation keeps the emergency response vehicular traffic separate from the public vehicular traffic as much as possible to ensure safe site circulation and secured staff parking and training area. Locating the public parking area to behind the fire station would greatly burden the safety and security of the firefighters.

OCMC 17.62.055.D.1a-i
5. On sites with one hundred feet or more of frontage at least sixty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line, unless a greater setback is accepted under the provisions of Section 17.62.055D. For sites with less than one hundred feet of street

frontage, at least fifty percent of the site frontage width shall be occupied by buildings placed within five feet of the property line unless a greater setback is accepted under the provisions of Section 17.62.055D.

Applicant's Response: The applicant is requesting a variance for the quantity of elements to be incorporated into the design to help mitigate the proposed fire station setback from the street frontage. The subject property frontage is approximately 186-feet and runs north-south at an obtuse angle from the south property line. The proposed building is oriented perpendicular to the street lot line, thus creating varying setback distances from 112', 126', and 148' along the street frontage. The proposed building front facing facade is 114'-7" wide. The south end (apparatus bay), 67% of this facade is setback between 112' and 126' from the front property, matching the existing fire station setback distance. The north end (Public Entry) of this facade is setback is setback between 126' and 148' from the front property line. In comparison, the existing fire station north end is setback between 147'-0" and 164'-0", thus moving the building closer to the street frontage by an average of 18'-0".

Due to existing site configuration and operational requirements of the 24-hour emergency response, the proposed fire station is set as close as possible to the front property line to maintain operational and emergency response requirements. Each of the fire apparatus vehicles need to be able to utilize the full maneuvering area between the apparatus bay exterior wall and the street to; 1) traverse in a safe and responsive way for emergency responses; 2) Response and turn-out times require fire apparatus vehicles, including a 65-foot ladder truck to fully exit the apparatus bay, stop and then exit out onto Molalla Avenue; 3) The maximum slope the apron can be in in front of the apparatus bay for fire apparatus vehicle maneuvering is 2.5%.

Placing the fire station any closer to the front property line, would greatly jeopardize maneuverability, emergency responses, and generate extensive site grade cuts creating an expenditure that is cost-prohibitive.

The proposed setback would require a total of 22 items be incorporated into the design. The applicant is requesting to use the following elements to help mitigate the larger setback:

- **Tables, benches or other approved seating area:**
  (5) colored precast concrete seats measuring 16" w x 17" H x 16" L will be provided in the pedestrian plaza area adjacent to the public sidewalk along Molalla Avenue.
- **Cobbled, patterned or paved stone or enhanced concrete:**
  Scored, colored concrete at the pedestrian circulation system/plaza will be utilized to enhance the concrete surface of the pedestrian circulation system/plaza.
- **Pedestrian scale lighting:**
  The use of pedestrian scale lighting (bollards) along the pedestrian circulation system and plaza will be utilized to enhance the pedestrian experience and safety of the site.
- **At least twenty square feet of landscaping or planter boxes for each tenant facade fronting on the activity area.**
  Approximately 3,625 square feet of landscaped area between the building facade and the front property line is proposed.
- **Enhanced landscaping or additional landscaping.**
  The landscape plan has been designed to maximize the visual interest, create a lively atmosphere, while also maintaining operational functions for the fire station emergency services. The landscape design proposed exceeds the minimum site landscape area requirements by 3% (2,006 sf) and the minimum tree planting requirements by 2 (Minimum required = 24, Proposed = 26). The overall design is to not just meet minimum standards but to create a nice landscape for the proposed fire station and along Molalla Avenue.
- **Additional elements incorporated into the design.**

- Art: The fire district will procure a piece of public art to be incorporated into the pedestrian plaza area, adjacent or near the seating area. Size and type is unknown at this time.
- Reader Board: A reader board providing community and emergency service information will be incorporated into the monument sign.

Variance may be granted in the event that all of the following conditions are met:
A. That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title;

Applicant's Response: The requested site variances will not impact adjacent properties by reducing light, air, safe access or other desirable or necessary qualities. The current and propose use of the site will remain an emergency use service (Fire Station). The proposed fire station is located very close to its current location, allowing current operational requirements of the 24-hour emergency response to remain intact and provide both efficient and safe vehicular site circulation.
Each of the proposed site elements incorporated into the site provide the desirable and necessary qualities promoting design and neighborhood livability.

B. That the request is the minimum variance that would alleviate the hardship;

Applicant's Response: The variance request to the building setback distance and public parking location is the minimum variance feasible to maintain current emergency operational requirements. Placing the building at the specified 5' setback distance would cause the fire station to be removed from its current location and greatly impact life safety operational requirements for fire apparatus to safely and efficiently travel to a scene of an emergency. While locating the public parking to the rear of the building would jeopardize the security and safety of the fire fighters.

C. Granting the variance will equal or exceed the purpose of the regulation to be modified.

Applicant's Response: The purpose of the 5-foot setback maximum and off-street parking placement is, presumably, to ensure that building placement supports convenient and safe pedestrian access from public streets, and promotes architectural interest and human scale to the street facing facade. As noted above, the proposed site plan configuration is designed to maintain current operational requirements of the 24-hour emergency response while also upholding the utmost safe environment for access to and from the public way for pedestrians and automobiles, while offering appropriate opportunities for privacy and security transitions from public to private spaces/areas. Both the public parking area, pedestrian amenities, and landscape enhancements are meeting the intent of the ordinance.

D. Any impacts resulting from the adjustment are mitigated.

Applicant's Response: The pedestrian plaza and direct connection to the main building entrance along with scaled lighting, additional and enhanced landscape, and building offsets creating portions of the new fire station closer to the street than the existing fire station all serve to mitigate the larger setback from the public street.

E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance.

Applicant's Response: The proposed location of the fire station is the most beneficial area on the subject property that provides the most unobstructed, safe, and efficient route of travel for the fire district to conduct emergency services.

F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Applicant's Response: There does not appear to be any comprehensive plan policies that require a 5-foot maximum setback. The proposed pedestrian plaza, walkway, lighting, vehicular location, and landscape provide the most safe, convenient, and architectural interest. These elements all achieve the same purpose as the ordinance standard.

Building Design Variance from OCMC 17.62.055H.2

H.2 - Variance of Facades greater than one hundred feet in length, measured horizontally, shall incorporate wall plane projections or recesses having a depth of at least three percent of the length of the facade and extending at least twenty percent of the length of the facade. No uninterrupted length of any facade shall exceed one hundred horizontal feet.

Applicant's Response: The applicant is requesting a variance to the 3% depth of the required projections along the north faced of the proposed fire station.
The north facade is 138'-10" in length and would require projections or recesses having a depth of 4'-2". Adjacent to the north facade is an on-site storm treatment/retention swale and the main internal driveway aisle used by the fire apparatus and staff vehicles. To minimize the impact the projections would have on the storm treatment/retention swale and driveway aisle, the proposed projection depths are set at a depth of 2'-8". The total length of the proposed projections exceeds the minimum by 40% (83'-0") and have been placed to coincide with the interior bunk rooms.

Variance may be granted in the event that all of the following conditions are met:
A. That the variance from the requirements is not likely to cause substantial damage to adjacent properties by reducing light, air, safe access or other desirable or necessary qualities otherwise protected by this title;

Applicant's Response: The requested variance is building mass size and articulation related and will not impact adjacent properties by reducing light, air, safe access or other desirable or necessary qualities for the applicant or the surrounding neighbors.

B. That the request is the minimum variance that would alleviate the hardship;

Applicant's Response: The requested variance is the minimum variance feasible to maintain site functionality of the required stormwater treatment facility and maintain the minimum width of the internal driveway aisle for fire apparatus vehicles.

C. Granting the variance will equal or exceed the purpose of the regulation to be modified.

Applicant's Response: The purpose of the horizontal mass height and wall plane variations, presumably, to ensure that building masses have variation in size and no wall planes are long and expansive without

some variation in wall planes. The proposed wall projections along the north facade provide variation in the wall plane and contribute to the overall architectural interest of the building and human scale.

D. Any impacts resulting from the adjustment are mitigated.

Applicant's Response: The proposed variations have no visual impact on the property for the Applicant or surrounding neighbors because the design and placement of the proposed projections meet the intent of the ordinance by avoiding single, large horizontal masses and incorporating wall articulation and interest.

E. No practical alternatives have been identified which would accomplish the same purpose and not require a variance.

Applicant's Response: The proposed design of the north facade projections has been identified as a reasonable and practical alternative that meets the intent of the ordinance while having minimal impact on site and operational requirements.

F. The variance conforms to the comprehensive plan and the intent of the ordinance being varied.

Applicant's Response: The proposed variations conform to the comprehensive plan by meeting the provisions and intent of the ordinance that promote design integrity and neighborhood livability.

ADDITIONAL DETAILS

Flagpoles: The proposed flagpole will be an inground mounted flagpole with an overall height of 30-feet above finish grade. The flagpole will be 6-inches in diameter at the base and taper to 3-inches at the top.

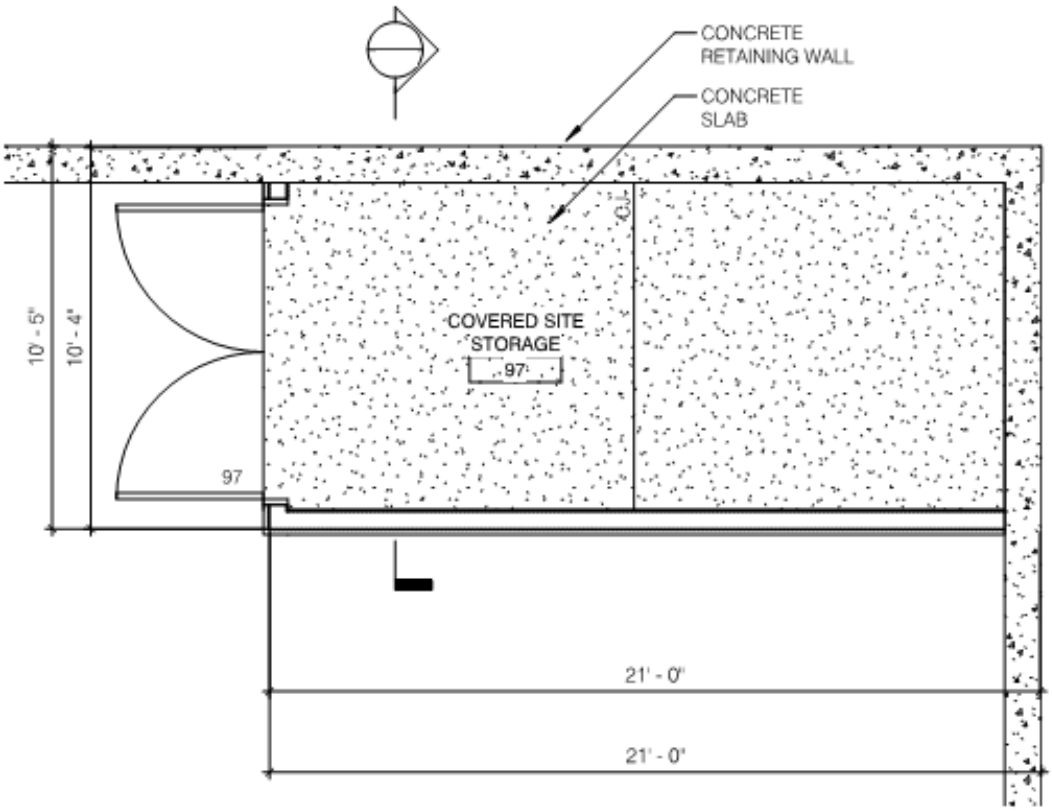
Covered Site Storage: The proposed covered site storage locating in the northeast corner of the subject property will constructed on top of the new retaining wall system. The exterior facade material will utilize the same exterior metal wall panel as the proposed fire station. See attached plan and section.

Fuel Station / Generator: Information regarding the fuel station and generator equipment is provided on page 16 in the land use narrative. Additional information is provided herein.
The fuel station and generator are both existing pieces of equipment the owner intends to reuse. The proposed location will be screened on the north, south and east sides by a 6-0" tall enclosure. The west side of the enclosure which faces the proposed fire station needs to remain open so the fire apparatus can access the fuel tank. The screened portions of the enclosure utilize a painted steel enclosure with ribbed (10% open area) perforated metal wall panel system, which match the proposed fire station metal wall panel profile. See attached plan and section.

Mechanical / Refuse Enclosure: Information regarding the fuel station and generator equipment is provided on page 30 in the land use narrative. Additional information is provided herein.
The mechanical / refuse enclosure utilizes a 6'-0" tall, painted steel enclosure with ribbed (10% open area) perforated metal wall panel system on all sides, which match the proposed fire station metal wall panel profile. See attached plan and section.

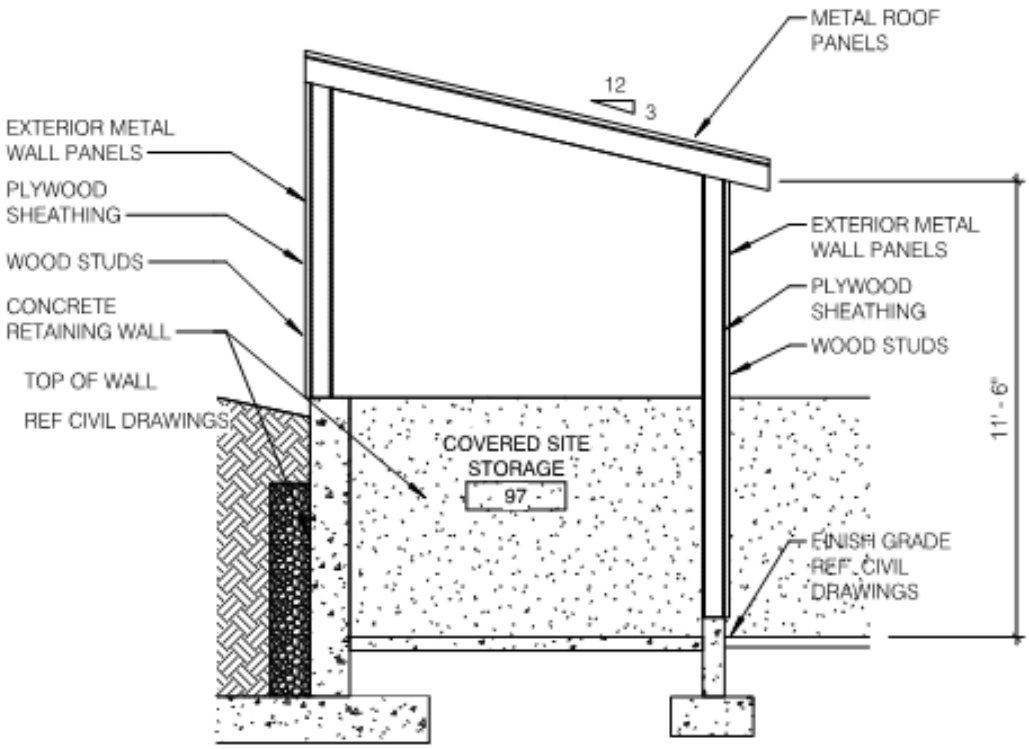
Pedestrian Seating: (5) colored precast concrete seats measuring 16” w x 17” H x 16” L will be provided in the pedestrian plaza area adjacent to the public sidewalk along Molalla Avenue.

COVERED SITE STORAGE



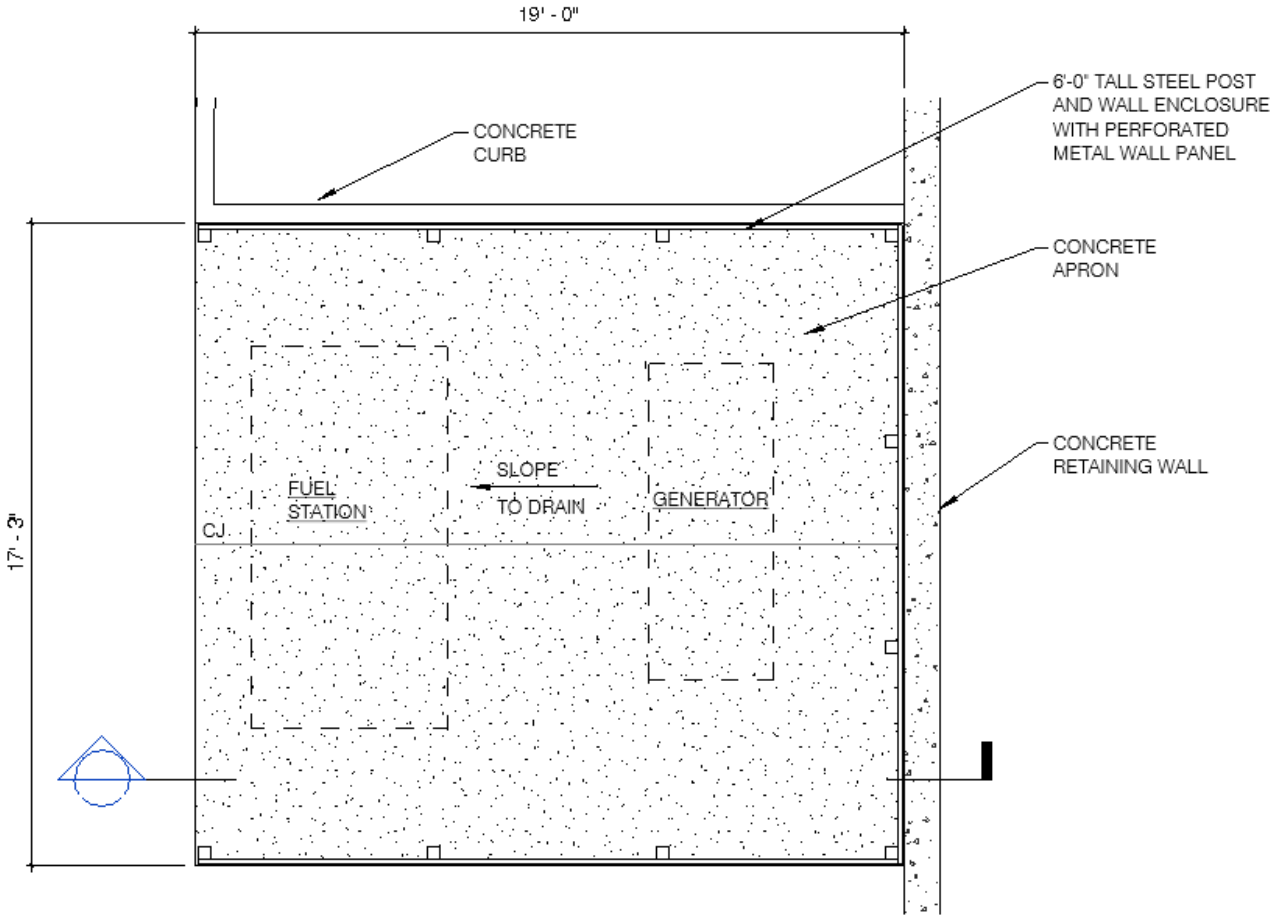
ENLARGED PLAN - SITE STORAGE
1/4" = 1'-0"

0' 4' 8' 16' 32'



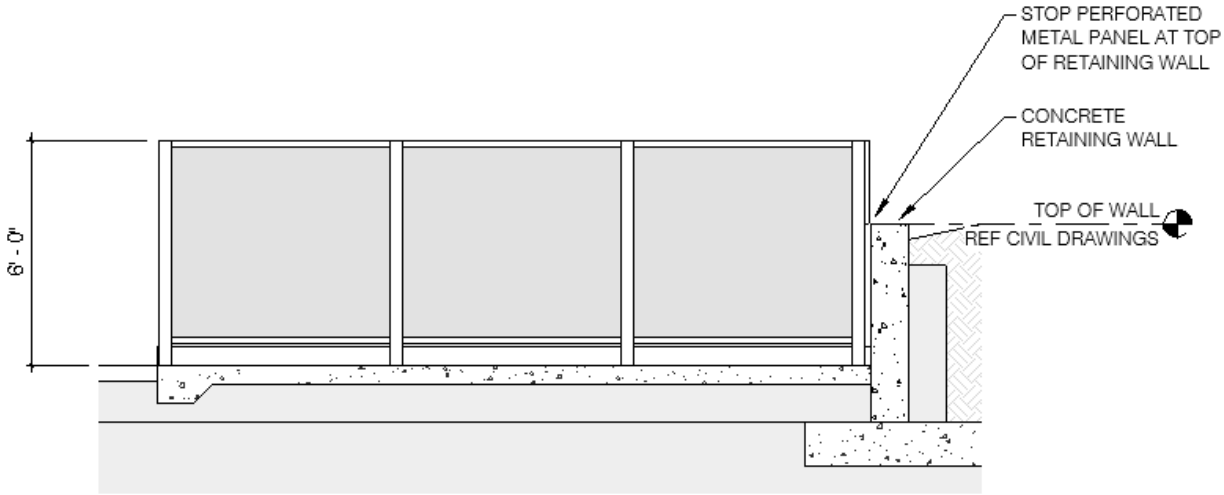
SITE STORAGE - SECTION
1/4" = 1'-0"

FUEL STATION & GENERATOR



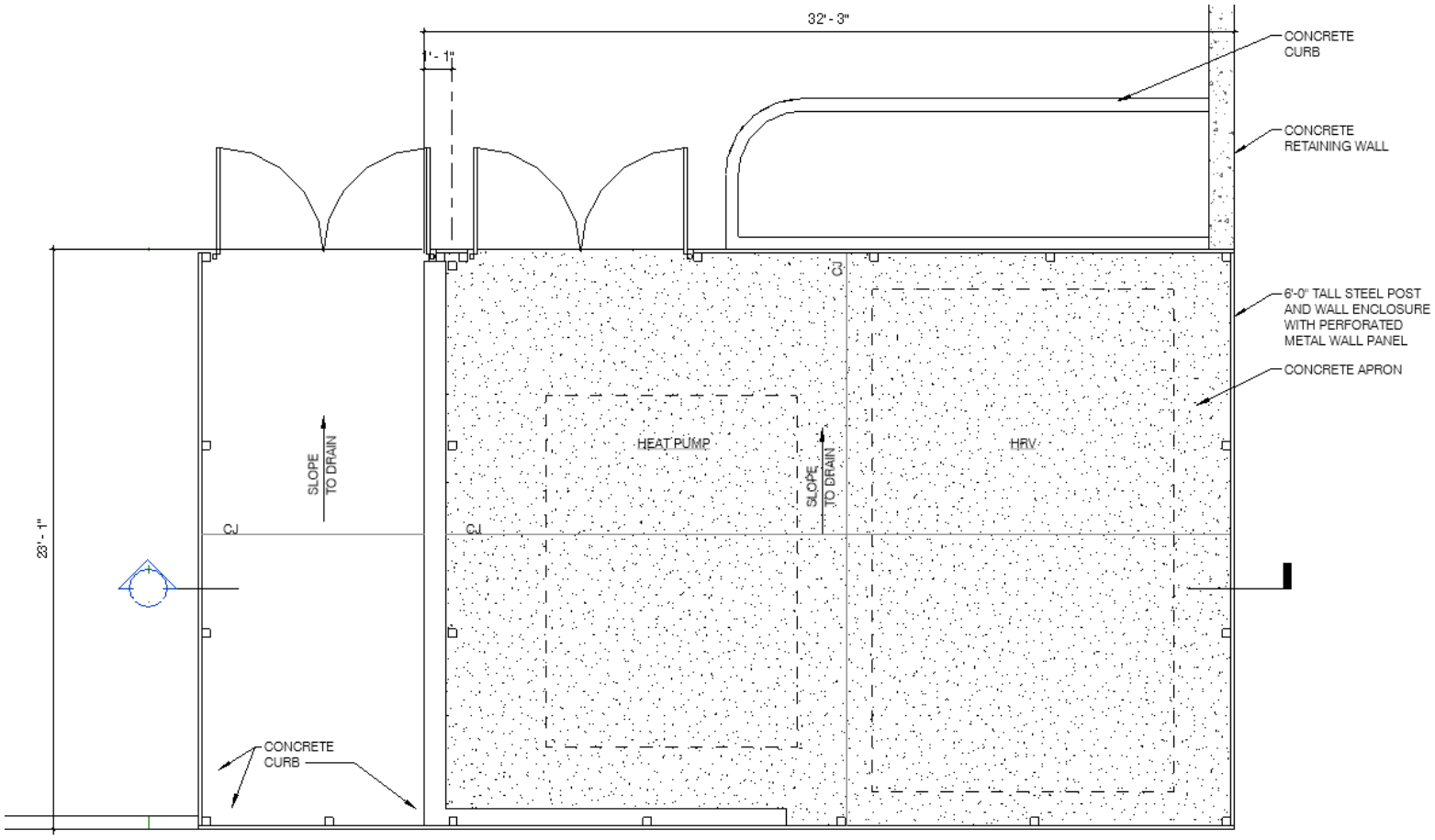
ENLARGED PLAN - FUEL STATION & GENERATOR
1/4" = 1'-0"

0' 4' 8' 16' 32'



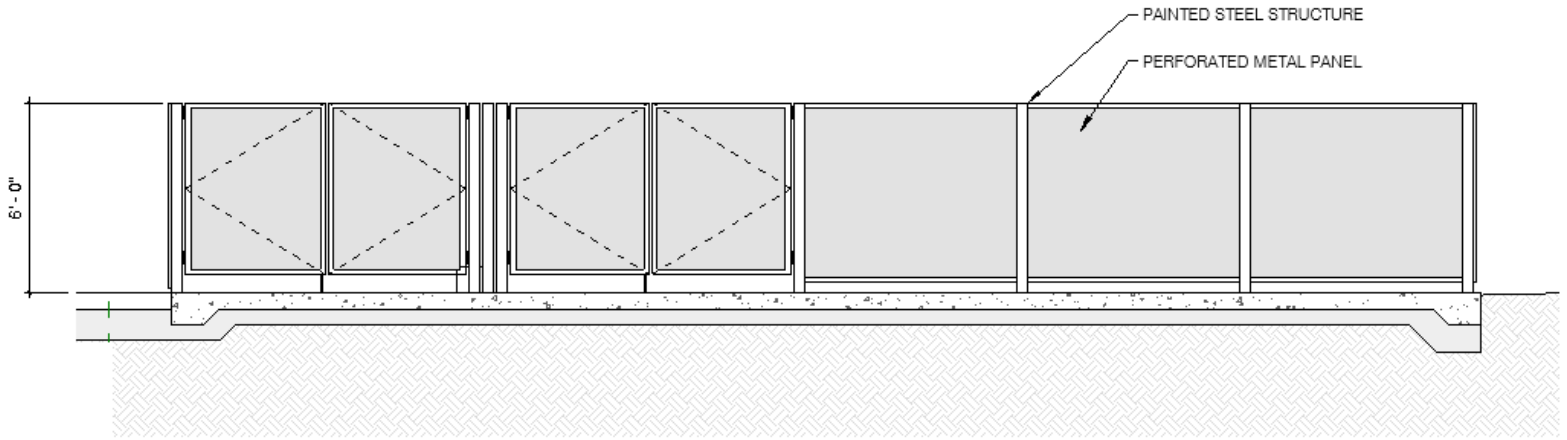
FUEL STATION - SECTION
1/4" = 1'-0"

REFUSE & HVAC ENCLOSURE



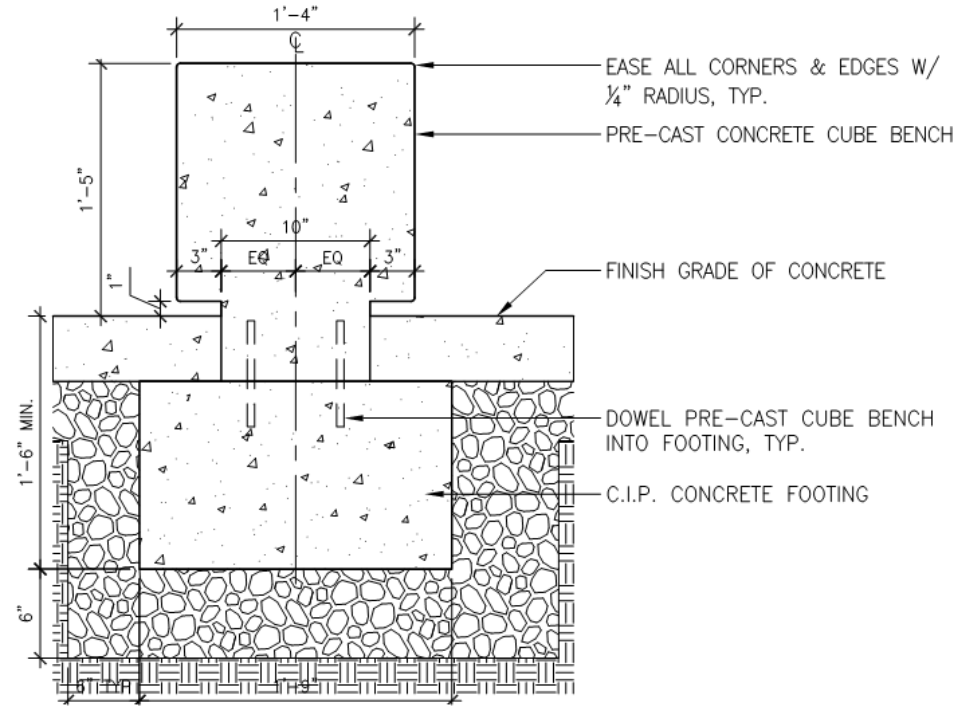
ENLARGED PLAN - HVAC & TRASH ENCLOSURE
1/4" = 1'-0"

0' 4' 8' 16' 32'



SECTION - HVAC & TRASH ENCLOSURE
1/4" = 1'-0"

PEDESTRIAN SEATING



4 CONCRETE CUBE SEAT — **Section** **1-1/2"=1'-0"**



From: Diliana Vassileva
To: Trevor Martin
Subject: FW: Land Use Application SP 17-40/CU 17-02/VR 17-02/VR 17-03
Date: Friday, June 16, 2017 9:47:09 AM

Fire station

Diliana Vassileva
Assistant Planner
Planning Division
City of Oregon City
PO Box 3040
221 Molalla Avenue, Suite 200
Oregon City, Oregon 97045
Direct - 503.974.5501
Planning Division - 503.722.3789
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Website: www.orcity.org | webmaps.orcity.org | Follow us on: Facebook!|Twitter
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From: Dorothy Dahlsrud [mailto:dorothydahlsrud@gmail.com]
Sent: Thursday, June 15, 2017 6:49 PM
To: Diliana Vassileva <dvassileva@orcity.org>
Subject: Re: Land Use Application SP 17-40/CU 17-02/VR 17-02/VR 17-03

Yes, I approve.
Dorothy Dahlsrud

On Jun 15, 2017 11:40 AM, "Diliana Vassileva" <dvassileva@orcity.org> wrote:

> Good Afternoon,
>
> The applicant is seeking approval of a Site Plan and Design Review, Conditional Use Permit and two Variance applications, for the construction of a new fire station. Please review the proposed development posted here and provide your comments by July 10, 2017.
>
> COMMENTS DUE BY: July 10, 2017
> HEARING BODY: __Staff Review; _XX__PC; ___ _HRB; ___CC Hearing Date: N/A
> FILE # & TYPE: SP 17-40: Site Plan and Design Review, CU 17-02: Conditional Use, VR 17-02: Variance, and
> VR 17-03: Variance
> PLANNER: Trevor Martin, AICP, Planner (503) 496-1562, tmartin@orcity.org
> APPLICANT: Clackamas Fire District #1
> REQUEST: The applicant submitted a Site Plan and

Design Review, Conditional Use, and two Variance applications to construct a new fire station within the “C” General Commercial District.

ZONING: “C” General Commercial District

LOCATION: 19340 Molalla Avenue, Oregon City, Oregon 97045
Clackamas County Map 3-2E-9B, Tax Lot 1601

Thank you.

Diliana Vassileva
Assistant Planner
Planning Division
City of Oregon City
PO Box 3040
221 Molalla Avenue, Suite 200
Oregon City, Oregon 97045
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